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CONSUMER SERIES CAPACITORS

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CONSUMER  
SERIES  
CAPACITORS  
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CAPACITOR SERIES TABLE, CONTENTS

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

| Category & Series |                 |    | Features                                | Endurance (hours) | Rated Voltage Range (Vdc) | Operating Temperature Range(°C) | Capacitance Range(uF) | Page |
|-------------------|-----------------|----|---|-------------------|---------------------------|---------------------------------|-----------------------|------|
| Solid             | Multilayer Type | A1 | Low ESR                                 | 105°C 2,000       | 2~25                      | -55~+105                        | 10~470                | 24   |
|                   |                 | A2 | Low ESR                                 | 105°C 2,000       | 2~16                      | -55~+105                        | 47~470                | 27   |
|                   | Radial Type     | PZ | Standard                                | 105°C 2,000       | 6.3~125                   | -55~+105                        | 4.7~5,600             | 29   |
|                   |                 | PT | Long Life, high temperature             | 125°C 2,000       | 6.3~25                    | -55~+125                        | 22~5,600              | 37   |
|                   |                 | PF | Long life                               | 105°C 3,000~5,000 | 6.3~125                   | -55~+105                        | 4.7~5,600             | 42   |
|                   |                 | PU | Low ESR                                 | 105°C 2,000       | 6.3~25                    | -55~+105                        | 39~5,600              | 49   |
|                   |                 | PR | Low ESR, long life, high ripple current | 105°C 5,000       | 2.5~35                    | -55~+105                        | 47~1,500              | 54   |
|                   | SMD Type        | VZ | Standard                                | 105°C 2,000       | 2.5 ~100                  | -55~+105                        | 22~2,200              | 57   |
|                   |                 | VD | High voltage                            | 105°C 2,000       | 35 ~63                    | -55~+105                        | 22~470                | 61   |
|                   |                 | VT | High temperature                        | 125°C 2,000       | 2.5 ~63                   | -55~+125                        | 22~2,200              | 63   |
|                   |                 | VF | Long life                               | 105°C 3,000~5,000 | 2.5 ~63                   | -55~+105                        | 22~2,200              | 66   |

ALUMINUM ELECTROLYTIC CAPACITORS

| Category & Series  |  |                  | Features   | Endurance (hours)                    | Rated Voltage Range (Vdc) | Operating Temperature Range(°C) | Capacitance Range(uF) | Page        |     |
|--------------------|--|------------------|--|--------------------------------------|---------------------------|---------------------------------|-----------------------|-------------|-----|
| Surface Mount Type | SMD Type   | MK               | Standard   | 105°C 2,000                          | 6.3~100                   | -55~+105                        | 4.7~1,000             | 69          |     |
|                    |  | MF               | Long life  | 105°C 5,000                          | 6.3~100                   | -55~+105                        | 22~1,000              | 71          |     |
|                    |  | MH               | Resistant to 125°C, long life                              | 125°C 1,000~3,000                    | 10~100                    | -55~+125                        | 10~1,000              | 73          |     |
| Radial Type        | Low Profile  | H7               | 105°C 7mm Height, miniature series                         | 105°C 1,000                          | 6.3~50                    | -40~+105                        | 0.1~100               | 75          |     |
|                    |  | L7               | 105°C 7mm Height, miniature series                         | 105°C 2,000                          | 6.3~63                    | -40~+105                        | 0.1~220               | 77          |     |
|                    | Standard   | WK               | Standard series for general purpose                        | 85°C 2,000                           | 6.3~100<br>160~450        | -40~+85<br>-25~+85              | 0.1~22,000            | 79          |     |
|                    |  | WH               | Standard series for general purpose                        | 105°C 2,000                          | 6.3~100<br>160~500        | -40~+105<br>-25~+105            | 0.1~22,000            | 83          |     |
|                    | For Input and Output Circuit                                       | RR               | High frequency, low impedance, high reliability            | 105°C 2,000                          | 6.3~120                   | -40~+105                        | 0.47~6,800            | 87          |     |
|                    |  | RE               | High frequency, low impedance                              | 105°C 2,000~4,000                    | 6.3~120                   | -40~+105                        | 10~4,700              | 92          |     |
|                    |  | RF               | Ultra-low impedance, high ripple current                   | 105°C 3,000~6,000                    | 6.3~120                   | -40~+105                        | 6.8~6,800             | 96          |     |
|                    |  | RS               | High ripple current, low impedance, long life              | 105°C 4,000~10,000                   | 6.3~120                   | -40~+105                        | 6.8~18,000            | 101         |     |
|                    |  | RZ               | High ripple, high reliability                              | 105°C 6,000~10,000                   | 6.3~50                    | -40~+105                        | 22~10,000             | 108         |     |
|                    |  | RJ               | Low impedance, high ripple current, long life              | 105°C 8,000~12,000                   | 10~120                    | -40~+105                        | 8.2~5,600             | 112         |     |
|                    |  | RH               | High frequency, low impedance                              | 105°C 2,000~3,000                    | 160~450<br>500~550        | -40~+105<br>-25~+105            | 1~470                 | 118         |     |
|                    |  | HS               | High ripple current  | 105°C 3,000~5,000                    | 160~450<br>500~550        | -40~+105<br>-25~+105            | 1~420                 | 121         |     |
|                    |  | HF               | Long life and high ripple current                          | 105°C 5,000~10,000                   | 160~450<br>475~550        | -40~+105<br>-25~+105            | 1~390                 | 125         |     |
|                    |  | HT               | High temperature & ripple current                          | 125°C 2,000                          | 160~450<br>500            | -40~+125<br>-25~+125            | 4.7~150               | 128         |     |
|                    |  | HL               | Long life, downsized and high ripple current               | 105°C 8,000~12,000                   | 160~450<br>500            | -40~+105<br>-25~+105            | 6.8~680               | 131         |     |
|                    |  | RK               | Miniaturized, high voltage. Specially designed for charger | 105°C 2,000                          | 160~450<br>500 ~ 600      | -40~+105<br>-25~+105            | 1~120                 | 134         |     |
|                    |  | High Reliability | ML   | 105°C 7~9mm Height, long life        | 105°C 5,000               | 6.3~50                          | -40~+105              | 4.7~1,000   | 137 |
|                    |  |                  | RM   | Miniaturized, long life              | 105°C 10,000              | 10~100                          | -40~+105              | 0.47~330    | 139 |
|                    |  |                  | NB   | Resistant to 130°C, high reliability | 130°C 2,000~5,000         | 10~120                          | -25~+130              | 1~4,700     | 141 |
|                    |  | Special Purpose  | RD   | High frequency, low impedance        | 105°C 2,000~5,000         | 6.3~100                         | -40~+105              | 0.47~15,000 | 144 |
| GH                 | For intelligent instrument, electronic ballast, etc.               |                  | 105°C 5,000~10,000   | 6.3~450                              | -40~+105                  | 1~18,000                        | 151                   |             |     |
| LL                 | Extremely low leakage current                                      |                  | 105°C 2,000  | 6.3~100                              | -40~+105                  | 0.47~2,200                      | 156                   |             |     |
| RG                 | Good low temperature performance, low impedance and high frequency |                  | 105°C 2,000~8,000  | 6.3~100                              | -55~+105                  | 10~10,000                       | 158                   |             |     |
| HP                 | Standard bi-polarized series                                       | 105°C 1,000      | 6.3~100  | -40~+105                             | 0.47~6,800                | 163                             |                       |             |     |

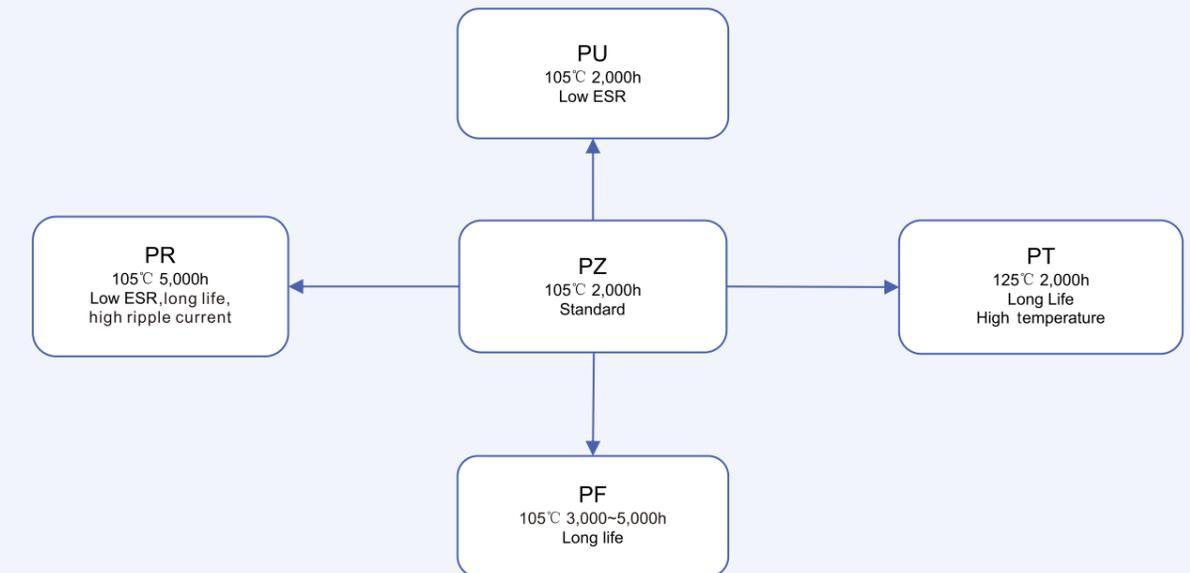
Group Chart

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

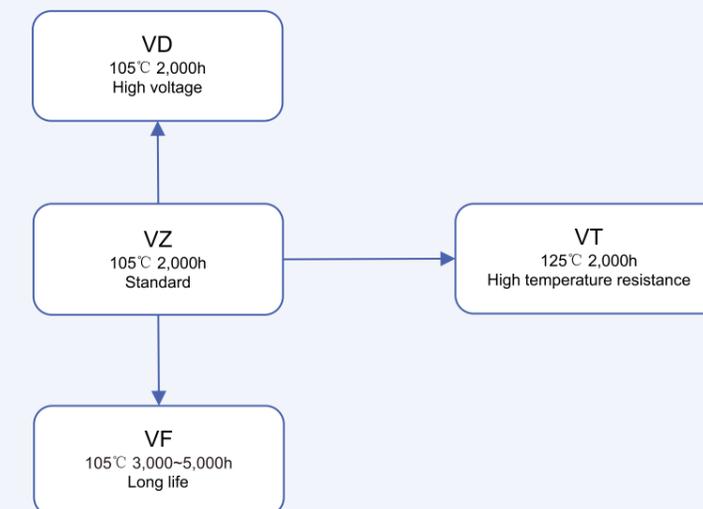
MULTILAYER TYPE



RADIAL TYPE



SMD TYPE

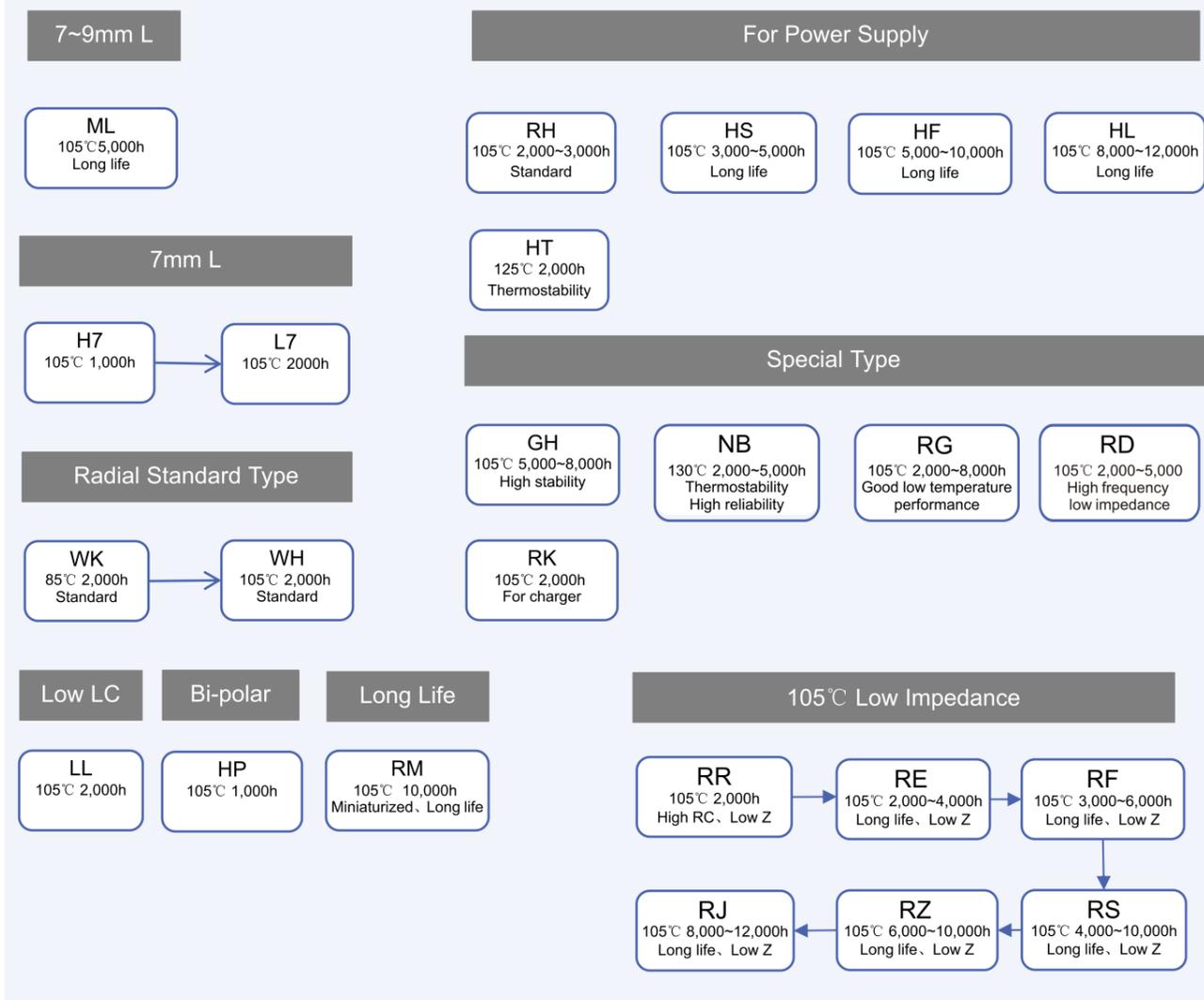


ALUMINUM ELECTROLYTIC CAPACITORS

■ SMD TYPE

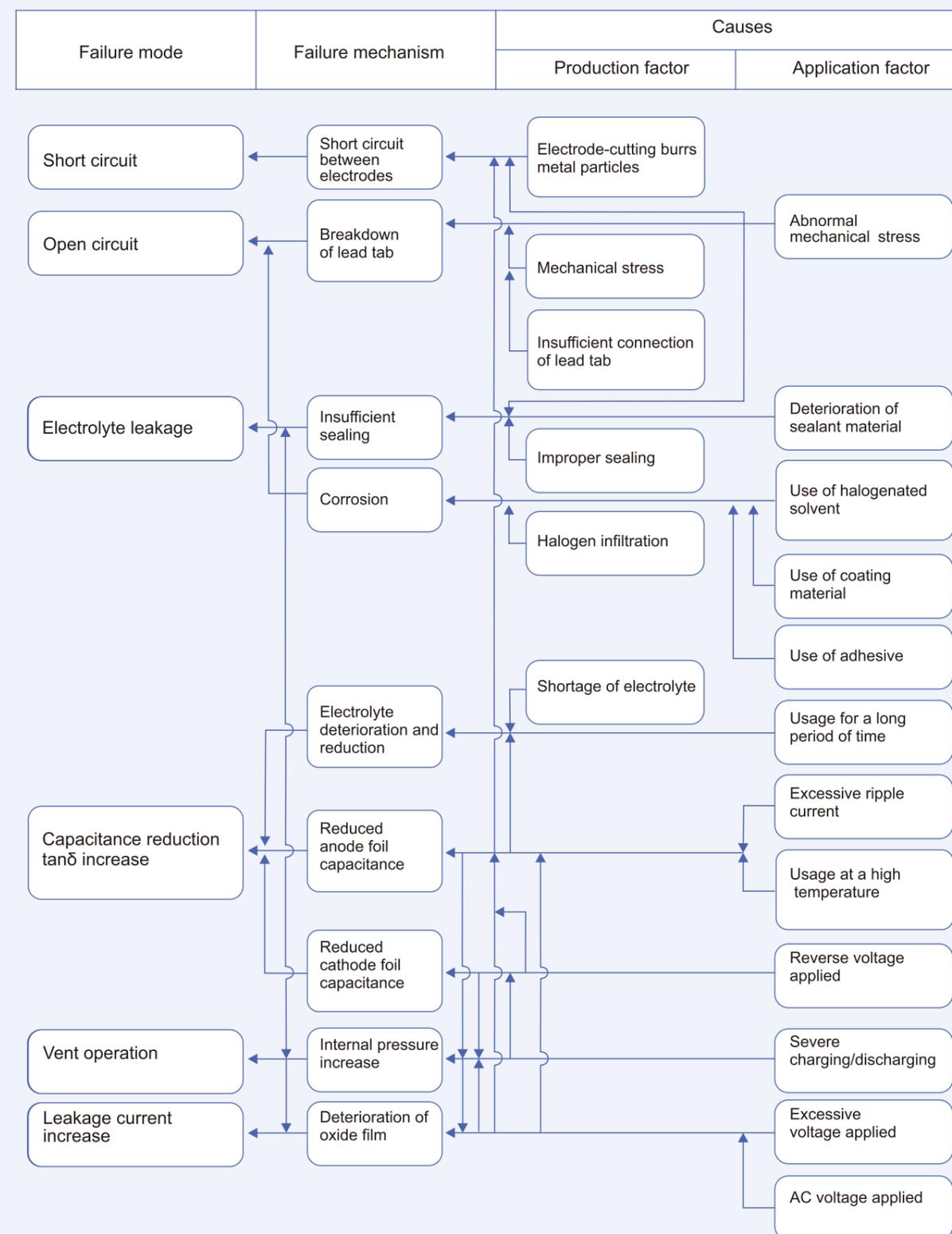


■ RADIAL TYPE



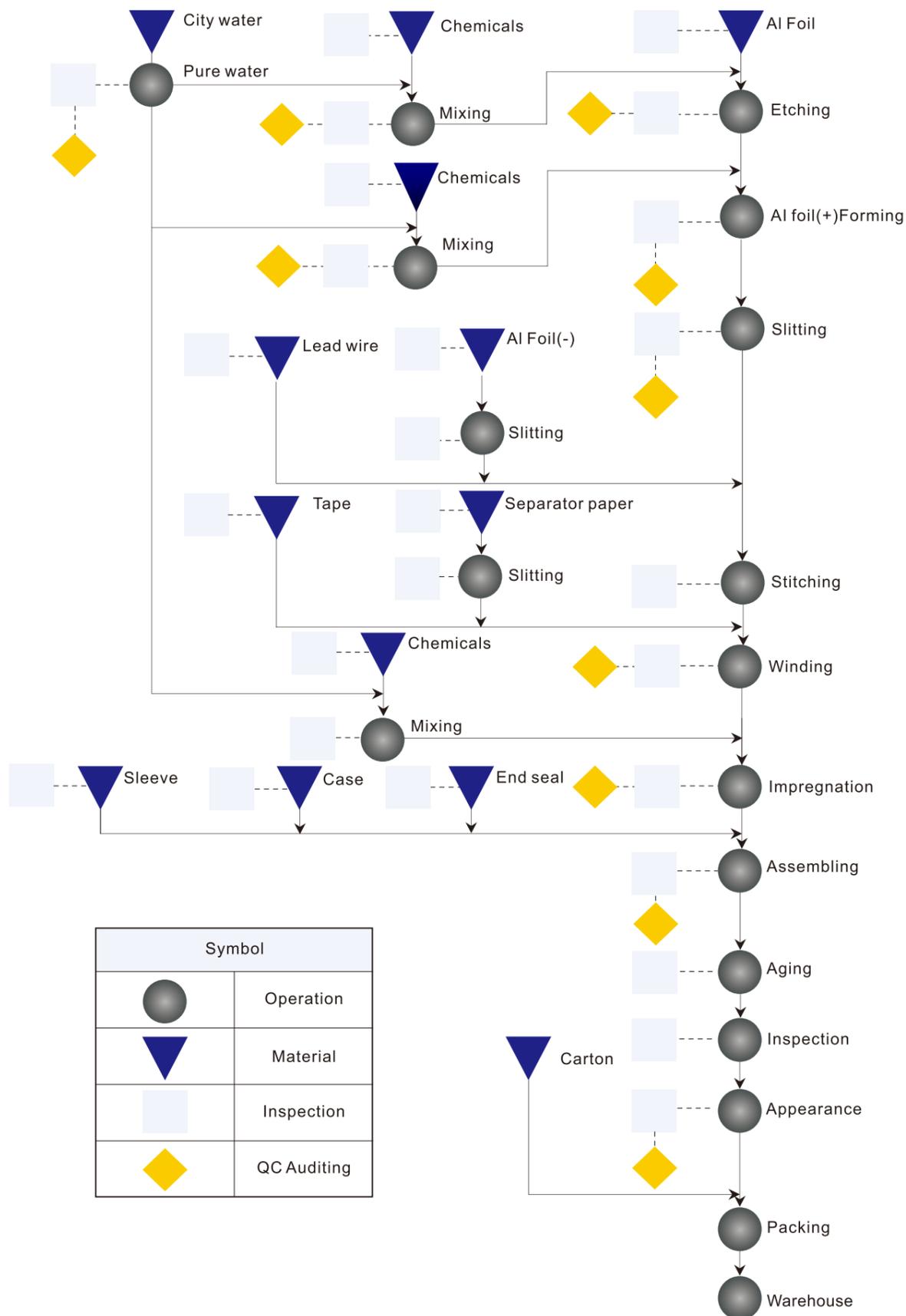
■ Failure Modes

Aluminum Electrolytic Capacitors Show Various Failure Modes in Different Applications



■ Flow Chart

Aluminum Electrolytic Capacitors Flow Chart



Application Guidelines for Conductive Polymer Aluminum Solid Capacitors

● For Multilayer Type

1. Cautions for use

1) Polarity

Conductive polymer aluminum solid capacitors have polarity. When in use, they cannot be reverse charged as this will damage the capacitor oxide film and the capacitors.

2) Ripple current

Do not use the ripple current in excess of the allowable values shown in the "Characteristic Table" as this may cause the capacitor to heat up and damage the capacitor. The total voltage and the AC voltage peak value can not exceed the rated voltage, and no reverse voltage is allowed.

2. Storage condition

1) This product is guaranteed for 2 years when sealed and packaged in a moisture-proof bag under the following conditions; This product needs to be stored in a moisture-proof, humidity-sensitive level 3.

2) Conductive polymer aluminum solid capacitors should be stored in a dry environment, please avoid sunlight and dew condensation, otherwise the following problems may occur:

- ① Leakage current will increase and damage the circuit.
- ② Water vapor absorbed by the resin will evaporate and dissipate heat on the surface, damaging the resin.

3) The capacitors should be stored in a dry place after opening the moisture-proof bag. If the capacitors are stored for more than 1 week under the recommended storage environment after opening the bag, it is recommended to perform voltage charging and baking according to the following conditions to solve the problems mentioned in (2)-①-② above;

- ① Recommended voltage conditions:  
Applied voltage: the rated voltage  
Charging Time: 30 minutes  
Temperature: 25°C  
Current Limiting Resistance: 1000 Ω (In series)
- ② Recommended baking conditions:  
Temperature: 60(+0, -5)°C  
Time: 168 hours.

● For Radial & SMD Type

I . Device Circuit Design Considerations

1. Prohibited circuits

Conductive polymer solid aluminum electrolytic capacitors (hereinafter referred to as capacitors) may change their leakage current due to thermal stress during soldering. Avoid using them in the following circuits.

- ① High resistance voltage holding circuits
- ② Coupling circuits
- ③ Other circuits where the leakage current is greatly affected.

2. Circuit design

Please design the circuit based on the following contents.

- ① The electrical characteristics of capacitors change with temperature and frequency.
- ② When connecting two or more capacitors in parallel, please consider the current balance when designing the circuit.
- ③ When connecting two or more capacitors in series, overvoltage may occur due to the difference in load voltage. Please consult us separately when using.
- ④ Do not install heating parts around capacitors or on the back of printed circuit boards.

3. Safety-critical product applications

If the product is to be used in a life-related application (① aerospace equipment, ② nuclear energy equipment, ③ medical equipment) or in an application where the product's defects will have a significant impact on society, please be sure to consult with us before using the product.

4. Polarity

Our conductive polymer capacitors are solid aluminum electrolytic capacitors with polarity. Do not apply a reverse voltage or AC voltage. If the polarity is reversed during installation, the circuit may be shorted in the initial state. Please refer to the dimensional drawings in the catalog or specifications for polarity.

5. Operating voltage

Do not apply a voltage that exceeds the rated voltage, as even a momentary load may cause an increase in leakage current and short-circuit failure. Set the peak value of the ripple voltage superimposed on the DC voltage below the rated voltage. It is not necessary to reduce the voltage in any operation. Although the ripple voltage exceeding the rated voltage is specified, if it is below the rated voltage within the temperature range, there are limitations regardless of the ambient temperature, and prolonged use is not guaranteed.

6. Ripple current

Do not apply excessive current that exceeds the rated ripple current. If excessive ripple current is applied, it may result in increased internal heat generation, shortened service life, short circuit failure, etc.

7. Operating temperature

If the capacitor is used out of the category temperature range, performance deterioration and malfunction may occur.

8. Charging and discharging

Do not use capacitors in circuits subject to repeated rapid charging and discharging. Otherwise, the capacitance may be reduced and the capacitor may be damaged by internal heat generation. If the peak current value exceeds 10A, it is recommended that a protective circuit be used to maintain reliability.

9. Leakage current

Sometimes the leakage current rises, but if the voltage is loaded within the operating temperature, it gradually decreases by self-healing. In addition, the leakage current decreases faster the closer it gets to the upper operating temperature and the rated voltage. The reasons for the increase in leakage current are as follows.

- ① Welding
- ② High temperature and no load, high temperature and high humidity, rapid temperature change and other tests.

10. Failure mode

- ① The failure rate can be reduced by reducing the ambient temperature, ripple current, and load voltage.
- ② Open mode damage caused by a reduction of electrostatic capacity due to an increase in product temperature and an increase in ESR are the main failure modes. Occasionally, short-circuit mode may occur due to excessive voltage and large current.
- ③ If a short-circuit is caused by the load voltage exceeding the rated voltage or the current is too high, the aluminum case may expand or peel off due to the increase in internal pressure and emit a foul odor.
- ④ The material of the product contains flammable substances. The short-circuit area may catch fire due to electric sparks, etc. Please take the following design considerations into account when installing, positioning, and graphically designing the product to ensure absolute safety.

\* Protective circuits and devices are provided to ensure the safety of the equipment.

\* Provide redundant circuits, etc., so that the equipment does not become unstable due to a single failure.

**11. Insulation**

The aluminum case of the capacitor is not insulated. Provide electrical insulation between the capacitor case and the cathode terminal, the anode terminal and the printed circuit board.

**12. Operating conditions**

Do not use/expose capacitors to the following conditions.

- ① Water, salty water and oil. Avoid storage in damp locations.
- ② Direct sunlight.
- ③ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, bromine and its compounds, ammonia, etc.
- ④ Ozone, ultraviolet rays, or radiation.
- ⑤ Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalogs or the product specification.

**13. Configuration**

- ① For a surface mount capacitor, design the copper pads of the PC board in accordance with the catalog or the product specifications.
- ② For a radial type capacitor, provide the appropriate hole spacing on the PC board to match the lead spacing of the capacitor.
- ③ Do not wire the circuit underneath the capacitor's seal. When wiring near the capacitors, make sure the wires are spaced 1mm (2mm if possible) or more apart.
- ④ When designing double-sided printed circuit boards, do not place substrate holes or through-holes below the capacitor mounting position.
- ⑤ When mounting a capacitor on a double-sided PCB, the capacitor mounting position cannot configure lines.

**II. Installation**

**1. Assembling**

- ① Do not reuse capacitors that have been assembled and electrified.
- ② Regenerative voltage may be generated inside the capacitor. In this case, discharge the capacitor through a resistor of approximately 1kΩ.
- ③ The leakage current of the capacitors may increase if they are stored for a long period of time under conditions other than room temperature of 35°C and humidity of 75%RH, or for a period of time other than the period specified in the catalog or specification. In this case, discharge the capacitor through a resistor of about 1kΩ before use.
- ④ Check the rated specifications (capacitance and rated voltage) of the capacitor before installation.
- ⑤ Check the polarity of the capacitor before installation.
- ⑥ Do not use a capacitor that has been dropped on the floor.
- ⑦ Do not deform the capacitor during installation.

⑧ Check that the terminal spacing of the capacitor and the hole spacing of the printed wiring board are aligned before installation.

⑨ Do not apply a force to the capacitor that exceeds the mechanical strength specified in the catalog or specifications. If excessive force is applied to the capacitor, the terminals may break or be deformed, which may interfere with installation. It may also cause short-circuiting, breakage, increased leakage current, and damage to the case. The automatic assembly machine may also generate stress when adsorbing and mounting as well as leads cutting, so be aware of its impact force.

**2. Soldering and heat resistance**

Please set the soldering conditions refer to our recommended conditions. Leakage current may increase and capacitance may decrease due to thermal stress from soldering, etc. When the voltage is applied at conditions that are below the upper operating temperature, the increasing leakage current will gradually decrease. In addition, the leakage current is improved by self-healing, and the closer the condition is to the upper operating temperature and rated voltage, the faster the self-healing will be.

- 1) When soldering with a soldering iron
  - ① Soldering conditions (temperature and time) should be within the limits prescribed in the catalogs or the product specifications.
  - ② Do not touch the capacitor body with the hot tip of the soldering iron
- 2) Flow soldering (Wave soldering)
  - ① Do not dip the body of a capacitor into the solder bath, only dip the terminals in. Soldering must be done on the backside of the PCB with capacitors.
  - ② Soldering conditions should be within the limits prescribed in the catalogs or the product specifications.
  - ③ Do not apply flux to any part of capacitors other than their terminals.
  - ④ Make sure the capacitors do not come into contact with any other components while soldering.

\* Please note that SMD type products are not suitable for flow soldering!

3) Reflow soldering

- ① Soldering conditions (preheat, solder temperature and time) should be within the limits prescribed in the catalog or the product specification.
- ② The type and position of the heater in the reflow oven, and even the color and material of the capacitor may affect the temperature stress to which the capacitor is subjected, so please pay attention to the degree of heating.

\* Please note that except for SMD type products, other types of capacitors cannot be reflow soldered.

4) Do not reuse a capacitor once it has been installed. When reinstalling a capacitor in the same location, remove the flux and use a soldering iron to install the capacitor under the specified conditions.

**3. Handling After Soldering**

Do not apply any mechanical stress to the capacitor after soldering onto the PC board.

- ① Do not lean or twist the body of the capacitor after soldering the the capacitor onto the PC board.
- ② Do not use the capacitors for lifting or carrying the assembly board.
- ③ Do not allow other objects to collide with the capacitor. When stacking the assembly board, be careful that other components do not touch the aluminum electrolytic capacitors.
- ④ Do not drop the assembly board.

**4. Cleaning PC board**

1) Do not clean capacitors with the following agents. If cleaning is required, do not exceed the conditions specified in the catalog or specifications. Please pay special attention to the conditions for ultrasonic cleaning.

|                             |  |
|-----------------------------|--|
| Halogenated solvents        | →Capacitor failure due to electrochemical corrosion. |
| Alkaline solvents           | →Corrosion (dissolution) of aluminum case            |
| Terpene, petroleum solvents | → deterioration of sealing rubber plug               |
| Xylene, toluene             | → deterioration of sealing rubber plug               |
| Acetone                     | → labeling disappears                                |

\* Please consult us before using CFC alternatives or other cleaning agents.

2) Check the following points when cleaning capacitors.

- ① Pay attention to the contamination management of the cleaning agent (conductivity, pH, specific gravity, water content, etc.).
- ② After cleaning the capacitors, do not store them in cleaning solution or sealed containers. In addition, please dry the aluminum electrolytic capacitors sufficiently by blowing them with hot air (below the upper operating temperature) for more than 10 minutes to avoid the residue of cleaning solution on the PCB and capacitors. Generally, aluminum electrolytic capacitors react easily with halogen ions (especially chloride ions), and the degree of reaction varies depending on the electrolyte used and the packaging material, etc. However, when a certain amount of halogen ions intrude into the interior, it can lead to corrosive reactions during use and cause

destructive failures such as a large increase in the leakage current, heat generation, and open circuit.

3) Use the following cleaning conditions when cleaning with the following new solvents.

- ① Highly concentrated ethanol-based cleaners

Cleaning conditions: Immersion in a liquid at a temperature of 60°C or less for no more than 10 minutes, or ultrasonic cleaning. Regardless of the cleaning method, do not wipe other parts or the labeled portion of the capacitor on the PCB. Note that rinsing with a cleaning solution may be harmful to the labeled portion of the capacitor.

- ② CFC alternatives

Cleaning conditions: Please do not immerse the product in liquid, ultrasonic waves or steam for more than 5 minutes. The use of CFC alternatives will be gradually banned from the perspective of global environment, so please take this as a temporary measure and avoid using it as much as possible.

- ③ Isopropanol

Immersion cleaning (Please keep the flux concentration less than 2wt% relative to the cleaning solution.)

**5. Precautions for using adhesives and coating agent**

- 1) Do not use fixatives or coatings containing halogenated solvents.
- 2) Check the following when using fixatives and coatings on capacitors.
  - ① Do not leave flux residue or dirt between the PCB and the capacitor seal.
  - ② Dry and remove the cleaning solution before applying the fixative and coating. Do not completely cover the seal area.
  - ③ Consult us for the heat curing condition of the fixative and coating agent.
  - ④ If the sealing area of the capacitor is completely blocked with resin, a dangerous situation will occur because the internal pressure inside the capacitor cannot be effectively released. In addition, if there are a large number of halogen ions in the fixing agent and coating agent, they may penetrate through the sealing rubber into the inside of the capacitor and cause an abnormality, so please get in touch with us.
  - ⑤ Some coating materials, it can not be implemented on the capacitor.

**6. Fumigation**

When importing or exporting electronic equipment, it is sometimes necessary to fumigate with halogen compounds such as methyl bromide. If aluminum electrolytic capacitors come into contact with halogen compounds such as methyl bromide, there is a risk of corrosion due to the generation of halogen ions.

Our company adopts the packaging method without fumigation treatment. When importing or exporting electronic equipment, semi-finished products or aluminum electrolytic capacitors, please pay attention to the presence or absence of fumigation treatment and the final packaging form. (There is a risk of fumigant gas entering even if they are packaged in corrugated cardboard or plastic).

**III.The Operation of Devices**

- 1. Do not have direct contact with the capacitor terminals.
- 2. There must be no conductive material between the capacitor terminals, otherwise there is a risk of short circuit.

In addition, do not splash conductive solutions such as acidic and alkaline solutions on the capacitors.

3. Check the installation environment of the circuit with capacitors.

Do not use/expose capacitors to the following conditions.

- ① Splash water or oil.
- ② Direct sunlight.
- ③ Ozone, ultraviolet rays, or radiation.
- ④ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, bromine and its compounds, and ammonium.
- ⑤ Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalogs or the product specification.

**IV. Maintenance Inspection**

- 1. Periodically inspect capacitors used in industrial equipment.

When performing maintenance checks on capacitors, disconnect power to the equipment and discharge the stored electricity in the capacitors. When checking with a multimeter, check the polarity of the multimeter before use. Also, be careful not to stress the lead terminals.

2. Please make regular inspections as follows.

- ① Appearance for obvious abnormality
- ② Electrical performance (leakage current, capacitance, DF value and items specified in the catalog or specification).

\* If there is any abnormality in the above items, confirm the specifications of the capacitor and replace it accordingly.

**V.Contingencies**

- 1) Disconnect the main power supply or unplug the power cord from the wall outlet if gas is emitted from the capacitor, if a short circuit causes combustion, or if a foul odor or smoke is emitted.
- 2) If the capacitor is abnormal or burns, there is a possibility that the outer packaging resin, etc. may burn and decompose, producing gas. Keep your face and hands away from it. If the discharged gas enters your eyes or is inhaled, immediately wash your eyes and mouth with water. If it gets on your skin, wash it with soap.

**VI.Storage**

The following storage conditions are recommended.

- 1) Do not store capacitors in high temperature or high humidity environments. Store the capacitors at a room temperature of 5 to 35°C and a humidity of 75% or less.

Refer to the following table for the storage period.

|             | Before unpacking                | After unpacking                        |
|-------------|---------------------------------|--|
| SMD Type    | Within 6 months after delivery  | Within 7 days of package opening date  |
| Radial Type | Within 12 months after delivery | Within 30 days of package opening date |

- ① SMD products are sealed in a PE plastic bag. Please use all capacitors within the disposal period once the bag is opened.
- ② If you need to store the unpacked product, please put it back into the bag and seal it with a zipper.
- ③ Be sure to follow our reflow soldering recommendations.
- 2) Store the capacitors away from direct contact with water, salt water, and oil.
- 3) Do not store capacitors in an environment containing harmful gases (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, halogenated gases such as bromine, halogenated compounds such as methylene bromide, ammonia, etc.).
- 4) Do not store the capacitors in an environment exposed to ozone, ultraviolet rays, or radiation.
- 5) It is recommended that capacitors be stored in their original packaging whenever possible.

**VII.Disposal**

For disposal of capacitors, please contact a local industrial waste disposal company.

**VIII.RoHS & REACH**

- 1) Our products comply with the RoHS Directive and other regulations on environmentally hazardous substances.
- 2) Our products comply with the REACH regulation and other regulations on environmentally hazardous substances.

**IX.Catalogs**

Catalog specifications are subject to change without notice. Test data shown in catalogs is not guaranteed as total performance, but is typical.

**Application Guidelines for Aluminum Electrolytic Capacitors**

**■ Designing Device Circuits**

**1. Select the capacitors to suit the installation and operating conditions, and use the capacitors to meet the performance limits prescribed in this catalog or the product specifications.**

**2. Polarity**

Aluminum Electrolytic Capacitors are polarized.

Apply neither reverse voltage nor AC voltage to polarized capacitors. Using reversed polarity causes a short circuit, or venting. Before use, refer to the catalog, product specifications or capacitor body to identify the polarity marking. (The shape of the rubber seal does not represent the directional rule for polarity.) Use a bi-polar type of non-solid aluminum electrolytic capacitor for a circuit where the polarity is occasionally reversed. However, note that even a bi-polar aluminum electrolytic capacitor must not be used for AC voltage applications.

**3. Operating voltage**

Do not apply a DC voltage that exceeds the rated voltage. The peak voltage of a superimposed AC voltage (ripple voltage) on the DC voltage must not exceed the rated voltage.

A surge voltage value, that exceeds the rated voltage, is prescribed in the catalogs, but it is a restricted condition, for very short periods of time.

**4. Ripple current**

The rated ripple current has been specified at a certain ripple frequency. The rated ripple current at several frequencies must be calculated by multiplying the rated ripple current at the original frequency using the frequency multipliers for each product series.

**5. Category temperature**

Capacitors used outside the category temperature range will considerably shorten the lifespan or cause the capacitor to vent.

The relation between the lifetime of aluminum electrolytic capacitors and ambient temperature follows Arrhenius' rule that the lifetime is approximately halved with each 10°C rise in ambient temperature.

**6. Life expectancy**

Select capacitors that meet the device's service life requirements.

**7. Charge and discharge**

Do not use capacitors in circuits where heavy charge and discharge cycles are frequently repeated. Frequent and sharp heavy discharging cycles will decrease capacitance and damage to the capacitors due to generated heat. Specified capacitors can be designed to endure such a condition. Rapid charging/discharging may be repeated in a circuit where the ripple voltage at the two terminals of the aluminum electrolytic capacitor fluctuates greatly. If the variation range of voltage exceeds 70Vp-p, please consult us.

**8. Failure modes of capacitors**

Non-solid aluminum electrolytic capacitors, in general, have a lifetime that ends in an open circuit, the period is dependent upon temperature. Consequently, the lifetime of capacitors can be extended by reducing the ambient temperature and/or ripple current.

**9. Insulation**

- a) Electrically isolate the following parts of a capacitor from the negative terminal, the positive terminal and the circuit traces.
  - The outer can case of a non-solid aluminum electrolytic capacitor.
  - The dummy terminal of a non-solid aluminum electrolytic capacitor, which is designed for mounting stability.
- b) The outer sleeve of a capacitor is not assured as an insulator (Except for screw type). For applications that require an insulated outer sleeve, a custom-designed capacitor is recommended.

**10. Conditions**

Do not use/expose capacitors to the following conditions.

- a) Oil, water, salty water. Avoid storage in damp locations.
- b) Direct sunlight.
- c) Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or its compounds, and ammonium.
- d) Ozone, ultraviolet rays, or radiation.
- e) Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog or the product specifications.

**11. Mounting**

- a) The electrolytic paper and the electrolytic-conductive electrolyte in a non-solid aluminum electrolytic capacitor are flammable. Leaking electrolyte on a printed circuit board can gradually erode the copper traces, possibly causing smoke or burning by short-circuiting the copper traces.

Verify the following points when designing a PC board.

- Provide the appropriate hole spacing on the PC board to match the terminal spacing of the capacitor.
- Make the following open space over the vent so that the vent can operate correctly.

| Case diameter | Clearance   |
|---------------|-------------|
| φ6.3 to φ16mm | 2mm minimum |
| φ18 to φ35mm  | 3mm minimum |
| φ40mm or more | 5mm minimum |

- Do not place any wires or copper traces over the vent of the capacitor.
- Installing a capacitor with the vent facing the PC board needs an appropriate ventilation hole in the PC board.
- Do not pass any copper traces beneath the seal side of a capacitor. The trace must pass 1 or 2mm to the side of the capacitor.
- Avoid placing any heat-generating objects adjacent to a capacitor or even on the reverse side of the PC board.
- Do not pass anything via holes or underneath a capacitor.
- In designing double-sided PC boards, do not locate any copper trace under the seal side of a capacitor.
- b) Do not mount the terminal side of a screw mount capacitor downwards. If a screw terminal capacitor is mounted on its side, make sure the positive terminal is higher than the negative terminal.

Do not fasten the screws of the terminals and the mounting damps over

- the specified torque prescribed in the catalog or the product specifications.
- c) For a surface mount capacitor, design the copper pads of the PC board in accordance with the catalog or the product specifications.

**12. Others**

- a) The electrical characteristics of capacitors vary in respect to temperature, frequency and service life. Design the device circuits by taking these changes into account
- b) Capacitors mounted in parallel need the current to flow equally through the individual capacitors.
- c) Capacitors mounted in series require resistors in parallel with the individual capacitors to balance the voltage.
- d) Using capacitors for applications that always consider safety. Consult with our factory before use in applications which can affect human life. (space equipment, aerial equipment, nuclear equipment, medical equipment, vehicle control equipment, etc.) Please note that the product that is designed only for specific usage can not be used for other purposes. (ex.Photo flash type, etc.)

**■ Installing Capacitors**

**1. Installing**

- a) Used capacitors are not reusable, except in the case that the capacitors are detached from a device for periodic inspection to measure their electrical characteristics.
- b) If the capacitors have self-charged, discharge the capacitors through a resistor of approximately 1kΩ before use.
- c) If capacitors are stored at a temperature of 35°C or more and more than 75% RH, the leakage current may increase. In this case, they can be reformed by applying the rated voltage through a resistor of approximately 1kΩ.
- d) Verify the rated capacitance and voltage of the capacitors when installing.
- e) Verify the polarity of the capacitors.
- f) Do not use the capacitors if they have been dropped on the floor.
- g) Do not deform the cases of capacitors.
- h) Verify that the lead spacing of the capacitor fits the hole spacing in the PC board before installing the capacitors. Some standard preformed leads are available.
  - i) For pin terminals or snap-in terminals, insert the terminals into PC board and press the capacitor downward until the bottom of the capacitor body reaches the PC board surface.
  - j) Do not apply any mechanical force in excess of the limits prescribed in the catalogs or the product specifications of the capacitors. Also, note the capacitors may be damaged by mechanical shocks caused by the vacuum/insertion head, component checker or centering operation of an automatic mounting or insertion machine.

**2. Soldering and heat resistance**

- a) When soldering with a soldering iron
  - Soldering conditions (temperature and time) should be within the limits prescribed in the catalog or the product specifications.
  - If the terminal spacing of a capacitor does not fit the terminal hole spacing of the PC board, reform the terminals in a manner to minimize mechanical stress on the capacitor body.
  - Remove the capacitors from the PC board, after the solder is completely melted, reworking by using a soldering iron minimizes the mechanical stress on the capacitors.
  - Do not touch the capacitor body with the hot tip of the soldering iron.
- b) Flow soldering (Wave soldering)
  - Do not dip the body of a capacitor into the solder bath, only dip the terminals in. The soldering must be done on the reverse side of the PC board.
  - Soldering conditions (preheat, solder temperature and dipping time) should be within the limits prescribed in the catalog or the product specifications.
  - Do not apply flux to any part of capacitors other than their terminals.
  - Make sure the capacitors do not come into contact with any other components while soldering.
- c) Reflow soldering
  - Soldering conditions (preheat, solder temperature and dipping time) should be within the limits prescribed in the catalog or the product specifications.
  - When setting the temperature of infrared heaters, consider that the infrared absorption causes the material to be discolored and change in appearance.
  - Do not solder capacitors more than once using reflow. If needed, be sure to consult us first.
  - Make sure capacitors do not come into contact with copper traces.
- d) Do not re-use surface mount capacitors that have already been soldered. In addition, when installing a new capacitor onto the assembly board to rework, remove old residual flux from the surface of the PC board, and then use a soldering iron within the prescribed conditions.
- e) Confirm whether reflow soldering is applicable for the capacitors before operation.

**3. Handling after soldering**

- Do not apply any mechanical stress to the capacitor after soldering onto the PC board.
- a) Do not lean or twist the body of the capacitor after soldering the capacitors onto the PC board.
- b) Do not use the capacitors for lifting or carrying the assembly board.
- c) Do not hit or poke the capacitor after soldering to the PC board.
  - When stacking the assembly board, be careful that other components do not touch the aluminum electrolytic capacitors.
- d) Do not drop the assembly board.

**4. Cleaning PC board**

- a) Do not wash capacitors by using the following cleaning agents.
  - Halogenated solvents: cause capacitors to fail due to corrosion.
  - Alkali system solvents: corrode (dissolve) an aluminum case.
  - Petroleum and terpene system solvents: cause the rubber seal material to deteriorate.
  - Xylene: causes the rubber seal material to deteriorate.
  - Acetone: erases the marking. Solvent-proof capacitors are only suitable for washing within the cleaning conditions prescribed in the catalogs or the product specifications. In particular, ultrasonic cleaning will accelerate damaging capacitors.

b) Verify the following points when cleaning capacitors.

- Monitor conductivity, pH, specific gravity, and the water content of cleaning agents. Contamination adversely affects these characteristics.

• Be sure not to keep the capacitors in an atmosphere containing the cleaning agent or in an air tight container.

In addition, please dry the solvent sufficiently on the PC board and the capacitor with an air knife (temperature should be less than the maximum rated category temperature of the capacitor) over 10 minutes. Aluminum electrolytic capacitors can be characteristically and catastrophically damaged by halogen ions, particularly by chlorine ions, though the degree of the damage mainly depends upon the characteristics of the electrolyte and rubber seal material. When halogen ions come into contact with the capacitors, the foil corrodes when voltage is applied. This corrosion causes extremely high leakage current, which in turn, causes venting and an open circuit.

**5. Precautions for using adhesives and coating agent**

a) Do not use any adhesive and coating materials containing halogenated solvent.

b) Verify the following before using adhesive and coating material.

- Remove flux and dust leftover between the rubber seal and the PC board before applying adhesive or coating materials to the capacitor.

• Dry and remove any residual cleaning agents before applying adhesive and coating materials to the capacitors. Do not cover the whole surface of the rubber seal with the adhesive or coating materials.

• For permissible heat conditions for curing adhesives or coating materials, follow the instructions in the catalog or the product specifications of the capacitors.

• Covering the whole surface of the capacitor rubber seal with resin may result in a hazardous condition because the inside pressure cannot be released completely. Also, a large amount of halogen ions in resins will cause the capacitors to fail because the halogen ions penetrate into the rubber seal and the inside of the capacitor.

c) Some of the coating material cannot be cured over the capacitor. Please note that loose luster and whitening on the surface of the outer sleeve might be caused by the kind of solvents used for mounting adhesives and coating agents.

**6. Fumigation**

In many cases when exporting or importing electronic devices, such as capacitors, wooden packaging is used. In order to control insects, most often, it becomes necessary to fumigate the shipments. Precautions during "Fumigation" using halogenated chemicals such as Methyl Bromide must be taken. Halogen gas can penetrate packaging materials used, such as cardboard boxes and vinyl bags. Penetration of the halogenated gas can cause corrosion of electrolytic capacitors.

**The Operation of Devices**

a) Do not touch a capacitor directly with bare hands.

b) Do not short-circuit the terminal of a capacitor by letting it come into contact with any conductive object. Also, do not spill conductive liquid such as acid or alkaline solution over the capacitor.

c) Do not use capacitors in circumstances where they would be subject to exposure to the following substances:

- Oil, water, salty water, or damp location.
- Direct sunlight.
- Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid,

chlorine or its compounds, and ammonium.

- Ozone, ultraviolet rays, or radiation.
- Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog or product specifications.

**Maintenance Inspection**

a) Make periodic inspections of capacitors that have been used in industrial applications. Before inspection, turn off the power supply and carefully discharge the electricity in the capacitors. Verify the polarity when measuring the capacitors with a volt-ohm meter. Also, do not apply any mechanical stress to the terminals of the capacitors.

b) The following items should be checked during the periodic inspections.

- Significant damage in appearance: venting and electrolyte leakage.
- Electrical characteristics: leakage current, capacitance, tanδ, and other characteristics prescribed in the catalog or product specifications.

We recommend replacing the capacitors if the parts are out of specification.

**In Case of Venting**

a) If a non-solid aluminum electrolytic capacitor expels gas when venting, it will discharge odors or smoke, or burn in the case of a short-circuit failure. Immediately turn off or unplug the main power supply of the device.

b) When venting, a non-solid aluminum electrolytic capacitor blows out gas with a temperature of over 100°C. (A solid aluminum electrolytic capacitor discharges decomposition gas or burning gas while the outer resin case is burning.) Never expose the face close to a venting capacitor.

If your eyes inadvertently become exposed to the spouting gas or you inhale it, immediately flush the open eyes with large amounts of water and gargle with water respectively. If electrolyte is on the skin, wash the electrolyte away from the skin with soap and plenty of water. Do not lick the electrolyte of non-solid aluminum electrolytic capacitors.

**Storage**

We recommend the following conditions for storage.

a) Do not store capacitors at a high temperature or in high humidity. Store the capacitors indoors at a temperature of 5 to 35°C and a relative humidity of 75% or below.

b) Store the capacitors in places free from water, oil or salt water.

c) Store the capacitors in places free from toxic gases (hydrogen sulfide, sulfurous acid, chlorine, ammonium, etc.)

d) Store the capacitors in places free from ozone, ultraviolet rays or radiation.

e) Keep capacitors in the original package.

**Disposal**

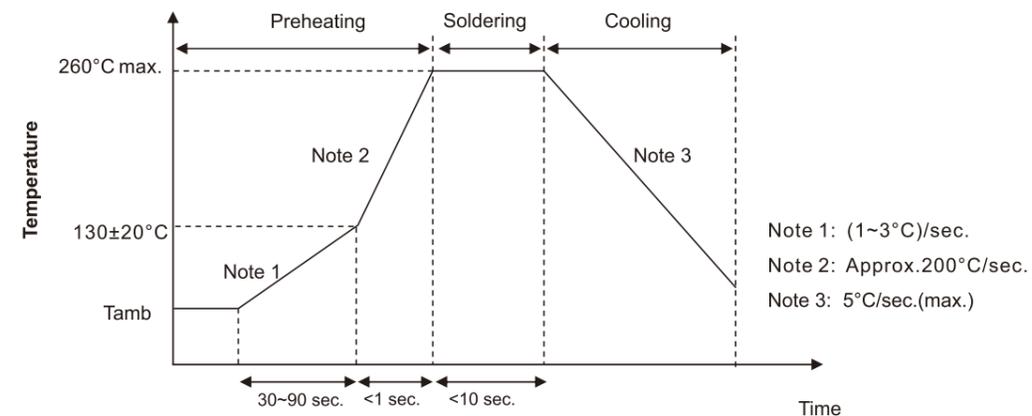
Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.

**Catalog**

Specifications in the catalog may be subject to change without notice. Please consult us first before use. Hunan Aihua Group reserves the right to the final interpretation of all content.

**Soldering Recommendation**

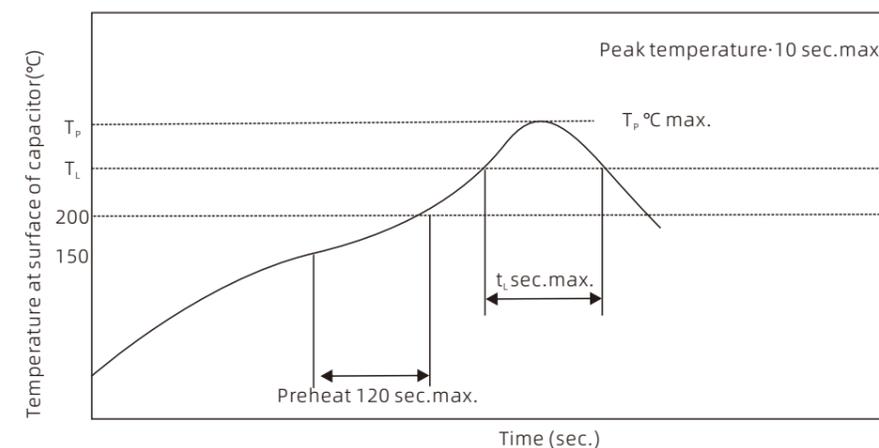
**Wave Soldering(Radial Lead Type)**



**Reflow Soldering**

**(For Polymer Solid Multilayer Type)**

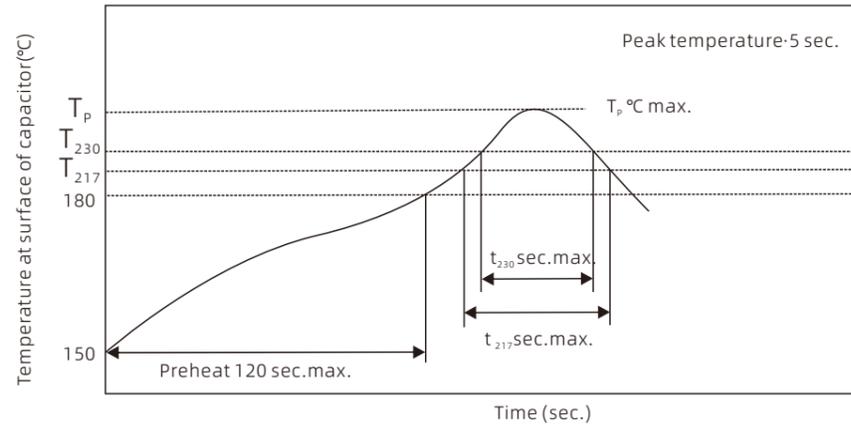
- Temperature at surface of capacitor shall not exceed T<sub>p</sub>°C (peak temperature).
- The duration for over T<sub>L</sub>°C at surface of capacitor shall not exceed t<sub>L</sub> seconds.
- Preheat shall be done at 150°C to 200°C and for Maximum 120 seconds.



| Preheat   |                | T <sub>p</sub> °C max | T <sub>L</sub> (°C) | t <sub>L</sub> (sec.) max | Reflow cycle    |
|-----------|----------------|-----------------------|---------------------|---------------------------|-----------------|
| Temp.(°C) | Time(sec.) max |                       |                     |                           |                 |
| 150-200   | 120            | 260                   | >217                | 120                       | 2 times or less |

• (For Liquid SMD Type)

- Temperature at surface of capacitor shall not exceed  $T_P$ °C (peak temperature) .
- The duration for over  $T_{217}$ °C and  $T_{230}$ °C at surface of capacitor shall not exceed  $t_{217}$  and  $t_{230}$  seconds, respectively.
- Preheat shall be done at 150°C to 180°C and for Maximum 120 seconds.

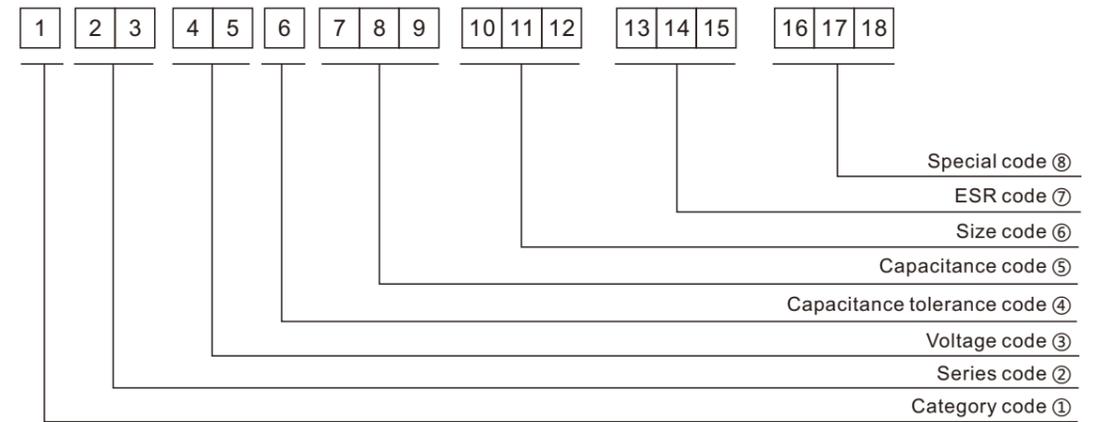


| Case size (mm) | Preheat   |                | $T_P$ °C max | $T_{217}$ (°C) | $T_{230}$ (°C) | $t_{217}$ (sec.) max | $t_{230}$ (sec.) max | Reflow cycle    |
|----------------|-----------|----------------|--------------|----------------|----------------|----------------------|----------------------|-----------------|
|                | Temp.(°C) | Time(sec.) max |              |                |                |                      |                      |                 |
| φ6.3           | 150-180   | 120            | 250          | 217            | 230            | 60                   | 40                   | 2 times or less |
| φ8-φ10         |           |                | 245          | 217            | 230            | 60                   | 30                   | 2 times or less |
| φ12.5-φ18      |           |                | 240          | 217            | 230            | 30                   | 20                   | 2 times or less |

■ Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

• Part Numbering System(Conductive polymer solid capacitors)

• (For Multilayer Type)



① Category code

| Type  | Code |
|---|------|
| Conductive polymer aluminum solid capacitor | 1    |
|   | S    |

② Series code

| Series name     | Code |     |
|-----------------|------|-----|
|                 | 2    | 3   |
| Multilayer Type | A1   | A 1 |
|                 | A2   | A 2 |

③ Voltage code

| WV (V) | Code |   |
|--------|------|---|
|        | 4    | 5 |
| 2      | 0    | B |
| 2.5    | 0    | E |
| 4      | 0    | G |
| 6.3    | 0    | J |
| 7      | 0    | Q |
| 10     | 1    | A |
| 16     | 1    | C |
| 25     | 1    | E |
| 35     | 1    | V |
| 50     | 1    | H |

④ Capacitance tolerance code

| Tol. (%) | Code |
|----------|------|
|          | 6    |
| -25~+20  | Y    |
| -10~+10  | K    |
| -20~+20  | M    |
| -10~+30  | Q    |
| -10~+20  | V    |
| -0~+20   | A    |
| -5~+20   | C    |
| +6~+20   | J    |
| -10~-20  | B    |
| -15~+15  | W    |
| -15~-+20 | G    |
| -35~-+10 | L    |

⑤ Capacitance code

| Cap (uF) | Code |   |   |
|----------|------|---|---|
|          | 7    | 8 | 9 |
| 4.7      | 4    | R | 7 |
| 10       | 1    | 0 | 0 |
| 15       | 1    | 5 | 0 |
| 22       | 2    | 2 | 0 |
| 33       | 3    | 3 | 0 |
| 47       | 4    | 7 | 0 |
| 68       | 6    | 8 | 0 |
| 82       | 8    | 2 | 0 |
| 100      | 1    | 0 | 1 |
| 150      | 1    | 5 | 1 |
| 180      | 1    | 8 | 1 |
| 200      | 2    | 0 | 1 |
| 220      | 2    | 2 | 1 |
| 330      | 3    | 3 | 1 |
| 470      | 4    | 7 | 1 |
| 560      | 5    | 6 | 1 |

⑥ Size code

| L×W (mm) | Code |  |
|----------|------|--|
|          | 10   |  |
| 7.3×4.3  | A    |  |

| T (mm) | Code |    |
|--------|------|----|
|        | 11   | 12 |
| 0.9    | 0    | 9  |
| 1.9    | 1    | 9  |
| 2.8    | 2    | 8  |

⑦ ESR Code

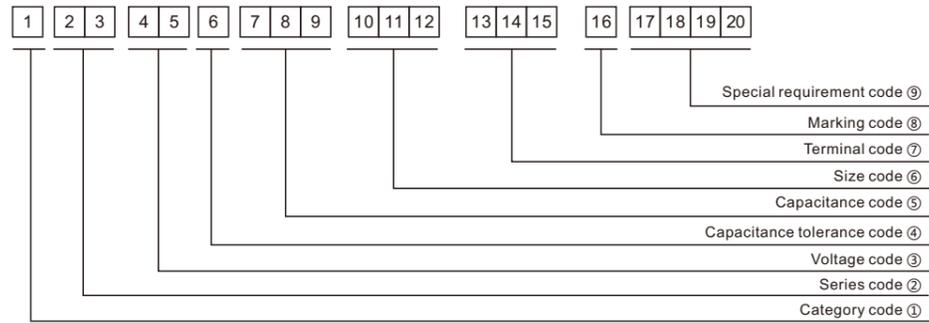
| ESR (mΩ) | Code |    |    |
|----------|------|----|----|
|          | 13   | 14 | 15 |
| 4.5      | R    | 0  | 4  |
| 6.0      | R    | 0  | 6  |
| 7.0      | R    | 0  | 7  |
| 9.0      | R    | 0  | 9  |
| 10       | R    | 1  | 0  |
| 12       | R    | 1  | 2  |
| 15       | R    | 1  | 5  |
| 20       | R    | 2  | 0  |
| 100      | R    | A  | 0  |
| 120      | R    | A  | 2  |
| 200      | R    | B  | 0  |
| 220      | R    | B  | 2  |

⑧ Special Code

| Special                      | Code |    |    |
|------------------------------|------|----|----|
|                              | 16   | 17 | 18 |
| Special customer requirement | X    | X  | X  |

Note: This code is reserved for customers with special requirements. It is used to distinguish custom products from regular products, for example, "F" is the special custom code for a customer.

• (For Radial & SMD Type)



① Category code

| Type  | Code |
|---|------|
|   | 1    |
| Conductive polymer aluminum solid capacitor | S    |

② Series code

| Series name | Code |     |
|-------------|------|-----|
|             | 2    | 3   |
| Radial Type | PZ   | P Z |
|             | PT   | P T |
|             | PF   | P F |
|             | PU   | P U |
| SMD type    | PR   | P R |
|             | VZ   | V Z |
|             | VD   | V D |
|             | VF   | V F |

③ Voltage code

| WV (V) | Code |   |
|--------|------|---|
|        | 4    | 5 |
| 2      | 0    | B |
| 2.5    | 0    | E |
| 3      | 0    | D |
| 4      | 0    | G |
| 6.3    | 0    | J |
| 6.5    | 0    | F |
| 6.8    | 0    | C |
| 7      | 0    | Q |
| 7.5    | 0    | A |
| 10     | 1    | A |
| 12     | 1    | T |
| 14     | 1    | L |
| 16     | 1    | C |
| 18     | 1    | Q |
| 20     | 1    | D |
| 22     | 1    | I |
| 25     | 1    | E |
| 30     | 1    | S |
| 32     | 1    | F |
| 35     | 1    | V |
| 38     | 1    | N |
| 40     | 1    | G |
| 50     | 1    | H |
| 63     | 1    | J |
| 80     | 1    | B |
| 100    | 1    | K |

④ Capacitance tolerance code

| Tol. (%) | Code |
|----------|------|
|          | 6    |
| -10~+10  | K    |
| -20~+20  | M    |
| -10~+30  | Q    |
| -10~+50  | T    |
| -10~+20  | V    |
| -8~+20   | H    |
| 0~+20    | A    |
| 0~+30    |      |
| -5~+20   | C    |
| +6~+20   | J    |
| +6~+30   | O    |
| -10~-20  | B    |
| -5~+5    | D    |
| 0~+10    | E    |
| -5~-20   | F    |
| -15~+5   | N    |
| -15~+15  | W    |
| -15~+20  | G    |
| -35~+10  | L    |
| +4~+30   | I    |

⑤ Capacitance code

| Cap (uF) | Code |   |   |
|----------|------|---|---|
|          | 7    | 8 | 9 |
| 0.1      | R    | 1 | 0 |
| 0.22     | R    | 2 | 2 |
| 1        | 0    | 1 | 0 |
| 2.2      | 2    | R | 2 |
| 9.8      | 9    | R | 8 |
| 10       | 1    | 0 | 0 |
| 22       | 2    | 2 | 0 |
| 33       | 3    | 3 | 0 |
| 47       | 4    | 7 | 0 |
| 56       | 5    | 6 | 0 |
| 68       | 6    | 8 | 0 |
| 100      | 1    | 0 | 1 |
| 150      | 1    | 5 | 1 |
| 180      | 1    | 8 | 1 |
| 220      | 2    | 2 | 1 |
| 270      | 2    | 7 | 1 |
| 470      | 4    | 7 | 1 |
| 560      | 5    | 6 | 1 |
| 680      | 6    | 8 | 1 |
| 820      | 8    | 2 | 1 |
| 1000     | 1    | 0 | 2 |
| 1200     | 1    | 2 | 2 |
| 2200     | 2    | 2 | 2 |
| 3300     | 3    | 3 | 2 |

⑥ Size code

| φD (mm) | Code |
|---------|------|
|         | 10   |
| 4       | C    |
| 4.5     | A    |
| 5       | D    |
| 5.5     | B    |
| 6.3     | E    |
| 6.8     | Q    |
| 7       | R    |
| 8       | F    |
| 10      | G    |
| 11      | H    |
| 12      | J    |
| 12.5    | W    |
| 13      | K    |
| 14      | X    |
| 16      | L    |
| 18      | M    |
| 19      | Z    |
| 20      | N    |

| L (mm) | Code |    |
|--------|------|----|
|        | 11   | 12 |
| 5      | 0    | 5  |
| 7      | 0    | 7  |
| 7.5    | 7    | R  |
| 8      | 0    | 8  |
| 9      | 0    | 9  |
| 10     | 1    | 0  |
| 11     | 1    | 1  |
| 12     | 1    | 2  |
| 16     | 1    | 6  |
| 20     | 2    | 0  |
| 25     | 2    | 5  |
| 10.5   | A    | R  |
| 11.5   | B    | R  |
| 12.5   | C    | R  |

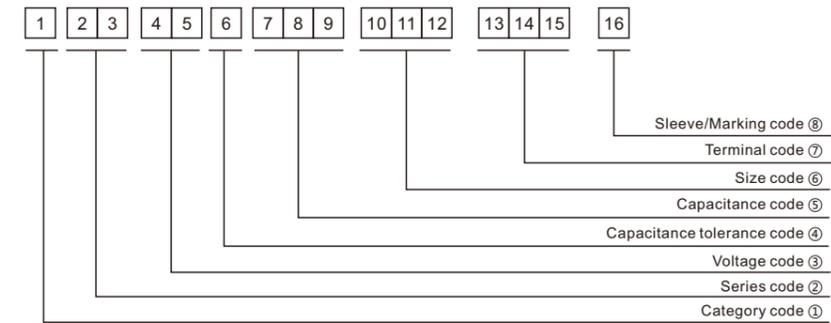
⑦ Terminal code

| Specification                      | Code |    |    |
|------------------------------------|------|----|----|
|                                    | 13   | 14 | 15 |
| Bulk packing (standard lead pitch) | O    | 0  | 0  |
| Bulk packing (special lead pitch)  | O    | -  | -  |
| Bulk packing (SMD type)            | D    | 0  | 0  |
| Taping (SMD type)                  | E    | 0  | 0  |

⑧ Marking code

| Marking            | Code |
|--------------------|------|
|                    | 16   |
| Dark blue          | B    |
| Baby blue          | L    |
| Bright red         | R    |
| Sky-blue           | S    |
| Black              | H    |
| Purple-blue sleeve | V    |
| Red sleeve         | O    |
| Black sleeve       | A    |

• Part Numbering System(Aluminum electrolytic capacitors)



① Category code

| Type                            | Code |
|---------------------------------|------|
|                                 | 1    |
| Aluminum Electrolytic Capacitor | E    |

② Series code

| Series Name | Code |   |
|-------------|------|---|
|             | 2    | 3 |
| MK          | M    | K |
| MF          | M    | F |
| MH          | M    | H |
| H7          | H    | 7 |
| L7          | L    | 7 |
| WK          | W    | K |
| WH          | W    | H |
| RR          | R    | R |
| RE          | R    | E |
| RF          | R    | F |
| RS          | R    | S |
| RZ          | R    | Z |
| RJ          | R    | J |
| RH          | R    | H |
| HS          | H    | S |
| HF          | H    | F |
| HT          | H    | T |
| HL          | H    | L |
| RK          | R    | K |
| ML          | M    | L |
| RM          | R    | M |
| NB          | N    | B |
| RD          | R    | D |
| GH          | G    | H |
| LL          | L    | L |
| RG          | R    | G |
| HP          | H    | P |

③ Voltage code

| WV (Vdc) | Code |   |
|----------|------|---|
|          | 4    | 5 |
| 2.5      | 0    | E |
| 3        | 0    | D |
| 4        | 0    | G |
| 6.3      | 0    | J |
| 6.8      | 0    | C |
| 7        | 0    | Q |
| 7.5      | 0    | A |
| 10       | 1    | A |
| 12       | 1    | T |
| 16       | 1    | C |
| 25       | 1    | E |
| 35       | 1    | V |
| 40       | 1    | G |
| 50       | 1    | H |
| 63       | 1    | J |
| 80       | 1    | B |
| 100      | 1    | K |
| 160      | 2    | C |
| 180      | 2    | L |
| 200      | 2    | D |
| 220      | 2    | N |
| 250      | 2    | E |
| 315      | 2    | F |
| 350      | 2    | V |
| 380      | 2    | P |
| 400      | 2    | G |
| 420      | 2    | T |
| 450      | 2    | W |
| 500      | 2    | H |
| 550      | 2    | J |
| 600      | 2    | K |

④ Capacitance tolerance code

| Tol. (%) | Code |
|----------|------|
|          | 6    |
| -10~+10  | K    |
| -20~+20  | M    |
| -10~+30  | Q    |
| -10~+20  | V    |
| 0~+20    | A    |
| -5~+20   | C    |
| -10~-20  | B    |
| -5~+5    | D    |
| 0~+10    | E    |
| -5~-20   | F    |
| -15~+5   | N    |
| 0~+30    | 3    |

⑥ Size code

| ΦD (mm) | Code |
|---------|------|
|         | 10   |
| 4       | C    |
| 5       | D    |
| 6.3     | E    |
| 8       | F    |
| 10      | G    |
| 11      | H    |
| 12      | J    |
| 12.5    | W    |
| 13      | K    |
| 14.5    | X    |
| 16      | L    |
| 18      | M    |
| 19      | Z    |
| 20      | N    |
| 22      | O    |
| 25      | P    |
| 30      | Q    |
| 35      | R    |
| 40      | Y    |
| 51.6    | S    |
| 64.3    | T    |
| 76.9    | U    |
| 91      | V    |
| 100     | A    |

| L (SMD) (mm) | Code |    |
|--------------|------|----|
|              | 11   | 12 |
| 5.2          | 5    | 5  |
| 5.7          | 6    | 0  |
| 6.3          | 6    | 6  |
| 7.0          | 7    | 3  |
| 7.7          | 8    | 0  |
| 8.0          | 8    | 3  |
| 8.7          | 9    | 0  |
| 9.5          | 9    | 5  |
| 10           | A    | 0  |
| 10.5         | B    | 0  |
| 11           | B    | 5  |
| 11.5         | C    | 0  |
| 12           | C    | 5  |
| 12.5         | D    | 0  |
| 13           | D    | 5  |
| 13.5         | E    | 0  |
| 16           | G    | 5  |
| 16.5         | H    | 0  |
| 18           | J    | 5  |
| 18.5         | K    | 0  |
| 19           | K    | 5  |
| 19.5         | L    | 0  |
| 20           | L    | 5  |
| 20.5         | M    | 0  |
| 21           | M    | 5  |
| 21.5         | N    | 0  |

| L(other) (mm) | Code |    |
|---------------|------|----|
|               | 11   | 12 |
| 5             | 0    | 5  |
| 7             | 0    | 7  |
| 11            | 1    | 1  |
| 12            | 1    | 2  |
| 12.5          | 1    | B  |
| 13            | 1    | 3  |
| 16            | 1    | 6  |
| 20            | 2    | 0  |
| 25            | 2    | 5  |
| 30            | 3    | 0  |
| 35            | 3    | 5  |
| 40            | 4    | 0  |
| 46            | 4    | 6  |
| 50            | 5    | 0  |
| 60            | 6    | 0  |
| 80            | 8    | 0  |
| 100           | A    | 0  |
| 115           | B    | 5  |
| 120           | C    | 0  |
| 130           | D    | 0  |
| 140           | E    | 0  |
| 160           | G    | 0  |
| 200           | K    | 0  |
| 220           | M    | 0  |
| 236           | N    | 6  |
| 250           | P    | 0  |

⑤ Capacitance code

| Cap (pF) | Code |   |   |
|----------|------|---|---|
|          | 7    | 8 | 9 |
| 0.1      | R    | 1 | 0 |
| 0.22     | R    | 2 | 2 |
| 0.33     | R    | 3 | 3 |
| 0.47     | R    | 4 | 7 |
| 0.68     | R    | 6 | 8 |
| 1        | 0    | 1 | 0 |
| 2.2      | 2    | R | 2 |
| 3.3      | 3    | R | 3 |
| 4.7      | 4    | R | 7 |
| 6.8      | 6    | R | 8 |
| 10       | 1    | 0 | 0 |
| 22       | 2    | 2 | 0 |
| 33       | 3    | 3 | 0 |
| 47       | 4    | 7 | 0 |
| 68       | 6    | 8 | 0 |
| 100      | 1    | 0 | 1 |
| 220      | 2    | 2 | 1 |
| 330      | 3    | 3 | 1 |
| 470      | 4    | 7 | 1 |
| 680      | 6    | 8 | 1 |
| 1000     | 1    | 0 | 2 |
| 2200     | 2    | 2 | 2 |
| 3300     | 3    | 3 | 2 |
| 4700     | 4    | 7 | 2 |
| 6800     | 6    | 8 | 2 |
| 10000    | 1    | 0 | 3 |
| 22000    | 2    | 2 | 3 |
| 33000    | 3    | 3 | 3 |
| 68000    | 6    | 8 | 3 |

⑦ Terminal code

| Specification                         | Code |    |    |
|---------------------------------------|------|----|----|
|                                       | 13   | 14 | 15 |
| Bulk packing                          | O    | -  | -  |
| Platform rubber& straight taping      | D    | 0  | 0  |
| φ4~8 taping F=5.0mm                   | P    | 5  | 0  |
| φ10~12.5 taping F=5.0mm               | B    | 5  | 0  |
| Lead cut L=3.5mm                      | C    | 3  | 5  |
| Lead cut L=11.0mm                     | C    | B  | O  |
| Lead forming&cut L=4.5mm              | F    | -  | -  |
| Kink&cut L=4.5mm                      | J    | -  | -  |
| Snap-in type terminal 4.0mm in length | K    | -  | -  |
| Three terminal                        | T    | -  | -  |
| Ring clip mounting standard design    | A    | 0  | 0  |
| Ring clip mounting special design     | S    | -  | -  |

⑧ Sleeve/Marking code

| Sleeve | Code |
|--------|------|
|        | 16   |
| PVC    | C    |
| PET    | T    |

| Marking     | Code |
|-------------|------|
|             | 16   |
| Dark blue   | B    |
| Bright Red  | R    |
| Sky-blue    | S    |
| Light blue  | T    |
| Pink        | Z    |
| Black       | H    |
| Purple-blue | V    |
| Red         | O    |

Lead Forming (Aluminum electrolytic capacitors)  
Taping Specifications

Fig.1 code: X

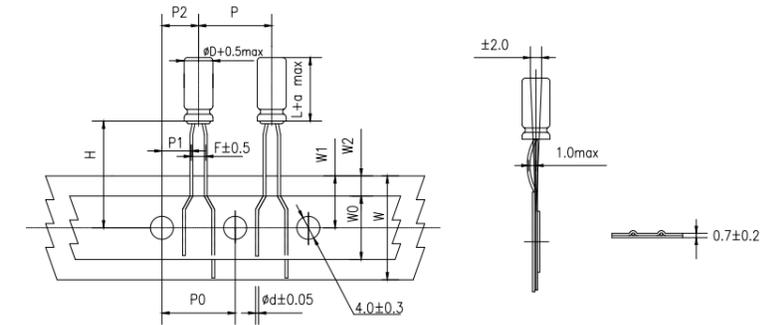


Fig.2 code: B

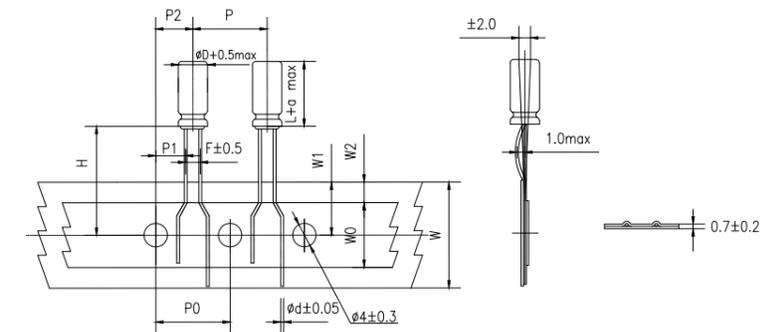


Fig.3 code: B

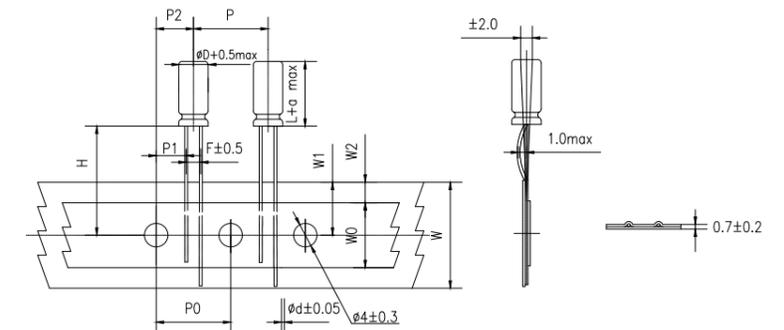
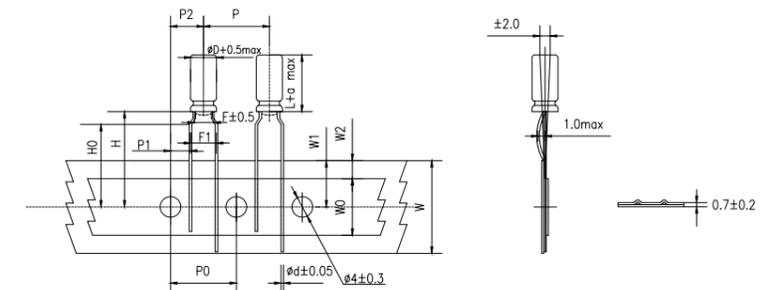


Fig.4 code: P



Lead Forming (Aluminum electrolytic capacitors)

Specification Fig.1 & Fig.2 & Fig.3

(mm)

| Items  | Symbol | Case size  |     |            |      |      |      |       |                                    |                                   |              | Tolerance |                                       |                             |
|--|--------|------------|-----|------------|------|------|------|-------|------------------------------------|-----------------------------------|--------------|-----------|---------------------------------------|-----------------------------|
|  |        | 4x5<br>4x7 |     | 5x5<br>5x7 |      | 5x11 |      | 6.3x5 | 6.3x7<br>6.3x9<br>6.3x11<br>6.3x12 | 8x5/7<br>8x9/11<br>8x11.5<br>8x12 | 8x16<br>8x20 |           | 10x9<br>10x12<br>10x13/16<br>10x20/25 | 12.5x16<br>12.5x20<br>13x20 |
| Pin code                                     |        | X          | B   | X          | B    | X    | B    | B     | B                                  | B                                 | B            | B         | B                                     |                             |
| Lead wire diameter                           | φd     | 0.45       |     | 0.45       |      | 0.5  |      | 0.45  | 0.5                                | 0.5                               | 0.5/0.6      | 0.6       | 0.6                                   | ±0.05                       |
| Pitch of capacitor body                      | P      | 12.7       |     | 12.7       |      | 12.7 |      | 12.7  | 12.7                               | 12.7                              | 12.7         | 12.7      | 15.0                                  | ±1.0                        |
| Pitch of hole center                         | P0     | 12.7       |     | 12.7       |      | 12.7 |      | 12.7  | 12.7                               | 12.7                              | 12.7         | 12.7      | 15.0                                  | ±0.2                        |
| Distance from hole center to lead            | P1     | 5.1        | 5.6 | 5.1        | 5.35 | 5.1  | 5.35 | 5.1   | 5.1                                | 4.6                               | 4.6          | 3.85      | 5.0                                   | ±0.7                        |
| Distance from hole center to body center     | P2     | 6.35       |     | 6.35       |      | 6.35 |      | 6.35  | 6.35                               | 6.35                              | 6.35         | 7.5       | ±1.0                                  |                             |
| Lead spacing                                 | F      | 2.5        | 1.5 | 2.5        | 2.0  | 2.5  | 2.0  | 2.5   | 2.5                                | 3.5                               | 3.5          | 5.0       | 5.0                                   | ±0.5                        |
| Height of body from tape center              | H      | 18.5       |     | 18.5       |      | 18.5 |      | 18.5  | 18.5                               | 18.5                              | 18.5         | 18.5      | 18.5                                  | ±0.75                       |
| Base tape width                              | W      | 18.0       |     | 18.0       |      | 18.0 |      | 18.0  | 18.0                               | 18.0                              | 18.0         | 18.0      | 18.0                                  | ±0.5                        |
| Adhesive tape width                          | W0     | 6.0        |     | 6.0        |      | 6.0  |      | 6.0   | 8.0                                | 8.0                               | 8.0          | 11.0      | 11.0                                  | min                         |
| Distance between hole center and base tape   | W1     | 9.0        |     | 9.0        |      | 9.0  |      | 9.0   | 9.0                                | 9.0                               | 9.0          | 9.0       | 9.0                                   | +0.75<br>-0.5               |
| Distance between base tape and adhesive tape | W2     | 1.5        |     | 1.5        |      | 1.5  |      | 1.5   | 1.5                                | 1.5                               | 1.5          | 1.5       | 1.5                                   | max                         |

Specification Fig.4

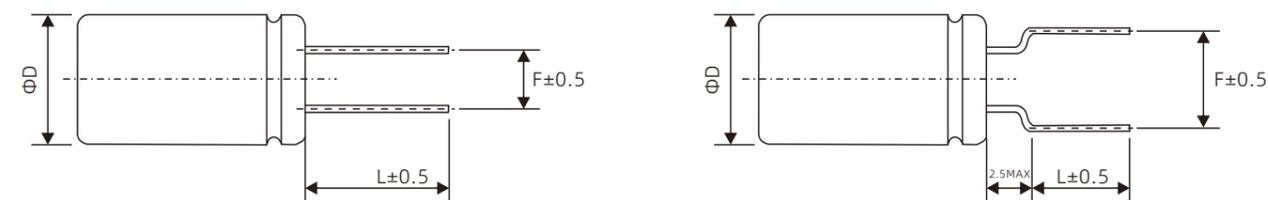
(mm)

| Items  | Symbol | Case size  |      |      |      |       |                |                  |                              |              | Tolerance     |
|--|--------|------------|------|------|------|-------|----------------|------------------|------------------------------|--------------|---------------|
|  |        | 4x5<br>4x7 | 5x5  | 5x7  | 5x11 | 6.3x5 | 6.3x7<br>6.3x9 | 6.3x11<br>6.3x12 | 8x5/7<br>8x9/11<br>8x11.5/12 | 8x16<br>8x20 |               |
| Pin code                                     |        | P          | P    | P    | P    | P     | P              | P                | P                            | P            |               |
| Lead wire diameter                           | φd     | 0.45       | 0.45 | 0.45 | 0.5  | 0.45  | 0.5            | 0.5              | 0.45/0.5                     | 0.5/0.6      | ±0.05         |
| Pitch of capacitor body                      | P      | 12.7       | 12.7 | 12.7 | 12.7 | 12.7  | 12.7           | 12.7             | 12.7                         | 12.7         | ±1.0          |
| Pitch of hole center                         | P0     | 12.7       | 12.7 | 12.7 | 12.7 | 12.7  | 12.7           | 12.7             | 12.7                         | 12.7         | ±0.2          |
| Distance from hole center to lead            | P1     | 3.85       | 3.85 | 3.85 | 3.85 | 3.85  | 3.85           | 3.85             | 3.85                         | 3.85         | ±0.7          |
| Distance from hole center to body center     | P2     | 6.35       | 6.35 | 6.35 | 6.35 | 6.35  | 6.35           | 6.35             | 6.35                         | 6.35         | ±1.0          |
| Lead-to-lead distance                        | F      | 1.5        | 2.0  | 2.0  | 2.0  | 2.5   | 2.5            | 2.5              | 3.5                          | 3.5          | ±0.5          |
| Lead spacing                                 | F1     | 5.0        | 5.0  | 5.0  | 5.0  | 5.0   | 5.0            | 5.0              | 5.0                          | 5.0          | ±0.5          |
| Height of body from tape center              | H      | 18.5       | 18.5 | 18.5 | 18.5 | 18.5  | 18.5           | 18.5             | 18.5                         | 18.5         | ±0.75         |
| Height of formed lead from tape              | B      | 16.0       | 16.0 | 16.0 | 16.0 | 16.0  | 16.0           | 16.0             | 16.0                         | 16.0         | ±0.5          |
| Base tape width                              | W      | 18.0       | 18.0 | 18.0 | 18.0 | 18.0  | 18.0           | 18.0             | 18.0                         | 18.0         | ±0.5          |
| Adhesive tape width                          | W0     | 6.0        | 6.0  | 6.0  | 6.0  | 6.0   | 6.0            | 8.0              | 8.0                          | 8.0          | min           |
| Distance between hole center and base tape   | W1     | 9.0        | 9.0  | 9.0  | 9.0  | 9.0   | 9.0            | 9.0              | 9.0                          | 9.0          | +0.75<br>-0.5 |
| Distance between base tape and adhesive tape | W2     | 1.5        | 1.5  | 1.5  | 1.5  | 1.5   | 1.5            | 1.5              | 1.5                          | 1.5          | max           |

Lead Forming (Aluminum electrolytic capacitors)  
Lead Forming & Cut

Code: C  
RANGE: φ4-φ18

Code:F  
RANGE: φ4-φ8



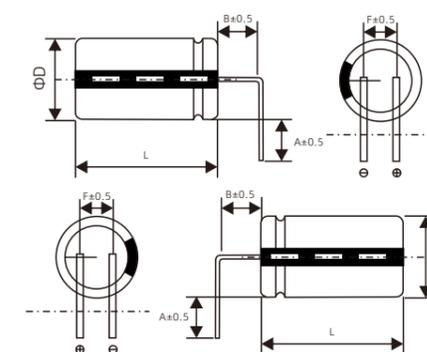
(mm)

| φD   | F   | L        | φD  | F   | L                 |
|------|-----|----------|-----|-----|-------------------|
| 4.0  | 1.5 | 3.0-12.0 | 4.0 | 5.0 | 3.5,4.5, 5.0, 7.0 |
| 5.0  | 2.0 | 3.0-12.0 | 5.0 | 5.0 | 3.5,4.5, 5.0, 7.0 |
| 6.3  | 2.5 | 3.0-12.0 | 6.3 | 5.0 | 3.5,4.5, 5.0, 7.0 |
| 8.0  | 3.5 | 3.0-12.0 | 8.0 | 5.0 | 3.5,4.5, 5.0, 7.0 |
| 10.0 | 5.0 | 3.0-12.0 | -   | -   | ,                 |
| 12.5 | 5.0 | 3.0-12.0 | -   | -   | ,                 |
| 16.0 | 7.5 | 3.0-12.0 | -   | -   | ,                 |
| 18.0 | 7.5 | 3.0-12.0 | -   | -   | ,                 |

Code:R/L  
RANGE: φ10 -φ18

Right horizontal forming

Left horizontal forming



(mm)

| φD      | F   | A                            | B        |
|---------|-----|------------------------------|----------|
| 10-12.5 | 5.0 | 2.5, 3.0, 3.5, 4.0, 4.5, 5.0 | 1.5, 2.5 |
| 16-18   | 7.5 | 2.5, 3.0, 3.5, 4.0, 4.5, 5.0 | 1.5, 2.5 |

Lead Forming (Conductive polymer aluminum solid capacitors)  
Taping Specifications

Fig.1 code:P

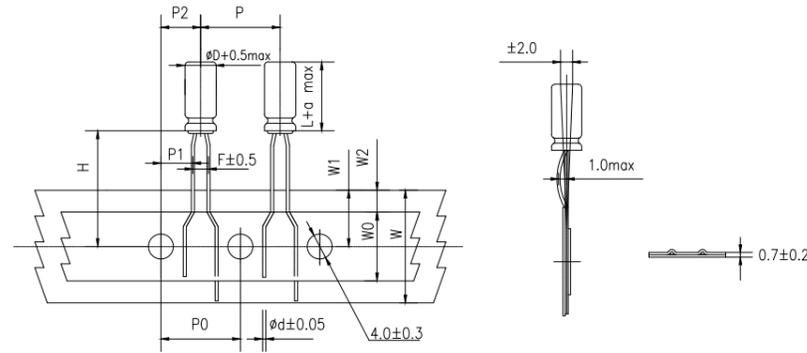


Fig.2 code:P

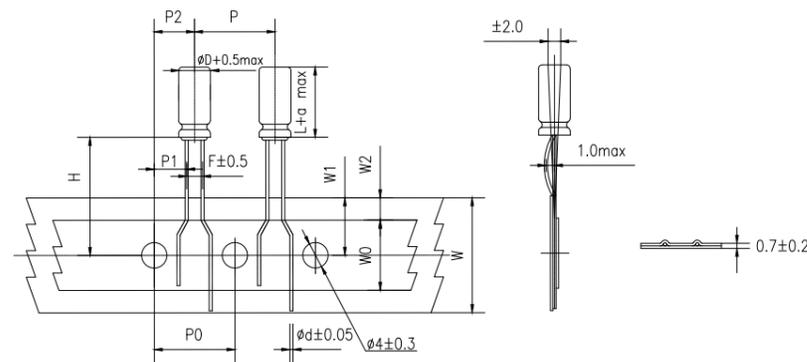


Fig.3 code: P

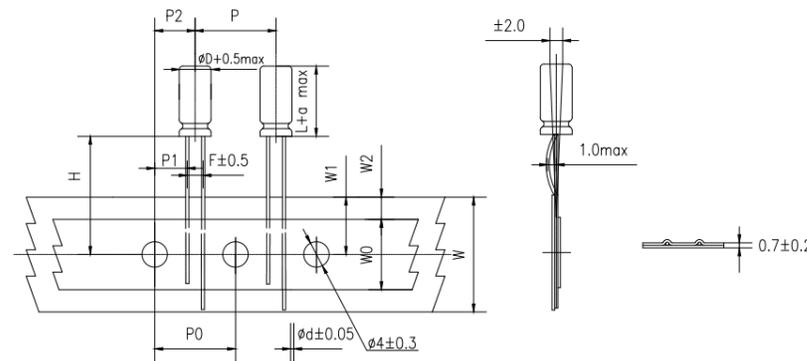
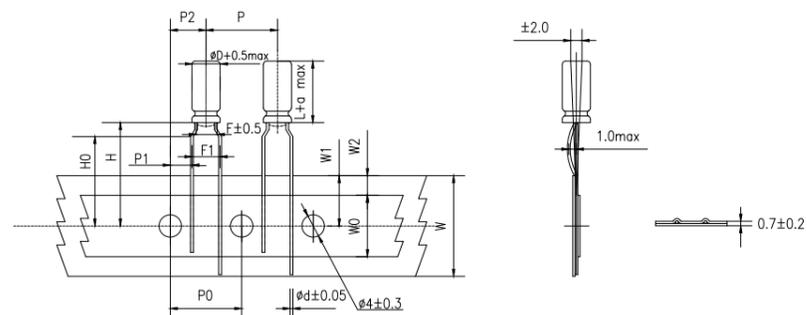


Fig.4 code: K



Lead Forming (Conductive polymer aluminum solid capacitors)  
Specification Fig.1 & Fig.2 & Fig.3

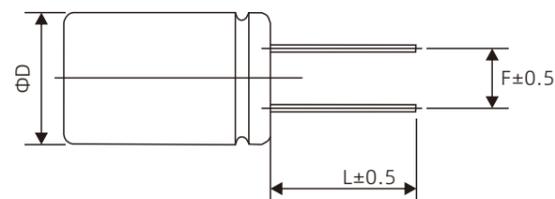
| Items  | Symbol   | Case size |      |      |      |      |      | Tolerance      |
|--|----------|-----------|------|------|------|------|------|----------------|
|  |          | Φ4.5/Φ5   | Φ5.5 | Φ6.3 | Φ8   | Φ8   | Φ10  |                |
| Pin Code                                     |          | P         | P    | P    | P    | P    | P    |                |
| Lead wire diameter                           | $\phi d$ | 0.5       | 0.5  | 0.5  | 0.6  | 0.6  | 0.6  | $\pm 0.05$     |
| Pitch of capacitor body                      | P        | 12.7      | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | $\pm 1.0$      |
| Pitch of hole center                         | P0       | 12.7      | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | $\pm 0.2$      |
| Distance from hole center to lead            | P1       | 5.35      | 5.1  | 5.1  | 5.1  | 4.6  | 3.85 | $\pm 0.7$      |
| Distance from hole center to body center     | P2       | 6.35      | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 | $\pm 1.0$      |
| Lead spacing                                 | F        | 2.0       | 2.5  | 2.5  | 2.5  | 3.5  | 5.0  | $\pm 0.5$      |
| Height of body from tape center              | H        | 18.5      | 18.5 | 18.5 | 18.5 | 18.5 | 18.5 | $\pm 0.75$     |
| Base tape width                              | W        | 18.0      | 18.0 | 18.0 | 18.0 | 18.0 | 18.0 | $\pm 0.5$      |
| Adhesive tape width                          | W0       | 11.0      | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | min            |
| Distance between hole center and base tape   | W1       | 9.0       | 9.0  | 9.0  | 9.0  | 9.0  | 9.0  | +0.75<br>-0.25 |
| Distance between base tape and adhesive tape | W2       | 3-0       | 3-0  | 3-0  | 3-0  | 3-0  | 3-0  | max            |

Specification Fig.4

| Items  | Symbol   | Case size |      |      |      |      | Tolerance      |
|--|----------|-----------|------|------|------|------|----------------|
|  |          | Φ4.5/Φ5   | Φ5.5 | Φ6.3 | Φ8   | Φ8   |                |
| Pin Code                                     |          | K         | K    | K    | K    | K    |                |
| Lead wire diameter                           | $\phi d$ | 0.5       | 0.5  | 0.5  | 0.6  | 0.6  | $\pm 0.05$     |
| Pitch of capacitor body                      | P        | 12.7      | 12.7 | 12.7 | 12.7 | 12.7 | $\pm 1.0$      |
| Pitch of hole center                         | P0       | 12.7      | 12.7 | 12.7 | 12.7 | 12.7 | $\pm 0.2$      |
| Distance from hole center to lead            | P1       | 3.85      | 3.85 | 3.85 | 3.85 | 3.85 | $\pm 0.7$      |
| Distance from hole center to body center     | P2       | 6.35      | 6.35 | 6.35 | 6.35 | 6.35 | $\pm 1.0$      |
| Lead-to-lead distance                        | F        | 2.0       | 2.5  | 2.5  | 2.5  | 3.5  | $\pm 0.5$      |
| Lead spacing                                 | F1       | 5.0       | 5.0  | 5.0  | 5.0  | 5.0  | $\pm 0.5$      |
| Height of body from tape center              | H        | 18.5      | 18.5 | 18.5 | 18.5 | 18.5 | $\pm 0.75$     |
| Height of formed lead from tape              | H0       | 16.0      | 16.0 | 16.0 | 16.0 | 16.0 | $\pm 0.5$      |
| Base tape width                              | W        | 18.0      | 18.0 | 18.0 | 18.0 | 18.0 | $\pm 0.5$      |
| Adhesive tape width                          | W0       | 11.0      | 11.0 | 11.0 | 11.0 | 11.0 | min            |
| Distance between hole center and base tape   | W1       | 9.0       | 9.0  | 9.0  | 9.0  | 9.0  | +0.75<br>-0.25 |
| Distance between base tape and adhesive tape | W2       | 3-0       | 3-0  | 3-0  | 3-0  | 3-0  | max            |

Lead Forming (Conductive polymer aluminum solid capacitors)  
Lead Forming & Cut

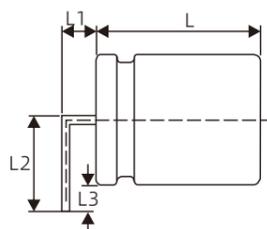
Code: C  
RANGE: φ4-φ10



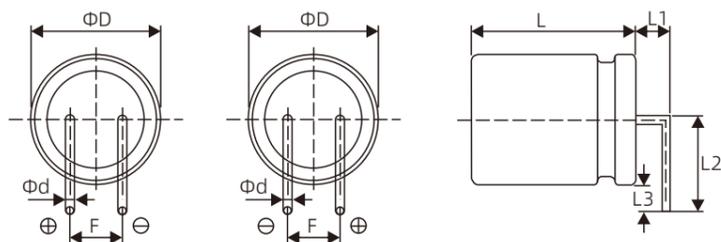
| ΦD(mm) | F(mm) | L(mm)    |
|--------|-------|----------|
| 4.5    | 2.0   | 2.0~12.0 |
| 5.0    | 2.0   | 2.0~12.0 |
| 6.3    | 2.5   | 2.0~12.0 |
| 8.0    | 3.5   | 2.0~12.0 |
| 10.0   | 5.0   | 2.0~12.0 |

Code:R/L  
RANGE: φ4 -φ10

Left horizontal forming



Right horizontal forming



| L1 (mm)<br>Pin included | L2 (mm)<br>Pin included | L3(mm)        |
|-------------------------|-------------------------|---------------|
| 2.0 (Min.)              | Customization           | Customization |

A1 series

- Endurance: 2,000 hours at 105°C
- Low ESR
- Recommended applications: 5G, server, PC, notebook, GPU, portable charger, small SSD, LED display and industrial equipment
- RoHS Compliant and lead-free

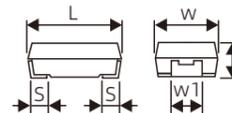


SPECIFICATIONS

| Items                       | Characteristics  |                                       |     |            |     |            |    |            |                 |
|-----------------------------|--|---------------------------------------|-----|------------|-----|------------|----|------------|-----------------|
| Category Temperature Range  | -55~+105°C   |                                       |     |            |     |            |    |            |                 |
| Rated Working Voltage Range | 2~25 Vdc   |                                       |     |            |     |            |    |            |                 |
| Nominal Capacitance Range   | 10~470μF   |                                       |     |            |     |            |    |            |                 |
| Capacitance Tolerance       | ±20%(M) -35%~+10%(L) (20°C,120Hz)  |                                       |     |            |     |            |    |            |                 |
| DC Leakage Current          | I≤0.1CV, W.V.:2V~25V (at 20°C after 2 minutes)<br>Where, I: leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V)  |                                       |     |            |     |            |    |            |                 |
| Dissipation Factor (tanδ)   | Rated Voltage(Vdc)   | 2                                     | 2.5 | 4          | 6.3 | 10         | 16 | 25         | (at 20°C,120Hz) |
|                             | tanδ (max.)  | 0.06                                  |     |            | 0.1 |            |    |            |                 |
| ESR(100kHz,20°C)            | Value in characteristics table   |                                       |     |            |     |            |    |            |                 |
| Endurance                   | After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements.   |                                       |     |            |     |            |    |            |                 |
|                             | Appearance   | No significant damage                 |     |            |     |            |    |            |                 |
|                             | Capacitance Change   | ≤±20% of the initial value            |     |            |     |            |    |            |                 |
|                             | D.F. (tanδ)  | ≤150% of the initial specified value  |     |            |     |            |    |            |                 |
|                             | Leakage Current  | ≤The initial specified value          |     |            |     |            |    |            |                 |
| Humidity Test               | After subjecting to 90%~95% RH for 500 hours at 60°C without voltage applied, the capacitors shall meet the requirement as Endurance.  |                                       |     |            |     |            |    |            |                 |
|                             | Rated Voltage (Vdc)  | 2~2.5                                 |     | 4          |     | 6.3        |    | 10~25      |                 |
|                             | Capacitance Change   | +70, -20 %                            |     | +60, -20 % |     | +50, -20 % |    | +40, -20 % |                 |
|                             | D.F. (tanδ)  | ≤200 % of the initial specified value |     |            |     |            |    |            |                 |
|                             | Leakage Current  | ≤300% of the initial specified value  |     |            |     |            |    |            |                 |
| Surge Test                  | After subjecting to 1,000 cycles each consisting of the charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                       |     |            |     |            |    |            |                 |
|                             | Appearance   | No significant damage                 |     |            |     |            |    |            |                 |
|                             | Capacitance Change   | ≤±10% of the initial value            |     |            |     |            |    |            |                 |
|                             | D.F. (tanδ)  | ≤The initial specified value          |     |            |     |            |    |            |                 |
|                             | Leakage Current  | ≤The initial specified value          |     |            |     |            |    |            |                 |

Conductive Polymer Multilayer Type

DIMENSIONS [mm]

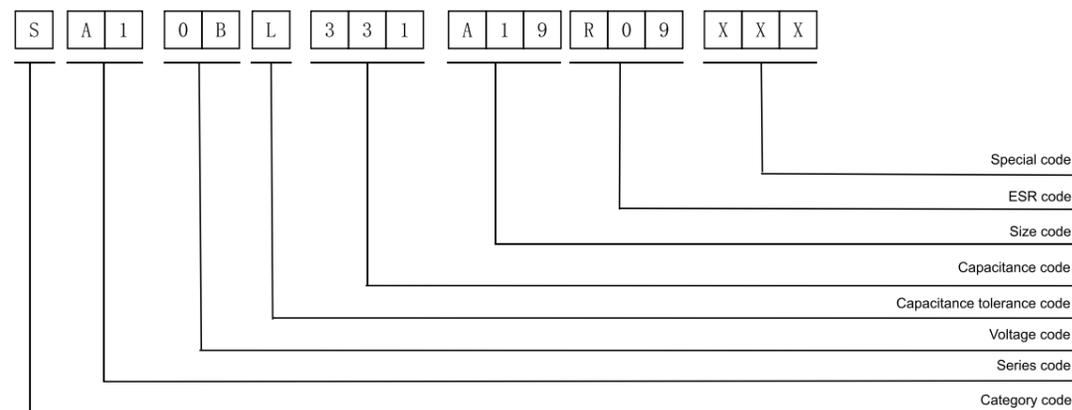


| Case Size   | L±0.3(mm) | W±0.2(mm) | T±0.2(mm) | W1±0.2(mm) | S±0.2(mm) |
|-------------|-----------|-----------|-----------|------------|-----------|
| 7.3*4.3*1.9 | 7.3       | 4.3       | 1.9       | 2.4        | 1.3       |

MARKING



PART NUMBERING SYSTEM



# A1 series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size (LxWxT mm) | ESR (mΩ),20°C100kHz (max.) | Rated Ripple Current (mArms)100kHz, 45°C | Leakage Current (uA max) 20°C | Part Number        |
|----------|----------|-----------------|----------------------------|--|-------------------------------|--------------------|
| 2        | 220      | 7.3×4.3×1.9     | 9                          | 6,300                                    | 44                            | SA10BM221A19R09XXX |
|          | 220      | 7.3×4.3×1.9     | 9                          | 6,300                                    | 44                            | SA10BL221A19R09XXX |
|          | 270      | 7.3×4.3×1.9     | 9                          | 6,300                                    | 54                            | SA10BM271A19R09XXX |
|          | 300      | 7.3×4.3×1.9     | 9                          | 6,300                                    | 60                            | SA10BM301A19R09XXX |
|          | 330      | 7.3×4.3×1.9     | 6                          | 7,500                                    | 66                            | SA10BM331A19R06XXX |
|          | 330      | 7.3×4.3×1.9     | 7                          | 7,000                                    | 66                            | SA10BM331A19R07XXX |
|          | 330      | 7.3×4.3×1.9     | 9                          | 6,300                                    | 66                            | SA10BM331A19R09XXX |
|          | 330      | 7.3×4.3×1.9     | 7                          | 7,000                                    | 66                            | SA10BL331A19R07XXX |
|          | 330      | 7.3×4.3×1.9     | 9                          | 6,300                                    | 198                           | SA10BL331A19R09XXX |
|          | 330      | 7.3×4.3×1.9     | 9                          | 6,300                                    | 66                            | SA10BL331A19R09X01 |
|          | 470      | 7.3×4.3×1.9     | 4.5                        | 8,500                                    | 94                            | SA10BM471A19R04XXX |
|          | 470      | 7.3×4.3×1.9     | 6                          | 7,500                                    | 94                            | SA10BM471A19R06XXX |
|          | 470      | 7.3×4.3×1.9     | 9                          | 6,300                                    | 94                            | SA10BM471A19R09XXX |
|          | 2.5      | 220             | 7.3×4.3×1.9                | 9  | 6,300                         | 55                 |
| 220      |          | 7.3×4.3×1.9     | 9                          | 6,300                                    | 55                            | SA10EL221A19R09XXX |
| 270      |          | 7.3×4.3×1.9     | 9                          | 6,300                                    | 67.5                          | SA10EM271A19R09XXX |
| 330      |          | 7.3×4.3×1.9     | 7                          | 7,000                                    | 82.5                          | SA10EM331A19R07XXX |
| 330      |          | 7.3×4.3×1.9     | 4.5                        | 8,500                                    | 82.5                          | SA10EM331A19R04XXX |
| 330      |          | 7.3×4.3×1.9     | 9                          | 6,300                                    | 82.5                          | SA10EM331A19R09XXX |
| 470      |          | 7.3×4.3×1.9     | 4.5                        | 8,500                                    | 117.5                         | SA10EM471A19R04XXX |
| 470      |          | 7.3×4.3×1.9     | 6                          | 7,500                                    | 117.5                         | SA10EM471A19R06XXX |
| 150      |          | 7.3×4.3×1.9     | 16                         | 5,000                                    | 60                            | SA10GM151A19R16XXX |
| 4        | 220      | 7.3×4.3×1.9     | 15                         | 5,100                                    | 88                            | SA10GM221A19R15XXX |
|          | 10       | 7.3×4.3×1.9     | 55                         | 2,400                                    | 6.3                           | SA10JM100A19R55XXX |
| 6.3      | 22       | 7.3×4.3×1.9     | 45                         | 2,600                                    | 13.9                          | SA10JM220A19R45XXX |
|          | 22       | 7.3×4.3×1.9     | 80                         | 2,000                                    | 13.86                         | SA10JM220A19R80XXX |
|          | 33       | 7.3×4.3×1.9     | 80                         | 2,000                                    | 20.79                         | SA10JM330A19R80XXX |
|          | 47       | 7.3×4.3×1.9     | 25                         | 4,000                                    | 29.6                          | SA10JM470A19R25XXX |
|          | 47       | 7.3×4.3×1.9     | 35                         | 3,400                                    | 29.61                         | SA10JM470A19R35XXX |
|          | 47       | 7.3×4.3×1.9     | 40                         | 3,200                                    | 29.61                         | SA10JM470A19R40XXX |
|          | 68       | 7.3×4.3×1.9     | 15                         | 5,100                                    | 42.84                         | SA10JM680A19R15XXX |
|          | 100      | 7.3×4.3×1.9     | 15                         | 5,100                                    | 63                            | SA10JM101A19R15XXX |
|          | 100      | 7.3×4.3×1.9     | 20                         | 4,300                                    | 63                            | SA10JM101A19R20XXX |
|          | 100      | 7.3×4.3×1.9     | 30                         | 3,700                                    | 63                            | SA10JM101A19R30XXX |
|          | 120      | 7.3×4.3×1.9     | 10                         | 6,000                                    | 75.6                          | SA10JM121A19R10XXX |
|          | 150      | 7.3×4.3×1.9     | 10                         | 6,000                                    | 94.5                          | SA10JM151A19R10XXX |
|          | 150      | 7.3×4.3×1.9     | 15                         | 5,100                                    | 94.5                          | SA10JM151A19R15XXX |
|          | 180      | 7.3×4.3×1.9     | 15                         | 5,100                                    | 113.4                         | SA10JM181A19R15XXX |
|          | 220      | 7.3×4.3×1.9     | 10                         | 6,000                                    | 138.6                         | SA10JM221A19R10XXX |
|          | 220      | 7.3×4.3×1.9     | 15                         | 5,100                                    | 138.6                         | SA10JM221A19R15XXX |
|          | 220      | 7.3×4.3×1.9     | 15                         | 5,100                                    | 138.6                         | SA10JL221A19R15XXX |
| 10       | 47       | 7.3×4.3×1.9     | 40                         | 3,200                                    | 47                            | SA11AM470A19R40XXX |
|          | 68       | 7.3×4.3×1.9     | 40                         | 3,200                                    | 68                            | SA11AM680A19R40XXX |
|          | 100      | 7.3×4.3×1.9     | 15                         | 5,100                                    | 100                           | SA11AM101A19R15XXX |
|          | 100      | 7.3×4.3×1.9     | 40                         | 3,200                                    | 100                           | SA11AM101A19R40XXX |

# A1 series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size (LxWxT mm) | ESR (mΩ),20°C100kHz (max.) | Rated Ripple Current (mArms)100kHz, 45°C | Leakage Current (uA max) 20°C | Part Number        |
|----------|----------|-----------------|----------------------------|--|-------------------------------|--------------------|
| 10       | 100      | 7.3×4.3×1.9     | 40                         | 3,200                                    | 100                           | SA11AL101A19R40XXX |
| 16       | 22       | 7.3×4.3×1.9     | 30                         | 3,700                                    | 35.2                          | SA11CM220A19R30XXX |
|          | 22       | 7.3×4.3×1.9     | 60                         | 2,300                                    | 35.2                          | SA11CM220A19R60XXX |
|          | 33       | 7.3×4.3×1.9     | 80                         | 2,000                                    | 52.8                          | SA11CM330A19R80XXX |
|          | 47       | 7.3×4.3×1.9     | 55                         | 2,400                                    | 75.2                          | SA11CM470A19R55XXX |
| 25       | 10       | 7.3×4.3×1.9     | 35                         | 3,400                                    | 25                            | SA11EM100A19R35XXX |
|          | 10       | 7.3×4.3×1.9     | 60                         | 2,300                                    | 25                            | SA11EM100A19R60XXX |
|          | 10       | 7.3×4.3×1.9     | 80                         | 2,000                                    | 25                            | SA11EM100A19R80XXX |
|          | 15       | 7.3×4.3×1.9     | 60                         | 2,300                                    | 37.5                          | SA11EM150A19R60XXX |
|          | 22       | 7.3×4.3×1.9     | 60                         | 2,300                                    | 55                            | SA11EM220A19R60XXX |
|          | 33       | 7.3×4.3×1.9     | 40                         | 3,200                                    | 82.5                          | SA11EM330A19R40XXX |
|          | 33       | 7.3×4.3×1.9     | 60                         | 2,300                                    | 82.5                          | SA11EM330A19R60XXX |
|          | 33       | 7.3×4.3×1.9     | 80                         | 2,000                                    | 82.5                          | SA11EM330A19R80XXX |
|          | 33       | 7.3×4.3×1.9     | 80                         | 2,000                                    | 82.5                          | SA11EM330A19R80XXX |

※Specifications subject to change without notice

Conductive Polymer  
Multilayer Type

## A2 series

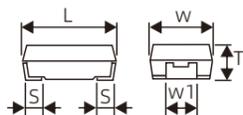
- Endurance: 2,000 hours at 105°C
- Low ESR
- Recommended applications: 5G, server, PC, notebook, GPU, portable charger, small SSD, LED display and industrial equipment
- RoHS Compliant and lead-free



### SPECIFICATIONS

| Items                       | Characteristics  |                                       |     |            |     |            |     |                 |  |
|-----------------------------|--|---------------------------------------|-----|------------|-----|------------|-----|-----------------|--|
| Category Temperature Range  | -55~+105°C   |                                       |     |            |     |            |     |                 |  |
| Rated Working Voltage Range | 2~16 Vdc   |                                       |     |            |     |            |     |                 |  |
| Nominal Capacitance Range   | 47~470μF   |                                       |     |            |     |            |     |                 |  |
| Capacitance Tolerance       | ±20%(M) -35% ~ +10%(L) (20°C,120Hz)  |                                       |     |            |     |            |     |                 |  |
| DC Leakage Current          | ≤0.1CV, W.V.:2V ~ 16V (at 20°C after 2 minutes)  |                                       |     |            |     |            |     |                 |  |
|                             | Where, I: leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V)  |                                       |     |            |     |            |     |                 |  |
| Dissipation Factor (tanδ)   | Rated Voltage(Vdc)   | 2                                     | 2.5 | 4          | 6.3 | 10         | 16  | (at 20°C,120Hz) |  |
|                             | tanδ (max.)  | 0.06                                  |     |            |     |            | 0.1 |                 |  |
| ESR(100kHz,20°C)            | Value in characteristics table   |                                       |     |            |     |            |     |                 |  |
| Endurance                   | After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements.   |                                       |     |            |     |            |     |                 |  |
|                             | Appearance   | No significant damage                 |     |            |     |            |     |                 |  |
|                             | Capacitance Change   | ≤±20% of the initial value            |     |            |     |            |     |                 |  |
|                             | D.F. (tanδ)  | ≤150% of the initial specified value  |     |            |     |            |     |                 |  |
|                             | Leakage Current  | ≤The initial specified value          |     |            |     |            |     |                 |  |
| Humidity Test               | After subjecting to 90%~95% RH for 500 hours at 60°C without voltage applied, the capacitors shall meet the requirement as Endurance.  |                                       |     |            |     |            |     |                 |  |
|                             | Rated Voltage (Vdc)  | 2~2.5                                 |     | 4          |     | 6.3        |     | 10~16           |  |
|                             | Capacitance Change   | +70, -20 %                            |     | +60, -20 % |     | +50, -20 % |     | +40, -20 %      |  |
|                             | D.F. (tanδ)  | ≤200 % of the initial specified value |     |            |     |            |     |                 |  |
|                             | Leakage Current  | ≤300% of the initial specified value  |     |            |     |            |     |                 |  |
| Surge Test                  | After subjecting to 1,000 cycles each consisting of the charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                       |     |            |     |            |     |                 |  |
|                             | Appearance   | No significant damage                 |     |            |     |            |     |                 |  |
|                             | Capacitance Change   | ≤±10% of the initial value            |     |            |     |            |     |                 |  |
|                             | D.F. (tanδ)  | ≤The initial specified value          |     |            |     |            |     |                 |  |
|                             | Leakage Current  | ≤The initial specified value          |     |            |     |            |     |                 |  |

### DIMENSIONS [mm]

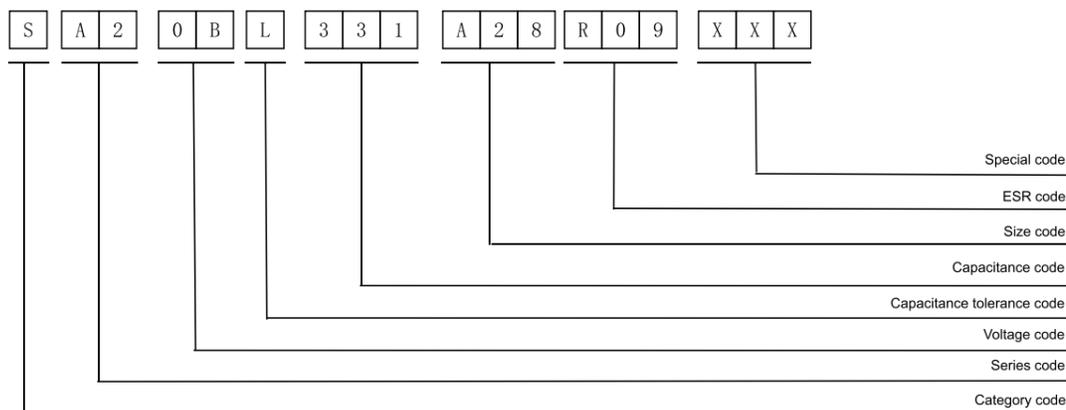


| Case Size   | L±0.3(mm) | W±0.2(mm) | T±0.2(mm) | W1±0.2(mm) | S±0.2(mm) |
|-------------|-----------|-----------|-----------|------------|-----------|
| 7.3*4.3*2.8 | 7.3       | 4.3       | 2.8       | 2.4        | 1.3       |

### MARKING



### PART NUMBERING SYSTEM



## A2 series

### STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size (LxWxT mm) | ESR (mΩ),20°C100kHz (max.) | Rated Ripple Current (mArms)100kHz, 45°C | Leakage Current (uA max) 20°C | Part Number        |
|----------|----------|-----------------|----------------------------|--|-------------------------------|--------------------|
| 2        | 330      | 7.3×4.3×2.8     | 9                          | 6,300                                    | 66                            | SA20BM331A28R09XXX |
|          | 470      | 7.3×4.3×2.8     | 9                          | 6,300                                    | 94                            | SA20BM471A28R09XXX |
| 2.5      | 270      | 7.3×4.3×2.8     | 9                          | 6,300                                    | 67.5                          | SA20EM271A28R09XXX |
|          | 330      | 7.3×4.3×2.8     | 7                          | 7,000                                    | 82.5                          | SA20EM331A28R07XXX |
|          | 330      | 7.3×4.3×2.8     | 9                          | 6,300                                    | 82.5                          | SA20EM331A28R09XXX |
|          | 470      | 7.3×4.3×2.8     | 4.5                        | 8,500                                    | 117.5                         | SA20EM471A28R04XXX |
|          | 470      | 7.3×4.3×2.8     | 6                          | 7,500                                    | 117.5                         | SA20EM471A28R06XXX |
| 4        | 220      | 7.3×4.3×2.8     | 15                         | 5,100                                    | 88                            | SA20GM221A28R15XXX |
|          | 330      | 7.3×4.3×2.8     | 15                         | 5,100                                    | 132                           | SA20GM331A28R15XXX |
| 6.3      | 150      | 7.3×4.3×2.8     | 10                         | 6,000                                    | 94.5                          | SA20JM151A28R10XXX |
|          | 150      | 7.3×4.3×2.8     | 15                         | 5,100                                    | 94.5                          | SA20JM151A28R15XXX |
|          | 220      | 7.3×4.3×2.8     | 10                         | 6,000                                    | 138.6                         | SA20JM221A28R10XXX |
|          | 220      | 7.3×4.3×2.8     | 15                         | 5,100                                    | 138.6                         | SA20JM221A28R15XXX |
| 10       | 100      | 7.3×4.3×2.8     | 15                         | 5,100                                    | 100                           | SA21AM101A28R15XXX |
|          | 100      | 7.3×4.3×2.8     | 40                         | 3,200                                    | 100                           | SA21AM101A28R40XXX |
| 16       | 47       | 7.3×4.3×2.8     | 30                         | 3,800                                    | 75.2                          | SA21CM470A28R30XXX |
|          | 68       | 7.3×4.3×2.8     | 30                         | 3,800                                    | 108.8                         | SA21CM680A28R30XXX |

※Specifications subject to change without notice

PZ series

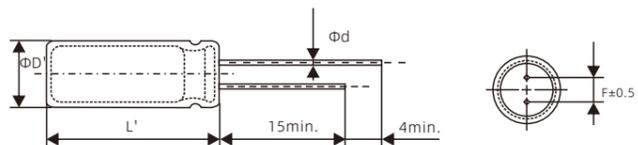
- Endurance: 2,000 hours at 105°C
- Standard
- Recommended applications: system board, display card, small charger and intelligent TV
- RoHS Compliant and lead-free



SPECIFICATIONS

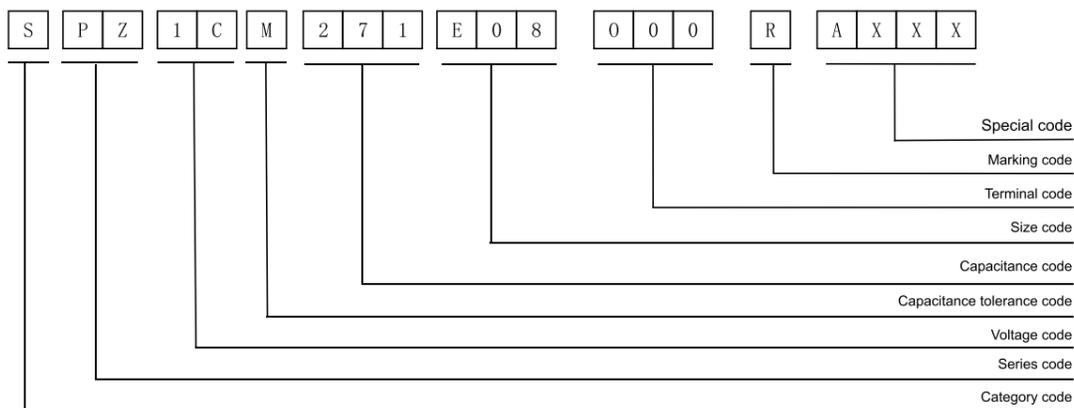
| Items  | Characteristics  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
|--|--|--------------------|-----------------------|--------------------|-----------------------------|--------------------|---------------------------------------|-----|---------------------------------------|-----------------|-------------------------------|----|----|-----|-----|-----|-----|---------------------------|------|--|--|--|------|--|--|--|--|--|------|--|--|--|--|
| Category Temperature Range                             | -55~+105°C   |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Rated Working Voltage Range                            | 6.3~125 Vdc  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Nominal Capacitance Range                              | 4.7~5,600μF  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| DC Leakage Current                                     | I ≤ 0.2CV or 500μA, whichever is greater.<br>Where, I: Max. leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V) (at 20°C after 2 minutes)  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Dissipation Factor (tanδ)                              | <table border="1"> <tr> <td>Rated Voltage(Vdc)</td> <td>6.3</td> <td>6.8</td> <td>7</td> <td>7.5</td> <td>10</td> <td>12</td> <td>16</td> <td>20</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>80</td> <td>100</td> <td>125</td> </tr> <tr> <td>Dissipation Factor (Max.)</td> <td colspan="4">0.08</td> <td colspan="6">0.12</td> <td colspan="5">0.15</td> </tr> </table> (at 20°C, 120Hz)  | Rated Voltage(Vdc) | 6.3                   | 6.8                | 7                           | 7.5                | 10                                    | 12  | 16                                    | 20              | 25                            | 35 | 50 | 63  | 80  | 100 | 125 | Dissipation Factor (Max.) | 0.08 |  |  |  | 0.12 |  |  |  |  |  | 0.15 |  |  |  |  |
| Rated Voltage(Vdc)                                     | 6.3  | 6.8                | 7                     | 7.5                | 10                          | 12                 | 16                                    | 20  | 25                                    | 35              | 50                            | 63 | 80 | 100 | 125 |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Dissipation Factor (Max.)                              | 0.08   |                    |                       |                    | 0.12                        |                    |                                       |     |                                       |                 | 0.15                          |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| ESR(100kHz,20°C)                                       | Value in the characteristics table   |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Temperature Characteristic (Impedance Ratio at 100kHz) | Z(+105°C)/Z(+20°C) ≤ 1.5<br>Z(-55°C)/Z(+20°C) ≤ 2.0  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Endurance  | After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements. <table border="1"> <tr> <td>Appearance</td> <td>No significant damage</td> </tr> <tr> <td>Capacitance Change</td> <td>≤ ±20% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>≤ 150% of the initial specified value</td> </tr> <tr> <td>ESR</td> <td>≤ 150% of the initial specified value</td> </tr> <tr> <td>Leakage Current</td> <td>≤ The initial specified value</td> </tr> </table>   | Appearance         | No significant damage | Capacitance Change | ≤ ±20% of the initial value | Dissipation Factor | ≤ 150% of the initial specified value | ESR | ≤ 150% of the initial specified value | Leakage Current | ≤ The initial specified value |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Appearance   | No significant damage  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Capacitance Change                                     | ≤ ±20% of the initial value  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Dissipation Factor                                     | ≤ 150% of the initial specified value  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| ESR  | ≤ 150% of the initial specified value  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Leakage Current  | ≤ The initial specified value  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Humidity Test  | After subjecting to 90%~95% RH for 1,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.   |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Surge Test   | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. <table border="1"> <tr> <td>Appearance</td> <td>No significant damage</td> </tr> <tr> <td>Capacitance Change</td> <td>≤ ±20% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>≤ 150% of the initial specified value</td> </tr> <tr> <td>ESR</td> <td>≤ 150% of the initial specified value</td> </tr> <tr> <td>Leakage Current</td> <td>≤ The initial specified value</td> </tr> </table> | Appearance         | No significant damage | Capacitance Change | ≤ ±20% of the initial value | Dissipation Factor | ≤ 150% of the initial specified value | ESR | ≤ 150% of the initial specified value | Leakage Current | ≤ The initial specified value |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Appearance   | No significant damage  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Capacitance Change                                     | ≤ ±20% of the initial value  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Dissipation Factor                                     | ≤ 150% of the initial specified value  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| ESR  | ≤ 150% of the initial specified value  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |
| Leakage Current  | ≤ The initial specified value  |                    |                       |                    |                             |                    |                                       |     |                                       |                 |                               |    |    |     |     |     |     |                           |      |  |  |  |      |  |  |  |  |  |      |  |  |  |  |

DIMENSIONS [mm]



|     |             |             |             |          |     |
|-----|-------------|-------------|-------------|----------|-----|
| ΦD  | 5           | 5.5         | 6.3         | 8        | 10  |
| Φd  | 0.5         | 0.5         | 0.5         | 0.6      | 0.6 |
| F   | 2           | 2.5         | 2.5         | 3.5      | 5   |
| ΦD' | ΦD-0.1~+0.5 | ΦD-0.3~+0.3 | ΦD-0.1~+0.5 |          |     |
| L'  | L+1.0max.   |             |             | L-1~+0.5 |     |

PART NUMBERING SYSTEM



PZ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz) (max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|----------------------------|---|---------------------------|----------------------|
| 6.3      | 100      | 5×7           | 30                         | 3,000                                     | 500                       | SPZ0JM101D07O00RAXXX |
|          | 220      | 5×7           | 20                         | 3,500                                     | 500                       | SPZ0JM221D07O00RAXXX |
|          | 220      | 6.3×7         | 20                         | 3,900                                     | 500                       | SPZ0JM221E07O00RAXXX |
|          | 270      | 5×7           | 20                         | 3,800                                     | 500                       | SPZ0JM271D07O00RAXXX |
|          | 330      | 5×8           | 20                         | 4,000                                     | 500                       | SPZ0JM331D08O00RAXXX |
|          | 330      | 6.3×5         | 25                         | 3,160                                     | 500                       | SPZ0JM331E05O00RAXXX |
|          | 330      | 6.3×8         | 15                         | 4,000                                     | 500                       | SPZ0JM331E08O00RAXXX |
|          | 390      | 5×9           | 20                         | 4,100                                     | 500                       | SPZ0JM391D09O00RAXXX |
|          | 470      | 5×10          | 20                         | 4,300                                     | 592                       | SPZ0JM471D10O00RAXXX |
|          | 470      | 5.5×9         | 20                         | 4,100                                     | 592                       | SPZ0JM471B09O00RAXXX |
|          | 470      | 6.3×8         | 15                         | 4,400                                     | 592                       | SPZ0JM471E08O00RAXXX |
|          | 500      | 5×9           | 20                         | 4,100                                     | 630                       | SPZ0JM501D09O00RAXXX |
|          | 560      | 5.5×9         | 20                         | 4,300                                     | 706                       | SPZ0JM561B09O00RAXXX |
|          | 560      | 6.3×8         | 20                         | 4,800                                     | 706                       | SPZ0JM561E08O00RAXXX |
|          | 680      | 5.5×9         | 20                         | 4,800                                     | 857                       | SPZ0JM681B09O00RAXXX |
|          | 680      | 6.3×9         | 20                         | 5,080                                     | 857                       | SPZ0JM681E09O00RAXXX |
|          | 680      | 8×9           | 20                         | 5,200                                     | 857                       | SPZ0JM681F09O00RAXXX |
|          | 820      | 5.5×12        | 20                         | 5,000                                     | 1,033                     | SPZ0JM821B12O00RAXXX |
|          | 820      | 6.3×9         | 20                         | 5,080                                     | 1,033                     | SPZ0JM821E09O00RAXXX |
|          | 1,000    | 6.3×10        | 10                         | 5,150                                     | 1,260                     | SPZ0JM102E10O00RAXXX |
|          | 1,000    | 8×11          | 10                         | 5,200                                     | 1,260                     | SPZ0JM102F11O00RAXXX |
|          | 1,200    | 6.3×11        | 10                         | 5,200                                     | 1,512                     | SPZ0JM122E11O00RAXXX |
|          | 1,200    | 8×11          | 10                         | 5,300                                     | 1,512                     | SPZ0JM122F11O00RAXXX |
|          | 1,500    | 8×11          | 10                         | 5,400                                     | 1,890                     | SPZ0JM152F11O00RAXXX |
| 1,500    | 10×12    | 10            | 5,500                      | 1,890                                     | SPZ0JM152G12O00RAXXX      |                      |
| 1,800    | 10×10    | 10            | 5,560                      | 2,268                                     | SPZ0JM182G10O00RAXXX      |                      |
| 2,200    | 8×14     | 10            | 5,700                      | 2,772                                     | SPZ0JM222F14O00RAXXX      |                      |
| 2,200    | 10×12    | 10            | 5,800                      | 2,772                                     | SPZ0JM222G12O00RAXXX      |                      |
| 3,300    | 10×14    | 10            | 5,900                      | 4,158                                     | SPZ0JM332G14O00RAXXX      |                      |
| 4,700    | 10×17    | 10            | 6,100                      | 5,000                                     | SPZ0JM472G17O00RAXXX      |                      |
| 5,600    | 10×18    | 10            | 6,300                      | 5,000                                     | SPZ0JM562G18O00RAXXX      |                      |
| 6.8      | 220      | 5×7           | 20                         | 3,300                                     | 500                       | SPZ0CM221D07O00RAXXX |
|          | 270      | 5×7           | 20                         | 3,600                                     | 500                       | SPZ0CM271D07O00RAXXX |
|          | 270      | 6.3×8         | 20                         | 3,900                                     | 500                       | SPZ0CM271E08O00RAXXX |
|          | 330      | 5×8           | 20                         | 3,800                                     | 500                       | SPZ0CM331D08O00RAXXX |
|          | 330      | 6.3×5         | 25                         | 3,100                                     | 500                       | SPZ0CM331E05O00RAXXX |
|          | 390      | 5×9           | 20                         | 3,900                                     | 530                       | SPZ0CM391D09O00RAXXX |
|          | 470      | 5×9           | 20                         | 4,100                                     | 639                       | SPZ0CM471D09O00RAXXX |
|          | 470      | 6.3×7         | 20                         | 3,700                                     | 639                       | SPZ0CM471E07O00RAXXX |
|          | 560      | 6.3×8         | 20                         | 4,500                                     | 762                       | SPZ0CM561E08O00RAXXX |
|          | 680      | 6.3×9         | 20                         | 4,800                                     | 925                       | SPZ0CM681E09O00RAXXX |
|          | 820      | 6.3×9         | 20                         | 4,900                                     | 1,115                     | SPZ0CM821E09O00RAXXX |
|          | 1,000    | 6.3×11        | 12                         | 5,100                                     | 1,360                     | SPZ0CM102E11O00RAXXX |
|          | 1,000    | 8×11          | 10                         | 5,150                                     | 1,360                     | SPZ0CM102F11O00RAXXX |

Conductive Polymer Radial Type

PZ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 7        | 220      | 5×7           | 20                        | 3,200                                     | 500                       | SPZ0QM221D07O00RAXXX |
|          | 270      | 5×8           | 20                        | 3,400                                     | 500                       | SPZ0QM271D08O00RAXXX |
|          | 330      | 5×9           | 20                        | 3,600                                     | 500                       | SPZ0QM331D09O00RAXXX |
|          | 470      | 5.5×9         | 20                        | 3,600                                     | 658                       | SPZ0QM471B09O00RAXXX |
|          | 470      | 6.3×8         | 20                        | 3,800                                     | 658                       | SPZ0QM471E08O00RAXXX |
|          | 560      | 6.3×8         | 20                        | 4,000                                     | 784                       | SPZ0QM561E08O00RAXXX |
|          | 680      | 6.3×9         | 12                        | 4,200                                     | 952                       | SPZ0QM681E09O00RAXXX |
|          | 820      | 6.3×10        | 12                        | 4,500                                     | 1,148                     | SPZ0QM821E10O00RAXXX |
|          | 820      | 8×9           | 12                        | 4,600                                     | 1,148                     | SPZ0QM821F09O00RAXXX |
| 7.5      | 220      | 5×7           | 20                        | 3,100                                     | 500                       | SPZ0AM221D07O00RAXXX |
|          | 270      | 5×8           | 20                        | 3,300                                     | 500                       | SPZ0AM271D08O00RAXXX |
|          | 330      | 5×8           | 20                        | 3,500                                     | 500                       | SPZ0AM331D08O00RAXXX |
|          | 390      | 5×9           | 20                        | 3,500                                     | 585                       | SPZ0AM391D09O00RAXXX |
|          | 470      | 5×9           | 20                        | 3,550                                     | 705                       | SPZ0AM471D09O00RAXXX |
|          | 470      | 5.5×9         | 20                        | 3,550                                     | 705                       | SPZ0AM471B09O00RAXXX |
|          | 470      | 6.3×7         | 25                        | 3,200                                     | 705                       | SPZ0AM471E07O00RAXXX |
|          | 500      | 5.5×9         | 20                        | 3,600                                     | 750                       | SPZ0AM501B09O00RAXXX |
|          | 560      | 6.3×8         | 20                        | 3,900                                     | 840                       | SPZ0AM561E08O00RAXXX |
|          | 680      | 6.3×9         | 12                        | 4,100                                     | 1,020                     | SPZ0AM681E09O00RAXXX |
|          | 820      | 6.3×10        | 12                        | 4,400                                     | 1,230                     | SPZ0AM821E10O00RAXXX |
|          | 820      | 8×9           | 12                        | 4,550                                     | 1,230                     | SPZ0AM821F09O00RAXXX |
|          | 1,000    | 6.3×11        | 12                        | 4,500                                     | 1,500                     | SPZ0AM102E11O00RAXXX |
|          | 1,000    | 8×11          | 12                        | 4,700                                     | 1,500                     | SPZ0AM102F11O00RAXXX |
|          | 1,200    | 8×11          | 12                        | 4,800                                     | 1,800                     | SPZ0AM122F11O00RAXXX |
|          | 1,500    | 8×11          | 12                        | 4,900                                     | 2,250                     | SPZ0AM152F11O00RAXXX |
|          | 1,800    | 8×14          | 12                        | 5,100                                     | 2,700                     | SPZ0AM182F14O00RAXXX |
|          | 2,200    | 10×12         | 12                        | 5,700                                     | 3,300                     | SPZ0AM222G12O00RAXXX |
| 10       | 47       | 5×7           | 35                        | 2,200                                     | 500                       | SPZ1AM470D07O00RAXXX |
|          | 56       | 5×7           | 35                        | 2,250                                     | 500                       | SPZ1AM560D07O00RAXXX |
|          | 68       | 5×7           | 35                        | 2,300                                     | 500                       | SPZ1AM680D07O00RAXXX |
|          | 82       | 5×7           | 35                        | 2,350                                     | 500                       | SPZ1AM820D07O00RAXXX |
|          | 100      | 5×7           | 35                        | 2,400                                     | 500                       | SPZ1AM101D07O00RAXXX |
|          | 100      | 6.3×5         | 30                        | 2,300                                     | 500                       | SPZ1AM101E05O00RAXXX |
|          | 120      | 5×7           | 20                        | 2,450                                     | 500                       | SPZ1AM121D07O00RAXXX |
|          | 150      | 5×7           | 20                        | 2,500                                     | 500                       | SPZ1AM151D07O00RAXXX |
|          | 180      | 5×8           | 20                        | 2,700                                     | 500                       | SPZ1AM181D08O00RAXXX |
|          | 180      | 6.3×7         | 20                        | 2,800                                     | 500                       | SPZ1AM181E07O00RAXXX |
|          | 220      | 5×9           | 20                        | 2,820                                     | 500                       | SPZ1AM221D09O00RAXXX |
|          | 220      | 6.3×5         | 25                        | 2,800                                     | 500                       | SPZ1AM221E05O00RAXXX |
|          | 220      | 6.3×8         | 15                        | 3,160                                     | 500                       | SPZ1AM221E08O00RAXXX |
|          | 270      | 6.3×8         | 20                        | 3,100                                     | 540                       | SPZ1AM271E08O00RAXXX |
|          | 330      | 6.3×8         | 20                        | 3,300                                     | 660                       | SPZ1AM331E08O00RAXXX |
|          | 330      | 8×9           | 15                        | 3,400                                     | 660                       | SPZ1AM331F09O00RAXXX |
|          | 390      | 6.3×8         | 20                        | 3,400                                     | 780                       | SPZ1AM391E08O00RAXXX |

PZ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |                      |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|----------------------|
| 10       | 470      | 5.5×9         | 20                        | 3,400                                     | 940                       | SPZ1AM471B09O00RAXXX |                      |
|          | 470      | 6.3×8         | 20                        | 3,500                                     | 940                       | SPZ1AM471E08O00RAXXX |                      |
|          | 470      | 8×9           | 15                        | 3,550                                     | 940                       | SPZ1AM471F09O00RAXXX |                      |
|          | 560      | 6.3×10        | 13                        | 3,600                                     | 1,120                     | SPZ1AM561E10O00RAXXX |                      |
|          | 560      | 8×9           | 15                        | 3,600                                     | 1,120                     | SPZ1AM561F09O00RAXXX |                      |
|          | 680      | 8×11          | 12                        | 3,900                                     | 1,360                     | SPZ1AM681F11O00RAXXX |                      |
|          | 820      | 8×11          | 12                        | 4,000                                     | 1,640                     | SPZ1AM821F11O00RAXXX |                      |
|          | 1,000    | 8×11          | 12                        | 4,200                                     | 2,000                     | SPZ1AM102F11O00RAXXX |                      |
|          | 1,000    | 10×12         | 10                        | 5,300                                     | 2,000                     | SPZ1AM102G12O00RAXXX |                      |
|          | 1,200    | 10×12         | 10                        | 5,450                                     | 2,400                     | SPZ1AM122G12O00RAXXX |                      |
|          | 1,500    | 8×14          | 10                        | 4,800                                     | 3,000                     | SPZ1AM152F14O00RAXXX |                      |
|          | 1,500    | 10×12         | 10                        | 5,500                                     | 3,000                     | SPZ1AM152G12O00RAXXX |                      |
|          | 1,800    | 10×13         | 10                        | 5,800                                     | 3,600                     | SPZ1AM182G13O00RAXXX |                      |
|          | 2,200    | 10×15         | 10                        | 6,100                                     | 4,400                     | SPZ1AM222G15O00RAXXX |                      |
|          | 3,300    | 10×18         | 10                        | 6,200                                     | 5,000                     | SPZ1AM332G18O00RAXXX |                      |
| 12       | 330      | 5.5×9         | 20                        | 3,100                                     | 792                       | SPZ1TM331B09O00RAXXX |                      |
|          | 330      | 6.3×8         | 20                        | 3,100                                     | 792                       | SPZ1TM331E08O00RAXXX |                      |
|          | 470      | 5.5×9         | 20                        | 3,200                                     | 1,128                     | SPZ1TM471B09O00RAXXX |                      |
|          | 470      | 6.3×9         | 20                        | 3,450                                     | 1,128                     | SPZ1TM471E09O00RAXXX |                      |
|          | 560      | 6.3×10        | 15                        | 3,400                                     | 1,344                     | SPZ1TM561E10O00RAXXX |                      |
|          | 680      | 6.3×11        | 15                        | 3,600                                     | 1,632                     | SPZ1TM681E11O00RAXXX |                      |
|          | 820      | 8×11          | 12                        | 3,800                                     | 1,968                     | SPZ1TM821F11O00RAXXX |                      |
|          | 1,000    | 8×12          | 12                        | 4,000                                     | 2,400                     | SPZ1TM102F12O00RAXXX |                      |
|          | 1,200    | 8×14          | 12                        | 4,400                                     | 2,880                     | SPZ1TM122F14O00RAXXX |                      |
|          | 1,500    | 8×16          | 12                        | 4,800                                     | 3,600                     | SPZ1TM152F16O00RAXXX |                      |
|          | 16       | 47            | 5×7                       | 20  | 2,050                     | 500                  | SPZ1CM470D07O00RAXXX |
|          |          | 56            | 5×7                       | 20  | 2,100                     | 500                  | SPZ1CM560D07O00RAXXX |
| 68       |          | 5×7           | 20                        | 2,150                                     | 500                       | SPZ1CM680D07O00RAXXX |                      |
| 82       |          | 5×7           | 20                        | 2,200                                     | 500                       | SPZ1CM820D07O00RAXXX |                      |
| 100      |          | 5×7           | 20                        | 2,250                                     | 500                       | SPZ1CM101D07O00RAXXX |                      |
| 100      |          | 6.3×5         | 25                        | 2,100                                     | 500                       | SPZ1CM101E05O00RAXXX |                      |
| 100      |          | 6.3×8         | 20                        | 2,800                                     | 500                       | SPZ1CM101E08O00RAXXX |                      |
| 120      |          | 5×8           | 20                        | 2,350                                     | 500                       | SPZ1CM121D08O00RAXXX |                      |
| 150      |          | 5×8           | 20                        | 2,400                                     | 500                       | SPZ1CM151D08O00RAXXX |                      |
| 180      |          | 5×8           | 20                        | 2,450                                     | 576                       | SPZ1CM181D08O00RAXXX |                      |
| 180      |          | 6.3×7         | 16                        | 2,500                                     | 576                       | SPZ1CM181E07O00RAXXX |                      |
| 220      |          | 5×10          | 20                        | 2,600                                     | 704                       | SPZ1CM221D10O00RAXXX |                      |
| 220      |          | 6.3×8         | 20                        | 2,700                                     | 704                       | SPZ1CM221E08O00RAXXX |                      |
| 220      |          | 6.3×10        | 15                        | 2,900                                     | 704                       | SPZ1CM221E10O00RAXXX |                      |
| 270      |          | 5.5×9         | 20                        | 2,750                                     | 864                       | SPZ1CM271B09O00RAXXX |                      |
| 270      |          | 6.3×8         | 20                        | 2,800                                     | 864                       | SPZ1CM271E08O00RAXXX |                      |
| 270      |          | 8×9           | 20                        | 2,900                                     | 864                       | SPZ1CM271F09O00RAXXX |                      |
| 330      |          | 5.5×9         | 20                        | 2,900                                     | 1,056                     | SPZ1CM331B09O00RAXXX |                      |
| 330      | 6.3×9    | 20            | 2,900                     | 1,056                                     | SPZ1CM331E09O00RAXXX      |                      |                      |

Conductive Polymer Radial Type

PZ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 16       | 470      | 5.5×11        | 20                        | 3,100                                     | 1,504                     | SPZ1CM471B11O00RAXXX |
|          | 470      | 6.3×11        | 15                        | 3,200                                     | 1,504                     | SPZ1CM471E11O00RAXXX |
|          | 470      | 8×11          | 11                        | 3,200                                     | 1,504                     | SPZ1CM471F11O00RAXXX |
|          | 560      | 8×11          | 11                        | 3,200                                     | 1,792                     | SPZ1CM561F11O00RAXXX |
|          | 560      | 8×13          | 15                        | 3,300                                     | 1,792                     | SPZ1CM561F13O00RAXXX |
|          | 560      | 10×12         | 11                        | 3,500                                     | 1,792                     | SPZ1CM561G12O00RAXXX |
|          | 680      | 8×11          | 15                        | 3,400                                     | 2,176                     | SPZ1CM681F11O00RAXXX |
|          | 680      | 10×12         | 11                        | 3,600                                     | 2,176                     | SPZ1CM681G12O00RAXXX |
|          | 820      | 8×13          | 11                        | 3,500                                     | 2,624                     | SPZ1CM821F13O00RAXXX |
|          | 820      | 10×12         | 11                        | 3,800                                     | 2,624                     | SPZ1CM821G12O00RAXXX |
|          | 1,000    | 8×14          | 11                        | 3,600                                     | 3,200                     | SPZ1CM102F14O00RAXXX |
|          | 1,000    | 10×12         | 11                        | 4,000                                     | 3,200                     | SPZ1CM102G12O00RAXXX |
|          | 1,200    | 10×12         | 12                        | 4,200                                     | 3,840                     | SPZ1CM122G12O00RAXXX |
|          | 1,200    | 10×15         | 12                        | 4,300                                     | 3,840                     | SPZ1CM122G15O00RAXXX |
|          | 1,500    | 10×12         | 12                        | 4,800                                     | 4,800                     | SPZ1CM152G12O00RAXXX |
|          | 1,500    | 10×18         | 12                        | 5,500                                     | 4,800                     | SPZ1CM152G18O00RAXXX |
|          | 1,800    | 10×14         | 12                        | 5,400                                     | 5,000                     | SPZ1CM182G14O00RAXXX |
|          | 2,200    | 10×15         | 12                        | 5,500                                     | 5,000                     | SPZ1CM222G15O00RAXXX |
| 2,200    | 10×17    | 12            | 5,800                     | 5,000                                     | SPZ1CM222G17O00RAXXX      |                      |
| 20       | 120      | 6.3×8         | 30                        | 2,300                                     | 500                       | SPZ1DM121E08O00RAXXX |
|          | 150      | 6.3×10        | 20                        | 2,350                                     | 600                       | SPZ1DM151E10O00RAXXX |
|          | 220      | 8×11          | 20                        | 2,550                                     | 880                       | SPZ1DM221F11O00RAXXX |
|          | 270      | 8×11          | 20                        | 2,700                                     | 1,080                     | SPZ1DM271F11O00RAXXX |
|          | 330      | 6.3×10        | 20                        | 2,350                                     | 1,320                     | SPZ1DM331E10O00RAXXX |
|          | 330      | 8×11          | 20                        | 2,800                                     | 1,320                     | SPZ1DM331F11O00RAXXX |
|          | 470      | 8×11          | 20                        | 2,400                                     | 1,880                     | SPZ1DM471F11O00RAXXX |
|          | 470      | 8×16          | 20                        | 3,000                                     | 1,880                     | SPZ1DM471F16O00RAXXX |
|          | 470      | 10×12         | 20                        | 3,100                                     | 1,880                     | SPZ1DM471G12O00RAXXX |
|          | 560      | 8×16          | 20                        | 3,200                                     | 2,240                     | SPZ1DM561F16O00RAXXX |
|          | 560      | 10×12         | 20                        | 3,100                                     | 2,240                     | SPZ1DM561G12O00RAXXX |
|          | 680      | 8×14          | 20                        | 2,700                                     | 2,720                     | SPZ1DM681F14O00RAXXX |
|          | 680      | 10×15         | 20                        | 3,300                                     | 2,720                     | SPZ1DM681G15O00RAXXX |
|          | 820      | 10×18         | 20                        | 3,400                                     | 3,280                     | SPZ1DM821G18O00RAXXX |
| 1,000    | 10×18    | 20            | 3,900                     | 4,000                                     | SPZ1DM102G18O00RAXXX      |                      |
| 25       | 6.8      | 6.3×5         | 100                       | 1,100                                     | 500                       | SPZ1EM6R8E05O00RAXXX |
|          | 10       | 5×8           | 70                        | 1,800                                     | 500                       | SPZ1EM100D08O00RAXXX |
|          | 22       | 5×9           | 60                        | 1,810                                     | 500                       | SPZ1EM220D09O00RAXXX |
|          | 33       | 5×9           | 50                        | 1,850                                     | 500                       | SPZ1EM330D09O00RAXXX |
|          | 39       | 5×8           | 60                        | 1,900                                     | 500                       | SPZ1EM390D08O00RAXXX |
|          | 47       | 5×9           | 60                        | 1,950                                     | 500                       | SPZ1EM470D09O00RAXXX |
|          | 56       | 5×9           | 60                        | 2,050                                     | 500                       | SPZ1EM560D09O00RAXXX |
|          | 68       | 6.3×7         | 30                        | 2,100                                     | 500                       | SPZ1EM680E07O00RAXXX |
|          | 82       | 6.3×7         | 30                        | 2,150                                     | 500                       | SPZ1EM820E07O00RAXXX |
|          | 100      | 6.3×8         | 30                        | 2,500                                     | 500                       | SPZ1EM101E08O00RAXXX |

PZ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 25       | 100      | 8×11          | 20                        | 3,000                                     | 500                       | SPZ1EM101F11O00RAXXX |
|          | 120      | 6.3×8         | 30                        | 2,500                                     | 600                       | SPZ1EM121E08O00RAXXX |
|          | 150      | 6.3×10        | 20                        | 2,800                                     | 750                       | SPZ1EM151E10O00RAXXX |
|          | 180      | 6.3×10        | 20                        | 2,800                                     | 900                       | SPZ1EM181E10O00RAXXX |
|          | 180      | 8×9           | 30                        | 2,500                                     | 900                       | SPZ1EM181F09O00RAXXX |
|          | 220      | 5.5×11        | 20                        | 1,900                                     | 1,100                     | SPZ1EM221B11O00RAXXX |
|          | 220      | 8×11          | 20                        | 3,000                                     | 1,100                     | SPZ1EM221F11O00RAXXX |
|          | 220      | 10×12         | 20                        | 3,500                                     | 1,100                     | SPZ1EM221G12O00RAXXX |
|          | 270      | 8×11          | 20                        | 3,000                                     | 1,350                     | SPZ1EM271F11O00RAXXX |
|          | 330      | 8×11          | 20                        | 3,100                                     | 1,650                     | SPZ1EM331F11O00RAXXX |
|          | 330      | 10×10         | 25                        | 3,100                                     | 1,650                     | SPZ1EM331G10O00RAXXX |
|          | 330      | 10×12         | 20                        | 3,800                                     | 1,650                     | SPZ1EM331G12O00RAXXX |
|          | 470      | 8×11          | 20                        | 3,000                                     | 2,350                     | SPZ1EM471F11O00RAXXX |
|          | 470      | 8×16          | 20                        | 3,400                                     | 2,350                     | SPZ1EM471F16O00RAXXX |
|          | 470      | 10×10         | 25                        | 3,100                                     | 2,350                     | SPZ1EM471G10O00RAXXX |
|          | 470      | 10×12         | 20                        | 4,000                                     | 2,350                     | SPZ1EM471G12O00RAXXX |
|          | 560      | 8×12          | 20                        | 3,100                                     | 2,800                     | SPZ1EM561F12O00RAXXX |
|          | 560      | 10×12         | 20                        | 4,000                                     | 2,800                     | SPZ1EM561G12O00RAXXX |
|          | 680      | 8×14          | 20                        | 3,400                                     | 3,400                     | SPZ1EM681F14O00RAXXX |
|          | 680      | 10×12         | 20                        | 4,100                                     | 3,400                     | SPZ1EM681G12O00RAXXX |
| 680      | 10×15    | 20            | 4,300                     | 3,400                                     | SPZ1EM681G15O00RAXXX      |                      |
| 820      | 8×16     | 20            | 3,600                     | 4,100                                     | SPZ1EM821F16O00RAXXX      |                      |
| 820      | 10×12    | 20            | 4,100                     | 4,100                                     | SPZ1EM821G12O00RAXXX      |                      |
| 820      | 10×18    | 20            | 4,500                     | 4,100                                     | SPZ1EM821G18O00RAXXX      |                      |
| 1,000    | 10×18    | 20            | 4,500                     | 5,000                                     | SPZ1EM102G18O00RAXXX      |                      |
| 35       | 4.7      | 5×8           | 60                        | 1,700                                     | 500                       | SPZ1VM4R7D08O00RAXXX |
|          | 10       | 5×8           | 60                        | 1,800                                     | 500                       | SPZ1VM100D08O00RAXXX |
|          | 15       | 5×8           | 60                        | 1,850                                     | 500                       | SPZ1VM150D08O00RAXXX |
|          | 22       | 5×9           | 100                       | 1,950                                     | 500                       | SPZ1VM220D09O00RAXXX |
|          | 33       | 5×9           | 50                        | 2,000                                     | 500                       | SPZ1VM330D09O00RAXXX |
|          | 39       | 5×9           | 50                        | 2,050                                     | 500                       | SPZ1VM390D09O00RAXXX |
|          | 47       | 6.3×7         | 50                        | 2,400                                     | 500                       | SPZ1VM470E07O00RAXXX |
|          | 56       | 6.3×7         | 50                        | 2,150                                     | 500                       | SPZ1VM560E07O00RAXXX |
|          | 68       | 6.3×7         | 50                        | 2,200                                     | 500                       | SPZ1VM680E07O00RAXXX |
|          | 82       | 6.3×7         | 50                        | 2,250                                     | 574                       | SPZ1VM820E07O00RAXXX |
|          | 100      | 6.3×8         | 50                        | 2,350                                     | 700                       | SPZ1VM101E08O00RAXXX |
|          | 100      | 8×11          | 40                        | 2,600                                     | 700                       | SPZ1VM101F11O00RAXXX |
|          | 120      | 6.3×10        | 40                        | 2,500                                     | 840                       | SPZ1VM121E10O00RAXXX |
|          | 150      | 6.3×10        | 40                        | 2,550                                     | 1,050                     | SPZ1VM151E10O00RAXXX |
| 180      | 6.3×11   | 40            | 2,600                     | 1,260                                     | SPZ1VM181E11O00RAXXX      |                      |
| 220      | 6.3×11   | 40            | 2,600                     | 1,540                                     | SPZ1VM221E11O00RAXXX      |                      |
| 220      | 8×11     | 40            | 2,800                     | 1,540                                     | SPZ1VM221F11O00RAXXX      |                      |
| 220      | 10×12    | 30            | 2,900                     | 1,540                                     | SPZ1VM221G12O00RAXXX      |                      |
| 270      | 10×12    | 30            | 3,000                     | 1,890                                     | SPZ1VM271G12O00RAXXX      |                      |

Conductive Polymer Radial Type

PZ series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 35       | 330      | 10×12         | 30                        | 3,100                                     | 2,310                     | SPZ1VM331G12O00RAXXX |
|          | 470      | 10×13         | 20                        | 3,200                                     | 3,290                     | SPZ1VM471G13O00RAXXX |
|          | 560      | 10×14         | 20                        | 3,300                                     | 3,920                     | SPZ1VM561G14O00RAXXX |
|          | 680      | 10×16         | 20                        | 3,400                                     | 4,760                     | SPZ1VM681G16O00RAXXX |
|          | 820      | 10×18         | 20                        | 3,500                                     | 5,000                     | SPZ1VM821G18O00RAXXX |
|          | 1,000    | 10×18         | 20                        | 3,700                                     | 5,000                     | SPZ1VM102G18O00RAXXX |
| 50       | 4.7      | 5×8           | 60                        | 1,600                                     | 500                       | SPZ1HM4R7D08O00RAXXX |
|          | 10       | 5×8           | 70                        | 1,630                                     | 500                       | SPZ1HM100D08O00RAXXX |
|          | 10       | 6.3×7         | 35                        | 1,850                                     | 500                       | SPZ1HM100E07O00RAXXX |
|          | 15       | 5×8           | 70                        | 1,660                                     | 500                       | SPZ1HM150D08O00RAXXX |
|          | 22       | 6.3×7         | 40                        | 1,900                                     | 500                       | SPZ1HM220E07O00RAXXX |
|          | 33       | 6.3×7         | 40                        | 2,000                                     | 500                       | SPZ1HM330E07O00RAXXX |
|          | 47       | 6.3×8         | 35                        | 2,100                                     | 500                       | SPZ1HM470E08O00RAXXX |
|          | 56       | 6.3×8         | 35                        | 2,120                                     | 560                       | SPZ1HM560E08O00RAXXX |
|          | 68       | 6.3×10        | 30                        | 2,150                                     | 680                       | SPZ1HM680E10O00RAXXX |
|          | 100      | 8×9           | 40                        | 2,150                                     | 1,000                     | SPZ1HM101F09O00RAXXX |
|          | 100      | 8×11          | 30                        | 2,300                                     | 1,000                     | SPZ1HM101F11O00RAXXX |
|          | 120      | 8×11          | 30                        | 2,400                                     | 1,200                     | SPZ1HM121F11O00RAXXX |
|          | 150      | 10×12         | 30                        | 2,500                                     | 1,500                     | SPZ1HM151G12O00RAXXX |
|          | 180      | 10×12         | 30                        | 2,600                                     | 1,800                     | SPZ1HM181G12O00RAXXX |
|          | 220      | 10×12         | 30                        | 2,700                                     | 2,200                     | SPZ1HM221G12O00RAXXX |
|          | 270      | 10×13         | 20                        | 2,900                                     | 2,700                     | SPZ1HM271G13O00RAXXX |
| 330      | 10×15    | 20            | 3,000                     | 3,300                                     | SPZ1HM331G15O00RAXXX      |                      |
| 440      | 10×18    | 20            | 3,100                     | 4,400                                     | SPZ1HM441G18O00RAXXX      |                      |
| 470      | 10×18    | 20            | 3,150                     | 4,700                                     | SPZ1HM471G18O00RAXXX      |                      |
| 63       | 4.7      | 6.3×8         | 60                        | 1,600                                     | 500                       | SPZ1JM4R7E08O00RAXXX |
|          | 6.8      | 6.3×8         | 60                        | 1,650                                     | 500                       | SPZ1JM6R8E08O00RAXXX |
|          | 33       | 6.3×8         | 30                        | 1,700                                     | 500                       | SPZ1JM330E08O00RAXXX |
|          | 39       | 6.3×8         | 30                        | 1,750                                     | 500                       | SPZ1JM390E08O00RAXXX |
|          | 47       | 6.3×9         | 30                        | 1,900                                     | 592                       | SPZ1JM470E09O00RAXXX |
|          | 56       | 8×9           | 30                        | 1,800                                     | 706                       | SPZ1JM560F09O00RAXXX |
|          | 68       | 8×11          | 30                        | 2,000                                     | 857                       | SPZ1JM680F11O00RAXXX |
|          | 82       | 8×11          | 30                        | 2,100                                     | 1,033                     | SPZ1JM820F11O00RAXXX |
|          | 100      | 10×12         | 30                        | 2,200                                     | 1,260                     | SPZ1JM101G12O00RAXXX |
|          | 150      | 10×12         | 30                        | 2,500                                     | 1,890                     | SPZ1JM151G12O00RAXXX |
|          | 180      | 10×13         | 20                        | 2,600                                     | 2,268                     | SPZ1JM181G13O00RAXXX |
|          | 220      | 10×15         | 20                        | 2,650                                     | 2,772                     | SPZ1JM221G15O00RAXXX |
|          | 270      | 10×17         | 20                        | 2,850                                     | 3,402                     | SPZ1JM271G17O00RAXXX |
| 330      | 10×18    | 20            | 2,950                     | 4,158                                     | SPZ1JM331G18O00RAXXX      |                      |
| 80       | 4.7      | 6.3×8         | 60                        | 1,500                                     | 500                       | SPZ1BM4R7E08O00RAXXX |
|          | 6.8      | 6.3×8         | 60                        | 1,550                                     | 500                       | SPZ1BM6R8E08O00RAXXX |
|          | 22       | 6.3×10        | 60                        | 1,650                                     | 500                       | SPZ1BM220E10O00RAXXX |
|          | 33       | 8×11          | 35                        | 1,700                                     | 528                       | SPZ1BM330F11O00RAXXX |
|          | 47       | 10×12         | 35                        | 1,850                                     | 752                       | SPZ1BM470G12O00RAXXX |

PZ series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 80       | 68       | 10×12         | 35                        | 1,900                                     | 1,088                     | SPZ1BM680G12O00RAXXX |
|          | 100      | 10×14         | 35                        | 2,100                                     | 1,600                     | SPZ1BM101G14O00RAXXX |
| 100      | 4.7      | 6.3×8         | 120                       | 1,400                                     | 500                       | SPZ1KM4R7E08O00RAXXX |
|          | 6.8      | 6.3×8         | 120                       | 1,450                                     | 500                       | SPZ1KM6R8E08O00RAXXX |
|          | 10       | 6.3×10        | 50                        | 1,500                                     | 500                       | SPZ1KM100E10O00RAXXX |
|          | 10       | 8×11          | 50                        | 1,550                                     | 500                       | SPZ1KM100F11O00RAXXX |
|          | 15       | 8×11          | 50                        | 1,550                                     | 500                       | SPZ1KM150F11O00RAXXX |
|          | 22       | 10×12         | 35                        | 1,600                                     | 500                       | SPZ1KM220G12O00RAXXX |
| 125      | 33       | 10×14         | 35                        | 1,650                                     | 660                       | SPZ1KM330G14O00RAXXX |
|          | 47       | 10×16         | 35                        | 1,800                                     | 940                       | SPZ1KM470G16O00RAXXX |
|          | 33       | 10×14         | 35                        | 1,800                                     | 825                       | SPZ2IM330G14O00RAXXX |
|          | 47       | 10×16         | 35                        | 1,800                                     | 1,175                     | SPZ2IM470G16O00RAXXX |

※Specifications subject to change without notice

Conductive Polymer Radial Type

PT series

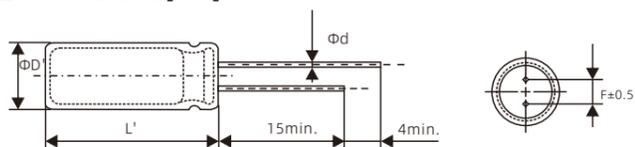
- Endurance: 2,000 hours at 125°C
- Long life, high temperature
- Recommended applications: power supply, service equipment
- RoHS Compliant and lead-free



SPECIFICATIONS

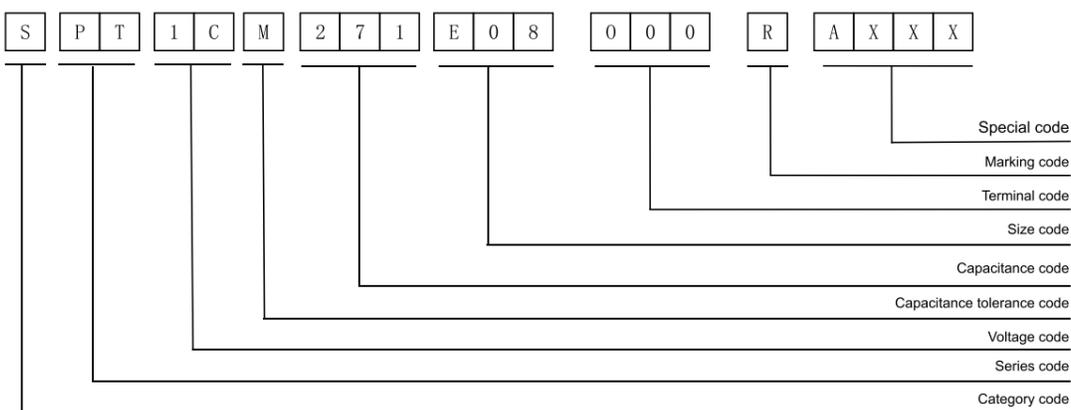
| Items  | Characteristics  |                                      |
|--|--|--------------------------------------|
| Category Temperature Range                             | -55~+125°C   |                                      |
| Rated Working Voltage Range                            | 6.3~25 Vdc   |                                      |
| Nominal Capacitance Range                              | 22~5,600μF   |                                      |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)  |                                      |
| DC Leakage Current                                     | I≤0.2CV or 500μA, whichever is greater.  |                                      |
|  | Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)  |                                      |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 6.3 6.8 7 7.5 10 12 16 20 25         |
|  | Dissipation Factor (Max.)  | 0.08 0.12 (at 20°C,120Hz)            |
| ESR(100kHz,20°C)                                       | Value in the characteristics table   |                                      |
| Temperature Characteristic (Impedance Ratio at 100kHz) | Z(+125°C)/Z(+20°C)≤1.5<br>Z(-55°C)/Z(+20°C)≤2.0  |                                      |
| Endurance  | After applying rated voltage for 2,000 hours at 125°C, the capacitors shall meet the following requirements.   |                                      |
|  | Appearance   | No significant damage                |
|  | Capacitance Change   | ≤±20% of the initial value           |
|  | Dissipation Factor   | ≤150% of the initial specified value |
|  | ESR  | ≤150% of the initial specified value |
|  | Leakage Current  | ≤The initial specified value         |
| Humidity Test  | After subjecting to 90%~95% RH for 1,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.   |                                      |
| Surge Test   | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                      |
|  | Appearance   | No significant damage                |
|  | Capacitance Change   | ≤±20% of the initial value           |
|  | Dissipation Factor   | ≤150% of the initial specified value |
|  | ESR  | ≤150% of the initial specified value |
|  | Leakage Current  | ≤The initial specified value         |

DIMENSIONS [mm]



| ΦD  | 5           | 5.5         | 6.3         | 8        | 10  |
|-----|-------------|-------------|-------------|----------|-----|
| Φd  | 0.5         | 0.5         | 0.5         | 0.6      | 0.6 |
| F   | 2           | 2.5         | 2.5         | 3.5      | 5   |
| ΦD' | ΦD-0.1~+0.5 | ΦD-0.3~+0.3 | ΦD-0.1~+0.5 |          |     |
| L'  | L+1.0max.   |             |             | L-1~+0.5 |     |

PART NUMBERING SYSTEM



PT series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz) (max) | Rated Ripple Current (mArms/125°C,100kHz) | Leakage Current (μA)(max) | Part Number          |                      |
|----------|----------|---------------|----------------------------|---|---------------------------|----------------------|----------------------|
| 6.3      | 220      | 5×7           | 30                         | 1,400                                     | 500                       | SPT0JM221D07O00RAXXX |                      |
|          | 270      | 5×7           | 30                         | 1,500                                     | 500                       | SPT0JM271D07O00RAXXX |                      |
|          | 330      | 5×8           | 30                         | 1,600                                     | 500                       | SPT0JM331D08O00RAXXX |                      |
|          | 330      | 6.3×8         | 22                         | 1,600                                     | 500                       | SPT0JM331E08O00RAXXX |                      |
|          | 390      | 5×9           | 30                         | 1,600                                     | 500                       | SPT0JM391D09O00RAXXX |                      |
|          | 470      | 5×10          | 30                         | 1,600                                     | 592                       | SPT0JM471D10O00RAXXX |                      |
|          | 470      | 5.5×9         | 30                         | 1,600                                     | 592                       | SPT0JM471B09O00RAXXX |                      |
|          | 470      | 6.3×8         | 22                         | 1,700                                     | 592                       | SPT0JM471E08O00RAXXX |                      |
|          | 560      | 6.3×8         | 30                         | 1,800                                     | 706                       | SPT0JM561E08O00RAXXX |                      |
|          | 560      | 5.5×9         | 30                         | 1,600                                     | 706                       | SPT0JM561B09O00RAXXX |                      |
|          | 680      | 5.5×9         | 30                         | 1,800                                     | 857                       | SPT0JM681B09O00RAXXX |                      |
|          | 680      | 6.3×9         | 30                         | 1,900                                     | 857                       | SPT0JM681E09O00RAXXX |                      |
|          | 680      | 8×9           | 30                         | 1,900                                     | 857                       | SPT0JM681F09O00RAXXX |                      |
|          | 820      | 6.3×9         | 30                         | 1,900                                     | 1,033                     | SPT0JM821E09O00RAXXX |                      |
|          | 1,000    | 6.3×10        | 15                         | 1,900                                     | 1,260                     | SPT0JM102E10O00RAXXX |                      |
|          | 1,000    | 8×9           | 18                         | 1,900                                     | 1,260                     | SPT0JM102F09O00RAXXX |                      |
|          | 1,000    | 8×11          | 15                         | 1,900                                     | 1,260                     | SPT0JM102F11O00RAXXX |                      |
|          | 1,200    | 8×11          | 15                         | 1,900                                     | 1,512                     | SPT0JM122F11O00RAXXX |                      |
|          | 1,500    | 8×11          | 15                         | 2,000                                     | 1,890                     | SPT0JM152F11O00RAXXX |                      |
|          | 1,500    | 10×12         | 15                         | 2,000                                     | 1,890                     | SPT0JM152G12O00RAXXX |                      |
| 6.8      | 220      | 5×7           | 28                         | 1,300                                     | 500                       | SPT0CM221D07O00RAXXX |                      |
|          | 270      | 5×7           | 28                         | 1,400                                     | 500                       | SPT0CM271D07O00RAXXX |                      |
|          | 330      | 5×8           | 28                         | 1,500                                     | 500                       | SPT0CM331D08O00RAXXX |                      |
|          | 330      | 6.3×5         | 35                         | 1,300                                     | 500                       | SPT0CM331E05O00RAXXX |                      |
|          | 470      | 5×9           | 28                         | 1,600                                     | 639                       | SPT0CM471D09O00RAXXX |                      |
|          | 470      | 6.3×7         | 28                         | 1,500                                     | 639                       | SPT0CM471E07O00RAXXX |                      |
|          | 560      | 6.3×8         | 28                         | 1,700                                     | 762                       | SPT0CM561E08O00RAXXX |                      |
|          | 680      | 6.3×9         | 28                         | 1,800                                     | 925                       | SPT0CM681E09O00RAXXX |                      |
|          | 820      | 6.3×9         | 28                         | 1,800                                     | 1,115                     | SPT0CM821E09O00RAXXX |                      |
|          | 1,000    | 6.3×11        | 17                         | 1,900                                     | 1,360                     | SPT0CM102E11O00RAXXX |                      |
|          | 1,000    | 8×11          | 14                         | 1,900                                     | 1,360                     | SPT0CM102F11O00RAXXX |                      |
|          | 7        | 220           | 5×7                        | 28  | 1,300                     | 500                  | SPT0QM221D07O00RAXXX |
|          |          | 270           | 5×8                        | 28  | 1,400                     | 500                  | SPT0QM271D08O00RAXXX |
|          |          | 330           | 5×9                        | 28  | 1,400                     | 500                  | SPT0QM331D09O00RAXXX |
|          |          | 470           | 5.5×9                      | 28  | 1,400                     | 658                  | SPT0QM471B09O00RAXXX |
|          |          | 470           | 6.3×7                      | 28  | 1,500                     | 658                  | SPT0QM471E07O00RAXXX |
|          |          | 560           | 6.3×8                      | 28  | 1,600                     | 784                  | SPT0QM561E08O00RAXXX |
|          |          | 680           | 6.3×9                      | 17  | 1,600                     | 952                  | SPT0QM681E09O00RAXXX |

Conductive Polymer Radial Type

PT series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/125°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 7        | 820      | 6.3×10        | 17                        | 1,700                                     | 1,148                     | SPT0QM821E10O00RAXXX |
|          | 820      | 8×9           | 17                        | 1,700                                     | 1,148                     | SPT0QM821F09O00RAXXX |
| 7.5      | 220      | 5×7           | 28                        | 1,300                                     | 500                       | SPT0AM221D07O00RAXXX |
|          | 270      | 5×7           | 28                        | 1,300                                     | 500                       | SPT0AM271D07O00RAXXX |
|          | 330      | 5×9           | 28                        | 1,400                                     | 500                       | SPT0AM331D09O00RAXXX |
|          | 390      | 5×9           | 28                        | 1,400                                     | 585                       | SPT0AM391D09O00RAXXX |
|          | 470      | 5.5×9         | 28                        | 1,400                                     | 705                       | SPT0AM471B09O00RAXXX |
|          | 470      | 6.3×7         | 35                        | 1,300                                     | 705                       | SPT0AM471E07O00RAXXX |
|          | 500      | 5.5×9         | 28                        | 1,400                                     | 750                       | SPT0AM501B09O00RAXXX |
|          | 560      | 6.3×8         | 28                        | 1,500                                     | 840                       | SPT0AM561E08O00RAXXX |
|          | 680      | 6.3×9         | 17                        | 1,600                                     | 1,020                     | SPT0AM681E09O00RAXXX |
|          | 820      | 6.3×10        | 17                        | 1,700                                     | 1,230                     | SPT0AM821E10O00RAXXX |
|          | 820      | 8×9           | 17                        | 1,700                                     | 1,230                     | SPT0AM821F09O00RAXXX |
| 1,200    | 8×11     | 17            | 1,840                     | 1,800                                     | SPT0AM122F11O00RAXXX      |                      |
| 10       | 47       | 5×7           | 52                        | 1,000                                     | 500                       | SPT1AM470D07O00RAXXX |
|          | 56       | 5×7           | 52                        | 1,000                                     | 500                       | SPT1AM560D07O00RAXXX |
|          | 68       | 5×7           | 52                        | 1,000                                     | 500                       | SPT1AM680D07O00RAXXX |
|          | 82       | 5×7           | 52                        | 1,100                                     | 500                       | SPT1AM820D07O00RAXXX |
|          | 100      | 5×7           | 52                        | 1,100                                     | 500                       | SPT1AM101D07O00RAXXX |
|          | 120      | 5×7           | 30                        | 1,100                                     | 500                       | SPT1AM121D07O00RAXXX |
|          | 150      | 5×7           | 30                        | 1,100                                     | 500                       | SPT1AM151D07O00RAXXX |
|          | 180      | 5×8           | 30                        | 1,200                                     | 500                       | SPT1AM181D08O00RAXXX |
|          | 220      | 5×9           | 30                        | 1,200                                     | 500                       | SPT1AM221D09O00RAXXX |
|          | 220      | 6.3×8         | 30                        | 1,300                                     | 500                       | SPT1AM221E08O00RAXXX |
|          | 270      | 6.3×8         | 30                        | 1,300                                     | 540                       | SPT1AM271E08O00RAXXX |
|          | 330      | 6.3×8         | 30                        | 1,300                                     | 660                       | SPT1AM331E08O00RAXXX |
|          | 330      | 8×9           | 22                        | 1,400                                     | 660                       | SPT1AM331F09O00RAXXX |
|          | 390      | 6.3×8         | 30                        | 1,400                                     | 780                       | SPT1AM391E08O00RAXXX |
|          | 470      | 5.5×9         | 30                        | 1,400                                     | 940                       | SPT1AM471B09O00RAXXX |
|          | 470      | 6.3×8         | 30                        | 1,400                                     | 940                       | SPT1AM471E08O00RAXXX |
|          | 470      | 8×9           | 22                        | 1,400                                     | 940                       | SPT1AM471F09O00RAXXX |
|          | 560      | 6.3×10        | 18                        | 1,600                                     | 1,020                     | SPT1AM561E10O00RAXXX |
|          | 560      | 8×9           | 22                        | 1,400                                     | 1,020                     | SPT1AM561F09O00RAXXX |
|          | 680      | 8×11          | 18                        | 1,500                                     | 1,360                     | SPT1AM681F11O00RAXXX |
| 820      | 8×11     | 18            | 1,600                     | 1,640                                     | SPT1AM821F11O00RAXXX      |                      |
| 1,000    | 8×11     | 18            | 1,600                     | 2,000                                     | SPT1AM102F11O00RAXXX      |                      |
| 1,000    | 10×12    | 15            | 1,900                     | 2,000                                     | SPT1AM102G12O00RAXXX      |                      |
| 1,200    | 8×12     | 15            | 1,700                     | 2,400                                     | SPT1AM122F12O00RAXXX      |                      |
| 1,200    | 10×12    | 15            | 2,000                     | 2,400                                     | SPT1AM122G12O00RAXXX      |                      |
| 1,500    | 10×12    | 15            | 2,000                     | 3,000                                     | SPT1AM152G12O00RAXXX      |                      |
| 1,800    | 10×13    | 15            | 2,100                     | 3,600                                     | SPT1AM182G13O00RAXXX      |                      |
| 2,200    | 10×15    | 15            | 2,200                     | 4,400                                     | SPT1AM222G15O00RAXXX      |                      |
| 3,300    | 10×18    | 15            | 2,200                     | 5,000                                     | SPT1AM332G18O00RAXXX      |                      |
| 12       | 330      | 5.5×9         | 28                        | 1,300                                     | 792                       | SPT1TM331B09O00RAXXX |

PT series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/125°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 12       | 470      | 5.5×9         | 28                        | 1,300                                     | 1,128                     | SPT1TM471B09O00RAXXX |
|          | 470      | 6.3×9         | 28                        | 1,400                                     | 1,128                     | SPT1TM471E09O00RAXXX |
|          | 560      | 6.3×10        | 21                        | 1,400                                     | 1,334                     | SPT1TM561E10O00RAXXX |
|          | 680      | 6.3×11        | 21                        | 1,500                                     | 1,632                     | SPT1TM681E11O00RAXXX |
|          | 820      | 8×11          | 17                        | 1,500                                     | 1,968                     | SPT1TM821F11O00RAXXX |
|          | 1,000    | 8×12          | 17                        | 1,600                                     | 2,400                     | SPT1TM102F12O00RAXXX |
|          | 1,200    | 8×14          | 17                        | 1,700                                     | 2,880                     | SPT1TM122F14O00RAXXX |
|          | 1,500    | 8×16          | 17                        | 1,800                                     | 3,600                     | SPT1TM152F16O00RAXXX |
| 16       | 47       | 5×7           | 30                        | 1,000                                     | 500                       | SPT1CM470D07O00RAXXX |
|          | 56       | 5×7           | 30                        | 1,000                                     | 500                       | SPT1CM560D07O00RAXXX |
|          | 68       | 5×7           | 30                        | 1,000                                     | 500                       | SPT1CM680D07O00RAXXX |
|          | 82       | 5×8           | 30                        | 1,000                                     | 500                       | SPT1CM820D08O00RAXXX |
|          | 100      | 5×7           | 30                        | 1,000                                     | 500                       | SPT1CM101D07O00RAXXX |
|          | 100      | 6.3×5         | 37                        | 1,000                                     | 500                       | SPT1CM101E05O00RAXXX |
|          | 100      | 6.3×8         | 30                        | 1,200                                     | 500                       | SPT1CM101E08O00RAXXX |
|          | 120      | 5×8           | 30                        | 1,100                                     | 500                       | SPT1CM121D08O00RAXXX |
|          | 150      | 5×8           | 30                        | 1,100                                     | 500                       | SPT1CM151D08O00RAXXX |
|          | 180      | 5×8           | 30                        | 1,100                                     | 576                       | SPT1CM181D08O00RAXXX |
|          | 180      | 6.3×7         | 30                        | 1,100                                     | 576                       | SPT1CM181E07O00RAXXX |
|          | 220      | 5×10          | 30                        | 1,100                                     | 704                       | SPT1CM221D10O00RAXXX |
|          | 220      | 6.3×8         | 30                        | 1,200                                     | 704                       | SPT1CM221E08O00RAXXX |
|          | 220      | 6.3×10        | 22                        | 1,200                                     | 704                       | SPT1CM221E10O00RAXXX |
|          | 270      | 5.5×9         | 30                        | 1,200                                     | 864                       | SPT1CM271B09O00RAXXX |
|          | 270      | 6.3×8         | 30                        | 1,200                                     | 864                       | SPT1CM271E08O00RAXXX |
|          | 270      | 8×9           | 30                        | 1,200                                     | 864                       | SPT1CM271F09O00RAXXX |
|          | 330      | 5.5×9         | 30                        | 1,200                                     | 1,056                     | SPT1CM331B09O00RAXXX |
|          | 330      | 6.3×9         | 30                        | 1,200                                     | 1,056                     | SPT1CM331E09O00RAXXX |
|          | 470      | 6.3×11        | 22                        | 1,300                                     | 1,504                     | SPT1CM471E11O00RAXXX |
| 470      | 8×11     | 22            | 1,700                     | 1,504                                     | SPT1CM471F11O00RAXXX      |                      |
| 560      | 8×11     | 22            | 1,300                     | 1,792                                     | SPT1CM561F11O00RAXXX      |                      |
| 560      | 8×13     | 22            | 1,300                     | 1,792                                     | SPT1CM561F13O00RAXXX      |                      |
| 560      | 10×12    | 18            | 1,400                     | 1,792                                     | SPT1CM561G12O00RAXXX      |                      |
| 680      | 8×11     | 22            | 1,400                     | 2,176                                     | SPT1CM681F11O00RAXXX      |                      |
| 680      | 10×12    | 18            | 1,400                     | 2,176                                     | SPT1CM681G12O00RAXXX      |                      |
| 820      | 8×13     | 16            | 1,400                     | 2,624                                     | SPT1CM821F13O00RAXXX      |                      |
| 820      | 10×12    | 18            | 1,500                     | 2,624                                     | SPT1CM821G12O00RAXXX      |                      |
| 1,000    | 8×14     | 18            | 1,600                     | 3,200                                     | SPT1CM102F14O00RAXXX      |                      |
| 1,000    | 10×12    | 18            | 1,600                     | 3,200                                     | SPT1CM102G12O00RAXXX      |                      |
| 1,500    | 10×18    | 18            | 2,000                     | 4,800                                     | SPT1CM152G18O00RAXXX      |                      |
| 1,800    | 10×14    | 18            | 2,000                     | 5,000                                     | SPT1CM182G14O00RAXXX      |                      |
| 2,200    | 10×18    | 18            | 2,100                     | 5,000                                     | SPT1CM222G18O00RAXXX      |                      |
| 20       | 82       | 6.3×8         | 42                        | 1,690                                     | 500                       | SPT1DM820E08O00RAXXX |
|          | 120      | 6.3×8         | 42                        | 1,100                                     | 500                       | SPT1DM121E08O00RAXXX |
|          | 150      | 6.3×10        | 28                        | 1,100                                     | 600                       | SPT1DM151E10O00RAXXX |

PT series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mA rms/125°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|--|---------------------------|----------------------|
| 20       | 220      | 8×11          | 28                        | 1,100                                      | 880                       | SPT1DM221F11O00RAXXX |
|          | 270      | 8×11          | 28                        | 1,200                                      | 1,080                     | SPT1DM271F11O00RAXXX |
|          | 470      | 8×11          | 28                        | 1,100                                      | 1,880                     | SPT1DM471F11O00RAXXX |
|          | 470      | 10×12         | 28                        | 1,200                                      | 1,880                     | SPT1DM471G12O00RAXXX |
|          | 560      | 10×12         | 28                        | 1,300                                      | 2,240                     | SPT1DM561G12O00RAXXX |
|          | 680      | 10×15         | 28                        | 1,300                                      | 2,720                     | SPT1DM681G15O00RAXXX |
|          | 820      | 10×18         | 28                        | 1,400                                      | 3,280                     | SPT1DM821G18O00RAXXX |
| 25       | 1,000    | 10×18         | 28                        | 1,500                                      | 4,000                     | SPT1DM102G18O00RAXXX |
|          | 22       | 5×9           | 90                        | 900  | 500                       | SPT1EM220D09O00RAXXX |
|          | 33       | 5×9           | 90                        | 900  | 500                       | SPT1EM330D09O00RAXXX |
|          | 39       | 5×8           | 90                        | 900  | 500                       | SPT1EM390D08O00RAXXX |
|          | 47       | 5×9           | 90                        | 900  | 500                       | SPT1EM470D09O00RAXXX |
|          | 56       | 5×9           | 90                        | 1,000                                      | 500                       | SPT1EM560D09O00RAXXX |
|          | 68       | 6.3×7         | 45                        | 1,100                                      | 500                       | SPT1EM680E07O00RAXXX |
|          | 82       | 6.3×7         | 45                        | 1,100                                      | 500                       | SPT1EM820E07O00RAXXX |
|          | 100      | 6.3×8         | 45                        | 1,100                                      | 500                       | SPT1EM101E08O00RAXXX |
|          | 100      | 6.3×10        | 30                        | 1,200                                      | 500                       | SPT1EM101E10O00RAXXX |
|          | 100      | 8×11          | 30                        | 1,300                                      | 500                       | SPT1EM101F11O00RAXXX |
|          | 120      | 6.3×8         | 45                        | 1,100                                      | 600                       | SPT1EM121E08O00RAXXX |
|          | 150      | 6.3×10        | 30                        | 1,200                                      | 750                       | SPT1EM151E10O00RAXXX |
|          | 180      | 6.3×10        | 30                        | 1,200                                      | 900                       | SPT1EM181E10O00RAXXX |
|          | 180      | 8×9           | 45                        | 1,100                                      | 900                       | SPT1EM181F09O00RAXXX |
|          | 220      | 8×11          | 30                        | 1,300                                      | 1,100                     | SPT1EM221F11O00RAXXX |
|          | 220      | 10×12         | 30                        | 1,400                                      | 1,100                     | SPT1EM221G12O00RAXXX |
|          | 270      | 8×11          | 30                        | 1,300                                      | 1,350                     | SPT1EM271F11O00RAXXX |
|          | 330      | 8×11          | 30                        | 1,300                                      | 1,650                     | SPT1EM331F11O00RAXXX |
|          | 330      | 10×10         | 37                        | 1,200                                      | 1,650                     | SPT1EM331G10O00RAXXX |
| 330      | 10×12    | 30            | 1,500                     | 1,650                                      | SPT1EM331G12O00RAXXX      |                      |
| 470      | 8×16     | 30            | 1,400                     | 2,350                                      | SPT1EM471F16O00RAXXX      |                      |
| 470      | 10×12    | 30            | 1,600                     | 2,350                                      | SPT1EM471G12O00RAXXX      |                      |
| 560      | 10×12    | 30            | 1,600                     | 2,800                                      | SPT1EM561G12O00RAXXX      |                      |
| 680      | 10×12    | 30            | 1,600                     | 3,400                                      | SPT1EM681G12O00RAXXX      |                      |
| 680      | 10×15    | 30            | 1,600                     | 3,400                                      | SPT1EM681G15O00RAXXX      |                      |
| 820      | 10×18    | 30            | 1,600                     | 4,100                                      | SPT1EM821G18O00RAXXX      |                      |
| 1,000    | 10×18    | 30            | 1,700                     | 5,000                                      | SPT1EM102G18O00RAXXX      |                      |

※Specifications subject to change without notice

PF series

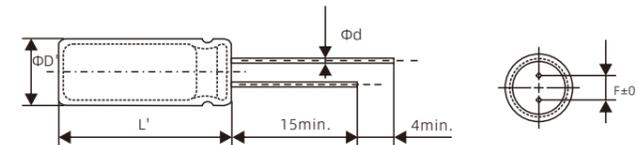
- Endurance: 3,000~5,000 hours at 105°C
- Long life
- Recommended applications: system board, display card, small changer and intelligent TV
- RoHS Compliant and lead-free



SPECIFICATIONS

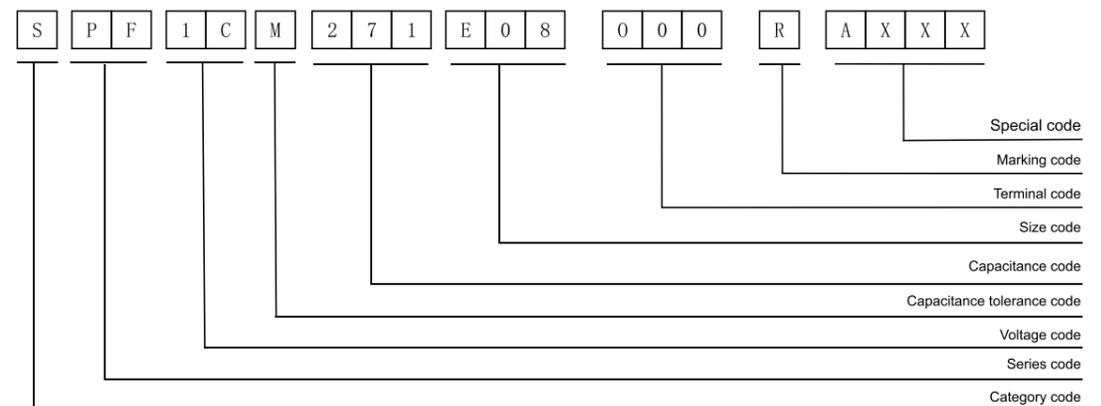
| Items  | Characteristics  |   |
|--|--|---|
| Category Temperature Range                             | -55~+105°C   |   |
| Rated Working Voltage Range                            | 6.3~125 Vdc  |   |
| Nominal Capacitance Range                              | 4.7~5,600μF  |   |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |   |
| DC Leakage Current                                     | I ≤ 0.2CV or 500μA, whichever is greater.<br>Where, I: Max. leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V) (at 20°C after 2 minutes)  |   |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 6.3 6.8 7 7.5 10 12 16 20 25 35 50 63 80 100 125 (at 20°C, 120Hz) |
|  | Dissipation Factor (Max.)  | 0.08 0.12 0.15  |
| ESR(100kHz,20°C)                                       | Value in the characteristics table   |   |
| Temperature Characteristic (Impedance Ratio at 100kHz) | Z(+105°C)/Z(+20°C) ≤ 1.5<br>Z(-55°C)/Z(+20°C) ≤ 2.0  |   |
| Endurance  | After applying rated voltage for 3,000~5,000 hours at 105°C, the capacitors shall meet the following requirements.   |   |
|  | Appearance   | No significant damage   |
|  | Capacitance Change   | ≤ ±20% of the initial value                                       |
|  | Dissipation Factor   | ≤ 150% of the initial specified value                             |
|  | ESR  | ≤ 150% of the initial specified value                             |
| Humidity Test  | After subjecting to 90%~95% RH for 1,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.   |   |
|  | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |   |
| Surge Test   | Appearance   | No significant damage   |
|  | Capacitance Change   | ≤ ±20% of the initial value                                       |
|  | Dissipation Factor   | ≤ 150% of the initial specified value                             |
|  | ESR  | ≤ 150% of the initial specified value                             |
|  | Leakage Current  | ≤ The initial specified value                                     |

DIMENSIONS [mm]



| ΦD  | 5           | 5.5         | 6.3         | 8   | 10       |
|-----|-------------|-------------|-------------|-----|----------|
| Φd  | 0.5         | 0.5         | 0.5         | 0.6 | 0.6      |
| F   | 2           | 2.5         | 2.5         | 3.5 | 5        |
| ΦD' | ΦD-0.1~+0.5 | ΦD-0.3~+0.3 | ΦD-0.1~+0.5 |     |          |
| L'  | L+1.0max.   |             |             |     | L-1~+0.5 |

PART NUMBERING SYSTEM



Conductive Polymer Radial Type

PF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 6.3      | 220      | 5×7           | 22                        | 3,100                                     | 500                       | SPF0JM221D07O00RAXXX |
|          | 270      | 5×7           | 22                        | 3,400                                     | 500                       | SPF0JM271D07O00RAXXX |
|          | 330      | 5×8           | 22                        | 3,600                                     | 500                       | SPF0JM331D08O00RAXXX |
|          | 330      | 6.3×5         | 27                        | 2,800                                     | 500                       | SPF0JM331E05O00RAXXX |
|          | 330      | 6.3×8         | 16                        | 3,600                                     | 500                       | SPF0JM331E08O00RAXXX |
|          | 390      | 5×9           | 22                        | 3,600                                     | 500                       | SPF0JM391D09O00RAXXX |
|          | 470      | 5×10          | 22                        | 3,800                                     | 592                       | SPF0JM471D10O00RAXXX |
|          | 470      | 5.5×9         | 22                        | 3,600                                     | 592                       | SPF0JM471B09O00RAXXX |
|          | 470      | 6.3×8         | 16                        | 3,900                                     | 592                       | SPF0JM471E08O00RAXXX |
|          | 560      | 5.5×9         | 22                        | 3,800                                     | 706                       | SPF0JM561B09O00RAXXX |
|          | 560      | 6.3×8         | 22                        | 4,300                                     | 706                       | SPF0JM561E08O00RAXXX |
|          | 680      | 5.5×9         | 22                        | 4,300                                     | 857                       | SPF0JM681B09O00RAXXX |
|          | 680      | 6.3×9         | 22                        | 4,500                                     | 857                       | SPF0JM681E09O00RAXXX |
|          | 680      | 8×9           | 22                        | 4,100                                     | 857                       | SPF0JM681F09O00RAXXX |
|          | 820      | 6.3×9         | 22                        | 4,500                                     | 1,033                     | SPF0JM821E09O00RAXXX |
|          | 1,000    | 6.3×10        | 11                        | 4,800                                     | 1,260                     | SPF0JM102E10O00RAXXX |
|          | 1,000    | 8×9           | 13                        | 4,600                                     | 1,260                     | SPF0JM102F09O00RAXXX |
|          | 1,000    | 8×11          | 11                        | 4,800                                     | 1,260                     | SPF0JM102F11O00RAXXX |
|          | 1,200    | 8×11          | 11                        | 4,800                                     | 1,512                     | SPF0JM122F11O00RAXXX |
|          | 1,500    | 8×11          | 11                        | 4,800                                     | 1,890                     | SPF0JM152F11O00RAXXX |
|          | 1,500    | 10×12         | 11                        | 4,900                                     | 1,890                     | SPF0JM152G12O00RAXXX |
|          | 1,800    | 10×10         | 11                        | 5,000                                     | 2,268                     | SPF0JM182G10O00RAXXX |
|          | 2,200    | 8×14          | 11                        | 5,100                                     | 2,772                     | SPF0JM222F14O00RAXXX |
|          | 2,200    | 10×12         | 11                        | 5,200                                     | 2,772                     | SPF0JM222G12O00RAXXX |
| 3,300    | 10×14    | 11            | 5,300                     | 4,158                                     | SPF0JM332G14O00RAXXX      |                      |
| 4,700    | 10×17    | 11            | 5,400                     | 5,000                                     | SPF0JM472G17O00RAXXX      |                      |
| 5,600    | 10×18    | 11            | 5,600                     | 5,000                                     | SPF0JM562G18O00RAXXX      |                      |
| 6.8      | 220      | 5×7           | 22                        | 2,900                                     | 500                       | SPF0CM221D07O00RAXXX |
|          | 270      | 5×7           | 22                        | 3,200                                     | 500                       | SPF0CM271D07O00RAXXX |
|          | 330      | 5×8           | 22                        | 3,400                                     | 500                       | SPF0CM331D08O00RAXXX |
|          | 390      | 5×9           | 22                        | 3,500                                     | 530                       | SPF0CM391D09O00RAXXX |
|          | 470      | 5×9           | 22                        | 3,600                                     | 639                       | SPF0CM471D09O00RAXXX |
|          | 470      | 6.3×7         | 22                        | 3,800                                     | 639                       | SPF0CM471E07O00RAXXX |
|          | 560      | 6.3×8         | 22                        | 4,000                                     | 762                       | SPF0CM561E08O00RAXXX |
|          | 680      | 6.3×9         | 22                        | 4,300                                     | 925                       | SPF0CM681E09O00RAXXX |
|          | 820      | 6.3×9         | 22                        | 4,400                                     | 1,115                     | SPF0CM821E09O00RAXXX |
|          | 1,000    | 6.3×11        | 13                        | 4,600                                     | 1,360                     | SPF0CM102E11O00RAXXX |
| 1,000    | 8×11     | 11            | 4,600                     | 1,360                                     | SPF0CM102F11O00RAXXX      |                      |
| 7        | 220      | 5×7           | 22                        | 2,800                                     | 500                       | SPF0QM221D07O00RAXXX |
|          | 270      | 5×8           | 22                        | 3,000                                     | 500                       | SPF0QM271D08O00RAXXX |
|          | 330      | 5×9           | 22                        | 3,200                                     | 500                       | SPF0QM331D09O00RAXXX |
|          | 470      | 5.5×9         | 22                        | 3,200                                     | 658                       | SPF0QM471B09O00RAXXX |
|          | 470      | 6.3×8         | 22                        | 3,400                                     | 658                       | SPF0QM471E08O00RAXXX |
|          | 560      | 6.3×8         | 22                        | 3,600                                     | 784                       | SPF0QM561E08O00RAXXX |

PF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 7        | 680      | 6.3×9         | 13                        | 3,700                                     | 952                       | SPF0QM681E09O00RAXXX |
|          | 820      | 6.3×10        | 13                        | 4,000                                     | 1,148                     | SPF0QM821E10O00RAXXX |
|          | 820      | 8×9           | 13                        | 4,100                                     | 1,148                     | SPF0QM821F09O00RAXXX |
| 7.5      | 220      | 5×7           | 22                        | 2,700                                     | 500                       | SPF0AM221D07O00RAXXX |
|          | 270      | 5×8           | 22                        | 2,900                                     | 500                       | SPF0AM271D08O00RAXXX |
|          | 330      | 5×9           | 22                        | 3,100                                     | 500                       | SPF0AM331D09O00RAXXX |
|          | 470      | 5.5×9         | 22                        | 3,100                                     | 705                       | SPF0AM471B09O00RAXXX |
|          | 470      | 6.3×7         | 28                        | 2,800                                     | 705                       | SPF0AM471E07O00RAXXX |
|          | 500      | 5.5×9         | 22                        | 3,200                                     | 750                       | SPF0AM501B09O00RAXXX |
|          | 560      | 6.3×8         | 22                        | 3,500                                     | 840                       | SPF0AM561E08O00RAXXX |
|          | 680      | 6.3×9         | 13                        | 3,600                                     | 1,020                     | SPF0AM681E09O00RAXXX |
|          | 820      | 6.3×10        | 13                        | 3,900                                     | 1,230                     | SPF0AM821E10O00RAXXX |
|          | 820      | 8×9           | 13                        | 4,000                                     | 1,230                     | SPF0AM821F09O00RAXXX |
|          | 1,200    | 8×11          | 13                        | 4,300                                     | 1,800                     | SPF0AM122F11O00RAXXX |
|          | 47       | 5×7           | 38                        | 1,900                                     | 500                       | SPF1AM470D07O00RAXXX |
|          | 56       | 5×7           | 38                        | 2,000                                     | 500                       | SPF1AM560D07O00RAXXX |
| 68       | 5×7      | 38            | 2,000                     | 500                                       | SPF1AM680D07O00RAXXX      |                      |
| 82       | 5×7      | 38            | 2,100                     | 500                                       | SPF1AM820D07O00RAXXX      |                      |
| 100      | 5×7      | 38            | 2,100                     | 500                                       | SPF1AM101D07O00RAXXX      |                      |
| 120      | 5×7      | 22            | 2,200                     | 500                                       | SPF1AM121D07O00RAXXX      |                      |
| 150      | 5×7      | 22            | 2,200                     | 500                                       | SPF1AM151D07O00RAXXX      |                      |
| 220      | 5×9      | 22            | 2,500                     | 500                                       | SPF1AM221D09O00RAXXX      |                      |
| 220      | 6.3×8    | 16            | 2,800                     | 500                                       | SPF1AM221E08O00RAXXX      |                      |
| 270      | 6.3×8    | 22            | 2,700                     | 540                                       | SPF1AM271E08O00RAXXX      |                      |
| 330      | 6.3×8    | 22            | 2,900                     | 660                                       | SPF1AM331E08O00RAXXX      |                      |
| 330      | 8×9      | 16            | 3,000                     | 660                                       | SPF1AM331F09O00RAXXX      |                      |
| 390      | 6.3×8    | 22            | 3,000                     | 780                                       | SPF1AM391E08O00RAXXX      |                      |
| 470      | 5.5×9    | 22            | 3,000                     | 940                                       | SPF1AM471B09O00RAXXX      |                      |
| 470      | 6.3×8    | 22            | 3,100                     | 940                                       | SPF1AM471E08O00RAXXX      |                      |
| 470      | 8×9      | 16            | 3,100                     | 940                                       | SPF1AM471F09O00RAXXX      |                      |
| 560      | 6.3×10   | 14            | 3,200                     | 1,120                                     | SPF1AM561E10O00RAXXX      |                      |
| 560      | 8×9      | 16            | 3,200                     | 1,120                                     | SPF1AM561F09O00RAXXX      |                      |
| 680      | 8×11     | 13            | 3,500                     | 1,360                                     | SPF1AM681F11O00RAXXX      |                      |
| 820      | 8×11     | 13            | 3,600                     | 1,640                                     | SPF1AM821F11O00RAXXX      |                      |
| 1,000    | 8×11     | 13            | 3,700                     | 2,000                                     | SPF1AM102F11O00RAXXX      |                      |
| 1,000    | 10×12    | 11            | 4,700                     | 2,000                                     | SPF1AM102G12O00RAXXX      |                      |
| 1,200    | 8×12     | 11            | 4,000                     | 2,400                                     | SPF1AM122F12O00RAXXX      |                      |
| 1,200    | 10×12    | 11            | 4,900                     | 2,400                                     | SPF1AM122G12O00RAXXX      |                      |
| 1,500    | 10×12    | 11            | 4,900                     | 3,000                                     | SPF1AM152G12O00RAXXX      |                      |
| 1,800    | 10×13    | 11            | 5,200                     | 3,600                                     | SPF1AM182G13O00RAXXX      |                      |
| 2,200    | 10×15    | 11            | 5,400                     | 4,400                                     | SPF1AM222G15O00RAXXX      |                      |
| 3,300    | 10×18    | 11            | 5,500                     | 5,000                                     | SPF1AM332G18O00RAXXX      |                      |
| 12       | 330      | 5.5×9         | 22                        | 2,700                                     | 792                       | SPF1TM331B09O00RAXXX |
|          | 470      | 5.5×9         | 22                        | 2,800                                     | 1,128                     | SPF1TM471B09O00RAXXX |

Conductive Polymer Radial Type

PF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |                      |
|----------|----------|---------------|---------------------------|--|---------------------------|----------------------|----------------------|
| 12       | 470      | 6.3×9         | 22                        | 3,100                                      | 1,128                     | SPF1TM471E09000RAXXX |                      |
|          | 680      | 6.3×11        | 17                        | 3,200                                      | 1,632                     | SPF1TM681E11000RAXXX |                      |
|          | 820      | 8×11          | 13                        | 3,400                                      | 1,968                     | SPF1TM821F11000RAXXX |                      |
|          | 1,000    | 8×12          | 13                        | 3,600                                      | 2,400                     | SPF1TM102F12000RAXXX |                      |
|          | 1,200    | 8×14          | 13                        | 3,900                                      | 2,880                     | SPF1TM122F14000RAXXX |                      |
|          | 1,500    | 8×16          | 13                        | 4,300                                      | 3,600                     | SPF1TM152F16000RAXXX |                      |
| 16       | 47       | 5×7           | 22                        | 1,800                                      | 500                       | SPF1CM470D07000RAXXX |                      |
|          | 56       | 5×7           | 22                        | 1,800                                      | 500                       | SPF1CM560D07000RAXXX |                      |
|          | 68       | 5×7           | 22                        | 1,900                                      | 500                       | SPF1CM680D07000RAXXX |                      |
|          | 82       | 5×8           | 22                        | 1,900                                      | 500                       | SPF1CM820D08000RAXXX |                      |
|          | 100      | 5×7           | 22                        | 2,000                                      | 500                       | SPF1CM101D07000RAXXX |                      |
|          | 100      | 6.3×5         | 27                        | 1,800                                      | 500                       | SPF1CM101E05000RAXXX |                      |
|          | 120      | 5×8           | 22                        | 2,100                                      | 500                       | SPF1CM121D08000RAXXX |                      |
|          | 150      | 5×8           | 22                        | 2,100                                      | 500                       | SPF1CM151D08000RAXXX |                      |
|          | 180      | 5×8           | 22                        | 2,200                                      | 576                       | SPF1CM181D08000RAXXX |                      |
|          | 180      | 6.3×7         | 17                        | 2,200                                      | 576                       | SPF1CM181E07000RAXXX |                      |
|          | 220      | 5×10          | 22                        | 2,300                                      | 704                       | SPF1CM221D10000RAXXX |                      |
|          | 220      | 6.3×8         | 22                        | 2,400                                      | 704                       | SPF1CM221E08000RAXXX |                      |
|          | 220      | 6.3×10        | 16                        | 2,600                                      | 704                       | SPF1CM221E10000RAXXX |                      |
|          | 270      | 5.5×9         | 22                        | 2,400                                      | 864                       | SPF1CM271B09000RAXXX |                      |
|          | 270      | 6.3×8         | 22                        | 2,500                                      | 864                       | SPF1CM271E08000RAXXX |                      |
|          | 270      | 8×9           | 22                        | 2,600                                      | 864                       | SPF1CM271F09000RAXXX |                      |
|          | 330      | 5.5×9         | 22                        | 2,600                                      | 1,056                     | SPF1CM331B09000RAXXX |                      |
|          | 330      | 6.3×9         | 22                        | 2,600                                      | 1,056                     | SPF1CM331E09000RAXXX |                      |
|          | 470      | 6.3×11        | 16                        | 2,800                                      | 1,504                     | SPF1CM471E11000RAXXX |                      |
|          | 470      | 8×11          | 16                        | 3,100                                      | 1,504                     | SPF1CM471F11000RAXXX |                      |
|          | 560      | 8×11          | 16                        | 2,800                                      | 1,792                     | SPF1CM561F11000RAXXX |                      |
|          | 560      | 8×13          | 16                        | 2,800                                      | 1,792                     | SPF1CM561F13000RAXXX |                      |
|          | 680      | 8×11          | 16                        | 3,000                                      | 2,176                     | SPF1CM681F11000RAXXX |                      |
|          | 680      | 10×12         | 13                        | 3,200                                      | 2,176                     | SPF1CM681G12000RAXXX |                      |
|          | 820      | 8×13          | 12                        | 3,100                                      | 2,624                     | SPF1CM821F13000RAXXX |                      |
|          | 820      | 10×12         | 13                        | 3,400                                      | 2,624                     | SPF1CM821G12000RAXXX |                      |
|          | 1,000    | 8×14          | 13                        | 3,200                                      | 3,200                     | SPF1CM102F14000RAXXX |                      |
|          | 1,000    | 10×12         | 13                        | 3,600                                      | 3,200                     | SPF1CM102G12000RAXXX |                      |
|          | 1,200    | 10×12         | 13                        | 3,700                                      | 3,840                     | SPF1CM122G12000RAXXX |                      |
|          | 1,200    | 10×15         | 13                        | 3,800                                      | 3,840                     | SPF1CM122G15000RAXXX |                      |
|          | 1,500    | 10×18         | 13                        | 4,900                                      | 4,800                     | SPF1CM152G18000RAXXX |                      |
|          | 1,800    | 10×14         | 13                        | 4,800                                      | 5,000                     | SPF1CM182G14000RAXXX |                      |
|          | 2,200    | 10×15         | 13                        | 4,900                                      | 5,000                     | SPF1CM222G15000RAXXX |                      |
|          | 2,200    | 10×17         | 13                        | 5,200                                      | 5,000                     | SPF1CM222G17000RAXXX |                      |
|          | 20       | 33            | 5×8                       | 44   | 1,700                     | 500                  | SPF1DM330D08000RAXXX |
|          |          | 39            | 5×8                       | 44   | 1,700                     | 500                  | SPF1DM390D08000RAXXX |
| 47       |          | 5×8           | 44                        | 1,900                                      | 500                       | SPF1DM470D08000RAXXX |                      |
| 56       |          | 5×9           | 44                        | 1,900                                      | 500                       | SPF1DM560D09000RAXXX |                      |

PF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|--|---------------------------|----------------------|
| 20       | 68       | 6.3×8         | 33                        | 1,900                                      | 500                       | SPF1DM680E08000RAXXX |
|          | 82       | 6.3×8         | 33                        | 1,900                                      | 500                       | SPF1DM820E08000RAXXX |
|          | 100      | 6.3×8         | 33                        | 1,900                                      | 500                       | SPF1DM101E08000RAXXX |
|          | 120      | 6.3×8         | 33                        | 2,000                                      | 500                       | SPF1DM121E08000RAXXX |
|          | 150      | 6.3×10        | 22                        | 2,100                                      | 600                       | SPF1DM151E10000RAXXX |
|          | 220      | 8×9           | 33                        | 2,200                                      | 880                       | SPF1DM221F09000RAXXX |
|          | 220      | 8×11          | 22                        | 2,200                                      | 880                       | SPF1DM221F11000RAXXX |
|          | 270      | 8×11          | 22                        | 2,400                                      | 1,080                     | SPF1DM271F11000RAXXX |
|          | 330      | 8×11          | 22                        | 2,500                                      | 1,320                     | SPF1DM331F11000RAXXX |
|          | 470      | 10×12         | 22                        | 2,600                                      | 1,880                     | SPF1DM471G12000RAXXX |
|          | 680      | 10×12         | 22                        | 2,700                                      | 2,720                     | SPF1DM681G12000RAXXX |
|          | 680      | 10×15         | 22                        | 2,900                                      | 2,720                     | SPF1DM681G15000RAXXX |
|          | 820      | 10×18         | 22                        | 3,000                                      | 3,280                     | SPF1DM821G18000RAXXX |
|          | 1,000    | 10×18         | 22                        | 3,500                                      | 4,000                     | SPF1DM102G18000RAXXX |
| 25       | 33       | 5×9           | 66                        | 1,600                                      | 500                       | SPF1EM330D09000RAXXX |
|          | 39       | 5×8           | 66                        | 1,700                                      | 500                       | SPF1EM390D08000RAXXX |
|          | 47       | 5×9           | 66                        | 1,700                                      | 500                       | SPF1EM470D09000RAXXX |
|          | 56       | 5×9           | 66                        | 1,800                                      | 500                       | SPF1EM560D09000RAXXX |
|          | 82       | 6.3×7         | 33                        | 2,200                                      | 500                       | SPF1EM820E07000RAXXX |
|          | 100      | 6.3×8         | 33                        | 2,200                                      | 500                       | SPF1EM101E08000RAXXX |
|          | 100      | 8×11          | 22                        | 2,700                                      | 500                       | SPF1EM101F11000RAXXX |
|          | 120      | 6.3×8         | 33                        | 2,200                                      | 600                       | SPF1EM121E08000RAXXX |
|          | 150      | 6.3×10        | 22                        | 2,500                                      | 750                       | SPF1EM151E10000RAXXX |
|          | 180      | 8×9           | 33                        | 2,200                                      | 900                       | SPF1EM181F09000RAXXX |
|          | 220      | 8×11          | 22                        | 2,700                                      | 1,100                     | SPF1EM221F11000RAXXX |
|          | 270      | 8×11          | 22                        | 2,700                                      | 1,350                     | SPF1EM271F11000RAXXX |
|          | 330      | 8×11          | 22                        | 2,700                                      | 1,650                     | SPF1EM331F11000RAXXX |
|          | 330      | 10×12         | 22                        | 3,000                                      | 1,650                     | SPF1EM331G12000RAXXX |
|          | 470      | 8×11          | 22                        | 2,700                                      | 2,350                     | SPF1EM471F11000RAXXX |
|          | 470      | 10×12         | 22                        | 3,600                                      | 2,350                     | SPF1EM471G12000RAXXX |
|          | 680      | 10×15         | 22                        | 3,800                                      | 3,400                     | SPF1EM681G15000RAXXX |
|          | 820      | 8×16          | 22                        | 3,200                                      | 4,100                     | SPF1EM821F16000RAXXX |
|          | 820      | 10×18         | 22                        | 4,000                                      | 4,100                     | SPF1EM821G18000RAXXX |
|          | 1,000    | 10×18         | 22                        | 4,000                                      | 5,000                     | SPF1EM102G18000RAXXX |
| 35       | 4.7      | 5×8           | 66                        | 1,500                                      | 500                       | SPF1VM47R08000RAXXX  |
|          | 10       | 5×8           | 66                        | 1,600                                      | 500                       | SPF1VM100D08000RAXXX |
|          | 15       | 5×8           | 66                        | 1,600                                      | 500                       | SPF1VM150D08000RAXXX |
|          | 22       | 5×9           | 110                       | 1,700                                      | 500                       | SPF1VM220D09000RAXXX |
|          | 33       | 5×9           | 55                        | 1,800                                      | 500                       | SPF1VM330D09000RAXXX |
|          | 39       | 5×9           | 55                        | 1,800                                      | 500                       | SPF1VM390D09000RAXXX |
|          | 47       | 6.3×7         | 55                        | 1,800                                      | 500                       | SPF1VM470E07000RAXXX |
|          | 56       | 6.3×7         | 55                        | 1,900                                      | 500                       | SPF1VM560E07000RAXXX |
| 68       | 6.3×7    | 55            | 1,900                     | 500  | SPF1VM680E07000RAXXX      |                      |
| 82       | 6.3×7    | 55            | 2,000                     | 574  | SPF1VM820E07000RAXXX      |                      |

Conductive Polymer Radial Type

PF series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|--|---------------------------|----------------------|
| 35       | 100      | 6.3×8         | 55                        | 2,100                                      | 700                       | SPF1VM101E08000RAXXX |
|          | 100      | 8×11          | 44                        | 2,300                                      | 700                       | SPF1VM101F11000RAXXX |
|          | 120      | 6.3×10        | 44                        | 2,200                                      | 840                       | SPF1VM121E10000RAXXX |
|          | 150      | 6.3×10        | 44                        | 2,200                                      | 1,050                     | SPF1VM151E10000RAXXX |
|          | 220      | 8×11          | 44                        | 2,500                                      | 1,540                     | SPF1VM221F11000RAXXX |
|          | 220      | 10×12         | 33                        | 2,600                                      | 1,540                     | SPF1VM221G12000RAXXX |
|          | 270      | 10×12         | 33                        | 2,700                                      | 1,890                     | SPF1VM271G12000RAXXX |
|          | 330      | 10×12         | 33                        | 2,700                                      | 2,310                     | SPF1VM331G12000RAXXX |
|          | 470      | 10×13         | 22                        | 2,800                                      | 3,290                     | SPF1VM471G13000RAXXX |
|          | 680      | 10×16         | 22                        | 3,000                                      | 4,760                     | SPF1VM681G16000RAXXX |
|          | 820      | 10×18         | 22                        | 3,100                                      | 5,000                     | SPF1VM821G18000RAXXX |
| 1,000    | 10×18    | 22            | 3,300                     | 5,000                                      | SPF1VM102G18000RAXXX      |                      |
| 50       | 4.7      | 5×8           | 66                        | 1,300                                      | 500                       | SPF1HM4R7D08000RAXXX |
|          | 10       | 5×8           | 77                        | 1,400                                      | 500                       | SPF1HM100D08000RAXXX |
|          | 10       | 6.3×7         | 38                        | 1,600                                      | 500                       | SPF1HM100E07000RAXXX |
|          | 15       | 5×8           | 77                        | 1,400                                      | 500                       | SPF1HM150D08000RAXXX |
|          | 22       | 6.3×7         | 44                        | 1,700                                      | 500                       | SPF1HM220E07000RAXXX |
|          | 33       | 6.3×7         | 44                        | 1,800                                      | 500                       | SPF1HM330E07000RAXXX |
|          | 47       | 6.3×8         | 38                        | 1,800                                      | 500                       | SPF1HM470E08000RAXXX |
|          | 56       | 6.3×8         | 38                        | 1,900                                      | 560                       | SPF1HM560E08000RAXXX |
|          | 68       | 6.3×10        | 33                        | 1,900                                      | 680                       | SPF1HM680E10000RAXXX |
|          | 100      | 8×11          | 33                        | 2,000                                      | 1,000                     | SPF1HM101F11000RAXXX |
|          | 120      | 8×11          | 33                        | 2,100                                      | 1,200                     | SPF1HM121F11000RAXXX |
|          | 150      | 10×12         | 33                        | 2,200                                      | 1,500                     | SPF1HM151G12000RAXXX |
|          | 220      | 10×12         | 33                        | 2,400                                      | 2,200                     | SPF1HM221G12000RAXXX |
|          | 270      | 10×13         | 22                        | 2,600                                      | 2,700                     | SPF1HM271G13000RAXXX |
|          | 330      | 10×15         | 22                        | 2,700                                      | 3,300                     | SPF1HM331G15000RAXXX |
| 440      | 10×18    | 22            | 2,700                     | 4,400                                      | SPF1HM441G18000RAXXX      |                      |
| 470      | 10×18    | 22            | 2,800                     | 4,700                                      | SPF1HM471G18000RAXXX      |                      |
| 63       | 4.7      | 6.3×8         | 66                        | 1,400                                      | 500                       | SPF1JM4R7E08000RAXXX |
|          | 6.8      | 6.3×8         | 66                        | 1,400                                      | 500                       | SPF1JM6R8E08000RAXXX |
|          | 10       | 6.3×8         | 66                        | 1,400                                      | 500                       | SPF1JM100E08000RAXXX |
|          | 33       | 6.3×8         | 33                        | 1,500                                      | 500                       | SPF1JM330E08000RAXXX |
|          | 39       | 6.3×8         | 33                        | 1,500                                      | 500                       | SPF1JM390E08000RAXXX |
|          | 47       | 6.3×9         | 33                        | 1,700                                      | 592                       | SPF1JM470E09000RAXXX |
|          | 56       | 8×9           | 33                        | 1,600                                      | 706                       | SPF1JM560F09000RAXXX |
|          | 68       | 8×11          | 33                        | 1,800                                      | 857                       | SPF1JM680F11000RAXXX |
|          | 82       | 8×11          | 33                        | 1,800                                      | 1,033                     | SPF1JM820F11000RAXXX |
|          | 100      | 10×12         | 33                        | 1,900                                      | 1,260                     | SPF1JM101G12000RAXXX |
|          | 150      | 10×12         | 33                        | 2,200                                      | 1,890                     | SPF1JM151G12000RAXXX |
|          | 220      | 10×15         | 22                        | 2,300                                      | 2,772                     | SPF1JM221G15000RAXXX |
|          | 270      | 10×17         | 22                        | 2,500                                      | 3,402                     | SPF1JM271G17000RAXXX |
| 330      | 10×18    | 22            | 2,600                     | 4,158                                      | SPF1JM331G18000RAXXX      |                      |
| 80       | 4.7      | 6.3×8         | 66                        | 1,300                                      | 500                       | SPF1BM4R7E08000RAXXX |

PF series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|--|---------------------------|----------------------|
| 80       | 6.8      | 6.3×8         | 66                        | 1,300                                      | 500                       | SPF1BM6R8E08000RAXXX |
|          | 22       | 6.3×10        | 66                        | 1,400                                      | 500                       | SPF1BM220E10000RAXXX |
|          | 33       | 8×11          | 38                        | 1,500                                      | 528                       | SPF1BM330F11000RAXXX |
|          | 47       | 10×12         | 38                        | 1,600                                      | 752                       | SPF1BM470G12000RAXXX |
|          | 68       | 10×12         | 38                        | 1,700                                      | 1,088                     | SPF1BM680G12000RAXXX |
|          | 100      | 10×14         | 38                        | 1,800                                      | 1,600                     | SPF1BM101G14000RAXXX |
| 100      | 4.7      | 6.3×8         | 132                       | 1,200                                      | 500                       | SPF1KM4R7E08000RAXXX |
|          | 6.8      | 6.3×8         | 132                       | 1,300                                      | 500                       | SPF1KM6R8E08000RAXXX |
|          | 10       | 6.3×10        | 55                        | 1,300                                      | 500                       | SPF1KM100E10000RAXXX |
|          | 10       | 8×11          | 55                        | 1,300                                      | 500                       | SPF1KM100F11000RAXXX |
|          | 15       | 8×11          | 55                        | 1,300                                      | 500                       | SPF1KM150F11000RAXXX |
|          | 22       | 10×12         | 38                        | 1,400                                      | 500                       | SPF1KM220G12000RAXXX |
|          | 33       | 10×14         | 38                        | 1,400                                      | 660                       | SPF1KM330G14000RAXXX |
|          | 47       | 10×16         | 38                        | 1,600                                      | 940                       | SPF1KM470G16000RAXXX |
| 125      | 33       | 10×14         | 38                        | 1,400                                      | 825                       | SPF2IM330G14000RAXXX |
|          | 47       | 10×16         | 38                        | 1,400                                      | 1,175                     | SPF2IM470G16000RAXXX |

※ Specifications subject to change without notice

Conductive Polymer Radial Type

PU series

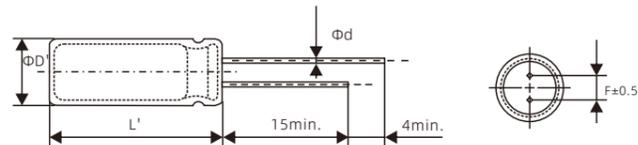
- Endurance: 2,000 hours at 105°C
- Low ESR
- Recommended applications : main board, display card
- RoHS Compliant and lead-free



SPECIFICATIONS

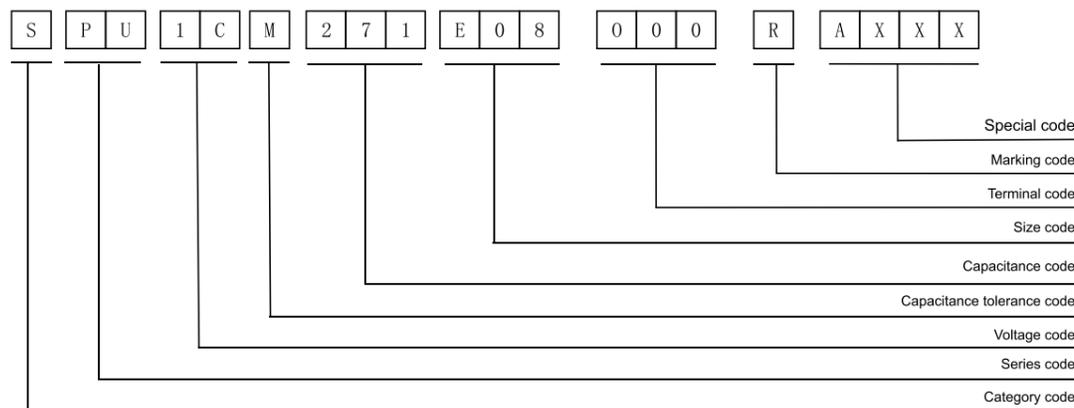
| Items  | Characteristics  |                                       |
|--|--|---------------------------------------|
| Category Temperature Range                             | -55~+105°C   |                                       |
| Rated Working Voltage Range                            | 6.3~25 Vdc   |                                       |
| Nominal Capacitance Range                              | 39~ 5,600μF  |                                       |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)  |                                       |
| DC Leakage Current                                     | I ≤ 0.2CV or 500μA, whichever is greater.<br>Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)   |                                       |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc) 6.3 6.8 7 7.5 10 12 16 20 25  |                                       |
|  | Dissipation Factor (Max.) 0.08 0.12 (at 20°C,120Hz)  |                                       |
| ESR(100kHz,20°C)                                       | Value in the characteristics table   |                                       |
| Temperature Characteristic (Impedance Ratio at 100kHz) | Z(+105°C)/Z(+20°C) ≤ 1.5<br>Z(-55°C)/Z(+20°C) ≤ 2.0  |                                       |
| Endurance  | After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements.   |                                       |
|  | Appearance   | No significant damage                 |
|  | Capacitance Change   | ≤ ±20% of the initial value           |
|  | Dissipation Factor   | ≤ 150% of the initial specified value |
|  | ESR  | ≤ 150% of the initial specified value |
|  | Leakage Current  | ≤ The initial specified value         |
| Humidity Test  | After subjecting to 90%~95% RH for 1,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.   |                                       |
| Surge Test   | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                       |
|  | Appearance   | No significant damage                 |
|  | Capacitance Change   | ≤ ±20% of the initial value           |
|  | Dissipation Factor   | ≤ 150% of the initial specified value |
|  | ESR  | ≤ 150% of the initial specified value |
|  | Leakage Current  | ≤ The initial specified value         |

DIMENSIONS [mm]



| ΦD  | 5           | 5.5         | 6.3         | 8        | 10  |
|-----|-------------|-------------|-------------|----------|-----|
| Φd  | 0.5         | 0.5         | 0.5         | 0.6      | 0.6 |
| F   | 2           | 2.5         | 2.5         | 3.5      | 5   |
| ΦD' | ΦD-0.1~+0.5 | ΦD-0.3~+0.3 | ΦD-0.1~+0.5 |          |     |
| L'  | L+1.0max.   |             |             | L-1~+0.5 |     |

PART NUMBERING SYSTEM



PU series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz) (max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |                      |
|----------|----------|---------------|----------------------------|--|---------------------------|----------------------|----------------------|
| 6.3      | 220      | 5×7           | 14                         | 3,800                                      | 500                       | SPU0JM221D07O00RAXXX |                      |
|          | 270      | 5×7           | 14                         | 4,100                                      | 500                       | SPU0JM271D07O00RAXXX |                      |
|          | 330      | 5×8           | 14                         | 4,400                                      | 500                       | SPU0JM331D08O00RAXXX |                      |
|          | 330      | 6.3×5         | 17                         | 3,400                                      | 500                       | SPU0JM331E05O00RAXXX |                      |
|          | 330      | 6.3×8         | 10                         | 4,400                                      | 500                       | SPU0JM331E08O00RAXXX |                      |
|          | 390      | 5×9           | 14                         | 4,500                                      | 500                       | SPU0JM391D09O00RAXXX |                      |
|          | 470      | 5×10          | 14                         | 4,700                                      | 592                       | SPU0JM471D10O00RAXXX |                      |
|          | 470      | 5.5×9         | 14                         | 4,500                                      | 592                       | SPU0JM471B09O00RAXXX |                      |
|          | 470      | 6.3×8         | 10                         | 4,800                                      | 592                       | SPU0JM471E08O00RAXXX |                      |
|          | 560      | 5.5×9         | 14                         | 4,700                                      | 706                       | SPU0JM561B09O00RAXXX |                      |
|          | 560      | 6.3×8         | 8                          | 5,200                                      | 706                       | SPU0JM561E08O00RAXXX |                      |
|          | 680      | 5.5×9         | 14                         | 5,200                                      | 857                       | SPU0JM681B09O00RAXXX |                      |
|          | 680      | 6.3×9         | 14                         | 5,500                                      | 857                       | SPU0JM681E09O00RAXXX |                      |
|          | 680      | 8×9           | 14                         | 5,000                                      | 857                       | SPU0JM681F09O00RAXXX |                      |
|          | 820      | 6.3×9         | 14                         | 5,500                                      | 1,033                     | SPU0JM821E09O00RAXXX |                      |
|          | 1,000    | 6.3×10        | 8                          | 5,600                                      | 1,260                     | SPU0JM102E10O00RAXXX |                      |
|          | 1,000    | 8×11          | 8                          | 5,700                                      | 1,260                     | SPU0JM102F11O00RAXXX |                      |
|          | 1,200    | 8×11          | 8                          | 5,800                                      | 1,512                     | SPU0JM122F11O00RAXXX |                      |
|          | 1,500    | 8×11          | 8                          | 5,900                                      | 1,890                     | SPU0JM152F11O00RAXXX |                      |
|          | 1,500    | 10×12         | 8                          | 6,000                                      | 1,890                     | SPU0JM152G12O00RAXXX |                      |
|          | 1,800    | 10×10         | 8                          | 6,100                                      | 2,268                     | SPU0JM182G10O00RAXXX |                      |
|          | 2,200    | 8×14          | 8                          | 6,200                                      | 2,772                     | SPU0JM222F14O00RAXXX |                      |
|          | 2,200    | 10×12         | 8                          | 6,300                                      | 2,772                     | SPU0JM222G12O00RAXXX |                      |
|          | 3,300    | 10×14         | 8                          | 6,400                                      | 4,158                     | SPU0JM332G14O00RAXXX |                      |
| 4,700    | 10×17    | 8             | 6,700                      | 5,000                                      | SPU0JM472G17O00RAXXX      |                      |                      |
| 5,600    | 10×18    | 8             | 6,900                      | 5,000                                      | SPU0JM562G18O00RAXXX      |                      |                      |
| 6.8      | 220      | 5×7           | 15                         | 3,630                                      | 500                       | SPU0CM221D07O00RAXXX |                      |
|          | 270      | 5×7           | 15                         | 3,960                                      | 500                       | SPU0CM271D07O00RAXXX |                      |
|          | 330      | 5×8           | 15                         | 4,180                                      | 500                       | SPU0CM331D08O00RAXXX |                      |
|          | 330      | 6.3×5         | 20                         | 3,410                                      | 500                       | SPU0CM331E05O00RAXXX |                      |
|          | 390      | 5×9           | 15                         | 4,290                                      | 530                       | SPU0CM391D09O00RAXXX |                      |
|          | 470      | 5×9           | 15                         | 4,510                                      | 639                       | SPU0CM471D09O00RAXXX |                      |
|          | 470      | 6.3×7         | 15                         | 4,070                                      | 639                       | SPU0CM471E07O00RAXXX |                      |
|          | 560      | 6.3×8         | 15                         | 4,950                                      | 762                       | SPU0CM561E08O00RAXXX |                      |
|          | 680      | 6.3×9         | 15                         | 5,280                                      | 925                       | SPU0CM681E09O00RAXXX |                      |
|          | 820      | 6.3×9         | 15                         | 5,390                                      | 1,115                     | SPU0CM821E09O00RAXXX |                      |
|          | 1,000    | 6.3×11        | 10                         | 5,610                                      | 1,360                     | SPU0CM102E11O00RAXXX |                      |
|          | 1,000    | 8×11          | 8                          | 5,665                                      | 1,360                     | SPU0CM102F11O00RAXXX |                      |
|          | 7        | 220           | 5×7                        | 18   | 3,520                     | 500                  | SPU0QM221D07O00RAXXX |
|          |          | 270           | 5×8                        | 18   | 3,740                     | 500                  | SPU0QM271D08O00RAXXX |
| 330      |          | 5×9           | 18                         | 3,960                                      | 500                       | SPU0QM331D09O00RAXXX |                      |
| 470      |          | 5.5×9         | 18                         | 3,960                                      | 658                       | SPU0QM471B09O00RAXXX |                      |
| 470      |          | 6.3×8         | 18                         | 4,180                                      | 658                       | SPU0QM471E08O00RAXXX |                      |
| 560      |          | 6.3×8         | 18                         | 4,400                                      | 784                       | SPU0QM561E08O00RAXXX |                      |

Conductive Polymer Radial Type

PU series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mAmps/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 7        | 680      | 6.3×9         | 11                        | 4,620                                     | 952                       | SPU0QM681E09O00RAXXX |
|          | 820      | 6.3×10        | 11                        | 4,950                                     | 1,148                     | SPU0QM821E10O00RAXXX |
|          | 820      | 8×9           | 11                        | 5,060                                     | 1,148                     | SPU0QM821F09O00RAXXX |
| 7.5      | 220      | 5×7           | 18                        | 3,410                                     | 500                       | SPU0AM221D07O00RAXXX |
|          | 270      | 5×8           | 18                        | 3,630                                     | 500                       | SPU0AM271D08O00RAXXX |
|          | 330      | 5×9           | 18                        | 3,850                                     | 500                       | SPU0AM331D09O00RAXXX |
|          | 390      | 5×9           | 18                        | 3,850                                     | 585                       | SPU0AM391D09O00RAXXX |
|          | 470      | 5.5×9         | 18                        | 3,905                                     | 705                       | SPU0AM471B09O00RAXXX |
|          | 470      | 6.3×7         | 23                        | 3,520                                     | 705                       | SPU0AM471E07O00RAXXX |
|          | 500      | 5.5×9         | 18                        | 3,960                                     | 750                       | SPU0AM501B09O00RAXXX |
|          | 560      | 6.3×8         | 18                        | 4,290                                     | 840                       | SPU0AM561E08O00RAXXX |
|          | 680      | 6.3×9         | 11                        | 4,510                                     | 1,020                     | SPU0AM681E09O00RAXXX |
|          | 820      | 6.3×10        | 11                        | 4,840                                     | 1,230                     | SPU0AM821E10O00RAXXX |
|          | 820      | 8×9           | 11                        | 5,005                                     | 1,230                     | SPU0AM821F09O00RAXXX |
|          | 1,200    | 8×11          | 11                        | 5,280                                     | 1,800                     | SPU0AM122F11O00RAXXX |
| 10       | 47       | 5×7           | 24                        | 2,400                                     | 500                       | SPU1AM470D07O00RAXXX |
|          | 56       | 5×7           | 24                        | 2,400                                     | 500                       | SPU1AM560D07O00RAXXX |
|          | 68       | 5×7           | 24                        | 2,500                                     | 500                       | SPU1AM680D07O00RAXXX |
|          | 82       | 5×7           | 24                        | 2,500                                     | 500                       | SPU1AM820D07O00RAXXX |
|          | 100      | 5×7           | 24                        | 2,600                                     | 500                       | SPU1AM101D07O00RAXXX |
|          | 120      | 5×7           | 14                        | 2,600                                     | 500                       | SPU1AM121D07O00RAXXX |
|          | 150      | 5×7           | 14                        | 2,700                                     | 500                       | SPU1AM151D07O00RAXXX |
|          | 220      | 5×9           | 14                        | 3,100                                     | 500                       | SPU1AM221D09O00RAXXX |
|          | 220      | 6.3×8         | 10                        | 3,400                                     | 500                       | SPU1AM221E08O00RAXXX |
|          | 270      | 6.3×8         | 14                        | 3,400                                     | 540                       | SPU1AM271E08O00RAXXX |
|          | 330      | 6.3×8         | 14                        | 3,600                                     | 660                       | SPU1AM331E08O00RAXXX |
|          | 330      | 8×9           | 10                        | 3,700                                     | 660                       | SPU1AM331F09O00RAXXX |
|          | 390      | 6.3×8         | 14                        | 3,700                                     | 780                       | SPU1AM391E08O00RAXXX |
|          | 470      | 5.5×9         | 14                        | 3,700                                     | 940                       | SPU1AM471B09O00RAXXX |
|          | 470      | 6.3×8         | 14                        | 3,800                                     | 940                       | SPU1AM471E08O00RAXXX |
|          | 470      | 8×9           | 10                        | 3,900                                     | 940                       | SPU1AM471F09O00RAXXX |
|          | 560      | 6.3×10        | 9                         | 3,900                                     | 1,120                     | SPU1AM561E10O00RAXXX |
|          | 560      | 8×9           | 10                        | 3,900                                     | 1,120                     | SPU1AM561F09O00RAXXX |
|          | 680      | 8×11          | 8                         | 4,200                                     | 1,360                     | SPU1AM681F11O00RAXXX |
|          | 820      | 8×11          | 8                         | 4,400                                     | 1,640                     | SPU1AM821F11O00RAXXX |
|          | 1,000    | 8×11          | 8                         | 4,600                                     | 2,000                     | SPU1AM102F11O00RAXXX |
|          | 1,000    | 10×12         | 8                         | 5,800                                     | 2,000                     | SPU1AM102G12O00RAXXX |
|          | 1,200    | 8×12          | 8                         | 4,900                                     | 2,400                     | SPU1AM122F12O00RAXXX |
|          | 1,200    | 10×12         | 8                         | 5,900                                     | 2,400                     | SPU1AM122G12O00RAXXX |
| 1,500    | 10×12    | 8             | 6,000                     | 3,000                                     | SPU1AM152G12O00RAXXX      |                      |
| 1,800    | 10×13    | 8             | 6,300                     | 3,600                                     | SPU1AM182G13O00RAXXX      |                      |
| 2,200    | 10×15    | 8             | 6,700                     | 4,400                                     | SPU1AM222G15O00RAXXX      |                      |
| 3,300    | 10×18    | 8             | 6,800                     | 5,000                                     | SPU1AM332G18O00RAXXX      |                      |
| 12       | 330      | 5.5×9         | 18                        | 3,410                                     | 792                       | SPU1TM331B09O00RAXXX |

PU series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mAmps/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 12       | 470      | 5.5×9         | 18                        | 3,520                                     | 1,128                     | SPU1TM471B09O00RAXXX |
|          | 470      | 6.3×9         | 18                        | 3,795                                     | 1,128                     | SPU1TM471E09O00RAXXX |
|          | 560      | 6.3×10        | 14                        | 3,740                                     | 1,344                     | SPU1TM561E10O00RAXXX |
|          | 680      | 6.3×11        | 14                        | 3,960                                     | 1,632                     | SPU1TM681E11O00RAXXX |
|          | 680      | 8×10          | 14                        | 4,070                                     | 1,632                     | SPU1TM681F10O00RAXXX |
|          | 820      | 8×11          | 11                        | 4,180                                     | 1,968                     | SPU1TM821F11O00RAXXX |
|          | 1,000    | 8×12          | 11                        | 4,400                                     | 2,400                     | SPU1TM102F12O00RAXXX |
|          | 1,200    | 8×14          | 11                        | 4,840                                     | 2,880                     | SPU1TM122F14O00RAXXX |
|          | 1,500    | 8×16          | 11                        | 5,280                                     | 3,600                     | SPU1TM152F16O00RAXXX |
| 16       | 47       | 5×7           | 14                        | 2,200                                     | 500                       | SPU1CM470D07O00RAXXX |
|          | 56       | 5×7           | 14                        | 2,300                                     | 500                       | SPU1CM560D07O00RAXXX |
|          | 68       | 5×7           | 14                        | 2,300                                     | 500                       | SPU1CM680D07O00RAXXX |
|          | 82       | 5×8           | 14                        | 2,400                                     | 500                       | SPU1CM820D08O00RAXXX |
|          | 100      | 5×7           | 14                        | 2,400                                     | 500                       | SPU1CM101D07O00RAXXX |
|          | 100      | 6.3×5         | 17                        | 2,300                                     | 500                       | SPU1CM101E05O00RAXXX |
|          | 100      | 6.3×8         | 14                        | 3,000                                     | 500                       | SPU1CM101E08O00RAXXX |
|          | 120      | 5×8           | 14                        | 2,500                                     | 500                       | SPU1CM121D08O00RAXXX |
|          | 150      | 5×8           | 14                        | 2,600                                     | 500                       | SPU1CM151D08O00RAXXX |
|          | 180      | 5×8           | 14                        | 2,600                                     | 576                       | SPU1CM181D08O00RAXXX |
|          | 180      | 6.3×7         | 11                        | 2,700                                     | 576                       | SPU1CM181E07O00RAXXX |
|          | 220      | 5×10          | 14                        | 2,800                                     | 704                       | SPU1CM221D10O00RAXXX |
|          | 220      | 6.3×8         | 14                        | 2,900                                     | 704                       | SPU1CM221E08O00RAXXX |
|          | 220      | 6.3×10        | 10                        | 3,100                                     | 704                       | SPU1CM221E10O00RAXXX |
|          | 270      | 5.5×9         | 14                        | 3,000                                     | 864                       | SPU1CM271B09O00RAXXX |
|          | 270      | 6.3×8         | 14                        | 3,000                                     | 864                       | SPU1CM271E08O00RAXXX |
|          | 270      | 8×9           | 14                        | 3,100                                     | 864                       | SPU1CM271F09O00RAXXX |
|          | 330      | 5.5×9         | 14                        | 3,100                                     | 1,056                     | SPU1CM331B09O00RAXXX |
|          | 330      | 6.3×9         | 14                        | 3,100                                     | 1,056                     | SPU1CM331E09O00RAXXX |
|          | 470      | 6.3×11        | 10                        | 3,500                                     | 1,504                     | SPU1CM471E11O00RAXXX |
|          | 470      | 8×11          | 10                        | 5,000                                     | 1,504                     | SPU1CM471F11O00RAXXX |
|          | 560      | 8×11          | 10                        | 3,500                                     | 1,792                     | SPU1CM561F11O00RAXXX |
|          | 560      | 8×13          | 10                        | 3,600                                     | 1,792                     | SPU1CM561F13O00RAXXX |
|          | 560      | 10×12         | 8                         | 3,800                                     | 1,792                     | SPU1CM561G12O00RAXXX |
| 680      | 8×11     | 10            | 3,700                     | 2,176                                     | SPU1CM681F11O00RAXXX      |                      |
| 680      | 10×12    | 8             | 3,900                     | 2,176                                     | SPU1CM681G12O00RAXXX      |                      |
| 820      | 8×13     | 8             | 3,800                     | 2,624                                     | SPU1CM821F13O00RAXXX      |                      |
| 820      | 10×12    | 8             | 4,100                     | 2,624                                     | SPU1CM821G12O00RAXXX      |                      |
| 1,000    | 8×14     | 8             | 3,900                     | 3,200                                     | SPU1CM102F14O00RAXXX      |                      |
| 1,000    | 10×12    | 8             | 4,400                     | 3,200                                     | SPU1CM102G12O00RAXXX      |                      |
| 1,200    | 10×15    | 8             | 4,700                     | 3,840                                     | SPU1CM122G15O00RAXXX      |                      |
| 1,500    | 10×18    | 8             | 6,000                     | 4,800                                     | SPU1CM152G18O00RAXXX      |                      |
| 1,800    | 10×15    | 9             | 5,900                     | 5,000                                     | SPU1CM182G15O00RAXXX      |                      |
| 2,200    | 10×18    | 8             | 6,300                     | 5,000                                     | SPU1CM222G18O00RAXXX      |                      |
| 20       | 39       | 5×8           | 36                        | 2,145                                     | 500                       | SPU1DM390D08O00RAXXX |

Conductive Polymer Radial Type



PR series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 2.5      | 560      | 6.3×8         | 12                        | 2,000                                     | 500                       | SPR0EM561E08O00RAXXX |
|          | 680      | 6.3×8         | 12                        | 2,000                                     | 500                       | SPR0EM681E08O00RAXXX |
|          | 820      | 6.3×9         | 12                        | 2,000                                     | 500                       | SPR0EM821E09O00RAXXX |
|          | 1,200    | 8×9           | 14                        | 2,100                                     | 600                       | SPR0EM122F09O00RAXXX |
| 6.3      | 330      | 6.3×8         | 12                        | 1,900                                     | 500                       | SPR0JM331E08O00RAXXX |
|          | 470      | 6.3×8         | 12                        | 1,900                                     | 592                       | SPR0JM471E08O00RAXXX |
|          | 470      | 8×9           | 14                        | 2,100                                     | 592                       | SPR0JM471F09O00RAXXX |
|          | 560      | 6.3×8         | 12                        | 1,900                                     | 706                       | SPR0JM561E08O00RAXXX |
|          | 680      | 8×11          | 12                        | 2,200                                     | 857                       | SPR0JM681F11O00RAXXX |
|          | 820      | 8×11          | 12                        | 2,200                                     | 1,033                     | SPR0JM821F11O00RAXXX |
|          | 1,000    | 8×11          | 12                        | 2,300                                     | 1,260                     | SPR0JM102F11O00RAXXX |
|          | 1,200    | 8×11          | 12                        | 2,300                                     | 1,512                     | SPR0JM122F11O00RAXXX |
|          | 1,500    | 10×12         | 12                        | 2,500                                     | 1,890                     | SPR0JM152G12O00RAXXX |
|          | 1,500    | 10×12         | 12                        | 2,500                                     | 1,890                     | SPR0JM152G12O00RAXXX |
| 10       | 220      | 6.3×8         | 12                        | 1,700                                     | 500                       | SPR1AM221E08O00RAXXX |
|          | 270      | 6.3×8         | 12                        | 1,700                                     | 540                       | SPR1AM271E08O00RAXXX |
|          | 330      | 6.3×10        | 12                        | 1,800                                     | 660                       | SPR1AM331E10O00RAXXX |
|          | 470      | 8×11          | 12                        | 2,000                                     | 940                       | SPR1AM471F11O00RAXXX |
|          | 560      | 8×11          | 12                        | 2,000                                     | 1,120                     | SPR1AM561F11O00RAXXX |
|          | 680      | 8×11          | 12                        | 2,100                                     | 1,360                     | SPR1AM681F11O00RAXXX |
|          | 820      | 8×11          | 12                        | 2,100                                     | 1,640                     | SPR1AM821F11O00RAXXX |
|          | 1,000    | 10×12         | 12                        | 2,200                                     | 2,000                     | SPR1AM102G12O00RAXXX |
|          | 1,200    | 10×12         | 12                        | 2,200                                     | 2,400                     | SPR1AM122G12O00RAXXX |
|          | 1,500    | 10×12         | 12                        | 2,400                                     | 3,000                     | SPR1AM152G12O00RAXXX |
| 16       | 100      | 6.3×8         | 17                        | 1,500                                     | 500                       | SPR1CM101E08O00RAXXX |
|          | 180      | 6.3×8         | 17                        | 1,500                                     | 576                       | SPR1CM181E08O00RAXXX |
|          | 220      | 6.3×10        | 17                        | 1,600                                     | 704                       | SPR1CM221E10O00RAXXX |
|          | 270      | 8×11          | 14                        | 1,700                                     | 864                       | SPR1CM271F11O00RAXXX |
|          | 330      | 6.3×10        | 14                        | 1,600                                     | 1,056                     | SPR1CM331E10O00RAXXX |
|          | 470      | 8×11          | 14                        | 1,700                                     | 1,504                     | SPR1CM471F11O00RAXXX |
|          | 560      | 10×12         | 14                        | 2,000                                     | 1,792                     | SPR1CM561G12O00RAXXX |
|          | 680      | 10×12         | 14                        | 2,000                                     | 2,176                     | SPR1CM681G12O00RAXXX |
|          | 820      | 10×12         | 14                        | 2,100                                     | 2,624                     | SPR1CM821G12O00RAXXX |
|          | 1,000    | 10×12         | 14                        | 2,100                                     | 3,200                     | SPR1CM102G12O00RAXXX |
| 25       | 68       | 6.3×7         | 24                        | 1,300                                     | 500                       | SPR1EM680E07O00RAXXX |
|          | 82       | 6.3×7         | 24                        | 1,300                                     | 500                       | SPR1EM820E07O00RAXXX |
|          | 100      | 6.3×8         | 24                        | 1,300                                     | 500                       | SPR1EM101E08O00RAXXX |
|          | 100      | 8×11          | 22                        | 1,500                                     | 500                       | SPR1EM101F11O00RAXXX |
|          | 120      | 6.3×10        | 22                        | 1,400                                     | 600                       | SPR1EM121E10O00RAXXX |
|          | 180      | 8×9           | 24                        | 1,300                                     | 900                       | SPR1EM181F09O00RAXXX |
|          | 220      | 8×11          | 22                        | 1,500                                     | 1,100                     | SPR1EM221F11O00RAXXX |
|          | 220      | 10×12         | 22                        | 1,700                                     | 1,100                     | SPR1EM221G12O00RAXXX |
|          | 270      | 8×11          | 22                        | 1,500                                     | 1,350                     | SPR1EM271F11O00RAXXX |
|          | 330      | 10×12         | 22                        | 1,700                                     | 1,650                     | SPR1EM331G12O00RAXXX |
|          | 470      | 8×16          | 22                        | 1,700                                     | 2,350                     | SPR1EM471F16O00RAXXX |

PR series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 25       | 470      | 10×12         | 22                        | 1,800                                     | 2,350                     | SPR1EM471G12O00RAXXX |
|          | 560      | 10×12         | 22                        | 1,800                                     | 2,800                     | SPR1EM561G12O00RAXXX |
| 35       | 47       | 6.3×7         | 52                        | 1,100                                     | 500                       | SPR1VM470E07O00RAXXX |
|          | 56       | 6.3×7         | 52                        | 1,100                                     | 500                       | SPR1VM560E07O00RAXXX |
|          | 68       | 6.3×7         | 52                        | 1,100                                     | 500                       | SPR1VM680E07O00RAXXX |
|          | 82       | 6.3×7         | 52                        | 1,100                                     | 574                       | SPR1VM820E07O00RAXXX |
|          | 100      | 6.3×10        | 42                        | 1,200                                     | 700                       | SPR1VM101E10O00RAXXX |
|          | 150      | 10×12         | 32                        | 1,400                                     | 1,050                     | SPR1VM151G12O00RAXXX |
|          | 220      | 8×11          | 32                        | 1,300                                     | 1,540                     | SPR1VM221F11O00RAXXX |
|          | 220      | 10×12         | 32                        | 1,400                                     | 1,540                     | SPR1VM221G12O00RAXXX |
|          | 270      | 10×12         | 32                        | 1,400                                     | 1,890                     | SPR1VM271G12O00RAXXX |
|          | 330      | 10×12         | 32                        | 1,400                                     | 2,310                     | SPR1VM331G12O00RAXXX |

※Specifications subject to change without notice

Conductive Polymer  
Radial Type

VZ series

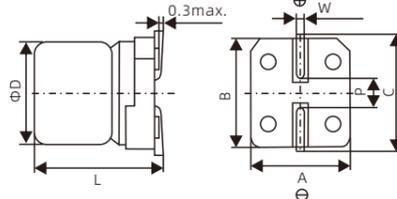
- Endurance: 2,000 hours at 105°C
- Standard
- Recommended applications: display card & system board
- RoHS Compliant and lead-free



SPECIFICATIONS

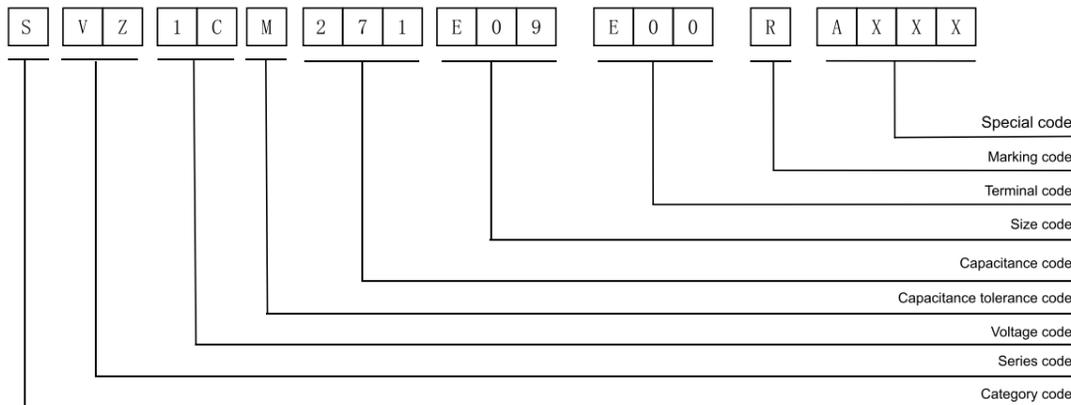
| Items  | Characteristics  |                                      |     |      |    |    |    |    |    |      |     |  |
|--|--|--------------------------------------|-----|------|----|----|----|----|----|------|-----|--|
| Category Temperature Range                             | -55~+105°C   |                                      |     |      |    |    |    |    |    |      |     |  |
| Rated Working Voltage Range                            | 2.5 ~100 Vdc   |                                      |     |      |    |    |    |    |    |      |     |  |
| Nominal Capacitance Range                              | 22~2,200µF   |                                      |     |      |    |    |    |    |    |      |     |  |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)  |                                      |     |      |    |    |    |    |    |      |     |  |
| DC Leakage Current                                     | I≤0.2CV or 500µA, whichever is greater.<br>Where, I:Max.leakage current (µA),C:Nominal capacitance (µF),V: Rated voltage (V) (at 20°C after 2 minutes)   |                                      |     |      |    |    |    |    |    |      |     |  |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 2.5                                  | 6.3 | 10   | 16 | 25 | 35 | 50 | 63 | 80   | 100 |  |
|  | Dissipation Factor (Max.)  | 0.08                                 |     | 0.12 |    |    |    |    |    | 0.15 |     |  |
| ESR(100kHz,20°C)                                       | Value in the characteristics table   |                                      |     |      |    |    |    |    |    |      |     |  |
| Temperature Characteristic (Impedance Ratio at 100kHz) | Z(+105°C)/Z(+20°C)≤1.5<br>Z(-55°C)/Z(+20°C)≤2.0  |                                      |     |      |    |    |    |    |    |      |     |  |
| Endurance  | After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements.   |                                      |     |      |    |    |    |    |    |      |     |  |
|  | Appearance   | No significant damage                |     |      |    |    |    |    |    |      |     |  |
|  | Capacitance Change   | ≤±20% of the initial value           |     |      |    |    |    |    |    |      |     |  |
|  | Dissipation Factor   | ≤150% of the initial specified value |     |      |    |    |    |    |    |      |     |  |
|  | ESR  | ≤150% of the initial specified value |     |      |    |    |    |    |    |      |     |  |
| Leakage Current  | ≤The initial specified value   |                                      |     |      |    |    |    |    |    |      |     |  |
| Humidity Test  | After subjecting to 90%~95% RH for 1,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.   |                                      |     |      |    |    |    |    |    |      |     |  |
| Surge Test   | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                      |     |      |    |    |    |    |    |      |     |  |
|  | Appearance   | No significant damage                |     |      |    |    |    |    |    |      |     |  |
|  | Capacitance Change   | ≤±20% of the initial value           |     |      |    |    |    |    |    |      |     |  |
|  | Dissipation Factor   | ≤150% of the initial specified value |     |      |    |    |    |    |    |      |     |  |
|  | ESR  | ≤150% of the initial specified value |     |      |    |    |    |    |    |      |     |  |
|  | Leakage Current  | ≤The initial specified value         |     |      |    |    |    |    |    |      |     |  |

DIMENSIONS [mm]



| Size Code | 6.3         | 8       | 10      |
|-----------|-------------|---------|---------|
| P±0.2     | 1.9         | 3.1     | 4.5     |
| A±0.2     | 6.6         | 8.3     | 10.3    |
| B±0.2     | 6.6         | 8.3     | 10.3    |
| C±0.2     | 7.2         | 9       | 11      |
| W         | 0.5~0.8     | 0.7~1.1 | 0.7~1.1 |
| ØD'       | ØD-0.1~+0.5 |         |         |
| L'        | L±0.5       |         |         |

PART NUMBERING SYSTEM



VZ series

STANDARD RATINGS

| WV (Vdc) | Cap (µF) | Size ØD×L(mm) | ESR (mΩ,20°C,100kHz) (max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (µA)(max) | Part Number          |                      |
|----------|----------|---------------|----------------------------|--|---------------------------|----------------------|----------------------|
| 2.5      | 330      | 6.3×6         | 20                         | 2,700                                      | 500                       | SVZ0EM331E06E00RAXXX |                      |
|          | 390      | 6.3×6         | 20                         | 2,800                                      | 500                       | SVZ0EM391E06E00RAXXX |                      |
|          | 470      | 6.3×6         | 20                         | 2,900                                      | 500                       | SVZ0EM471E06E00RAXXX |                      |
|          | 560      | 6.3×6         | 20                         | 3,000                                      | 500                       | SVZ0EM561E06E00RAXXX |                      |
|          | 680      | 6.3×9         | 15                         | 4,300                                      | 500                       | SVZ0EM681E09E00RAXXX |                      |
| 6.3      | 220      | 6.3×6         | 20                         | 2,800                                      | 500                       | SVZ0JM221E06E00RAXXX |                      |
|          | 270      | 6.3×6         | 20                         | 3,000                                      | 500                       | SVZ0JM271E06E00RAXXX |                      |
|          | 330      | 6.3×6         | 20                         | 3,000                                      | 500                       | SVZ0JM331E06E00RAXXX |                      |
|          | 470      | 6.3×9         | 15                         | 3,500                                      | 592                       | SVZ0JM471E09E00RAXXX |                      |
|          | 560      | 6.3×9         | 15                         | 3,700                                      | 706                       | SVZ0JM561E09E00RAXXX |                      |
|          | 1,000    | 8×11.5        | 15                         | 4,300                                      | 1,260                     | SVZ0JM102FBRE00RAXXX |                      |
|          | 1,500    | 8×11.5        | 15                         | 4,400                                      | 1,890                     | SVZ0JM152FBRE00RAXXX |                      |
|          | 2,200    | 10×12.5       | 15                         | 5,600                                      | 2,772                     | SVZ0JM222GCRE00RAXXX |                      |
| 10       | 120      | 6.3×6         | 30                         | 2,700                                      | 500                       | SVZ1AM121E06E00RAXXX |                      |
|          | 220      | 6.3×6         | 30                         | 2,700                                      | 500                       | SVZ1AM221E06E00RAXXX |                      |
|          | 220      | 6.3×9         | 20                         | 3,000                                      | 500                       | SVZ1AM221E09E00RAXXX |                      |
|          | 330      | 6.3×9         | 20                         | 3,100                                      | 660                       | SVZ1AM331E09E00RAXXX |                      |
|          | 470      | 6.3×9         | 30                         | 3,400                                      | 940                       | SVZ1AM471E09E00RAXXX |                      |
|          | 470      | 8×9.5         | 22                         | 3,400                                      | 940                       | SVZ1AM471F9RE00RAXXX |                      |
|          | 560      | 8×11.5        | 20                         | 3,600                                      | 1,120                     | SVZ1AM561FBRE00RAXXX |                      |
|          | 560      | 10×12.5       | 20                         | 5,000                                      | 1,120                     | SVZ1AM561GCRE00RAXXX |                      |
|          | 1,000    | 8×11.5        | 15                         | 4,200                                      | 2,000                     | SVZ1AM102FBRE00RAXXX |                      |
|          | 1,000    | 10×12.5       | 15                         | 4,400                                      | 2,000                     | SVZ1AM102GCRE00RAXXX |                      |
|          | 1,500    | 10×12.5       | 15                         | 4,400                                      | 3,000                     | SVZ1AM152GCRE00RAXXX |                      |
|          | 16       | 47            | 6.3×6                      | 40   | 1,700                     | 500                  | SVZ1CM470E06E00RAXXX |
| 68       |          | 6.3×6         | 40                         | 2,000                                      | 500                       | SVZ1CM680E06E00RAXXX |                      |
| 100      |          | 6.3×6         | 30                         | 2,400                                      | 500                       | SVZ1CM101E06E00RAXXX |                      |
| 150      |          | 6.3×6         | 30                         | 2,400                                      | 500                       | SVZ1CM151E06E00RAXXX |                      |
| 150      |          | 6.3×9         | 25                         | 2,600                                      | 500                       | SVZ1CM151E09E00RAXXX |                      |
| 180      |          | 6.3×6         | 60                         | 2,500                                      | 576                       | SVZ1CM181E06E00RAXXX |                      |
| 180      |          | 6.3×9         | 25                         | 2,700                                      | 576                       | SVZ1CM181E09E00RAXXX |                      |
| 220      |          | 6.3×9         | 25                         | 2,700                                      | 704                       | SVZ1CM221E09E00RAXXX |                      |
| 270      |          | 6.3×9         | 25                         | 2,700                                      | 864                       | SVZ1CM271E09E00RAXXX |                      |
| 270      |          | 8×9.5         | 25                         | 3,000                                      | 864                       | SVZ1CM271F9RE00RAXXX |                      |
| 330      |          | 6.3×9         | 25                         | 2,700                                      | 1,056                     | SVZ1CM331E09E00RAXXX |                      |
| 330      |          | 8×11.5        | 20                         | 4,000                                      | 1,056                     | SVZ1CM331FBRE00RAXXX |                      |
| 330      |          | 10×12.5       | 20                         | 5,000                                      | 1,056                     | SVZ1CM331GCRE00RAXXX |                      |
| 560      |          | 8×11.5        | 20                         | 4,000                                      | 1,792                     | SVZ1CM561FBRE00RAXXX |                      |
| 680      |          | 10×12.5       | 20                         | 5,000                                      | 2,176                     | SVZ1CM681GCRE00RAXXX |                      |
| 1,000    |          | 10×12.5       | 20                         | 5,000                                      | 3,200                     | SVZ1CM102GCRE00RAXXX |                      |
| 25       |          | 22            | 6.3×6                      | 80   | 1,600                     | 500                  | SVZ1EM220E06E00RAXXX |
|          |          | 27            | 6.3×6                      | 50   | 1,100                     | 500                  | SVZ1EM270E06E00RAXXX |
|          | 47       | 6.3×6         | 50                         | 1,800                                      | 500                       | SVZ1EM470E06E00RAXXX |                      |
|          | 47       | 6.3×9         | 35                         | 2,000                                      | 500                       | SVZ1EM470E09E00RAXXX |                      |

Conductive Polymer Surface Mount Type

VZ series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|--|---------------------------|----------------------|
| 25       | 56       | 6.3×6         | 50                        | 1,800                                      | 500                       | SVZ1EM560E06E00RAXXX |
|          | 68       | 6.3×6         | 50                        | 1,800                                      | 500                       | SVZ1EM680E06E00RAXXX |
|          | 100      | 6.3×6         | 50                        | 2,100                                      | 500                       | SVZ1EM101E06E00RAXXX |
|          | 100      | 6.3×9         | 30                        | 2,400                                      | 500                       | SVZ1EM101E09E00RAXXX |
|          | 150      | 6.3×9         | 30                        | 2,500                                      | 750                       | SVZ1EM151E09E00RAXXX |
|          | 220      | 6.3×9         | 30                        | 2,500                                      | 1,100                     | SVZ1EM221E09E00RAXXX |
|          | 220      | 8×11.5        | 30                        | 2,600                                      | 1,100                     | SVZ1EM221FBRE00RAXXX |
|          | 330      | 8×11.5        | 30                        | 2,700                                      | 1,650                     | SVZ1EM331FBRE00RAXXX |
|          | 330      | 10×12.5       | 22                        | 2,800                                      | 1,650                     | SVZ1EM331GCRE00RAXXX |
|          | 470      | 8×11.5        | 30                        | 2,800                                      | 2,350                     | SVZ1EM471FBRE00RAXXX |
|          | 470      | 10×12.5       | 22                        | 3,100                                      | 2,350                     | SVZ1EM471GCRE00RAXXX |
|          | 560      | 10×12.5       | 22                        | 3,300                                      | 2,800                     | SVZ1EM561GCRE00RAXXX |
| 680      | 10×12.5  | 22            | 3,300                     | 3,400                                      | SVZ1EM681GCRE00RAXXX      |                      |
| 35       | 22       | 6.3×6         | 60                        | 1,100                                      | 500                       | SVZ1VM220E06E00RAXXX |
|          | 27       | 6.3×6         | 60                        | 1,100                                      | 500                       | SVZ1VM270E06E00RAXXX |
|          | 33       | 6.3×6         | 60                        | 1,100                                      | 500                       | SVZ1VM330E06E00RAXXX |
|          | 47       | 6.3×6         | 45                        | 1,100                                      | 500                       | SVZ1VM470E06E00RAXXX |
|          | 47       | 6.3×9         | 50                        | 1,500                                      | 500                       | SVZ1VM470E09E00RAXXX |
|          | 68       | 6.3×6         | 45                        | 1,100                                      | 500                       | SVZ1VM680E06E00RAXXX |
|          | 68       | 6.3×9         | 40                        | 1,800                                      | 500                       | SVZ1VM680E09E00RAXXX |
|          | 100      | 6.3×9         | 40                        | 2,100                                      | 700                       | SVZ1VM101E09E00RAXXX |
|          | 100      | 8×9.5         | 40                        | 2,800                                      | 700                       | SVZ1VM101F9RE00RAXXX |
|          | 100      | 8×11.5        | 30                        | 3,000                                      | 700                       | SVZ1VM101FBRE00RAXXX |
|          | 150      | 8×11.5        | 30                        | 3,000                                      | 1,050                     | SVZ1VM151FBRE00RAXXX |
|          | 220      | 8×11.5        | 30                        | 2,400                                      | 1,540                     | SVZ1VM221FBRE00RAXXX |
|          | 270      | 8×11.5        | 30                        | 2,500                                      | 1,890                     | SVZ1VM271FBRE00RAXXX |
|          | 270      | 10×12.5       | 30                        | 2,700                                      | 1,890                     | SVZ1VM271GCRE00RAXXX |
|          | 330      | 10×12.5       | 30                        | 2,700                                      | 2,310                     | SVZ1VM331GCRE00RAXXX |
| 470      | 10×12.5  | 30            | 3,000                     | 3,290                                      | SVZ1VM471GCRE00RAXXX      |                      |
| 50       | 68       | 8×11.5        | 30                        | 2,000                                      | 680                       | SVZ1HM680FBRE00RAXXX |
|          | 82       | 8×11.5        | 30                        | 2,000                                      | 820                       | SVZ1HM820FBRE00RAXXX |
|          | 82       | 10×12.5       | 30                        | 2,000                                      | 820                       | SVZ1HM820GCRE00RAXXX |
|          | 100      | 8×11.5        | 30                        | 2,000                                      | 1,000                     | SVZ1HM101FBRE00RAXXX |
|          | 100      | 10×12.5       | 30                        | 2,100                                      | 1,000                     | SVZ1HM101GCRE00RAXXX |
|          | 120      | 8×11.5        | 30                        | 2,000                                      | 1,200                     | SVZ1HM121FBRE00RAXXX |
|          | 150      | 10×12.5       | 30                        | 2,100                                      | 1,500                     | SVZ1HM151GCRE00RAXXX |
|          | 220      | 10×12.5       | 30                        | 2,300                                      | 2,200                     | SVZ1HM221GCRE00RAXXX |
| 63       | 47       | 8×9.5         | 60                        | 1,000                                      | 592                       | SVZ1JM470F9RE00RAXXX |
|          | 56       | 8×11.5        | 40                        | 1,400                                      | 706                       | SVZ1JM560FBRE00RAXXX |
|          | 100      | 10×12.5       | 40                        | 1,600                                      | 1,260                     | SVZ1JM101GCRE00RAXXX |
| 80       | 27       | 8×11.5        | 50                        | 600  | 500                       | SVZ1BM270FBRE00RAXXX |
|          | 47       | 10×12.5       | 50                        | 900  | 752                       | SVZ1BM470GCRE00RAXXX |
|          | 68       | 10×12.5       | 50                        | 900  | 1,088                     | SVZ1BM680GCRE00RAXXX |
| 100      | 22       | 8×11.5        | 50                        | 600  | 500                       | SVZ1KM220FBRE00RAXXX |

VZ series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|--|---------------------------|----------------------|
| 100      | 47       | 10×12.5       | 50                        | 900  | 940                       | SVZ1KM470GCRE00RAXXX |

※ Specifications subject to change without notice

VD series

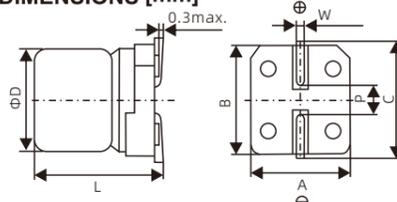
- Endurance: 2,000 hours at 105°C
- High voltage
- Recommended applications: high order main board, service equipment
- RoHS Compliant and lead-free



SPECIFICATIONS

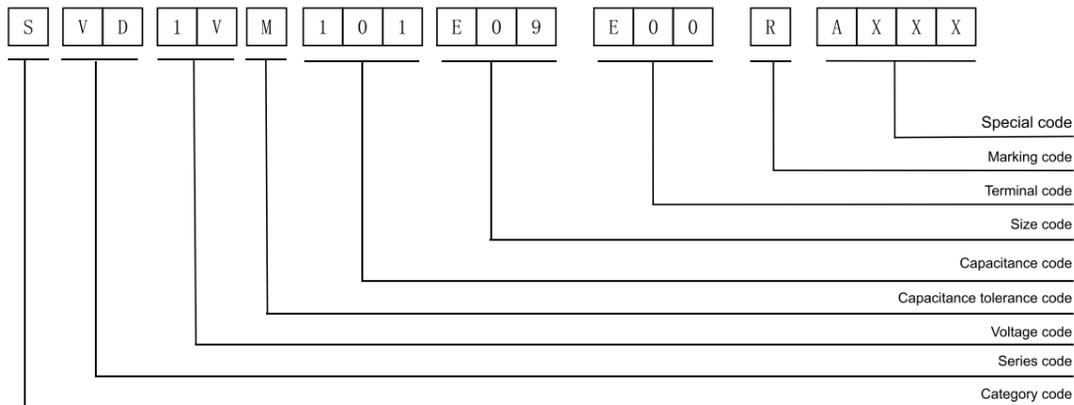
| Items  | Characteristics  |                                      |
|--|--|--------------------------------------|
| Category Temperature Range                             | -55~+105°C   |                                      |
| Rated Working Voltage Range                            | 35 ~63Vdc  |                                      |
| Nominal Capacitance Range                              | 22~470μF   |                                      |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)  |                                      |
| DC Leakage Current                                     | I ≤ 0.2CV or 500μA, whichever is greater.  |                                      |
|  | Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)  |                                      |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 35 50 63                             |
|  | Dissipation Factor (Max.)  | 0.12 (at 20°C,120Hz)                 |
| ESR(100kHz,20°C)                                       | Value in the characteristics table   |                                      |
| Temperature Characteristic (Impedance Ratio at 100kHz) | Z(+105°C)/Z(+20°C) ≤ 1.5<br>Z(-55°C)/Z(+20°C) ≤ 2.0  |                                      |
| Endurance  | After applying rated voltage for 2,000 hours at 105°C,the capacitors shall meet the following requirements.  |                                      |
|  | Appearance   | No significant damage                |
|  | Capacitance Change   | ±20% of the initial value            |
|  | Dissipation Factor   | ≤150% of the initial specified value |
|  | ESR  | ≤150% of the initial specified value |
|  | Leakage Current  | ≤The initial specified value         |
| Humidity Test  | After subjecting to 90%-95% RH for 1,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.   |                                      |
| Surge Test   | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                      |
|  | Appearance   | No significant damage                |
|  | Capacitance Change   | ±20% of the initial value            |
|  | Dissipation Factor   | ≤150% of the initial specified value |
|  | ESR  | ≤150% of the initial specified value |
|  | Leakage Current  | ≤The initial specified value         |

DIMENSIONS [mm]



| Size Code | 6.3         | 8       | 10      |
|-----------|-------------|---------|---------|
| P±0.2     | 1.9         | 3.1     | 4.5     |
| A±0.2     | 6.6         | 8.3     | 10.3    |
| B±0.2     | 6.6         | 8.3     | 10.3    |
| C±0.2     | 7.2         | 9       | 11      |
| W         | 0.5~0.8     | 0.7~1.1 | 0.7~1.1 |
| ØD'       | ØD-0.1~+0.5 |         |         |
| L'        | L±0.5       |         |         |

PART NUMBERING SYSTEM



VD series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ØD×L(mm) | ESR (mΩ,20°C,100kHz) (max) | Rated Ripple Current (mA rms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|----------------------------|--|---------------------------|----------------------|
| 35       | 22       | 6.3×6         | 54                         | 1,100                                      | 500                       | SVD1VM220E06E00RAXXX |
|          | 27       | 6.3×6         | 54                         | 1,100                                      | 500                       | SVD1VM270E06E00RAXXX |
|          | 33       | 6.3×6         | 54                         | 1,100                                      | 500                       | SVD1VM330E06E00RAXXX |
|          | 47       | 6.3×6         | 40                         | 1,100                                      | 500                       | SVD1VM470E06E00RAXXX |
|          | 47       | 6.3×9         | 45                         | 1,500                                      | 500                       | SVD1VM470E09E00RAXXX |
|          | 68       | 6.3×6         | 40                         | 1,100                                      | 500                       | SVD1VM680E06E00RAXXX |
|          | 68       | 6.3×9         | 36                         | 1,800                                      | 500                       | SVD1VM680E09E00RAXXX |
|          | 100      | 6.3×9         | 36                         | 2,200                                      | 700                       | SVD1VM101E09E00RAXXX |
|          | 100      | 8×9.5         | 36                         | 2,900                                      | 700                       | SVD1VM101F9RE00RAXXX |
|          | 100      | 8×11.5        | 27                         | 3,100                                      | 700                       | SVD1VM101FBRE00RAXXX |
|          | 150      | 8×11.5        | 27                         | 3,100                                      | 1,050                     | SVD1VM151FBRE00RAXXX |
|          | 220      | 8×11.5        | 27                         | 2,500                                      | 1,540                     | SVD1VM221FBRE00RAXXX |
|          | 270      | 8×11.5        | 27                         | 2,600                                      | 1,890                     | SVD1VM271FBRE00RAXXX |
|          | 270      | 10×12.5       | 27                         | 2,800                                      | 1,890                     | SVD1VM271GCRE00RAXXX |
|          | 330      | 10×12.5       | 27                         | 2,800                                      | 2,310                     | SVD1VM331GCRE00RAXXX |
| 470      | 10×12.5  | 27            | 3,100                      | 3,290                                      | SVD1VM471GCRE00RAXXX      |                      |
| 50       | 68       | 8×11.5        | 27                         | 2,100                                      | 680                       | SVD1HM680FBRE00RAXXX |
|          | 82       | 8×11.5        | 27                         | 2,100                                      | 820                       | SVD1HM820FBRE00RAXXX |
|          | 82       | 10×12.5       | 27                         | 2,100                                      | 820                       | SVD1HM820GCRE00RAXXX |
|          | 100      | 8×9.5         | 54                         | 1,500                                      | 1,000                     | SVD1HM101F9RE00RAXXX |
|          | 100      | 8×11.5        | 27                         | 2,100                                      | 1,000                     | SVD1HM101FBRE00RAXXX |
|          | 100      | 10×12.5       | 27                         | 2,200                                      | 1,000                     | SVD1HM101GCRE00RAXXX |
|          | 120      | 8×11.5        | 27                         | 2,100                                      | 1,200                     | SVD1HM121FBRE00RAXXX |
|          | 150      | 10×12.5       | 27                         | 2,200                                      | 1,500                     | SVD1HM151GCRE00RAXXX |
| 220      | 10×12.5  | 27            | 2,400                      | 2,200                                      | SVD1HM221GCRE00RAXXX      |                      |
| 63       | 47       | 8×9.5         | 54                         | 1,000                                      | 592                       | SVD1JM470F9RE00RAXXX |
|          | 56       | 8×11.5        | 36                         | 1,000                                      | 706                       | SVD1JM560FBRE00RAXXX |
|          | 100      | 10×12.5       | 36                         | 1,600                                      | 1,260                     | SVD1JM101GCRE00RAXXX |

※Specifications subject to change without notice

Conductive Polymer Surface Mount Type

VT series

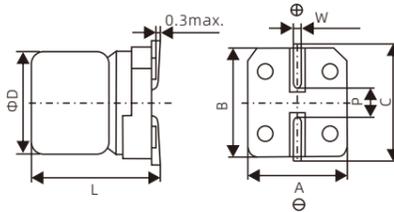
- Endurance: 2,000 hours at 125°C
- High temperature
- Recommended applications: lamps power, LED power, service equipment
- RoHS Compliant and lead-free



SPECIFICATIONS

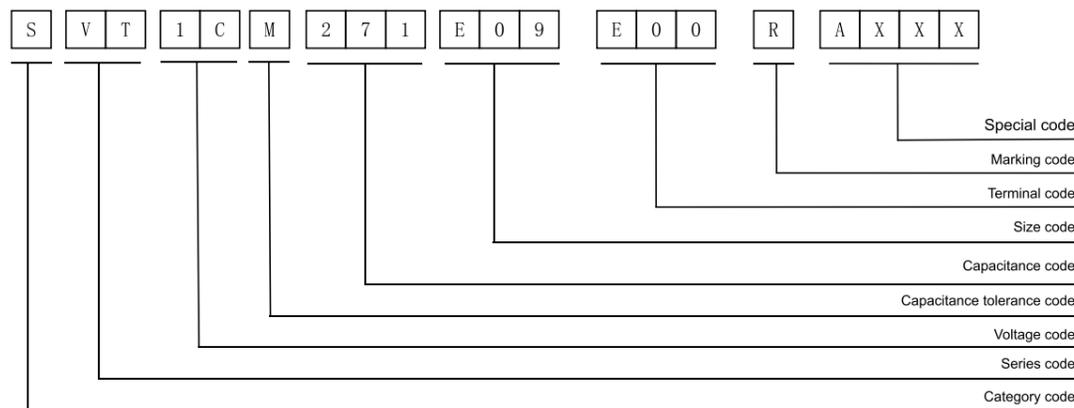
| Items  | Characteristics  |                                      |
|--|--|--------------------------------------|
| Category Temperature Range                             | -55~+125°C   |                                      |
| Rated Working Voltage Range                            | 2.5 ~63Vdc   |                                      |
| Nominal Capacitance Range                              | 22~2,200μF   |                                      |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)  |                                      |
| DC Leakage Current                                     | I≤0.2CV or 500μA, whichever is greater.  |                                      |
|  | Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)  |                                      |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 2.5 6.3 10 16 25 35 50 63            |
|  | Dissipation Factor (Max.)  | 0.12 0.12                            |
| ESR(100kHz,20°C)                                       | Value in the characteristics table   |                                      |
| Temperature Characteristic (Impedance Ratio at 100kHz) | Z(+125°C)/Z(+20°C)≤1.5   |                                      |
|  | Z(-55°C)/Z(+20°C)≤2.0  |                                      |
| Endurance  | After applying rated voltage for 2,000 hours at 125°C,the capacitors shall meet the following requirements.  |                                      |
|  | Appearance   | No significant damage                |
|  | Capacitance Change   | ±20% of the initial value            |
|  | Dissipation Factor   | ≤150% of the initial specified value |
|  | ESR  | ≤150% of the initial specified value |
| Humidity Test  | After subjecting to 90%~95% RH for 1,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.   |                                      |
|  | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                      |
| Surge Test   | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                      |
|  | Appearance   | No significant damage                |
|  | Capacitance Change   | ±20% of the initial value            |
|  | Dissipation Factor   | ≤150% of the initial specified value |
|  | ESR  | ≤150% of the initial specified value |
| Leakage Current  | ≤The initial specified value   |                                      |

DIMENSIONS [mm]



| Size Code | 6.3         | 8       | 10      |
|-----------|-------------|---------|---------|
| P±0.2     | 1.9         | 3.1     | 4.5     |
| A±0.2     | 6.6         | 8.3     | 10.3    |
| B±0.2     | 6.6         | 8.3     | 10.3    |
| C±0.2     | 7.2         | 9       | 11      |
| W         | 0.5~0.8     | 0.7~1.1 | 0.7~1.1 |
| ØD'       | ØD-0.1~+0.5 |         |         |
| L'        | L±0.5       |         |         |

PART NUMBERING SYSTEM



VT series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ØD×L(mm) | ESR (mΩ,20°C,100kHz) (max) | Rated Ripple Current (mArms/125°C,100kHz) | Leakage Current (μA)(max) | Part Number          |                      |
|----------|----------|---------------|----------------------------|---|---------------------------|----------------------|----------------------|
| 2.5      | 330      | 6.3×6         | 30                         | 800                                       | 500                       | SVT0EM331E06E00RAXXX |                      |
|          | 390      | 6.3×6         | 30                         | 800                                       | 500                       | SVT0EM391E06E00RAXXX |                      |
|          | 470      | 6.3×6         | 30                         | 800                                       | 500                       | SVT0EM471E06E00RAXXX |                      |
|          | 560      | 6.3×6         | 30                         | 900                                       | 500                       | SVT0EM561E06E00RAXXX |                      |
| 6.3      | 680      | 6.3×9         | 22                         | 1,200                                     | 500                       | SVT0EM681E09E00RAXXX |                      |
|          | 220      | 6.3×6         | 30                         | 800                                       | 500                       | SVT0JM221E06E00RAXXX |                      |
|          | 270      | 6.3×6         | 30                         | 900                                       | 500                       | SVT0JM271E06E00RAXXX |                      |
|          | 330      | 6.3×6         | 30                         | 900                                       | 500                       | SVT0JM331E06E00RAXXX |                      |
|          | 470      | 6.3×9         | 22                         | 1,000                                     | 592                       | SVT0JM471E09E00RAXXX |                      |
|          | 560      | 6.3×9         | 22                         | 1,100                                     | 706                       | SVT0JM561E09E00RAXXX |                      |
|          | 1,000    | 8×11.5        | 22                         | 1,200                                     | 1,260                     | SVT0JM102FBRE00RAXXX |                      |
| 10       | 1,500    | 8×11.5        | 22                         | 1,300                                     | 1,890                     | SVT0JM152FBRE00RAXXX |                      |
|          | 2,200    | 10×12.5       | 22                         | 1,600                                     | 2,772                     | SVT0JM222GCRE00RAXXX |                      |
|          | 120      | 6.3×6         | 45                         | 800                                       | 500                       | SVT1AM121E06E00RAXXX |                      |
|          | 220      | 6.3×6         | 45                         | 800                                       | 500                       | SVT1AM221E06E00RAXXX |                      |
|          | 220      | 6.3×9         | 30                         | 900                                       | 500                       | SVT1AM221E09E00RAXXX |                      |
|          | 330      | 6.3×9         | 30                         | 900                                       | 660                       | SVT1AM331E09E00RAXXX |                      |
|          | 560      | 8×11.5        | 30                         | 1,000                                     | 1,120                     | SVT1AM561FBRE00RAXXX |                      |
|          | 560      | 10×12.5       | 30                         | 1,500                                     | 1,120                     | SVT1AM561GCRE00RAXXX |                      |
|          | 1,000    | 8×11.5        | 22                         | 1,200                                     | 2,000                     | SVT1AM102FBRE00RAXXX |                      |
|          | 1,000    | 10×12.5       | 22                         | 1,300                                     | 2,000                     | SVT1AM102GCRE00RAXXX |                      |
|          | 1,500    | 10×12.5       | 22                         | 1,300                                     | 3,000                     | SVT1AM152GCRE00RAXXX |                      |
|          | 16       | 47            | 6.3×6                      | 60  | 500                       | 500                  | SVT1CM470E06E00RAXXX |
| 68       |          | 6.3×6         | 60                         | 600                                       | 500                       | SVT1CM680E06E00RAXXX |                      |
| 100      |          | 6.3×6         | 45                         | 700                                       | 500                       | SVT1CM101E06E00RAXXX |                      |
| 150      |          | 6.3×6         | 45                         | 700                                       | 500                       | SVT1CM151E06E00RAXXX |                      |
| 150      |          | 6.3×9         | 37                         | 700                                       | 500                       | SVT1CM151E09E00RAXXX |                      |
| 180      |          | 6.3×6         | 90                         | 700                                       | 576                       | SVT1CM181E06E00RAXXX |                      |
| 180      |          | 6.3×9         | 37                         | 800                                       | 576                       | SVT1CM181E09E00RAXXX |                      |
| 220      |          | 6.3×9         | 37                         | 700                                       | 704                       | SVT1CM221E09E00RAXXX |                      |
| 270      |          | 6.3×9         | 37                         | 700                                       | 864                       | SVT1CM271E09E00RAXXX |                      |
| 560      |          | 8×11.5        | 30                         | 1,000                                     | 1,792                     | SVT1CM561FBRE00RAXXX |                      |
| 680      |          | 10×12.5       | 30                         | 1,200                                     | 2,176                     | SVT1CM681GCRE00RAXXX |                      |
| 1,000    |          | 10×12.5       | 30                         | 1,200                                     | 3,200                     | SVT1CM102GCRE00RAXXX |                      |
| 25       |          | 27            | 6.3×6                      | 75  | 300                       | 500                  | SVT1EM270E06E00RAXXX |
|          |          | 47            | 6.3×6                      | 75  | 500                       | 500                  | SVT1EM470E06E00RAXXX |
|          | 47       | 6.3×9         | 52                         | 600                                       | 500                       | SVT1EM470E09E00RAXXX |                      |
|          | 56       | 6.3×6         | 75                         | 500                                       | 500                       | SVT1EM560E06E00RAXXX |                      |
|          | 100      | 6.3×6         | 75                         | 600                                       | 500                       | SVT1EM101E06E00RAXXX |                      |
|          | 100      | 6.3×9         | 45                         | 700                                       | 500                       | SVT1EM101E09E00RAXXX |                      |
|          | 150      | 6.3×9         | 45                         | 700                                       | 750                       | SVT1EM151E09E00RAXXX |                      |
|          | 220      | 8×11.5        | 45                         | 700                                       | 1,100                     | SVT1EM221FBRE00RAXXX |                      |
|          | 330      | 8×11.5        | 45                         | 800                                       | 1,650                     | SVT1EM331FBRE00RAXXX |                      |
|          | 330      | 10×12.5       | 33                         | 800                                       | 1,650                     | SVT1EM331GCRE00RAXXX |                      |

Conductive Polymer Surface Mount Type

VT series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mA rms/125°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|--|---------------------------|----------------------|
| 25       | 470      | 10×12.5       | 33                        | 900  | 2,350                     | SVT1EM471GCRE00RAXXX |
| 35       | 22       | 6.3×6         | 90                        | 300  | 500                       | SVT1VM220E06E00RAXXX |
|          | 27       | 6.3×6         | 90                        | 300  | 500                       | SVT1VM270E06E00RAXXX |
|          | 33       | 6.3×6         | 90                        | 300  | 500                       | SVT1VM330E06E00RAXXX |
|          | 47       | 6.3×6         | 67                        | 300  | 500                       | SVT1VM470E06E00RAXXX |
|          | 47       | 6.3×9         | 75                        | 400  | 500                       | SVT1VM470E09E00RAXXX |
|          | 68       | 6.3×9         | 60                        | 500  | 500                       | SVT1VM680E09E00RAXXX |
|          | 100      | 6.3×9         | 60                        | 600  | 700                       | SVT1VM101E09E00RAXXX |
|          | 100      | 8×11.5        | 45                        | 900  | 700                       | SVT1VM101FBRE00RAXXX |
|          | 150      | 8×11.5        | 45                        | 900  | 1,050                     | SVT1VM151FBRE00RAXXX |
|          | 220      | 8×11.5        | 45                        | 700  | 1,540                     | SVT1VM221FBRE00RAXXX |
|          | 270      | 8×11.5        | 45                        | 700  | 1,890                     | SVT1VM271FBRE00RAXXX |
|          | 270      | 10×12.5       | 45                        | 800  | 1,890                     | SVT1VM271GCRE00RAXXX |
|          | 330      | 10×12.5       | 45                        | 800  | 2,310                     | SVT1VM331GCRE00RAXXX |
| 470      | 10×12.5  | 45            | 900                       | 3,290                                      | SVT1VM471GCRE00RAXXX      |                      |
| 50       | 82       | 10×12.5       | 45                        | 600  | 820                       | SVT1HM820GCRE00RAXXX |
|          | 100      | 8×11.5        | 45                        | 600  | 1,000                     | SVT1HM101FBRE00RAXXX |
|          | 120      | 8×11.5        | 45                        | 600  | 1,200                     | SVT1HM121FBRE00RAXXX |
|          | 220      | 10×12.5       | 45                        | 600  | 2,200                     | SVT1HM221GCRE00RAXXX |
| 63       | 56       | 8×11.5        | 60                        | 400  | 706                       | SVT1JM560FBRE00RAXXX |
|          | 100      | 10×12.5       | 60                        | 400  | 1,260                     | SVT1JM101GCRE00RAXXX |

※Specifications subject to change without notice

VF series

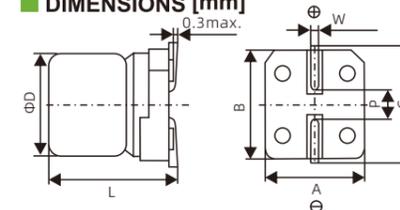
- Endurance: 3,000~5,000 hours at 105°C
- Long life
- Recommended applications: system board, display card, small changer and intelligent TV
- RoHS Compliant and lead-free



SPECIFICATIONS

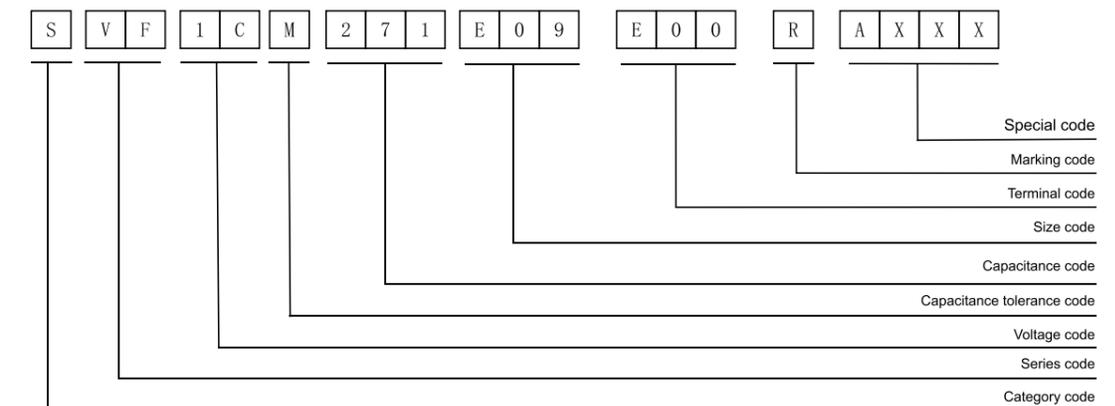
| Items  | Characteristics  |                                      |
|--|--|--------------------------------------|
| Category Temperature Range                             | -55~+105°C   |                                      |
| Rated Working Voltage Range                            | 2.5 ~63Vdc   |                                      |
| Nominal Capacitance Range                              | 22~2,200μF   |                                      |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)  |                                      |
| DC Leakage Current                                     | ≤0.2CV or 500μA, whichever is greater.   |                                      |
|  | Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)  |                                      |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 2.5 6.3 10 16 25 35 50 63            |
|  | Dissipation Factor (Max.)  | 0.08 0.12 (at 20°C,120Hz)            |
| ESR(100kHz,20°C)                                       | Value in the characteristics table   |                                      |
| Temperature Characteristic (Impedance Ratio at 100kHz) | Z(+105°C)/Z(+20°C)≤1.5<br>Z(-55°C)/Z(+20°C)≥2.0  |                                      |
| Endurance  | After applying rated voltage for 3,000~5,000 hours at 105°C,the capacitors shall meet the following requirements.  |                                      |
|  | Appearance   | No significant damage                |
|  | Capacitance Change   | ≤±20% of the initial value           |
|  | Dissipation Factor   | ≤150% of the initial specified value |
|  | ESR  | ≤150% of the initial specified value |
| Humidity Test  | After subjecting to 90%~95% RH for 1,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.   |                                      |
|  | After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements. |                                      |
| Surge Test   | Appearance   | No significant damage                |
|  | Capacitance Change   | ≤±20% of the initial value           |
|  | Dissipation Factor   | ≤150% of the initial specified value |
|  | ESR  | ≤150% of the initial specified value |
|  | Leakage Current  | ≤The initial specified value         |

DIMENSIONS [mm]



| Size Code | 6.3         | 8       | 10      |
|-----------|-------------|---------|---------|
| P±0.2     | 1.9         | 3.1     | 4.5     |
| A±0.2     | 6.6         | 8.3     | 10.3    |
| B±0.2     | 6.6         | 8.3     | 10.3    |
| C±0.2     | 7.2         | 9       | 11      |
| W         | 0.5~0.8     | 0.7~1.1 | 0.7~1.1 |
| ΦD'       | ΦD-0.1~+0.5 |         |         |
| L'        | L±0.5       |         |         |

PART NUMBERING SYSTEM



VF series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 2.5      | 330      | 6.3×6         | 22                        | 2,400                                     | 500                       | SVF0EM331E06E00RAXXX |
|          | 390      | 6.3×6         | 22                        | 2,500                                     | 500                       | SVF0EM391E06E00RAXXX |
|          | 470      | 6.3×6         | 22                        | 2,600                                     | 500                       | SVF0EM471E06E00RAXXX |
|          | 560      | 6.3×6         | 22                        | 2,700                                     | 500                       | SVF0EM561E06E00RAXXX |
|          | 680      | 6.3×9         | 16                        | 3,800                                     | 500                       | SVF0EM681E09E00RAXXX |
| 6.3      | 220      | 6.3×6         | 22                        | 2,500                                     | 500                       | SVF0JM221E06E00RAXXX |
|          | 270      | 6.3×6         | 22                        | 2,700                                     | 500                       | SVF0JM271E06E00RAXXX |
|          | 330      | 6.3×6         | 22                        | 2,700                                     | 500                       | SVF0JM331E06E00RAXXX |
|          | 470      | 6.3×9         | 16                        | 3,100                                     | 592                       | SVF0JM471E09E00RAXXX |
|          | 560      | 6.3×9         | 16                        | 3,300                                     | 706                       | SVF0JM561E09E00RAXXX |
|          | 1,000    | 8×11.5        | 16                        | 3,800                                     | 1,260                     | SVF0JM102FBRE00RAXXX |
|          | 1,500    | 8×11.5        | 16                        | 3,900                                     | 1,890                     | SVF0JM152FBRE00RAXXX |
|          | 2,200    | 10×12.5       | 16                        | 5,000                                     | 2,772                     | SVF0JM222GCRE00RAXXX |
| 10       | 120      | 6.3×6         | 33                        | 2,400                                     | 500                       | SVF1AM121E06E00RAXXX |
|          | 220      | 6.3×6         | 33                        | 2,400                                     | 500                       | SVF1AM221E06E00RAXXX |
|          | 220      | 6.3×9         | 22                        | 2,700                                     | 500                       | SVF1AM221E09E00RAXXX |
|          | 330      | 6.3×9         | 22                        | 2,700                                     | 660                       | SVF1AM331E09E00RAXXX |
|          | 560      | 8×11.5        | 22                        | 3,200                                     | 1,120                     | SVF1AM561FBRE00RAXXX |
|          | 560      | 10×12.5       | 22                        | 4,500                                     | 1,120                     | SVF1AM561GCRE00RAXXX |
|          | 1,000    | 8×11.5        | 16                        | 3,700                                     | 2,000                     | SVF1AM102FBRE00RAXXX |
|          | 1,000    | 10×12.5       | 16                        | 3,900                                     | 2,000                     | SVF1AM102GCRE00RAXXX |
|          | 1,500    | 10×12.5       | 16                        | 3,900                                     | 3,000                     | SVF1AM152GCRE00RAXXX |
| 16       | 47       | 6.3×6         | 44                        | 1,500                                     | 500                       | SVF1CM470E06E00RAXXX |
|          | 68       | 6.3×6         | 44                        | 1,800                                     | 500                       | SVF1CM680E06E00RAXXX |
|          | 100      | 6.3×6         | 33                        | 2,100                                     | 500                       | SVF1CM101E06E00RAXXX |
|          | 150      | 6.3×6         | 33                        | 2,100                                     | 500                       | SVF1CM151E06E00RAXXX |
|          | 150      | 6.3×9         | 27                        | 2,300                                     | 500                       | SVF1CM151E09E00RAXXX |
|          | 180      | 6.3×6         | 66                        | 2,200                                     | 576                       | SVF1CM181E06E00RAXXX |
|          | 180      | 6.3×9         | 27                        | 2,400                                     | 576                       | SVF1CM181E09E00RAXXX |
|          | 220      | 6.3×9         | 27                        | 2,200                                     | 704                       | SVF1CM221E09E00RAXXX |
|          | 270      | 6.3×9         | 27                        | 2,300                                     | 864                       | SVF1CM271E09E00RAXXX |
|          | 270      | 8×9.5         | 27                        | 2,500                                     | 864                       | SVF1CM271F9RE00RAXXX |
|          | 560      | 8×11.5        | 22                        | 3,100                                     | 1,792                     | SVF1CM561FBRE00RAXXX |
|          | 680      | 10×12.5       | 22                        | 3,600                                     | 2,176                     | SVF1CM681GCRE00RAXXX |
|          | 1,000    | 10×12.5       | 22                        | 3,600                                     | 3,200                     | SVF1CM102GCRE00RAXXX |
| 25       | 27       | 6.3×6         | 55                        | 900                                       | 500                       | SVF1EM270E06E00RAXXX |
|          | 47       | 6.3×6         | 55                        | 1,600                                     | 500                       | SVF1EM470E06E00RAXXX |
|          | 47       | 6.3×9         | 38                        | 1,800                                     | 500                       | SVF1EM470E09E00RAXXX |
|          | 56       | 6.3×6         | 55                        | 1,600                                     | 500                       | SVF1EM560E06E00RAXXX |
|          | 100      | 6.3×6         | 55                        | 1,800                                     | 500                       | SVF1EM101E06E00RAXXX |
|          | 100      | 6.3×9         | 33                        | 2,100                                     | 500                       | SVF1EM101E09E00RAXXX |
|          | 150      | 6.3×9         | 33                        | 2,200                                     | 750                       | SVF1EM151E09E00RAXXX |
|          | 220      | 8×11.5        | 33                        | 2,300                                     | 1,100                     | SVF1EM221FBRE00RAXXX |
|          | 330      | 8×11.5        | 33                        | 2,400                                     | 1,650                     | SVF1EM331FBRE00RAXXX |

VF series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | ESR (mΩ,20°C,100kHz)(max) | Rated Ripple Current (mArms/105°C,100kHz) | Leakage Current (μA)(max) | Part Number          |
|----------|----------|---------------|---------------------------|---|---------------------------|----------------------|
| 25       | 330      | 10×12.5       | 24                        | 2,500                                     | 1,650                     | SVF1EM331GCRE00RAXXX |
|          | 470      | 10×12.5       | 24                        | 2,700                                     | 2,350                     | SVF1EM471GCRE00RAXXX |
| 35       | 22       | 6.3×6         | 66                        | 900                                       | 500                       | SVF1VM220E06E00RAXXX |
|          | 27       | 6.3×6         | 66                        | 900                                       | 500                       | SVF1VM270E06E00RAXXX |
|          | 33       | 6.3×6         | 66                        | 900                                       | 500                       | SVF1VM330E06E00RAXXX |
|          | 47       | 6.3×6         | 49                        | 900                                       | 500                       | SVF1VM470E06E00RAXXX |
|          | 47       | 6.3×9         | 55                        | 1,300                                     | 500                       | SVF1VM470E09E00RAXXX |
|          | 68       | 6.3×9         | 44                        | 1,600                                     | 500                       | SVF1VM680E09E00RAXXX |
|          | 100      | 6.3×9         | 44                        | 1,800                                     | 700                       | SVF1VM101E09E00RAXXX |
|          | 100      | 8×11.5        | 33                        | 2,700                                     | 700                       | SVF1VM101FBRE00RAXXX |
|          | 150      | 8×11.5        | 33                        | 2,700                                     | 1,050                     | SVF1VM151FBRE00RAXXX |
|          | 220      | 8×11.5        | 33                        | 2,100                                     | 1,540                     | SVF1VM221FBRE00RAXXX |
|          | 270      | 8×11.5        | 33                        | 2,200                                     | 1,890                     | SVF1VM271FBRE00RAXXX |
|          | 270      | 10×12.5       | 33                        | 2,400                                     | 1,890                     | SVF1VM271GCRE00RAXXX |
|          | 330      | 10×12.5       | 33                        | 2,400                                     | 2,310                     | SVF1VM331GCRE00RAXXX |
| 470      | 10×12.5  | 33            | 2,700                     | 3,290                                     | SVF1VM471GCRE00RAXXX      |                      |
| 50       | 82       | 10×12.5       | 33                        | 1,800                                     | 820                       | SVF1HM820GCRE00RAXXX |
|          | 100      | 8×11.5        | 33                        | 1,800                                     | 1,000                     | SVF1HM101FBRE00RAXXX |
|          | 120      | 8×11.5        | 33                        | 1,800                                     | 1,200                     | SVF1HM121FBRE00RAXXX |
|          | 220      | 10×12.5       | 33                        | 2,000                                     | 2,200                     | SVF1HM221GCRE00RAXXX |
| 63       | 47       | 8×9.5         | 66                        | 900                                       | 592                       | SVF1JM470F9RE00RAXXX |
|          | 56       | 8×11.5        | 44                        | 1,200                                     | 706                       | SVF1JM560FBRE00RAXXX |
|          | 100      | 10×12.5       | 44                        | 1,400                                     | 1,260                     | SVF1JM101GCRE00RAXXX |

※Specifications subject to change without notice

# MK series

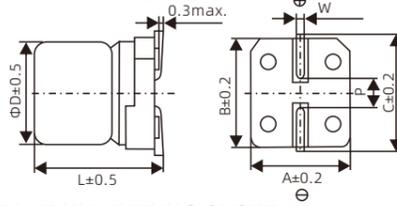
- Endurance: 2,000 hours at 105°C
- General product
- Designed for surface mounting on high density PC board
- RoHS Compliant



## SPECIFICATIONS

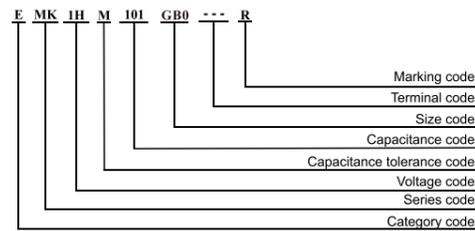
| Items  | Characteristics   |                                       |      |      |      |      |        |      |
|--|---|---------------------------------------|------|------|------|------|--------|------|
| Category Temperature Range                             | -55 ~ +105°C  |                                       |      |      |      |      |        |      |
| Rated Voltage Range                                    | 6.3 ~ 100 Vdc   |                                       |      |      |      |      |        |      |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)   |                                       |      |      |      |      |        |      |
| Leakage Current  | 6.3 ~ 100 Vdc   |                                       |      |      |      |      |        |      |
|  | ≤0.01CV or 3μA, whichever is greater (2 minutes) (at 20°C)  |                                       |      |      |      |      |        |      |
|  | Where, I: Max. leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V)  |                                       |      |      |      |      |        |      |
| Dissipation Factor                                     | Rated Voltage (Vdc)   | 6.3                                   | 10   | 16   | 25   | 35   | 50~100 |      |
|  | Dissipation Factor(Max.)  | D80 ~ E83                             | 0.30 | 0.24 | 0.20 | 0.16 | 0.14   | 0.12 |
|  |   | FB0 ~ WG5                             | 0.40 | 0.30 | 0.26 | 0.16 | 0.14   |      |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)   | 6.3                                   | 10   | 16   | 25   | 35   | 50~100 |      |
|  | Z(-25°C)/Z(+20°C)   | 4                                     | 3    | 2    | 2    | 2    | 2      |      |
|  | Z(-40°C)/Z(+20°C)   | 6                                     | 4    | 3    | 3    | 3    | 3      |      |
|  | Z(-55°C)/Z(+20°C)   | 8                                     | 6    | 4    | 3    | 3    | 3      |      |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after rated voltage is applied for a specified period of time at 105°C. |                                       |      |      |      |      |        |      |
|  | Load Life   | 2,000 hours                           |      |      |      |      |        |      |
|  | Capacitance Change  | ≤±20% of the initial value            |      |      |      |      |        |      |
|  | Dissipation Factor  | ≤200% of the initial specified value  |      |      |      |      |        |      |
|  | Leakage Current   | ≤The initial specified value          |      |      |      |      |        |      |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 500 hours                    |                                       |      |      |      |      |        |      |
|  | Capacitance Change  | ≤±20% of the initial value            |      |      |      |      |        |      |
|  | Dissipation Factor  | ≤200% of the initial specified value  |      |      |      |      |        |      |
|  | Leakage Current   | ≤ 200% of the initial specified value |      |      |      |      |        |      |

## DIMENSIONS [mm]



| Size code | D    | L    | A    | B    | C    | W         | P   |
|-----------|------|------|------|------|------|-----------|-----|
| D80       | 5.0  | 7.7  | 5.3  | 5.3  | 5.9  | 0.5 ~ 0.8 | 1.4 |
| E80       | 6.3  | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 ~ 0.8 | 1.9 |
| E83       | 6.3  | 8.0  | 6.6  | 6.6  | 7.2  | 0.5 ~ 0.8 | 1.9 |
| FB0       | 8.0  | 10.5 | 8.3  | 8.3  | 9.0  | 0.7 ~ 1.1 | 3.1 |
| GB0       | 10.0 | 10.5 | 10.3 | 10.3 | 11.0 | 0.7 ~ 1.1 | 4.5 |
| WE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 ~ 1.3 | 4.5 |
| WG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 ~ 1.3 | 4.5 |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)          | 120  | 1K   | 10K  | 100K |
|--------------------|------|------|------|------|
| 4.7 ≤ Cap. ≤ 1,000 | 0.50 | 0.80 | 0.90 | 1.00 |

# MK series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size Code | Rated Ripple Current (mArms/105°C, 100kHz) | Part Number     |
|----------|----------|-----------|--|-----------------|
| 6.3      | 100      | D80       | 105  | EMK0JM101D80--R |
|          | 220      | E83       | 160  | EMK0JM221E83--R |
|          | 330      | FB0       | 340  | EMK0JM331FB0--R |
|          | 470      | FB0       | 370  | EMK0JM471FB0--R |
|          | 680      | GB0       | 670  | EMK0JM681GB0--R |
| 10       | 1,000    | GB0       | 860  | EMK0JM102GB0--R |
|          | 33       | D80       | 105  | EMK1AM330D80--R |
|          | 100      | E83       | 175  | EMK1AM101E83--R |
|          | 220      | E83       | 180  | EMK1AM221E83--R |
|          | 330      | FB0       | 340  | EMK1AM331FB0--R |
| 16       | 470      | FB0       | 360  | EMK1AM471FB0--R |
|          | 820      | GB0       | 860  | EMK1AM821GB0--R |
|          | 1,000    | GB0       | 900  | EMK1AM102GB0--R |
|          | 47       | D80       | 105  | EMK1CM470D80--R |
|          | 100      | E83       | 175  | EMK1CM101E83--R |
| 25       | 150      | E83       | 190  | EMK1CM151E83--R |
|          | 220      | FB0       | 500  | EMK1CM221FB0--R |
|          | 330      | FB0       | 545  | EMK1CM331FB0--R |
|          | 470      | FB0       | 560  | EMK1CM471FB0--R |
|          | 680      | GB0       | 850  | EMK1CM681GB0--R |
| 35       | 1,000    | WE0       | 1,050                                      | EMK1CM102WE0--R |
|          | 33       | D80       | 105  | EMK1EM330D80--R |
|          | 47       | E83       | 180  | EMK1EM470E83--R |
|          | 100      | E83       | 205  | EMK1EM101E83--R |
|          | 220      | FB0       | 550  | EMK1EM221FB0--R |
| 50       | 330      | GB0       | 780  | EMK1EM331GB0--R |
|          | 470      | GB0       | 800  | EMK1EM471GB0--R |
|          | 680      | WE0       | 950  | EMK1EM681WE0--R |
|          | 1,000    | WE0       | 1,280                                      | EMK1EM102WE0--R |
|          | 10       | D80       | 105  | EMK1VM100D80--R |
| 63       | 22       | D80       | 110  | EMK1VM220D80--R |
|          | 47       | E83       | 210  | EMK1VM470E83--R |
|          | 100      | FB0       | 575  | EMK1VM101FB0--R |
|          | 220      | GB0       | 835  | EMK1VM221GB0--R |
|          | 330      | GB0       | 850  | EMK1VM331GB0--R |
| 100      | 470      | WE0       | 980  | EMK1VM471WE0--R |
|          | 680      | WG5       | 1,280                                      | EMK1VM681WG5--R |
|          | 10       | E83       | 120  | EMK1HM100E83--R |
|          | 22       | E83       | 175  | EMK1HM220E83--R |
|          | 33       | E83       | 180  | EMK1HM330E83--R |
| 150      | 47       | E83       | 190  | EMK1HM470E83--R |
|          | 47       | FB0       | 540  | EMK1HM470FB0--R |
|          | 100      | FB0       | 600  | EMK1HM101FB0--R |
|          | 100      | GB0       | 700  | EMK1HM101GB0--R |
|          | 220      | GB0       | 700  | EMK1HM221GB0--R |
| 200      | 330      | WE0       | 950  | EMK1HM331WE0--R |
|          | 470      | WG5       | 1,300                                      | EMK1HM471WG5--R |
|          | 10       | D80       | 85   | EMK1JM100D80--R |
|          | 22       | E83       | 150  | EMK1JM220E83--R |
|          | 33       | FB0       | 375  | EMK1JM330FB0--R |
| 250      | 47       | FB0       | 450  | EMK1JM470FB0--R |
|          | 100      | GB0       | 575  | EMK1JM101GB0--R |

| WV (Vdc) | Cap (μF) | Size Code | Rated Ripple Current (mArms/105°C, 100kHz) | Part Number     |
|----------|----------|-----------|--|-----------------|
| 63       | 220      | WE0       | 890  | EMK1JM221WE0--R |
|          | 330      | WG5       | 960  | EMK1JM331WG5--R |
| 80       | 10       | E83       | 140  | EMK1BM100E83--R |
|          | 22       | FB0       | 375  | EMK1BM220FB0--R |
|          | 33       | FB0       | 450  | EMK1BM330FB0--R |
|          | 47       | GB0       | 575  | EMK1BM470GB0--R |
|          | 100      | WE0       | 760  | EMK1BM101WE0--R |
| 100      | 150      | WE0       | 800  | EMK1BM151WE0--R |
|          | 220      | WG5       | 960  | EMK1BM221WG5--R |
|          | 4.7      | D80       | 70   | EMK1KM47D80--R  |
|          | 10       | E83       | 135  | EMK1KM100E83--R |
|          | 22       | FB0       | 345  | EMK1KM220FB0--R |
| 150      | 33       | GB0       | 560  | EMK1KM330GB0--R |
|          | 47       | GB0       | 575  | EMK1KM470GB0--R |
|          | 100      | WE0       | 680  | EMK1KM101WE0--R |
|          | 150      | WG5       | 890  | EMK1KM151WG5--R |

※Specifications subject to change without notice

# MF series

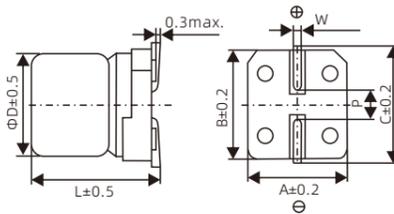
- Endurance: 5,000 hours at 105°C
- Long life
- Designed for surface mounting on high density PC board
- RoHS Compliant



## SPECIFICATIONS

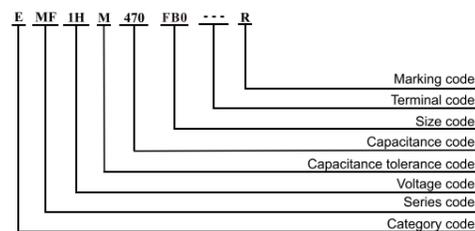
| Items  | Characteristics   |                                       |      |      |      |       |       |      |                  |
|--|---|---------------------------------------|------|------|------|-------|-------|------|------------------|
| Category Temperature Range                             | -55 ~ +105°C  |                                       |      |      |      |       |       |      |                  |
| Rated Voltage Range                                    | 6.3 ~ 100 Vdc   |                                       |      |      |      |       |       |      |                  |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)   |                                       |      |      |      |       |       |      |                  |
| Leakage Current  | 6.3 ~ 100 Vdc (at 20°C)   |                                       |      |      |      |       |       |      |                  |
|  | I≤0.01CV or 3μA, whichever is greater (2 minutes)   |                                       |      |      |      |       |       |      |                  |
|  | Where, I:Max. leakage current (μA), C:Nominal capacitance (μF), V:Rated voltage (V)   |                                       |      |      |      |       |       |      |                  |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)   | 6.3                                   | 10   | 16   | 25   | 35~50 | 63~80 | 100  | (at 20°C, 120Hz) |
|  | Dissipation Factor(Max.)  | 0.32                                  | 0.28 | 0.26 | 0.16 | 0.14  | 0.12  | 0.10 |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)   | 6.3                                   | 10   | 16   | 25   | 35~50 | 63~80 | 100  | (at 120Hz)       |
|  | Z(-25°C)/Z(+20°C)   | 4                                     | 3    | 2    | 2    | 2     | 2     | 2    |                  |
|  | Z(-40°C)/Z(+20°C)   | 6                                     | 4    | 3    | 3    | 3     | 3     | 3    |                  |
|  | Z(-55°C)/Z(+20°C)   | 8                                     | 6    | 4    | 3    | 3     | 3     | 3    |                  |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after rated voltage is applied for a specified period of time at 105°C. |                                       |      |      |      |       |       |      |                  |
|  | Rated Voltage (Vdc)   | 6.3 ~ 100                             |      |      |      |       |       |      |                  |
|  | Load Life   | 5,000 hours                           |      |      |      |       |       |      |                  |
|  | Capacitance Change  | ≤±30% of the initial value            |      |      |      |       |       |      |                  |
|  | Dissipation Factor  | ≤300% of the initial specified value  |      |      |      |       |       |      |                  |
|  | Leakage Current   | ≤The initial specified value          |      |      |      |       |       |      |                  |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.                 |                                       |      |      |      |       |       |      |                  |
|  | Rated Voltage (Vdc)   | 6.3 ~ 100                             |      |      |      |       |       |      |                  |
|  | Capacitance Change  | ≤±30% of the initial value            |      |      |      |       |       |      |                  |
|  | Dissipation Factor  | ≤300% of the initial specified value  |      |      |      |       |       |      |                  |
|  | Leakage Current   | ≤ 200% of the initial specified value |      |      |      |       |       |      |                  |

## DIMENSIONS [mm]



| Size code | D    | L    | A    | B    | C    | W         | P   |
|-----------|------|------|------|------|------|-----------|-----|
| FB0       | 8.0  | 10.5 | 8.3  | 8.3  | 9.0  | 0.7 ~ 1.1 | 3.1 |
| GB0       | 10.0 | 10.5 | 10.3 | 10.3 | 11.0 | 0.7 ~ 1.1 | 4.5 |
| GD0       | 10.0 | 12.5 | 10.3 | 10.3 | 11.0 | 0.7 ~ 1.1 | 4.5 |
| WE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 ~ 1.3 | 4.5 |
| WG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 ~ 1.3 | 4.5 |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)         | 120  | 1K   | 10K  | 100K |
|-------------------|------|------|------|------|
| 22 ≤ Cap. ≤ 1,000 | 0.50 | 0.80 | 0.90 | 1.00 |

# MF series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size Code | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number     |
|----------|----------|-----------|---|-----------------|
| 6.3      | 330      | FB0       | 280   | EMF0JM331FB0--R |
|          | 470      | FB0       | 360   | EMF0JM471FB0--R |
|          | 560      | FB0       | 380   | EMF0JM561FB0--R |
|          | 680      | GB0       | 500   | EMF0JM681GB0--R |
|          | 1,000    | GB0       | 600   | EMF0JM102GB0--R |
| 10       | 220      | FB0       | 280   | EMF1AM221FB0--R |
|          | 330      | GB0       | 400   | EMF1AM331GB0--R |
|          | 470      | GB0       | 545   | EMF1AM471GB0--R |
|          | 680      | GB0       | 560   | EMF1AM681GB0--R |
|          | 1000     | WE0       | 850   | EMF1AM102WE0--R |
| 16       | 220      | FB0       | 475   | EMF1CM221FB0--R |
|          | 330      | GB0       | 520   | EMF1CM331GB0--R |
|          | 470      | GB0       | 720   | EMF1CM471GB0--R |
|          | 680      | WE0       | 960   | EMF1CM681WE0--R |
|          | 1,000    | WE0       | 1,030                                       | EMF1CM102WE0--R |
| 25       | 220      | FB0       | 535   | EMF1EM221FB0--R |
|          | 330      | GB0       | 750   | EMF1EM331GB0--R |
|          | 470      | GB0       | 750   | EMF1EM471GB0--R |
|          | 680      | WE0       | 1000  | EMF1EM681WE0--R |
|          | 1,000    | WG5       | 1,300                                       | EMF1EM102WG5--R |
| 35       | 100      | FB0       | 560   | EMF1VM101FB0--R |
|          | 220      | GB0       | 800   | EMF1VM221GB0--R |
|          | 330      | GB0       | 850   | EMF1VM331GB0--R |
|          | 470      | WE0       | 900   | EMF1VM471WE0--R |
|          | 560      | WE0       | 960   | EMF1VM561WE0--R |
| 50       | 680      | WG5       | 1,600                                       | EMF1VM681WG5--R |
|          | 47       | FB0       | 520   | EMF1HM470FB0--R |
|          | 100      | FB0       | 350   | EMF1HM101FB0--R |
|          | 100      | GB0       | 680   | EMF1HM101GB0--R |
|          | 220      | GD0       | 760   | EMF1HM221GD0--R |
| 63       | 220      | WE0       | 875   | EMF1HM221WE0--R |
|          | 330      | WG5       | 1,020                                       | EMF1HM331WG5--R |
|          | 470      | WG5       | 1,120                                       | EMF1HM471WG5--R |
|          | 33       | FB0       | 320   | EMF1JM330FB0--R |
|          | 47       | FB0       | 380   | EMF1JM470FB0--R |
| 80       | 100      | GB0       | 530   | EMF1JM101GB0--R |
|          | 220      | WE0       | 840   | EMF1JM221WE0--R |
|          | 330      | WG5       | 920   | EMF1JM331WG5--R |
|          | 22       | FB0       | 360   | EMF1BM220FB0--R |
|          | 33       | FB0       | 410   | EMF1BM330FB0--R |
| 100      | 47       | GB0       | 490   | EMF1BM470GB0--R |
|          | 100      | GD0       | 530   | EMF1BM101GD0--R |
|          | 220      | WG5       | 1,020                                       | EMF1BM221WG5--R |
|          | 22       | FB0       | 320   | EMF1KM220FB0--R |
|          | 33       | GB0       | 360   | EMF1KM330GB0--R |
| 150      | 47       | GB0       | 540   | EMF1KM470GB0--R |
|          | 100      | WE0       | 550   | EMF1KM101WE0--R |
|          | 150      | WG5       | 900   | EMF1KM151WG5--R |

※Specifications subject to change without notice

# MH series

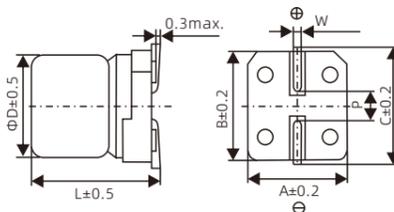
- Endurance: 1,000~3,000 hours at 125°C
- High temperature 125°C
- Designed for surface mounting on high density PC board
- RoHS Compliant



## SPECIFICATIONS

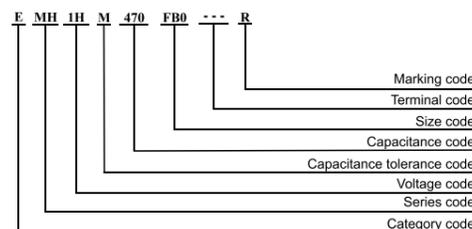
| Items  | Characteristics   |   |      |   |       |       |      |  |
|--|---|---|------|---|-------|-------|------|--|
| Category Temperature Range   | -55 ~ +125°C  |   |      |   |       |       |      |  |
| Rated Voltage Range  | 10~ 100 Vdc   |   |      |   |       |       |      |  |
| Capacitance Tolerance  | ±20% (M) (at 20°C,120Hz)  |   |      |   |       |       |      |  |
| Leakage Current  | 10~ 100 Vdc   |   |      |   |       |       |      |  |
|  | E83-GB0   |   |      | WE0-WG5   |       |       |      |  |
|  | I≤0.01CV or 3μA, whichever is greater (2 minutes)   |   |      | I≤0.03CV or 4μA, whichever is greater (2 minutes) |       |       |      |  |
| Where, I:Max. leakage current (μA), C:Nominal capacitance (μF), V:Rated voltage (V) (at 20°C)                      |   |   |      |   |       |       |      |  |
| Dissipation Factor (tanδ)  | Rated Voltage (Vdc)   | 10  | 16   | 25  | 35-50 | 63-80 | 100  |  |
|  | Dissipation Factor(Max.)  | 0.24  | 0.20 | 0.16  | 0.14  | 0.12  | 0.10 |  |
| When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μF increase. (at 20°C,120Hz) |   |   |      |   |       |       |      |  |
| Low Temperature Characteristics (Max. Impedance Ratio)   | Rated Voltage (Vdc)   |   |      |   |       |       |      |  |
|  | E83-GB0   | Z(-25°C)/Z(+20°C)   | 3    | 2   | 2     | 2     | 2    |  |
|  |   | Z(-40°C)/Z(+20°C)   | 6    | 4   | 4     | 3     | 3    |  |
|  |   | Z(-55°C)/Z(+20°C)   | 6    | 4   | 4     | 3     | -    |  |
|  | WE0-WG5   | Z(-25°C)/Z(+20°C)   | 4    | 3   | 2     | 2     | 2    |  |
|  |   | Z(-40°C)/Z(+20°C)   | 6    | 6   | 4     | 3     | 3    |  |
| Z(-55°C)/Z(+20°C)  |   | 6   | 6    | 4   | 3     | -     |      |  |
| (at 120Hz)   |   |   |      |   |       |       |      |  |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after rated voltage is applied for a specified period of time at 125°C. |   |      |   |       |       |      |  |
|  | Load Life   | E83 : 1,000 hours<br>FB0-GB0 : 2,000 hours<br>WE0-WG5 : 3,000 hours |      |   |       |       |      |  |
|  | Capacitance Change  | ≤±30% of the initial value  |      |   |       |       |      |  |
|  | Dissipation Factor  | ≤300% of the initial specified value                                |      |   |       |       |      |  |
|  | Leakage Current   | ≤The initial specified value  |      |   |       |       |      |  |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 125°C for 1,000 hours                  |   |      |   |       |       |      |  |
|  | Capacitance Change  | ≤±30% of the initial value  |      |   |       |       |      |  |
|  | Dissipation Factor  | ≤300% of the initial specified value                                |      |   |       |       |      |  |
|  | Leakage Current   | ≤ 500% of the initial specified value                               |      |   |       |       |      |  |

## DIMENSIONS [mm]



| Size code | D    | L    | A    | B    | C    | W         | P   |
|-----------|------|------|------|------|------|-----------|-----|
| E83       | 6.3  | 8.0  | 6.6  | 6.6  | 7.2  | 0.5 ~ 0.8 | 1.9 |
| FB0       | 8.0  | 10.5 | 8.3  | 8.3  | 9.0  | 0.7 ~ 1.1 | 3.1 |
| GB0       | 10.0 | 10.5 | 10.3 | 10.3 | 11.0 | 0.7 ~ 1.1 | 4.5 |
| WE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 ~ 1.3 | 4.5 |
| WG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 ~ 1.3 | 4.5 |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)          | 120  | 1k   | 10k  | 100k |
|--------------------|------|------|------|------|
| Cap. < 220         | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 ≤ Cap. < 680   | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 ≤ Cap. < 1,000 | 0.60 | 0.87 | 0.95 | 1.00 |

# MH series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size Code | Rated Ripple Current (mA rms/125°C, 100kHz) | Part Number     |
|----------|----------|-----------|---|-----------------|
| 10       | 100      | E83       | 110   | EMH1AM101E83--R |
|          | 220      | E83       | 110   | EMH1AM221E83--R |
|          | 220      | FB0       | 220   | EMH1AM221FB0--R |
|          | 330      | FB0       | 220   | EMH1AM331FB0--R |
|          | 330      | GB0       | 296   | EMH1AM331GB0--R |
|          | 470      | GB0       | 296   | EMH1AM471GB0--R |
|          | 1,000    | WE0       | 750   | EMH1AM102WE0--R |
| 16       | 100      | E83       | 110   | EMH1CM101E83--R |
|          | 100      | FB0       | 220   | EMH1CM101FB0--R |
|          | 220      | FB0       | 220   | EMH1CM221FB0--R |
|          | 330      | GB0       | 296   | EMH1CM331GB0--R |
|          | 470      | GB0       | 310   | EMH1CM471GB0--R |
|          | 680      | WE0       | 750   | EMH1CM681WE0--R |
|          | 1,000    | WG5       | 800   | EMH1CM102WG5--R |
| 25       | 47       | E83       | 110   | EMH1EM470E83--R |
|          | 100      | E83       | 110   | EMH1EM101E83--R |
|          | 100      | FB0       | 220   | EMH1EM101FB0--R |
|          | 220      | FB0       | 220   | EMH1EM221FB0--R |
|          | 220      | GB0       | 296   | EMH1EM221GB0--R |
|          | 330      | GB0       | 296   | EMH1EM331GB0--R |
|          | 470      | WE0       | 750   | EMH1EM471WE0--R |
|          | 680      | WG5       | 800   | EMH1EM681WG5--R |
| 35       | 33       | E83       | 110   | EMH1VM330E83--R |
|          | 47       | E83       | 110   | EMH1VM470E83--R |
|          | 100      | FB0       | 220   | EMH1VM101FB0--R |
|          | 220      | GB0       | 296   | EMH1VM221GB0--R |
|          | 330      | WE0       | 750   | EMH1VM331WE0--R |
|          | 470      | WG5       | 900   | EMH1VM471WG5--R |
| 50       | 10       | E83       | 83  | EMH1HM100E83--R |
|          | 22       | E83       | 83  | EMH1HM220E83--R |
|          | 33       | E83       | 83  | EMH1HM330E83--R |
|          | 47       | FB0       | 160   | EMH1HM470FB0--R |
|          | 47       | GB0       | 247   | EMH1HM470GB0--R |
|          | 100      | GB0       | 247   | EMH1HM101GB0--R |
|          | 100      | WE0       | 550   | EMH1HM101WE0--R |
|          | 220      | WE0       | 550   | EMH1HM221WE0--R |
|          | 330      | WG5       | 700   | EMH1HM331WG5--R |
| 63       | 22       | E83       | 65  | EMH1JM220E83--R |
|          | 33       | FB0       | 100   | EMH1JM330FB0--R |
|          | 47       | FB0       | 125   | EMH1JM470FB0--R |
|          | 100      | GB0       | 205   | EMH1JM101GB0--R |
|          | 220      | WG5       | 600   | EMH1JM221WG5--R |
| 80       | 10       | E83       | 95  | EMH1BM100E83--R |
|          | 22       | FB0       | 110   | EMH1BM220FB0--R |
|          | 22       | GB0       | 215   | EMH1BM220GB0--R |
|          | 33       | FB0       | 130   | EMH1BM330FB0--R |
|          | 47       | GB0       | 245   | EMH1BM470GB0--R |
|          | 100      | WE0       | 475   | EMH1BM101WE0--R |
| 100      | 10       | E83       | 90  | EMH1KM100E83--R |
|          | 22       | FB0       | 105   | EMH1KM220FB0--R |
|          | 33       | GB0       | 200   | EMH1KM330GB0--R |
|          | 47       | GB0       | 230   | EMH1KM470GB0--R |

| WV (Vdc) | Cap (μF) | Size Code | Rated Ripple Current (mA rms/125°C, 100kHz) | Part Number     |
|----------|----------|-----------|---|-----------------|
| 100      | 68       | WE0       | 375   | EMH1KM680WE0--R |
|          | 100      | WE0       | 405   | EMH1KM101WE0--R |

※Specifications subject to change without notice

# H7 series

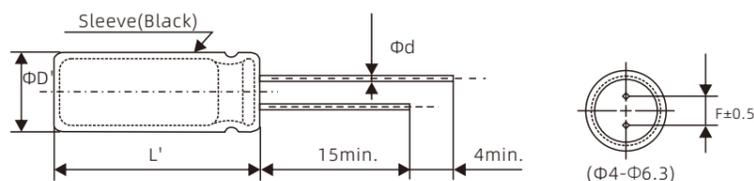
- Endurance: 1,000 hours at 105°C
- Miniature series with 7mm height
- Wide temperature range of -40°C to +105°C
- RoHS Compliant



## SPECIFICATIONS

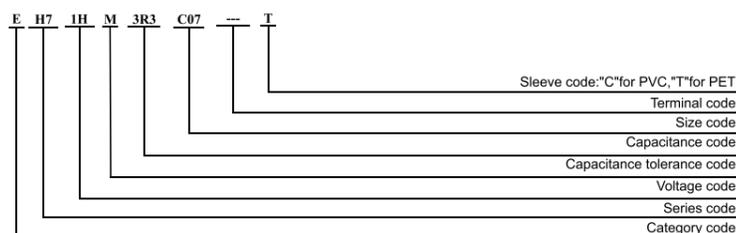
| Items  | Characteristics  |                                      |      |      |      |      |      |                 |
|--|--|--------------------------------------|------|------|------|------|------|-----------------|
| Category Temperature Range                             | -40~+105°C   |                                      |      |      |      |      |      |                 |
| Rated Working Voltage Range                            | 6.3~50 Vdc   |                                      |      |      |      |      |      |                 |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)  |                                      |      |      |      |      |      |                 |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater. (at 20°C after 2 minutes)<br>Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)      |                                      |      |      |      |      |      |                 |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 6.3                                  | 10   | 16   | 25   | 35   | 50   | (at 20°C,120Hz) |
|  | tanδ (max.)  | 0.22                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | (at 120Hz)      |
|  | Z(-25°C)/Z(+20°C)  | 3                                    |      | 2    |      |      |      |                 |
|  | Z(-40°C)/Z(+20°C)  | 8                                    | 5    | 4    | 3    |      |      |                 |
| Endurance  | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 105°C.        |                                      |      |      |      |      |      |                 |
|  | Capacitance Change   | ≤±20% of the initial value           |      |      |      |      |      |                 |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |                 |
|  | Leakage Current  | ≤The initial specified value         |      |      |      |      |      |                 |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied. |                                      |      |      |      |      |      |                 |
|  | Capacitance Change   | ≤±20% of the initial value           |      |      |      |      |      |                 |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |                 |
|  | Leakage Current  | ≤200% of the initial specified value |      |      |      |      |      |                 |

## DIMENSIONS [mm]



|     |            |      |     |
|-----|------------|------|-----|
| ΦD  | 4          | 5    | 6.3 |
| Φd  | 0.45       | 0.45 | 0.5 |
| F   | 1.5        | 2.0  | 2.5 |
| ΦD' | ΦD+0.5MAX. |      |     |
| L'  | L+1.5MAX.  |      |     |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| WV (Vdc)  | Freq. (Hz) |      |      |         |
|-----------|------------|------|------|---------|
|           | 50/60      | 120  | 1k   | 10~100k |
| 6.3 to 16 | 0.94       | 1.00 | 1.28 | 1.39    |
| 25 to 35  | 0.76       | 1.00 | 1.27 | 1.59    |
| 50        | 0.90       | 1.00 | 1.40 | 2.00    |

# H7 series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number      |
|----------|----------|---------------|--|------------------|
| 6.3      | 22       | 4×7           | 34   | EH70JM220C07---T |
|          | 33       | 5×7           | 42   | EH70JM330D07---T |
|          | 47       | 5×7           | 50   | EH70JM470D07---T |
|          | 100      | 6.3×7         | 77   | EH70JM101E07---T |
| 10       | 22       | 5×7           | 38   | EH71AM220D07---T |
|          | 33       | 5×7           | 47   | EH71AM330D07---T |
|          | 47       | 6.3×7         | 65   | EH71AM470E07---T |
|          | 100      | 6.3×7         | 87   | EH71AM101E07---T |
| 16       | 10       | 4×7           | 29   | EH71CM100C07---T |
|          | 22       | 5×7           | 44   | EH71CM220D07---T |
|          | 33       | 6.3×7         | 60   | EH71CM330E07---T |
|          | 47       | 6.3×7         | 70   | EH71CM470E07---T |
| 25       | 10       | 5×7           | 33   | EH71EM100D07---T |
|          | 22       | 6.3×7         | 51   | EH71EM220E07---T |
|          | 33       | 6.3×7         | 65   | EH71EM330E07---T |
| 35       | 10       | 5×7           | 36   | EH71VM100D07---T |
|          | 22       | 6.3×7         | 60   | EH71VM220E07---T |
| 50       | 0.1      | 4×7           | 1  | EH71HMR10C07---T |
|          | 0.22     | 4×7           | 2.3  | EH71HMR22C07---T |
|          | 0.33     | 4×7           | 3.5  | EH71HMR33C07---T |
|          | 0.47     | 4×7           | 5  | EH71HMR47C07---T |
|          | 1        | 4×7           | 10   | EH71HM010C07---T |
|          | 2.2      | 4×7           | 19   | EH71HM2R2C07---T |
|          | 3.3      | 4×7           | 24   | EH71HM3R3C07---T |
|          | 4.7      | 5×7           | 29   | EH71HM4R7D07---T |
|          | 10       | 6.3×7         | 44   | EH71HM100E07---T |
| 22       | 6.3×7    | 60            | EH71HM220E07---T                           |                  |

※Specifications subject to change without notice

# L7 series

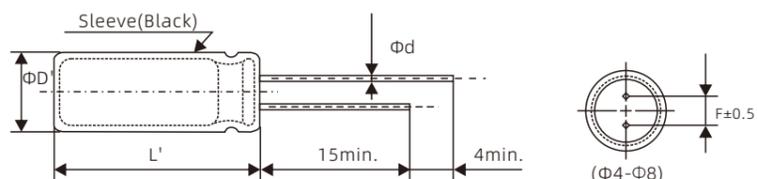
- Endurance: 2,000 hours at 105°C
- Miniature series with 7mm height
- Wide temperature range of -40°C to +105°C
- RoHS Compliant



## SPECIFICATIONS

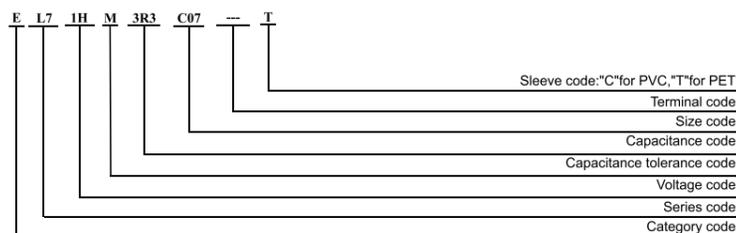
| Items  | Characteristics   |                                      |      |      |      |      |      |      |                 |
|--|---|--------------------------------------|------|------|------|------|------|------|-----------------|
| Category Temperature Range                             | -40~+105°C  |                                      |      |      |      |      |      |      |                 |
| Rated Working Voltage Range                            | 6.3-63 Vdc  |                                      |      |      |      |      |      |      |                 |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)   |                                      |      |      |      |      |      |      |                 |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater. (at 20°C after 2 minutes)<br>Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)       |                                      |      |      |      |      |      |      |                 |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | (at 20°C,120Hz) |
|  | tanδ (max.)   | 0.22                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)   | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | (at 120Hz)      |
|  | Z(-25°C)/Z(+20°C)   | 3                                    |      |      | 2    |      |      |      |                 |
|  | Z(-40°C)/Z(+20°C)   | 8                                    | 6    | 4    | 3    |      |      |      |                 |
| Endurance  | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.         |                                      |      |      |      |      |      |      |                 |
|  | Capacitance Change  | ≤±20% of the initial value           |      |      |      |      |      |      |                 |
|  | Dissipation Factor  | ≤200% of the initial specified value |      |      |      |      |      |      |                 |
|  | Leakage Current   | ≤The initial specified value         |      |      |      |      |      |      |                 |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000 hours at 105°C without voltage applied. |                                      |      |      |      |      |      |      |                 |
|  | Capacitance Change  | ≤±20% of the initial value           |      |      |      |      |      |      |                 |
|  | Dissipation Factor  | ≤200% of the initial specified value |      |      |      |      |      |      |                 |
|  | Leakage Current   | ≤200% of the initial specified value |      |      |      |      |      |      |                 |

## DIMENSIONS [mm]



| ΦD  | 4          | 5    | 6.3 | 8   |
|-----|------------|------|-----|-----|
| Φd  | 0.45       | 0.45 | 0.5 | 0.5 |
| F   | 1.5        | 2.0  | 2.5 | 3.5 |
| ΦD' | ΦD+0.5MAX. |      |     |     |
| L'  | L+2MAX.    |      |     |     |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| WV (Vdc)  | Freq. (Hz) |      |      |         |
|-----------|------------|------|------|---------|
|           | 50/60      | 120  | 1k   | 10-100k |
| 6.3 to 16 | 0.80       | 1.00 | 1.30 | 1.50    |
| 25 to 35  | 0.80       | 1.00 | 1.20 | 1.20    |
| ≥50       | 0.80       | 1.00 | 1.15 | 1.20    |

# L7 series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mArms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 6.3      | 22       | 4×7           | 28  | EL70JM220C07--T |
|          | 33       | 4×7           | 32  | EL70JM330C07--T |
|          | 33       | 5×7           | 35  | EL70JM330D07--T |
|          | 47       | 5×7           | 47  | EL70JM470D07--T |
|          | 68       | 5×7           | 50  | EL70JM680D07--T |
|          | 100      | 6.3×7         | 75  | EL70JM101E07--T |
|          | 220      | 8×7           | 92  | EL70JM221F07--T |
|          | 22       | 4×7           | 32  | EL71AM220C07--T |
| 10       | 33       | 5×7           | 48  | EL71AM330D07--T |
|          | 47       | 5×7           | 51  | EL71AM470D07--T |
|          | 68       | 6.3×7         | 68  | EL71AM680E07--T |
|          | 100      | 6.3×7         | 80  | EL71AM101E07--T |
|          | 100      | 8×7           | 95  | EL71AM101F07--T |
|          | 220      | 8×7           | 130                                       | EL71AM221F07--T |
| 16       | 10       | 4×7           | 28  | EL71CM100C07--T |
|          | 22       | 4×7           | 35  | EL71CM220C07--T |
|          | 22       | 5×7           | 42  | EL71CM220D07--T |
|          | 33       | 5×7           | 50  | EL71CM330D07--T |
|          | 47       | 6.3×7         | 67  | EL71CM470E07--T |
|          | 68       | 6.3×7         | 70  | EL71CM680E07--T |
|          | 68       | 8×7           | 78  | EL71CM680F07--T |
|          | 100      | 8×7           | 110                                       | EL71CM101F07--T |
| 25       | 10       | 4×7           | 28  | EL71EM100C07--T |
|          | 10       | 5×7           | 33  | EL71EM100D07--T |
|          | 22       | 5×7           | 43  | EL71EM220D07--T |
|          | 22       | 6.3×7         | 45  | EL71EM220E07--T |
|          | 33       | 6.3×7         | 62  | EL71EM330E07--T |
|          | 47       | 8×7           | 75  | EL71EM470F07--T |
|          | 68       | 8×7           | 80  | EL71EM680F07--T |
|          | 100      | 8×7           | 115                                       | EL71EM101F07--T |
| 35       | 10       | 5×7           | 35  | EL71VM100D07--T |
|          | 22       | 6.3×7         | 60  | EL71VM220E07--T |
|          | 33       | 6.3×7         | 50  | EL71VM330E07--T |
|          | 33       | 8×7           | 68  | EL71VM330F07--T |
|          | 47       | 8×7           | 80  | EL71VM470F07--T |
|          | 68       | 8×7           | 85  | EL71VM680F07--T |
| 50       | 0.1      | 4×7           | 1.5                                       | EL71HMR10C07--T |
|          | 0.22     | 4×7           | 2.5                                       | EL71HMR22C07--T |
|          | 0.33     | 4×7           | 3.5                                       | EL71HMR33C07--T |
|          | 0.47     | 4×7           | 5   | EL71HMR47C07--T |
|          | 0.68     | 4×7           | 7   | EL71HMR68C07--T |
|          | 1        | 4×7           | 10  | EL71HM010C07--T |
|          | 2.2      | 4×7           | 20  | EL71HM2R2C07--T |
|          | 3.3      | 4×7           | 26  | EL71HM3R3C07--T |
|          | 4.7      | 4×7           | 27  | EL71HM4R7C07--T |
|          | 4.7      | 5×7           | 29  | EL71HM4R7D07--T |
|          | 10       | 6.3×7         | 38  | EL71HM100E07--T |
|          | 22       | 8×7           | 63  | EL71HM220F07--T |
| 33       | 8×7      | 78            | EL71HM330F07--T                           |                 |
| 63       | 0.1      | 4×7           | 1.5                                       | EL71JMR10C07--T |
|          | 0.22     | 4×7           | 2.5                                       | EL71JMR22C07--T |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mArms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 63       | 0.33     | 4×7           | 3.5                                       | EL71JMR33C07--T |
|          | 0.47     | 4×7           | 6   | EL71JMR47C07--T |
|          | 1        | 4×7           | 12  | EL71JM010C07--T |
|          | 2.2      | 4×7           | 20  | EL71JM2R2C07--T |
|          | 3.3      | 5×7           | 28  | EL71JM3R3D07--T |
|          | 4.7      | 6.3×7         | 33  | EL71JM4R7E07--T |
|          | 10       | 6.3×7         | 40  | EL71JM100E07--T |
|          | 22       | 8×7           | 65  | EL71JM220F07--T |

※Specifications subject to change without notice

WKseries

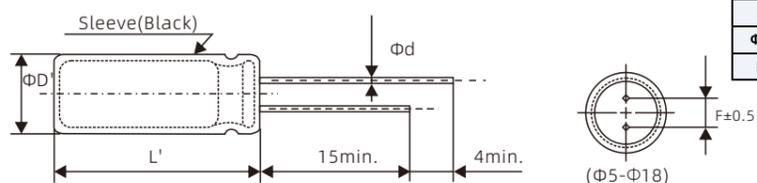
- Endurance: 2,000 hours at 85°C
- Standard series for general purpose
- RoHS Compliant



SPECIFICATIONS

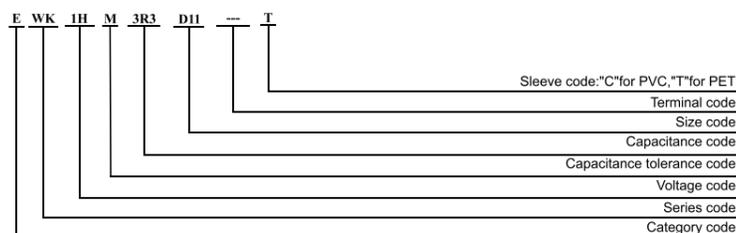
| Items  | Characteristics  |  |
|--|--|--|
| Category Temperature Range                             | -40 to +85°C (6.3 ~ 100Vdc)    -25 to +85°C (160 ~ 450Vdc)   |  |
| Rated Working Voltage Range                            | 6.3~450 Vdc  |  |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |  |
| Leakage Current  | 6.3 ~ 100 Vdc  | 160 ~ 450 Vdc  |
|  | Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)  |  |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 6.3    10    16    25    35    50    63    100    160    200    250    350    400    450                     |
|  | tanδ (max.)  | 0.28    0.24    0.20    0.16    0.14    0.12    0.10    0.08    0.20    0.20    0.20    0.24    0.24    0.24 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  | 6.3    10    16    25    35    50    63    100    160    200    250    350    400    450                     |
|  | Z(-25°C)/Z(+20°C)  | 5    4    3    2    3    3    3    3    3    3    3    3    3    3   |
| Endurance  | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 85°C.         |  |
|  | Capacitance Change   | ≤±20% of the initial value   |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000 hours at 85°C without voltage applied. |  |
|  | Capacitance Change   | ≤±20% of the initial value   |

DIMENSIONS [mm]



|     |            |     |     |     |      |     |     |
|-----|------------|-----|-----|-----|------|-----|-----|
| ΦD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
| Φd  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 3.5 | 5.0  | 5.0 | 7.5 |
| ΦD' | ΦD+0.5MAX. |     |     |     |      |     |     |
| L'  | L+2MAX.    |     |     |     |      |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)        | 50   | 120  | 300  | 1k   | 10   | 100k |
|------------------|------|------|------|------|------|------|
| Cap. < 10        | 0.65 | 1.00 | 1.35 | 1.75 | 2.30 | 2.50 |
| 10sCap. < 100    | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 |
| 100sCap. ≤ 1,000 | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| Cap. > 1,000     | 0.85 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

WKseries

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/85°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 6.3      | 33       | 5×11          | 65  | EWK0JM330D11--T |
|          | 47       | 5×11          | 80  | EWK0JM470D11--T |
|          | 100      | 5×11          | 135                                       | EWK0JM101D11--T |
|          | 220      | 5×12          | 220                                       | EWK0JM221D12--T |
|          | 330      | 6.3×11        | 280                                       | EWK0JM331E11--T |
|          | 470      | 6.3×12        | 360                                       | EWK0JM471E12--T |
|          | 1,000    | 8×12          | 590                                       | EWK0JM102F12--T |
|          | 2,200    | 10×20         | 1,000                                     | EWK0JM222G20--T |
|          | 3,300    | 10×25         | 1,200                                     | EWK0JM332G25--T |
|          | 4,700    | 12.5×20       | 1,550                                     | EWK0JM472W20--T |
|          | 6,800    | 12.5×25       | 1,920                                     | EWK0JM682W25--T |
|          | 10,000   | 16×25         | 2,370                                     | EWK0JM103L25--T |
|          | 15,000   | 16×35         | 2,880                                     | EWK0JM153L35--T |
|          | 22,000   | 18×40         | 3,350                                     | EWK0JM223M40--T |
| 10       | 22       | 5×11          | 60  | EWK1AM220D11--T |
|          | 33       | 5×11          | 75  | EWK1AM330D11--T |
|          | 47       | 5×11          | 95  | EWK1AM470D11--T |
|          | 100      | 5×11          | 140                                       | EWK1AM101D11--T |
|          | 220      | 5×12          | 240                                       | EWK1AM221D12--T |
|          | 330      | 6.3×11        | 310                                       | EWK1AM331E11--T |
|          | 470      | 6.3×12        | 400                                       | EWK1AM471E12--T |
|          | 1,000    | 10×13         | 660                                       | EWK1AM102G13--T |
|          | 2,200    | 10×20         | 1,090                                     | EWK1AM222G20--T |
|          | 3,300    | 12.5×20       | 1,450                                     | EWK1AM332W20--T |
|          | 4,700    | 12.5×25       | 1,800                                     | EWK1AM472W25--T |
|          | 6,800    | 16×25         | 2,250                                     | EWK1AM682L25--T |
|          | 10,000   | 16×35         | 2,710                                     | EWK1AM103L35--T |
|          | 15,000   | 18×35         | 3,120                                     | EWK1AM153M35--T |
| 16       | 10       | 5×11          | 50  | EWK1CM100D11--T |
|          | 22       | 5×11          | 65  | EWK1CM220D11--T |
|          | 33       | 5×11          | 80  | EWK1CM330D11--T |
|          | 47       | 5×11          | 115                                       | EWK1CM470D11--T |
|          | 100      | 5×11          | 175                                       | EWK1CM101D11--T |
|          | 220      | 6.3×11        | 280                                       | EWK1CM221E11--T |
|          | 330      | 8×11          | 380                                       | EWK1CM331F11--T |
|          | 470      | 8×11          | 460                                       | EWK1CM471F11--T |
|          | 1,000    | 10×16         | 800                                       | EWK1CM102G16--T |
|          | 2,200    | 12.5×20       | 1,320                                     | EWK1CM222W20--T |
|          | 3,300    | 12.5×25       | 1,670                                     | EWK1CM332W25--T |
|          | 4,700    | 16×25         | 2,120                                     | EWK1CM472L25--T |
|          | 6,800    | 16×30         | 2,550                                     | EWK1CM682L30--T |
|          | 25       | 10            | 5×11                                      | 45              |
| 22       |          | 5×11          | 70  | EWK1EM220D11--T |
| 33       |          | 5×11          | 98  | EWK1EM330D11--T |
| 47       |          | 5×11          | 120                                       | EWK1EM470D11--T |
| 100      |          | 6.3×11        | 190                                       | EWK1EM101E11--T |
| 220      |          | 8×11          | 330                                       | EWK1EM221F11--T |
| 330      |          | 8×12          | 440                                       | EWK1EM331F12--T |
| 470      |          | 10×13         | 550                                       | EWK1EM471G13--T |
| 1,000    |          | 10×20         | 970                                       | EWK1EM102G20--T |
| 2,200    |          | 12.5×25       | 1,570                                     | EWK1EM222W25--T |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/85°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 25       | 3,300    | 16×25         | 2,000                                     | EWK1EM332L25--T |
|          | 4,700    | 16×30         | 2,450                                     | EWK1EM472L30--T |
| 35       | 10       | 5×11          | 55  | EWK1VM100D11--T |
|          | 22       | 5×11          | 90  | EWK1VM220D11--T |
|          | 33       | 5×11          | 110                                       | EWK1VM330D11--T |
|          | 47       | 5×11          | 135                                       | EWK1VM470D11--T |
|          | 100      | 6.3×11        | 215                                       | EWK1VM101E11--T |
|          | 220      | 8×12          | 385                                       | EWK1VM221F12--T |
|          | 330      | 10×13         | 500                                       | EWK1VM331G13--T |
|          | 470      | 10×16         | 680                                       | EWK1VM471G16--T |
|          | 1,000    | 12.5×20       | 1,180                                     | EWK1VM102W20--T |
|          | 2,200    | 16×25         | 1,810                                     | EWK1VM222L25--T |
| 50       | 0.1      | 5×11          | 1.3                                       | EWK1HMR10D11--T |
|          | 0.22     | 5×11          | 2.9                                       | EWK1HMR22D11--T |
|          | 0.33     | 5×11          | 4.3                                       | EWK1HMR33D11--T |
|          | 0.47     | 5×11          | 7   | EWK1HMR47D11--T |
|          | 1        | 5×11          | 17  | EWK1HM010D11--T |
|          | 2.2      | 5×11          | 28  | EWK1HM2R2D11--T |
|          | 3.3      | 5×11          | 35  | EWK1HM3R3D11--T |
|          | 4.7      | 5×11          | 41  | EWK1HM4R7D11--T |
|          | 10       | 5×11          | 60  | EWK1HM100D11--T |
|          | 22       | 5×11          | 95  | EWK1HM220D11--T |
| 63       | 33       | 6.3×11        | 130                                       | EWK1HM330E11--T |
|          | 47       | 6.3×11        | 160                                       | EWK1HM470E11--T |
|          | 100      | 8×11          | 270                                       | EWK1HM101F11--T |
|          | 220      | 10×16         | 435                                       | EWK1HM221G16--T |
|          | 330      | 10×20         | 590                                       | EWK1HM331G20--T |
|          | 470      | 10×20         | 760                                       | EWK1HM471G20--T |
|          | 1,000    | 12.5×25       | 1,350                                     | EWK1HM102W25--T |
|          | 2,200    | 16×35         | 2,110                                     | EWK1HM222L35--T |
|          | 3,300    | 18×35         | 2,550                                     | EWK1HM332M35--T |
|          | 4.7      | 5×11          | 45  | EWK1JM4R7D11--T |
| 100      | 0.1      | 5×11          | 2.1                                       | EWK1KMR10D11--T |
|          | 0.22     | 5×11          | 4.7                                       | EWK1KMR22D11--T |
|          | 0.33     | 5×11          | 7   | EWK1KMR33D11--T |
|          | 0.47     | 5×11          | 10  | EWK1KMR47D11--T |
|          | 1        | 5×11          | 21  | EWK1KM010D11--T |
|          | 2.2      | 5×11          | 35  | EWK1KM2R2D11--T |
|          | 3.3      | 5×11          | 45  | EWK1KM3R3D11--T |

Radial Type

WKseries

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/85°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 100      | 4.7      | 5×11          | 50  | EWK1KM4R7D11--T |
|          | 10       | 6.3×11        | 75  | EWK1KM100E11--T |
|          | 22       | 8×11          | 135                                       | EWK1KM220F11--T |
|          | 33       | 8×12          | 185                                       | EWK1KM330F12--T |
|          | 47       | 10×13         | 235                                       | EWK1KM470G13--T |
|          | 100      | 10×20         | 380                                       | EWK1KM101G20--T |
|          | 220      | 12.5×25       | 630                                       | EWK1KM221W25--T |
|          | 330      | 12.5×30       | 760                                       | EWK1KM331W30--T |
|          | 470      | 16×30         | 1,000                                     | EWK1KM471L30--T |
|          | 1,000    | 18×40         | 1,350                                     | EWK1KM102M40--T |
| 160      | 0.47     | 6.3×11        | 10  | EWK2CMR47E11--T |
|          | 1        | 6.3×11        | 15  | EWK2CM010E11--T |
|          | 2.2      | 6.3×11        | 30  | EWK2CM2R2E11--T |
|          | 3.3      | 6.3×11        | 40  | EWK2CM3R3E11--T |
|          | 4.7      | 6.3×11        | 48  | EWK2CM4R7E11--T |
|          | 10       | 8×12          | 80  | EWK2CM100F12--T |
|          | 10       | 10×12         | 94  | EWK2CM100G12--T |
|          | 22       | 10×12         | 130                                       | EWK2CM220G12--T |
|          | 22       | 10×16         | 150                                       | EWK2CM220G16--T |
|          | 22       | 10×20         | 170                                       | EWK2CM220G20--T |
|          | 33       | 10×16         | 180                                       | EWK2CM330G16--T |
|          | 33       | 10×20         | 210                                       | EWK2CM330G20--T |
|          | 47       | 10×20         | 240                                       | EWK2CM470G20--T |
|          | 47       | 12.5×20       | 280                                       | EWK2CM470W20--T |
|          | 68       | 12.5×20       | 360                                       | EWK2CM680W20--T |
|          | 100      | 12.5×25       | 470                                       | EWK2CM101W25--T |
|          | 150      | 16×20         | 520                                       | EWK2CM151L20--T |
|          | 180      | 16×25         | 600                                       | EWK2CM181L25--T |
|          | 220      | 16×30         | 780                                       | EWK2CM221L30--T |
|          | 270      | 18×30         | 860                                       | EWK2CM271M30--T |
| 330      | 18×35    | 1,000         | EWK2CM331M35--T                           |                 |
| 390      | 18×35    | 1,020         | EWK2CM391M35--T                           |                 |
| 470      | 18×40    | 1,220         | EWK2CM471M40--T                           |                 |
| 200      | 0.47     | 6.3×11        | 10  | EWK2DMR47E11--T |
|          | 1        | 6.3×11        | 15  | EWK2DM010E11--T |
|          | 2.2      | 6.3×11        | 34  | EWK2DM2R2E11--T |
|          | 3.3      | 6.3×11        | 45  | EWK2DM3R3E11--T |
|          | 4.7      | 6.3×11        | 55  | EWK2DM4R7E11--T |
|          | 4.7      | 8×12          | 60  | EWK2DM4R7F12--T |
|          | 10       | 10×12         | 100                                       | EWK2DM100G12--T |
|          | 22       | 10×20         | 170                                       | EWK2DM220G20--T |
|          | 33       | 10×20         | 205                                       | EWK2DM330G20--T |
|          | 47       | 12.5×20       | 270                                       | EWK2DM470W20--T |
|          | 68       | 12.5×25       | 370                                       | EWK2DM680W25--T |
|          | 100      | 16×25         | 475                                       | EWK2DM101L25--T |
|          | 150      | 16×25         | 550                                       | EWK2DM151L25--T |
|          | 180      | 18×25         | 620                                       | EWK2DM181M25--T |
|          | 220      | 18×35         | 810                                       | EWK2DM221M35--T |
|          | 270      | 18×35         | 870                                       | EWK2DM271M35--T |
|          | 330      | 18×35         | 1,000                                     | EWK2DM331M35--T |
|          | 330      | 18×40         | 1,020                                     | EWK2DM331M40--T |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/85°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 250      | 0.47     | 6.3×11        | 10  | EWK2EMR47E11--T |
|          | 1        | 6.3×11        | 16  | EWK2EM010E11--T |
|          | 2.2      | 6.3×11        | 34  | EWK2EM2R2E11--T |
|          | 3.3      | 6.3×11        | 42  | EWK2EM3R3E11--T |
|          | 3.3      | 8×12          | 46  | EWK2EM3R3F12--T |
|          | 4.7      | 6.3×11        | 50  | EWK2EM4R7E11--T |
|          | 4.7      | 8×12          | 55  | EWK2EM4R7F12--T |
|          | 10       | 10×12         | 100                                       | EWK2EM100G12--T |
|          | 10       | 10×16         | 105                                       | EWK2EM100G16--T |
|          | 22       | 10×20         | 170                                       | EWK2EM220G20--T |
|          | 33       | 10×20         | 200                                       | EWK2EM330G20--T |
|          | 33       | 12.5×20       | 230                                       | EWK2EM330W20--T |
|          | 47       | 12.5×20       | 270                                       | EWK2EM470W20--T |
|          | 47       | 12.5×25       | 295                                       | EWK2EM470W25--T |
|          | 68       | 16×25         | 382                                       | EWK2EM680L25--T |
|          | 100      | 16×25         | 450                                       | EWK2EM101L25--T |
|          | 100      | 16×30         | 515                                       | EWK2EM101L30--T |
|          | 120      | 16×30         | 530                                       | EWK2EM121L30--T |
| 150      | 16×30    | 570           | EWK2EM151L30--T                           |                 |
| 180      | 18×30    | 620           | EWK2EM181M30--T                           |                 |
| 350      | 0.47     | 6.3×11        | 15  | EWK2VMR47E11--T |
|          | 1        | 6.3×11        | 22  | EWK2VM010E11--T |
|          | 2.2      | 8×12          | 38  | EWK2VM2R2F12--T |
|          | 3.3      | 8×12          | 46  | EWK2VM3R3F12--T |
|          | 4.7      | 10×12         | 65  | EWK2VM4R7G12--T |
|          | 10       | 10×12         | 90  | EWK2VM100G12--T |
|          | 10       | 10×16         | 100                                       | EWK2VM100G16--T |
|          | 10       | 10×20         | 120                                       | EWK2VM100G20--T |
|          | 22       | 12.5×20       | 185                                       | EWK2VM220W20--T |
|          | 33       | 16×25         | 275                                       | EWK2VM330L25--T |
| 47       | 16×25    | 325           | EWK2VM470L25--T                           |                 |
| 68       | 16×25    | 405           | EWK2VM680L25--T                           |                 |
| 100      | 18×30    | 530           | EWK2VM101M30--T                           |                 |
| 400      | 1        | 6.3×11        | 22  | EWK2GM010E11--T |
|          | 2.2      | 8×12          | 38  | EWK2GM2R2F12--T |
|          | 3.3      | 10×12         | 54  | EWK2GM3R3G12--T |
|          | 4.7      | 10×12         | 60  | EWK2GM4R7G12--T |
|          | 4.7      | 10×16         | 75  | EWK2GM4R7G16--T |
|          | 10       | 10×16         | 100                                       | EWK2GM100G16--T |
|          | 10       | 10×20         | 120                                       | EWK2GM100G20--T |
|          | 22       | 12.5×25       | 205                                       | EWK2GM220W25--T |
|          | 33       | 16×25         | 275                                       | EWK2GM330L25--T |
|          | 47       | 16×25         | 325                                       | EWK2GM470L25--T |
|          | 47       | 16×30         | 350                                       | EWK2GM470L30--T |
|          | 56       | 16×30         | 385                                       | EWK2GM560L30--T |
|          | 68       | 18×25         | 420                                       | EWK2GM680M25--T |
|          | 82       | 18×30         | 475                                       | EWK2GM820M30--T |
| 100      | 18×35    | 545           | EWK2GM101M35--T                           |                 |
| 450      | 1        | 8×12          | 16  | EWK2WM010F12--T |
|          | 2.2      | 8×12          | 32  | EWK2WM2R2F12--T |
|          | 2.2      | 10×12         | 35  | EWK2WM2R2G12--T |

WKseries

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/85°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 450      | 3.3      | 10×12         | 40  | EWK2WM3R3G12--T |
|          | 3.3      | 10×16         | 44  | EWK2WM3R3G16--T |
|          | 4.7      | 10×12         | 50  | EWK2WM4R7G12--T |
|          | 4.7      | 10×16         | 58  | EWK2WM4R7G16--T |
|          | 4.7      | 10×20         | 65  | EWK2WM4R7G20--T |
|          | 10       | 10×20         | 80  | EWK2WM100G20--T |
|          | 10       | 12.5×20       | 92  | EWK2WM100W20--T |
|          | 22       | 12.5×25       | 150                                       | EWK2WM220W25--T |
|          | 22       | 16×25         | 165                                       | EWK2WM220L25--T |
|          | 33       | 16×30         | 215                                       | EWK2WM330L30--T |
|          | 47       | 16×30         | 260                                       | EWK2WM470L30--T |
|          | 47       | 16×35         | 280                                       | EWK2WM470L35--T |
|          | 68       | 18×30         | 370                                       | EWK2WM680M30--T |
|          | 82       | 18×35         | 390                                       | EWK2WM820M35--T |
|          | 100      | 18×40         | 420                                       | EWK2WM101M40--T |

\* Specifications subject to change without notice

WHseries

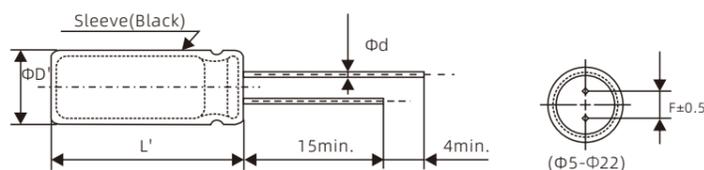
- Endurance: 2,000 hours at 105°C
- Wide temperature range from -40°C to +105°C
- Standard series for general purpose
- RoHS Compliant



SPECIFICATIONS

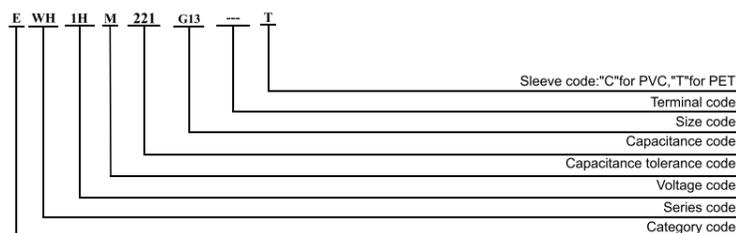
| Items  | Characteristics   |   |
|--|---|---|
| Category Temperature Range                         | -40~+105°C(6.3~100Vdc)  | -25~+105°C(160~500Vdc)  |
| Rated Voltage Range                                | 6.3~500Vdc  |   |
| Capacitance Tolerance                              | ±20%(M) (at 20°C, 120Hz)  |   |
| Leakage Current                                    | 6.3 to 100Vdc   |   |
|  | 160~500Vdc  |   |
|  | I ≤ 0.03CV or 4μA(at 1 minute)<br>I ≤ 0.01CV or 3μA(at 2 minutes)<br>whichever is greater   | I: leakage current(μA),<br>C: Nominal capacitance(μF)<br>V: Rated voltage(V)<br>(at 20°C) |
|  | CV ≤ 1,000 I ≤ 0.1CV+40μA I ≤ 0.03CV+15μA<br>CV > 1,000 I ≤ 0.04CV+100μA I ≤ 0.02CV+25μA  |   |
| Dissipation Factor (tanδ)                          | Rated Voltage (Vdc)   | 6.3 10 16 25 35 50 63 100 160~250 350~450   |
|  | Dissipation Factor(Max.)  | 0.28 0.24 0.20 0.18 0.16 0.14 0.12 0.10 0.20 0.24 (at 20°C, 120Hz)                        |
| Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)   | 6.3 10 16 25 35 50 63 100 160~250 350~450 500   |
|  | Z(-25°C)/Z(+20°C)   | 5 4 3 2 3 6 8   |
|  | Z(-40°C)/Z(+20°C)   | 12 10 8 5 4 3 - (120Hz)   |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 2,000 hours at 105°C. |   |
|  | Capacitance Change  | ≤±20% of the initial value  |
|  | Dissipation Factor  | ≤200% of the initial specified value  |
|  | Leakage Current   | ≤The initial specified value  |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.                         |   |
|  | Capacitance Change  | ≤±20% of the initial value  |
|  | Dissipation Factor  | ≤200% of the initial specified value  |
|  | Leakage Current   | ≤200% of the initial specified value  |

DIMENSIONS [mm]



| ΦD  | 5                              | 6.3 | 8   | 10  | 12.5/13 | 16/18 | 20  | 22※ |
|-----|--------------------------------|-----|-----|-----|---------|-------|-----|-----|
| Φd  | 0.5                            | 0.5 | 0.5 | 0.6 | 0.6     | 0.8   | 0.8 | 0.8 |
| F   | 2.0                            | 2.5 | 3.5 | 5.0 | 5.0     | 7.5   | 10  | 10  |
| ΦD' | ΦD+0.5max.                     |     |     |     |         |       |     |     |
| L'  | L+2max.                        |     |     |     |         |       |     |     |
| ※   | 22×55/22×60 Φd=1.0, L'=L+3max. |     |     |     |         |       |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)          | Freq. (Hz) |      |      |      |      |      |
|--------------------|------------|------|------|------|------|------|
|                    | 50         | 120  | 300  | 1k   | 10   | 100k |
| Cap. < 10          | 0.65       | 1.00 | 1.35 | 1.75 | 2.30 | 2.50 |
| 10 ≤ Cap. < 100    | 0.75       | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 |
| 100 ≤ Cap. < 1,000 | 0.80       | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| Cap. ≥ 1,000       | 0.85       | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

WHseries

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number      |                  |
|----------|----------|---------------|--|------------------|------------------|
| 6.3      | 33       | 5×11          | 54   | EWHOJM330D11 --T |                  |
|          | 47       | 5×11          | 64   | EWHOJM470D11 --T |                  |
|          | 100      | 5×11          | 94   | EWHOJM101D11 --T |                  |
|          | 220      | 5×11          | 140  | EWHOJM221D11 --T |                  |
|          | 330      | 6.3×11        | 190  | EWHOJM331E11 --T |                  |
|          | 470      | 6.3×11        | 230  | EWHOJM471E11 --T |                  |
|          | 1,000    | 8×12          | 380  | EWHOJM102F12 --T |                  |
|          | 2,200    | 10×20         | 710  | EWHOJM222G20 --T |                  |
|          | 3,300    | 10×20         | 840  | EWHOJM332G20 --T |                  |
|          | 4,700    | 12.5×20       | 1,090                                      | EWHOJM472W20 --T |                  |
|          | 6,800    | 12.5×25       | 1,350                                      | EWHOJM682W25 --T |                  |
|          | 10,000   | 16×25         | 1,650                                      | EWHOJM103L25 --T |                  |
|          | 15,000   | 16×35         | 2,010                                      | EWHOJM153L35 --T |                  |
|          | 22,000   | 18×40         | 2,350                                      | EWHOJM223M40 --T |                  |
|          | 10       | 22            | 5×11                                       | 46               | EWH1AM220D11 --T |
|          |          | 33            | 5×11                                       | 57               | EWH1AM330D11 --T |
| 47       |          | 5×11          | 68   | EWH1AM470D11 --T |                  |
| 100      |          | 5×11          | 100  | EWH1AM101D11 --T |                  |
| 220      |          | 6.3×11        | 170  | EWH1AM221E11 --T |                  |
| 330      |          | 6.3×11        | 200  | EWH1AM331E11 --T |                  |
| 470      |          | 8×11          | 250  | EWH1AM471F11 --T |                  |
| 1,000    |          | 10×13         | 460  | EWH1AM102G13 --T |                  |
| 2,200    |          | 10×20         | 760  | EWH1AM222G20 --T |                  |
| 3,300    |          | 12.5×20       | 1,000                                      | EWH1AM332W20 --T |                  |
| 4,700    |          | 12.5×25       | 1,260                                      | EWH1AM472W25 --T |                  |
| 6,800    |          | 16×25         | 1,570                                      | EWH1AM682L25 --T |                  |
| 10,000   |          | 16×35         | 1,890                                      | EWH1AM103L35 --T |                  |
| 15,000   |          | 18×35         | 2,180                                      | EWH1AM153M35 --T |                  |
| 16       |          | 10            | 5×11                                       | 34               | EWH1CM100D11 --T |
|          |          | 22            | 5×11                                       | 51               | EWH1CM220D11 --T |
|          | 33       | 5×11          | 63   | EWH1CM330D11 --T |                  |
|          | 47       | 5×11          | 75   | EWH1CM470D11 --T |                  |
|          | 100      | 5×11          | 110  | EWH1CM101D11 --T |                  |
|          | 220      | 6.3×11        | 180  | EWH1CM221E11 --T |                  |
|          | 330      | 8×11          | 260  | EWH1CM331F11 --T |                  |
|          | 470      | 8×12          | 310  | EWH1CM471F12 --T |                  |
|          | 1,000    | 10×16         | 560  | EWH1CM102G16 --T |                  |
|          | 2,200    | 12.5×20       | 920  | EWH1CM222W20 --T |                  |
|          | 3,300    | 12.5×25       | 1,170                                      | EWH1CM332W25 --T |                  |
|          | 4,700    | 16×25         | 1,480                                      | EWH1CM472L25 --T |                  |
|          | 6,800    | 16×30         | 1,780                                      | EWH1CM682L30 --T |                  |
|          | 10,000   | 18×35         | 2,060                                      | EWH1CM103M35 --T |                  |
|          | 25       | 4.7           | 5×11                                       | 25               | EWH1EM4R7D11 --T |
|          |          | 10            | 5×11                                       | 36               | EWH1EM100D11 --T |
| 22       |          | 5×11          | 54   | EWH1EM220D11 --T |                  |
| 33       |          | 5×11          | 67   | EWH1EM330D11 --T |                  |
| 47       |          | 5×11          | 80   | EWH1EM470D11 --T |                  |
| 100      |          | 6.3×11        | 130  | EWH1EM101E11 --T |                  |
| 220      |          | 8×11          | 230  | EWH1EM221F11 --T |                  |
| 330      |          | 8×12          | 310  | EWH1EM331F12 --T |                  |
| 470      |          | 10×13         | 380  | EWH1EM471G13 --T |                  |
| 1,000    |          | 10×20         | 680  | EWH1EM102G20 --T |                  |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number      |                  |
|----------|----------|---------------|--|------------------|------------------|
| 25       | 2,200    | 12.5×25       | 1,090                                      | EWH1EM222W25 --T |                  |
|          | 3,300    | 16×25         | 1,400                                      | EWH1EM332L25 --T |                  |
|          | 4,700    | 16×30         | 1,710                                      | EWH1EM472L30 --T |                  |
|          | 6,800    | 18×35         | 2,040                                      | EWH1EM682M35 --T |                  |
|          | 35       | 4.7           | 5×11                                       | 28               | EWH1VM4R7D11 --T |
| 10       |          | 5×11          | 41   | EWH1VM100D11 --T |                  |
| 22       |          | 5×11          | 61   | EWH1VM220D11 --T |                  |
| 33       |          | 5×11          | 75   | EWH1VM330D11 --T |                  |
| 47       |          | 5×11          | 90   | EWH1VM470D11 --T |                  |
| 100      |          | 6.3×11        | 150  | EWH1VM101E11 --T |                  |
| 220      |          | 8×12          | 270  | EWH1VM221F12 --T |                  |
| 330      |          | 10×13         | 350  | EWH1VM331G13 --T |                  |
| 470      |          | 10×16         | 460  | EWH1VM471G16 --T |                  |
| 1,000    |          | 12.5×20       | 810  | EWH1VM102W20 --T |                  |
| 2,200    |          | 16×25         | 1,260                                      | EWH1VM222L25 --T |                  |
| 3,300    | 16×35    | 1,610         | EWH1VM332L35 --T                           |                  |                  |
| 4,700    | 18×35    | 1,910         | EWH1VM472M35 --T                           |                  |                  |
| 50       | 0.1      | 5×11          | 1.3  | EWH1HMR10D11 --T |                  |
|          | 0.22     | 5×11          | 2.9  | EWH1HMR22D11 --T |                  |
|          | 0.33     | 5×11          | 4.3  | EWH1HMR33D11 --T |                  |
|          | 0.47     | 5×11          | 6.2  | EWH1HMR47D11 --T |                  |
|          | 1        | 5×11          | 13   | EWH1HM010D11 --T |                  |
|          | 2.2      | 5×11          | 20   | EWH1HM2R2D11 --T |                  |
|          | 3.3      | 5×11          | 25   | EWH1HM3R3D11 --T |                  |
|          | 4.7      | 5×11          | 30   | EWH1HM4R7D11 --T |                  |
|          | 10       | 5×11          | 40   | EWH1HM100D11 --T |                  |
|          | 22       | 5×11          | 65   | EWH1HM220D11 --T |                  |
|          | 33       | 6.3×11        | 90   | EWH1HM330E11 --T |                  |
|          | 47       | 6.3×11        | 110  | EWH1HM470E11 --T |                  |
|          | 100      | 8×11          | 180  | EWH1HM101F11 --T |                  |
|          | 220      | 10×13         | 300  | EWH1HM221G13 --T |                  |
|          | 330      | 10×16         | 410  | EWH1HM331G16 --T |                  |
|          | 470      | 10×20         | 530  | EWH1HM471G20 --T |                  |
| 1,000    | 12.5×25  | 950           | EWH1HM102W25 --T                           |                  |                  |
| 2,200    | 16×35    | 1,470         | EWH1HM222L35 --T                           |                  |                  |
| 3,300    | 18×35    | 1,770         | EWH1HM332M35 --T                           |                  |                  |
| 63       | 10       | 5×11          | 46   | EWH1JM100D11 --T |                  |
|          | 22       | 5×11          | 71   | EWH1JM220D11 --T |                  |
|          | 33       | 6.3×11        | 100  | EWH1JM330E11 --T |                  |
|          | 47       | 6.3×11        | 120  | EWH1JM470E11 --T |                  |
|          | 100      | 10×13         | 215  | EWH1JM101G13 --T |                  |
|          | 220      | 10×16         | 335  | EWH1JM221G16 --T |                  |
|          | 330      | 10×20         | 510  | EWH1JM331G20 --T |                  |
|          | 470      | 12.5×20       | 640  | EWH1JM471W20 --T |                  |
|          | 1,000    | 16×25         | 930  | EWH1JM102L25 --T |                  |
|          | 100      | 0.1           | 5×11                                       | 1.5              | EWH1KMR10D11 --T |
|          |          | 0.22          | 5×11                                       | 3.4              | EWH1KMR22D11 --T |
|          |          | 0.33          | 5×11                                       | 5                | EWH1KMR33D11 --T |
|          |          | 0.47          | 5×11                                       | 7.1              | EWH1KMR47D11 --T |
|          |          | 1             | 5×11                                       | 15               | EWH1KM010D11 --T |
|          |          | 2.2           | 5×11                                       | 21               | EWH1KM2R2D11 --T |
|          |          | 3.3           | 5×11                                       | 29               | EWH1KM3R3D11 --T |

Radial Type

WHseries

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/105°C, 120Hz) | Part Number       |
|----------|----------|---------------|---|-------------------|
| 100      | 4.7      | 5×11          | 32  | EWH1KM4R7D11 ---T |
|          | 10       | 6.3×11        | 54  | EWH1KM100E11 ---T |
|          | 22       | 8×11          | 93  | EWH1KM220F11 ---T |
|          | 33       | 8×12          | 130                                       | EWH1KM330F12 ---T |
|          | 47       | 10×13         | 165                                       | EWH1KM470G13 ---T |
|          | 100      | 10×20         | 265                                       | EWH1KM101G20 ---T |
|          | 220      | 12.5×25       | 440                                       | EWH1KM221W25 ---T |
|          | 330      | 16×25         | 540                                       | EWH1KM331L25 ---T |
|          | 470      | 16×30         | 715                                       | EWH1KM471L30 ---T |
|          | 1,000    | 18×40         | 985                                       | EWH1KM102M40 ---T |
| 160      | 3.3      | 6.3×9         | 28  | EWH2CM3R3E09 ---T |
|          | 4.7      | 6.3×9         | 34  | EWH2CM4R7E09 ---T |
|          | 10       | 6.3×12        | 60  | EWH2CM100E12 ---T |
|          | 10       | 8×9           | 60  | EWH2CM100F09 ---T |
|          | 22       | 8×12          | 88  | EWH2CM220F12 ---T |
|          | 22       | 10×12         | 98  | EWH2CM220G12 ---T |
|          | 33       | 10×12         | 140                                       | EWH2CM330G12 ---T |
|          | 33       | 10×16         | 158                                       | EWH2CM330G16 ---T |
|          | 47       | 10×14         | 142                                       | EWH2CM470G14 ---T |
|          | 47       | 10×20         | 182                                       | EWH2CM470G20 ---T |
|          | 68       | 10×20         | 240                                       | EWH2CM680G20 ---T |
|          | 100      | 12.5×20       | 300                                       | EWH2CM101W20 ---T |
|          | 100      | 16×20         | 316                                       | EWH2CM101L20 ---T |
|          | 220      | 16×25         | 530                                       | EWH2CM221L25 ---T |
|          | 330      | 18×25         | 600                                       | EWH2CM331M25 ---T |
|          | 470      | 18×35         | 820                                       | EWH2CM471M35 ---T |
| 200      | 1        | 6.3×7         | 12  | EWH2DM010E07 ---T |
|          | 2.2      | 6.3×7         | 18  | EWH2DM2R2E07 ---T |
|          | 3.3      | 6.3×9         | 28  | EWH2DM3R3E09 ---T |
|          | 4.7      | 6.3×9         | 40  | EWH2DM4R7E09 ---T |
|          | 10       | 8×9           | 70  | EWH2DM100F09 ---T |
|          | 10       | 8×12          | 78  | EWH2DM100F12 ---T |
|          | 22       | 8×16          | 110                                       | EWH2DM220F16 ---T |
|          | 22       | 10×12         | 110                                       | EWH2DM220G12 ---T |
|          | 33       | 10×16         | 166                                       | EWH2DM330G16 ---T |
|          | 33       | 10×20         | 185                                       | EWH2DM330G20 ---T |
|          | 47       | 10×20         | 200                                       | EWH2DM470G20 ---T |
|          | 68       | 12.5×20       | 290                                       | EWH2DM680W20 ---T |
|          | 82       | 12.5×20       | 300                                       | EWH2DM820W20 ---T |
|          | 100      | 12.5×25       | 340                                       | EWH2DM101W25 ---T |
|          | 100      | 13×20         | 305                                       | EWH2DM101K20 ---T |
|          | 100      | 16×20         | 325                                       | EWH2DM101L20 ---T |
| 150      | 16×25    | 446           | EWH2DM151L25 ---T                         |                   |
| 180      | 16×25    | 530           | EWH2DM181L25 ---T                         |                   |
| 220      | 18×25    | 620           | EWH2DM221M25 ---T                         |                   |
| 330      | 18×30    | 720           | EWH2DM331M30 ---T                         |                   |
| 470      | 18×40    | 840           | EWH2DM471M40 ---T                         |                   |
| 250      | 2.2      | 6.3×9         | 21  | EWH2EM2R2E09 ---T |
|          | 3.3      | 6.3×9         | 30  | EWH2EM3R3E09 ---T |
|          | 4.7      | 6.3×12        | 38  | EWH2EM4R7E12 ---T |
|          | 4.7      | 8×9           | 45  | EWH2EM4R7F09 ---T |
|          | 10       | 8×12          | 70  | EWH2EM100F12 ---T |
|          |          |               |   |                   |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/105°C, 120Hz) | Part Number       |                   |
|----------|----------|---------------|---|-------------------|-------------------|
| 250      | 10       | 10×12         | 75  | EWH2EM100G12 ---T |                   |
|          | 22       | 8×16          | 100                                       | EWH2EM220F16 ---T |                   |
|          | 22       | 10×16         | 116                                       | EWH2EM220G16 ---T |                   |
|          | 33       | 10×20         | 150                                       | EWH2EM330G20 ---T |                   |
|          | 33       | 12.5×16       | 165                                       | EWH2EM330W16 ---T |                   |
|          | 47       | 12.5×20       | 232                                       | EWH2EM470W20 ---T |                   |
|          | 100      | 16×25         | 370                                       | EWH2EM101L25 ---T |                   |
|          | 150      | 18×25         | 455                                       | EWH2EM151M25 ---T |                   |
|          | 220      | 18×30         | 600                                       | EWH2EM221M30 ---T |                   |
|          | 330      | 18×35         | 705                                       | EWH2EM331M35 ---T |                   |
|          | 350      | 1             | 6.3×9                                     | 13                | EWH2VM010E09 ---T |
|          |          | 2.2           | 6.3×9                                     | 23                | EWH2VM2R2E09 ---T |
|          |          | 3.3           | 8×9                                       | 31                | EWH2VM3R3F09 ---T |
|          |          | 4.7           | 8×9                                       | 45                | EWH2VM4R7F09 ---T |
| 10       |          | 10×12         | 68  | EWH2VM100G12 ---T |                   |
| 22       |          | 10×20         | 135                                       | EWH2VM220G20 ---T |                   |
| 33       |          | 12.5×20       | 184                                       | EWH2VM330W20 ---T |                   |
| 47       |          | 16×20         | 225                                       | EWH2VM470L20 ---T |                   |
| 68       |          | 16×25         | 336                                       | EWH2VM680L25 ---T |                   |
| 100      |          | 18×30         | 398                                       | EWH2VM101M30 ---T |                   |
| 400      | 1        | 6.3×9         | 14  | EWH2GM010E09 ---T |                   |
|          | 2.2      | 6.3×9         | 25  | EWH2GM2R2E09 ---T |                   |
|          | 2.2      | 8×9           | 30  | EWH2GM2R2F09 ---T |                   |
|          | 3.3      | 6.3×12        | 33  | EWH2GM3R3E12 ---T |                   |
|          | 3.3      | 8×9           | 34  | EWH2GM3R3F09 ---T |                   |
|          | 4.7      | 8×9           | 45  | EWH2GM4R7F09 ---T |                   |
|          | 4.7      | 8×12          | 48  | EWH2GM4R7F12 ---T |                   |
|          | 10       | 8×12          | 85  | EWH2GM100F12 ---T |                   |
|          | 10       | 8×16          | 92  | EWH2GM100F16 ---T |                   |
|          | 10       | 10×12         | 92  | EWH2GM100G12 ---T |                   |
|          | 22       | 10×20         | 160                                       | EWH2GM220G20 ---T |                   |
|          | 33       | 10×30         | 255                                       | EWH2GM330G30 ---T |                   |
|          | 33       | 16×20         | 258                                       | EWH2GM330L20 ---T |                   |
|          | 39       | 10×35         | 300                                       | EWH2GM390G35 ---T |                   |
|          | 47       | 10×40         | 305                                       | EWH2GM470G40 ---T |                   |
|          | 47       | 16×20         | 290                                       | EWH2GM470L20 ---T |                   |
| 450      | 56       | 10×45         | 350                                       | EWH2GM560G45 ---T |                   |
|          | 56       | 12.5×30       | 320                                       | EWH2GM560W30 ---T |                   |
|          | 68       | 12.5×35       | 435                                       | EWH2GM680W35 ---T |                   |
|          | 68       | 16×25         | 420                                       | EWH2GM680L25 ---T |                   |
|          | 68       | 18×20         | 420                                       | EWH2GM680M20 ---T |                   |
|          | 82       | 12.5×40       | 480                                       | EWH2GM820W40 ---T |                   |
|          | 82       | 18×25         | 474                                       | EWH2GM820M25 ---T |                   |
|          | 100      | 12.5×45       | 510                                       | EWH2GM101W45 ---T |                   |
|          | 100      | 16×30         | 492                                       | EWH2GM101L30 ---T |                   |
|          | 100      | 18×30         | 532                                       | EWH2GM101M30 ---T |                   |
|          | 120      | 18×30         | 550                                       | EWH2GM121M30 ---T |                   |
|          | 150      | 18×35         | 610                                       | EWH2GM151M35 ---T |                   |
|          | 150      | 20×30         | 620                                       | EWH2GM151N30 ---T |                   |
|          | 180      | 18×40         | 668                                       | EWH2GM181M40 ---T |                   |
|          | 180      | 20×35         | 676                                       | EWH2GM181N35 ---T |                   |
|          | 180      | 22×30         | 672                                       | EWH2GM181O30 ---T |                   |

WHseries

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/105°C, 120Hz) | Part Number         |                   |
|----------|----------|---------------|---|---------------------|-------------------|
| 400      | 220      | 18×45         | 768                                       | EWH2GM221M45 ---T   |                   |
|          | 220      | 20×40         | 772                                       | EWH2GM221N40 ---T   |                   |
|          | 220      | 22×35         | 764                                       | EWH2GM221O35 ---T   |                   |
|          | 250      | 20×45         | 820                                       | EWH2GM251N45 ---T   |                   |
|          | 250      | 22×40         | 820                                       | EWH2GM251O40 ---T   |                   |
|          | 270      | 18×50         | 856                                       | EWH2GM271M50 ---T   |                   |
|          | 270      | 20×50         | 868                                       | EWH2GM271N50 ---T   |                   |
|          | 270      | 22×46         | 864                                       | EWH2GM271O46 ---T   |                   |
|          | 300      | 18×55         | 904                                       | EWH2GM301M55 ---T   |                   |
|          | 300      | 20×55         | 916                                       | EWH2GM301N55 ---T   |                   |
|          | 300      | 22×50         | 912                                       | EWH2GM301O50 ---T   |                   |
|          | 330      | 18×60         | 952                                       | EWH2GM331M60 ---T   |                   |
|          | 330      | 22×55         | 952                                       | EWH2GM331O55 ---THO |                   |
|          | 350      | 20×60         | 984                                       | EWH2GM351N60 ---T   |                   |
|          | 390      | 22×60         | 1,012                                     | EWH2GM391O60 ---THO |                   |
|          | 420      | 120           | 18×30                                     | 558                 | EWH2TM121M30 ---T |
| 150      |          | 18×35         | 632                                       | EWH2TM151M35 ---T   |                   |
| 150      |          | 20×30         | 640                                       | EWH2TM151N30 ---T   |                   |
| 180      |          | 18×40         | 690                                       | EWH2TM181M40 ---T   |                   |
| 180      |          | 20×35         | 698                                       | EWH2TM181N35 ---T   |                   |
| 180      |          | 22×30         | 694                                       | EWH2TM181O30 ---T   |                   |
| 220      |          | 18×45         | 793                                       | EWH2TM221M45 ---T   |                   |
| 220      |          | 20×40         | 798                                       | EWH2TM221N40 ---T   |                   |
| 220      |          | 22×35         | 789                                       | EWH2TM221O35 ---T   |                   |
| 250      |          | 20×45         | 847                                       | EWH2TM251N45 ---T   |                   |
| 250      |          | 22×40         | 847                                       | EWH2TM251O40 ---T   |                   |
| 270      |          | 18×50         | 884                                       | EWH2TM271M50 ---T   |                   |
| 270      |          | 20×50         | 897                                       | EWH2TM271N50 ---T   |                   |
| 270      |          | 22×46         | 893                                       | EWH2TM271O46 ---T   |                   |
| 300      |          | 18×55         | 934                                       | EWH2TM301M55 ---T   |                   |
| 300      |          | 20×55         | 946                                       | EWH2TM301N55 ---T   |                   |
| 450      | 300      | 22×50         | 942                                       | EWH2TM301O50 ---T   |                   |
|          | 330      | 18×60         | 983                                       | EWH2TM331M60 ---T   |                   |
|          | 330      | 22×55         | 983                                       | EWH2TM331O55 ---THO |                   |
|          | 350      | 20×60         | 1,017                                     | EWH2TM351N60 ---T   |                   |
|          | 390      | 22×60         | 1,045                                     | EWH2TM391O60 ---THO |                   |
|          | 500      | 1             | 6.3×9                                     | 14                  | EWH2WM010E09 ---T |
|          |          | 1             | 6.3×12                                    | 16                  | EWH2WM010E12 ---T |
|          |          | 2.2           | 6.3×12                                    | 20                  | EWH2WM2R2E12 ---T |
|          |          | 2.2           | 8×9                                       | 22                  | EWH2WM2R2F09 ---T |
|          |          | 2.2           | 8×12                                      | 25                  | EWH2WM2R2F12 ---T |
|          |          | 3.3           | 8×9                                       | 22                  | EWH2WM3R3F09 ---T |
|          |          | 3.3           | 8×12                                      | 32                  | EWH2WM3R3F12 ---T |
|          |          | 4.7           | 8×12                                      | 44                  | EWH2WM4R7F12 ---T |
|          |          | 4.7           | 10×12                                     | 48                  | EWH2WM4R7G12 ---T |
|          |          | 10            | 10×16                                     | 85                  | EWH2WM100G16 ---T |
|          |          | 10            | 10×20                                     | 90                  | EWH2WM100G20 ---T |
| 22       |          | 12.5×20       | 150                                       | EWH2WM220W20 ---T   |                   |
| 22       |          | 16×20         | 185                                       | EWH2WM220L20 ---T   |                   |
| 27       |          | 10×30         | 195                                       | EWH2WM270G30 ---T   |                   |
| 33       |          | 10×35         | 210                                       | EWH2WM330G35 ---T   |                   |
| 33       |          | 16×20         | 200                                       | EWH2WM330L20 ---T   |                   |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/105°C, 120Hz) | Part Number         |
|----------|----------|---------------|---|---------------------|
| 450      | 39       | 10×40         | 250                                       | EWH2WM390G40 ---T   |
|          | 47       | 10×45         | 330                                       | EWH2WM470G45 ---T   |
|          | 47       | 12.5×30       | 320                                       | EWH2WM470W30 ---T   |
|          | 47       | 16×25         | 335                                       | EWH2WM470L25 ---T   |
|          | 56       | 12.5×35       | 360                                       | EWH2WM560W35 ---T   |
|          | 68       | 12.5×40       | 400                                       | EWH2WM680W40 ---T   |
|          | 68       | 18×25         | 400                                       | EWH2WM680M25 ---T   |
|          | 82       | 12.5×45       | 460                                       | EWH2WM820W45 ---T   |
|          | 82       | 16×30         | 460                                       | EWH2WM820L30 ---T   |
|          | 82       | 18×30         | 472                                       | EWH2WM820M30 ---T   |
|          | 100      | 16×35         | 480                                       | EWH2WM101L35 ---T   |
|          | 100      | 18×35         | 530                                       | EWH2WM101M35 ---T   |
|          | 100      | 20×30         | 517                                       | EWH2WM101N30 ---T   |
|          | 120      | 20×35         | 578                                       | EWH2WM121N35 ---T   |
|          | 120      | 22×30         | 560                                       | EWH2WM121O30 ---T   |
|          | 500      | 150           | 18×40                                     | 610                 |
| 150      |          | 22×35         | 621                                       | EWH2WM151O35 ---T   |
| 180      |          | 18×45         | 694                                       | EWH2WM181M45 ---T   |
| 180      |          | 20×40         | 703                                       | EWH2WM181N40 ---T   |
| 200      |          | 18×50         | 759                                       | EWH2WM201M50 ---T   |
| 200      |          | 20×45         | 767                                       | EWH2WM201N45 ---T   |
| 200      |          | 22×40         | 759                                       | EWH2WM201O40 ---T   |
| 220      |          | 18×55         | 819                                       | EWH2WM221M55 ---T   |
| 220      |          | 20×50         | 828                                       | EWH2WM221N50 ---T   |
| 250      |          | 18×60         | 879                                       | EWH2WM251M60 ---T   |
| 250      |          | 20×55         | 888                                       | EWH2WM251N55 ---T   |
| 250      |          | 22×46         | 892                                       | EWH2WM251O46 ---T   |
| 270      |          | 20×60         | 948                                       | EWH2WM271N60 ---T   |
| 270      |          | 22×50         | 953                                       | EWH2WM271O50 ---T   |
| 330      |          | 22×55         | 1,026                                     | EWH2WM331O55 ---THO |
| 350      |          | 22×60         | 1,047                                     | EWH2WM351O60 ---THO |
| 500      | 4.7      | 10×12         | 47  | EWH2HM4R7G12 ---T   |
|          | 4.7      | 10×16         | 50  | EWH2HM4R7G16 ---T   |
|          | 10       | 10×20         | 90  | EWH2HM100G20 ---T   |
|          | 10       | 12.5×20       | 115                                       | EWH2HM100W20 ---T   |
|          | 15       | 12.5×20       | 130                                       | EWH2HM150W20 ---T   |
|          | 15       | 12.5×25       | 140                                       | EWH2HM150W25 ---T   |
|          | 22       | 13×25         | 170                                       | EWH2HM220K25 ---T   |
|          | 22       | 16×20         | 180                                       | EWH2HM220L20 ---T   |
|          | 22       | 16×25         | 185                                       | EWH2HM220L25 ---T   |
|          | 33       | 16×25         | 200                                       | EWH2HM330L25 ---T   |
|          | 33       | 18×25         | 215                                       | EWH2HM330M25 ---T   |
|          | 47       | 18×25         | 300                                       | EWH2HM470M25 ---T   |
|          | 68       | 18×30         | 380                                       | EWH2HM680M30 ---T   |
|          | 68       | 18×35         | 390                                       | EWH2HM680M35 ---T   |
|          | 82       | 18×35         | 450                                       | EWH2HM820M35 ---T   |
|          | 82       | 18×40         | 490                                       | EWH2HM820M40 ---T   |
| 100      | 18×40    | 520           | EWH2HM101M40 ---T                         |                     |
| 100      | 22×35    | 535           | EWH2HM101O35 ---T                         |                     |
| 120      | 22×40    | 550           | EWH2HM121O40 ---T                         |                     |

\*Specifications subject to change without notice

Radial Type

# RR series

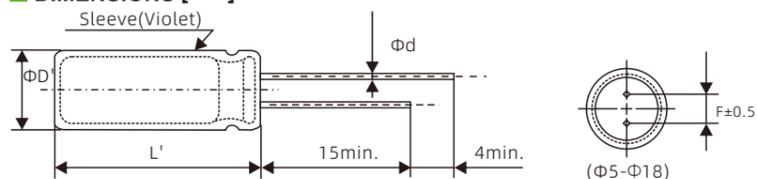
- Endurance: 2,000 hours at 105°C
- High frequency, low impedance, high reliability
- Suitable for switching power, UPS, power sources, etc.
- RoHS Compliant



## SPECIFICATIONS

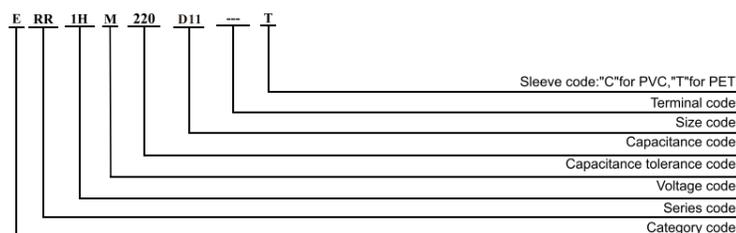
| Items  | Characteristics   |  |      |      |      |      |      |      |      |      |      |                  |  |
|--|---|--|------|------|------|------|------|------|------|------|------|------------------|--|
| Category Temperature Range                             | -40 ~ +105°C  |  |      |      |      |      |      |      |      |      |      |                  |  |
| Rated Voltage Range                                    | 6.3 ~ 120 Vdc   |  |      |      |      |      |      |      |      |      |      |                  |  |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)   |  |      |      |      |      |      |      |      |      |      |                  |  |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater.  |  |      |      |      |      |      |      |      |      |      |                  |  |
|  | Where, I: Max. leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V)  |  |      |      |      |      |      |      |      |      |      |                  |  |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)   | 6.3  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100  | 120  | (at 20°C, 120Hz) |  |
|  | Dissipation Factor (Max.)   | 0.22   | 0.18 | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 | 0.08 | 0.08 | 0.12 |                  |  |
|  | When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μF increase.  |  |      |      |      |      |      |      |      |      |      |                  |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)   | 6.3  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100  | 120  | (at 120Hz)       |  |
|  | Z(-25°C)/Z(+20°C)   | 2  | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 3    |                  |  |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 2,000 hours at 105°C. |  |      |      |      |      |      |      |      |      |      |                  |  |
|  | Capacitance Change  | ≤ ±20% of the initial value (6.3-10 Vdc: ≤ ±30%) |      |      |      |      |      |      |      |      |      |                  |  |
|  | Dissipation Factor  | ≤ 200% of the initial specified value            |      |      |      |      |      |      |      |      |      |                  |  |
|  | Leakage Current   | ≤ The initial specified value                    |      |      |      |      |      |      |      |      |      |                  |  |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.                         |  |      |      |      |      |      |      |      |      |      |                  |  |
|  | Capacitance Change  | ≤ ±20% of the initial value                      |      |      |      |      |      |      |      |      |      |                  |  |
|  | Dissipation Factor  | ≤ 200% of the initial specified value            |      |      |      |      |      |      |      |      |      |                  |  |
|  | Leakage Current   | ≤ 200% of the initial specified value            |      |      |      |      |      |      |      |      |      |                  |  |

## DIMENSIONS [mm]



| ΦD  | 5          | 6.3 | 8   | 10  | 12.5 | 13  | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|-----|
| Φd  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 5.0 | 7.5 | 7.5 |
| ΦD' | ΦD+0.5max. |     |     |     |      |     |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |     |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)            | Freq. (Hz) |      |      |      |
|----------------------|------------|------|------|------|
|                      | 120        | 1K   | 10K  | 100K |
| Cap. < 220           | 0.40       | 0.75 | 0.90 | 1.00 |
| 220 ≤ Cap. < 680     | 0.50       | 0.85 | 0.94 | 1.00 |
| 680 ≤ Cap. < 2,200   | 0.60       | 0.87 | 0.95 | 1.00 |
| 2,200 ≤ Cap. < 4,700 | 0.75       | 0.90 | 0.95 | 1.00 |
| Cap. ≥ 4,700         | 0.85       | 0.95 | 0.98 | 1.00 |

# RR series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impedance (Ωmax/20°C, 100kHz) | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number      |
|----------|----------|---------------|-------------------------------|---|------------------|
| 6.3      | 220      | 6.3×7         | 0.350                         | 218   | ERR0JM221E07---T |
|          | 330      | 6.3×9         | 0.200                         | 350   | ERR0JM331E09---T |
|          | 470      | 6.3×9         | 0.180                         | 400   | ERR0JM471E09---T |
|          | 560      | 6.3×11        | 0.180                         | 480   | ERR0JM561E11---T |
|          | 560      | 8×9           | 0.120                         | 550   | ERR0JM561F09---T |
|          | 820      | 8×16          | 0.056                         | 995   | ERR0JM821F16---T |
|          | 820      | 10×9          | 0.085                         | 800   | ERR0JM821G09---T |
|          | 1,000    | 10×13         | 0.053                         | 1,030                                       | ERR0JM102G13---T |
|          | 1,200    | 8×20          | 0.041                         | 1,250                                       | ERR0JM122F20---T |
|          | 1,200    | 10×16         | 0.038                         | 1,430                                       | ERR0JM122G16---T |
|          | 1,500    | 10×20         | 0.023                         | 1,820                                       | ERR0JM152G20---T |
|          | 2,200    | 10×25         | 0.022                         | 2,150                                       | ERR0JM222G25---T |
|          | 3,900    | 12.5×25       | 0.018                         | 2,770                                       | ERR0JM392W25---T |
|          | 4,700    | 12.5×30       | 0.016                         | 3,290                                       | ERR0JM472W30---T |
|          | 5,600    | 12.5×35       | 0.015                         | 3,400                                       | ERR0JM562W35---T |
|          | 5,600    | 16×20         | 0.018                         | 3,140                                       | ERR0JM562L20---T |
|          | 6,800    | 16×25         | 0.016                         | 3,460                                       | ERR0JM682L25---T |
|          | 10       | 100           | 5×11                          | 0.550                                       | 250              |
| 150      |          | 5×12          | 0.500                         | 300   | ERR1AM151D12---T |
| 220      |          | 6.3×11        | 0.130                         | 405   | ERR1AM221E11---T |
| 330      |          | 6.3×11        | 0.120                         | 471   | ERR1AM331E11---T |
| 470      |          | 6.3×12        | 0.091                         | 630   | ERR1AM471E12---T |
| 470      |          | 8×11          | 0.072                         | 760   | ERR1AM471F11---T |
| 680      |          | 8×12          | 0.070                         | 830   | ERR1AM681F12---T |
| 680      |          | 10×13         | 0.053                         | 1,030                                       | ERR1AM681G13---T |
| 820      |          | 8×12          | 0.055                         | 950   | ERR1AM821F12---T |
| 1,000    |          | 8×16          | 0.050                         | 1,074                                       | ERR1AM102F16---T |
| 1,000    |          | 10×16         | 0.038                         | 1,430                                       | ERR1AM102G16---T |
| 1,200    |          | 10×16         | 0.034                         | 1,550                                       | ERR1AM122G16---T |
| 1,500    |          | 10×16         | 0.034                         | 1,587                                       | ERR1AM152G16---T |
| 2,200    |          | 10×20         | 0.031                         | 1,978                                       | ERR1AM222G20---T |
| 2,200    |          | 12.5×20       | 0.028                         | 2,360                                       | ERR1AM222W20---T |
| 3,300    |          | 12.5×20       | 0.025                         | 2,490                                       | ERR1AM332W20---T |
| 4,700    |          | 13×25         | 0.022                         | 2,835                                       | ERR1AM472K25---T |
| 5,600    |          | 16×25         | 0.016                         | 3,460                                       | ERR1AM562L25---T |
| 16       | 100      | 5×11          | 0.570                         | 320   | ERR1CM101D11---T |
|          | 100      | 6.3×11        | 0.350                         | 326   | ERR1CM101E11---T |
|          | 220      | 6.3×11        | 0.120                         | 530   | ERR1CM221E11---T |
|          | 220      | 8×11          | 0.085                         | 570   | ERR1CM221F11---T |
|          | 330      | 6.3×12        | 0.110                         | 564   | ERR1CM331E12---T |
|          | 330      | 8×12          | 0.072                         | 760   | ERR1CM331F12---T |
| 470      | 8×16     | 0.056         | 795                           | ERR1CM471F16---T                            |                  |

Radial Type

RR series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 16       | 470      | 10×13         | 0.053                        | 1,030                                     | ERR1CM471G13---T |
|          | 680      | 8×16          | 0.045                        | 1,070                                     | ERR1CM681F16---T |
|          | 1,000    | 8×16          | 0.043                        | 1,380                                     | ERR1CM102F16---T |
|          | 1,000    | 10×13         | 0.052                        | 1,380                                     | ERR1CM102G13---T |
|          | 1,500    | 10×20         | 0.031                        | 1,980                                     | ERR1CM152G20---T |
|          | 2,200    | 12.5×20       | 0.040                        | 2,640                                     | ERR1CM222W20---T |
|          | 3,300    | 13×25         | 0.024                        | 2,850                                     | ERR1CM332K25---T |
|          | 4,700    | 16×25         | 0.016                        | 3,560                                     | ERR1CM472L25---T |
| 25       | 47       | 5×11          | 0.720                        | 250                                       | ERR1EM470D11---T |
|          | 68       | 5×11          | 0.650                        | 260                                       | ERR1EM680D11---T |
|          | 100      | 5×11          | 0.400                        | 350                                       | ERR1EM101D11---T |
|          | 100      | 6.3×11        | 0.280                        | 405                                       | ERR1EM101E11---T |
|          | 220      | 6.3×12        | 0.140                        | 597                                       | ERR1EM221E12---T |
|          | 220      | 8×11          | 0.072                        | 760                                       | ERR1EM221F11---T |
|          | 330      | 8×12          | 0.085                        | 930                                       | ERR1EM331F12---T |
|          | 470      | 8×16          | 0.055                        | 1,010                                     | ERR1EM471F16---T |
|          | 470      | 10×13         | 0.057                        | 1,200                                     | ERR1EM471G13---T |
|          | 680      | 8×16          | 0.057                        | 980                                       | ERR1EM681F16---T |
|          | 680      | 10×16         | 0.050                        | 1,280                                     | ERR1EM681G16---T |
|          | 820      | 10×20         | 0.036                        | 1,500                                     | ERR1EM821G20---T |
|          | 1,000    | 10×20         | 0.035                        | 1,820                                     | ERR1EM102G20---T |
|          | 1,500    | 12.5×20       | 0.022                        | 2,150                                     | ERR1EM152W20---T |
|          | 2,200    | 12.5×25       | 0.018                        | 2,770                                     | ERR1EM222W25---T |
|          | 35       | 33            | 5×11                         | 0.600                                     | 250              |
| 47       |          | 5×12          | 0.480                        | 270                                       | ERR1VM470D12---T |
| 47       |          | 6.3×11        | 0.450                        | 352                                       | ERR1VM470E11---T |
| 56       |          | 6.3×11        | 0.390                        | 405                                       | ERR1VM560E11---T |
| 100      |          | 6.3×11        | 0.350                        | 490                                       | ERR1VM101E11---T |
| 100      |          | 8×11          | 0.200                        | 538                                       | ERR1VM101F11---T |
| 150      |          | 8×12          | 0.170                        | 760                                       | ERR1VM151F12---T |
| 220      |          | 8×12          | 0.100                        | 789                                       | ERR1VM221F12---T |
| 220      |          | 10×13         | 0.066                        | 1,030                                     | ERR1VM221G13---T |
| 330      |          | 8×16          | 0.064                        | 1,030                                     | ERR1VM331F16---T |
| 470      |          | 8×20          | 0.055                        | 1,320                                     | ERR1VM471F20---T |
| 470      |          | 10×16         | 0.045                        | 1,485                                     | ERR1VM471G16---T |
| 560      |          | 10×20         | 0.035                        | 1,850                                     | ERR1VM561G20---T |
| 680      |          | 10×20         | 0.030                        | 1,980                                     | ERR1VM681G20---T |
| 1,000    |          | 12.5×20       | 0.028                        | 2,440                                     | ERR1VM102W20---T |
| 1,500    |          | 12.5×30       | 0.026                        | 3,010                                     | ERR1VM152W30---T |
| 2,200    | 16×25    | 0.025         | 3,490                        | ERR1VM222L25---T                          |                  |
| 50       | 22       | 5×11          | 0.840                        | 238                                       | ERR1HM220D11---T |
|          | 22       | 6.3×11        | 0.540                        | 260                                       | ERR1HM220E11---T |

RR series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |                  |
|----------|----------|---------------|------------------------------|---|------------------|------------------|
| 50       | 47       | 6.3×11        | 0.300                        | 310                                       | ERR1HM470E11---T |                  |
|          | 56       | 6.3×12        | 0.280                        | 385                                       | ERR1HM560E12---T |                  |
|          | 100      | 8×12          | 0.130                        | 724                                       | ERR1HM101F12---T |                  |
|          | 120      | 8×16          | 0.100                        | 950                                       | ERR1HM121F16---T |                  |
|          | 120      | 10×13         | 0.120                        | 900                                       | ERR1HM121G13---T |                  |
|          | 150      | 10×13         | 0.120                        | 979                                       | ERR1HM151G13---T |                  |
|          | 220      | 8×16          | 0.120                        | 960                                       | ERR1HM221F16---T |                  |
|          | 220      | 10×13         | 0.110                        | 980                                       | ERR1HM221G13---T |                  |
|          | 330      | 10×16         | 0.072                        | 1,370                                     | ERR1HM331G16---T |                  |
|          | 470      | 10×20         | 0.046                        | 1,690                                     | ERR1HM471G20---T |                  |
|          | 470      | 12.5×20       | 0.042                        | 2,050                                     | ERR1HM471W20---T |                  |
|          | 680      | 12.5×20       | 0.038                        | 2,200                                     | ERR1HM681W20---T |                  |
|          | 1,000    | 13×25         | 0.030                        | 2,500                                     | ERR1HM102K25---T |                  |
|          | 63       | 33            | 6.3×11                       | 0.450                                     | 266              | ERR1JM330E11---T |
| 47       |          | 6.3×12        | 0.450                        | 266                                       | ERR1JM470E12---T |                  |
| 47       |          | 8×12          | 0.350                        | 320                                       | ERR1JM470F12---T |                  |
| 100      |          | 8×12          | 0.250                        | 450                                       | ERR1JM101F12---T |                  |
| 220      |          | 10×13         | 0.210                        | 690                                       | ERR1JM221G13---T |                  |
| 330      |          | 10×20         | 0.080                        | 1,160                                     | ERR1JM331G20---T |                  |
| 470      |          | 13×20         | 0.060                        | 1,995                                     | ERR1JM471K20---T |                  |
| 680      |          | 12.5×25       | 0.045                        | 2,350                                     | ERR1JM681W25---T |                  |
| 680      |          | 16×20         | 0.039                        | 2,400                                     | ERR1JM681L20---T |                  |
| 1,000    |          | 13×30         | 0.056                        | 2,680                                     | ERR1JM102K30---T |                  |
| 1,000    |          | 16×25         | 0.050                        | 2,800                                     | ERR1JM102L25---T |                  |
| 1,500    |          | 18×30         | 0.035                        | 2,900                                     | ERR1JM152M30---T |                  |
| 2,200    |          | 18×40         | 0.032                        | 3,250                                     | ERR1JM222M40---T |                  |
| 80       |          | 22            | 6.3×11                       | 1.200                                     | 136              | ERR1BM220E11---T |
|          | 33       | 6.3×12        | 0.970                        | 145                                       | ERR1BM330E12---T |                  |
|          | 33       | 8×9           | 1.000                        | 140                                       | ERR1BM330F09---T |                  |
|          | 47       | 8×12          | 0.420                        | 450                                       | ERR1BM470F12---T |                  |
|          | 56       | 8×12          | 0.400                        | 480                                       | ERR1BM560F12---T |                  |
|          | 68       | 8×12          | 0.380                        | 510                                       | ERR1BM680F12---T |                  |
|          | 82       | 8×16          | 0.360                        | 585                                       | ERR1BM820F16---T |                  |
|          | 100      | 8×16          | 0.320                        | 620                                       | ERR1BM101F16---T |                  |
|          | 150      | 10×16         | 0.250                        | 800                                       | ERR1BM151G16---T |                  |
|          | 220      | 10×20         | 0.200                        | 870                                       | ERR1BM221G20---T |                  |
|          | 220      | 12.5×16       | 0.200                        | 870                                       | ERR1BM221W16---T |                  |
|          | 100      | 0.47          | 5×11                         | 5.000                                     | 10               | ERR1KMR47D11---T |
|          |          | 1             | 5×11                         | 4.500                                     | 50               | ERR1KM010D11---T |
|          |          | 2.2           | 5×11                         | 3.600                                     | 60               | ERR1KM2R2D11---T |
| 3.3      |          | 5×11          | 3.000                        | 75  | ERR1KM3R3D11---T |                  |
| 4.7      |          | 5×11          | 2.500                        | 90  | ERR1KM4R7D11---T |                  |

RR series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ØD×L(mm) | Impeance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |
|----------|----------|---------------|-----------------------------|--|------------------|
| 100      | 10       | 5×11          | 1.850                       | 130  | ERR1KM100D11---T |
|          | 10       | 6.3×11        | 1.500                       | 140  | ERR1KM100E11---T |
|          | 22       | 6.3×12        | 0.800                       | 210  | ERR1KM220E12---T |
|          | 33       | 8×12          | 0.450                       | 235  | ERR1KM330F12---T |
|          | 47       | 8×12          | 0.450                       | 235  | ERR1KM470F12---T |
|          | 47       | 10×13         | 0.340                       | 380  | ERR1KM470G13---T |
|          | 68       | 8×16          | 0.300                       | 360  | ERR1KM680F16---T |
|          | 68       | 10×13         | 0.300                       | 380  | ERR1KM680G13---T |
|          | 100      | 8×25          | 0.350                       | 453  | ERR1KM101F25---T |
|          | 100      | 10×16         | 0.350                       | 460  | ERR1KM101G16---T |
|          | 150      | 10×20         | 0.170                       | 740  | ERR1KM151G20---T |
|          | 220      | 13×20         | 0.100                       | 880  | ERR1KM221K20---T |
|          | 330      | 13×25         | 0.080                       | 1,010  | ERR1KM331K25---T |
|          | 330      | 16×20         | 0.078                       | 1,030  | ERR1KM331L20---T |
|          | 470      | 16×25         | 0.048                       | 1,250  | ERR1KM471L25---T |
|          | 680      | 16×35         | 0.038                       | 1,660  | ERR1KM681L35---T |
| 680      | 18×30    | 0.035         | 1,650                       | ERR1KM681M30---T                                       |                  |
| 1,000    | 18×35    | 0.030         | 2,300                       | ERR1KM102M35---T                                       |                  |
| 120      | 10       | 6.3×12        | 6.000                       | 85   | ERR2BM100E12---T |
|          | 15       | 6.3×12        | 4.000                       | 110  | ERR2BM150E12---T |
|          | 22       | 8×12          | 3.000                       | 140  | ERR2BM220F12---T |
|          | 33       | 8×16          | 2.000                       | 220  | ERR2BM330F16---T |
|          | 33       | 10×13         | 3.000                       | 240  | ERR2BM330G13---T |
|          | 47       | 8×20          | 2.800                       | 285  | ERR2BM470F20---T |
|          | 47       | 10×16         | 2.800                       | 300  | ERR2BM470G16---T |
|          | 56       | 10×16         | 2.500                       | 350  | ERR2BM560G16---T |
|          | 68       | 10×16         | 2.200                       | 350  | ERR2BM680G16---T |
|          | 82       | 10×20         | 2.000                       | 380  | ERR2BM820G20---T |
|          | 100      | 10×25         | 1.700                       | 420  | ERR2BM101G25---T |
|          | 120      | 12.5×20       | 1.500                       | 500  | ERR2BM121W20---T |
|          | 150      | 12.5×25       | 1.100                       | 620  | ERR2BM151W25---T |
|          | 220      | 13×30         | 0.850                       | 760  | ERR2BM221K30---T |
|          | 220      | 16×20         | 1.200                       | 760  | ERR2BM221L20---T |
|          | 330      | 16×30         | 0.400                       | 950  | ERR2BM331L30---T |
| 330      | 18×25    | 0.450         | 930                         | ERR2BM331M25---T                                       |                  |
| 470      | 16×40    | 0.350         | 1,030                       | ERR2BM471L40---T                                       |                  |
| 470      | 18×30    | 0.350         | 1,030                       | ERR2BM471M30---T                                       |                  |

※Specifications subject to change without notice

RE series

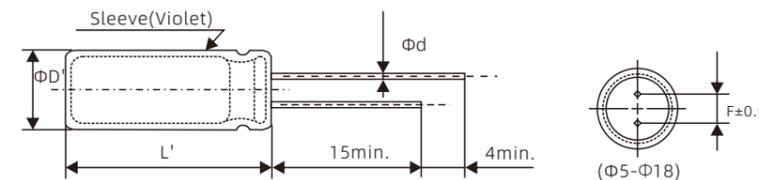


- Endurance: 2,000 ~ 4,000 hours at 105°C
- High frequency, low impedance
- Suitable for switching power, UPS, power sources, etc.
- RoHS Compliant

SPECIFICATIONS

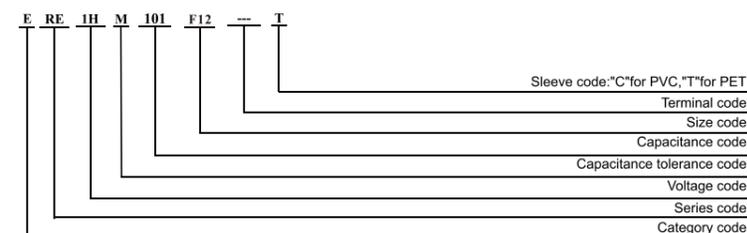
| Items  | Characteristics  |                                      |      |      |      |      |      |      |      |      |      |                 |                   |
|--|--|--------------------------------------|------|------|------|------|------|------|------|------|------|-----------------|-------------------|
| Category Temperature Range   | -40~+105°C   |                                      |      |      |      |      |      |      |      |      |      |                 |                   |
| Rated Voltage Range  | 6.3~120Vdc   |                                      |      |      |      |      |      |      |      |      |      |                 |                   |
| Capacitance Tolerance  | ±20%(M) (at 20°C,120Hz)  |                                      |      |      |      |      |      |      |      |      |      |                 |                   |
| Leakage Current  | I≤0.01CV or 3μA, whichever is greater.<br>Where, I:Max. leakage current (μA), C:Nominal capacitance (μF), V:Rated voltage (V)  |                                      |      |      |      |      |      |      |      |      |      |                 |                   |
| Dissipation Factor (tanδ)  | Rated Voltage (Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100  | 120  | (at 20°C,120Hz) |                   |
|  | Dissipation Factor(Max.)   | 0.22                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | 0.08 | 0.12 |                 |                   |
| When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μF increase. |  |                                      |      |      |      |      |      |      |      |      |      |                 |                   |
| Low Temperature Characteristics (Max. Impedance Ratio)   | Rated Voltage (Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100  | 120  | (120Hz)         |                   |
|  | Z(-25°C)/Z(+20°C)  | 4                                    | 3    | 2    |      |      |      |      |      | 3    |      |                 |                   |
|  | Z(-40°C)/Z(+20°C)  | 8                                    | 6    | 4    | 3    |      |      |      |      |      | 6    |                 |                   |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105°C. |                                      |      |      |      |      |      |      |      |      |      | Case Dia.(mm)   | Load life (hours) |
|  | Capacitance Change   | ≤±25% of the initial value           |      |      |      |      |      |      |      |      |      | ØD≤6.3          | 2,000             |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |      | ØD=8&10         | 3,000             |
|  | Leakage Current  | ≤The initial specified value         |      |      |      |      |      |      |      |      |      | ØD≥12.5         | 4,000             |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.  |                                      |      |      |      |      |      |      |      |      |      |                 |                   |
|  | Capacitance Change   | ≤±25% of the initial value           |      |      |      |      |      |      |      |      |      |                 |                   |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |      |                 |                   |
|  | Leakage Current  | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |      |                 |                   |

DIMENSIONS [mm]



| ØD  | 5          | 6.3 | 8   | 10  | 12.5 | 13  | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|-----|
| Ød  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 5.0 | 7.5 | 7.5 |
| ØD' | ØD+0.5max. |     |     |     |      |     |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)         | Freq. (Hz) |      |      |      |
|-------------------|------------|------|------|------|
|                   | 120        | 1K   | 10K  | 100K |
| Cap. <220         | 0.40       | 0.75 | 0.90 | 1.00 |
| 220≤Cap. <680     | 0.50       | 0.85 | 0.94 | 1.00 |
| 680≤Cap. <2,200   | 0.60       | 0.87 | 0.95 | 1.00 |
| 2,200≤Cap. <4,700 | 0.75       | 0.90 | 0.95 | 1.00 |
| Cap. ≥4,700       | 0.85       | 0.95 | 0.98 | 1.00 |

Radial Type

RE series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|--|------------------|
| 6.3      | 330      | 8×11          | 0.130                        | 650  | ERE0JM331F11---T |
|          | 470      | 8×11          | 0.130                        | 650  | ERE0JM471F11---T |
|          | 680      | 8×12          | 0.130                        | 680  | ERE0JM681F12--T  |
|          | 1,000    | 8×12          | 0.130                        | 720  | ERE0JM102F12--T  |
|          | 1,000    | 10×13         | 0.080                        | 870  | ERE0JM102G13---T |
|          | 1,500    | 10×16         | 0.060                        | 1,210  | ERE0JM152G16---T |
|          | 2,200    | 10×20         | 0.045                        | 1,400  | ERE0JM222G20---T |
|          | 3,300    | 12.5×20       | 0.035                        | 1,900  | ERE0JM332W20---T |
|          | 4,700    | 12.5×25       | 0.030                        | 2,130  | ERE0JM472W25---T |
| 10       | 470      | 8×11          | 0.130                        | 650  | ERE1AM471F11---T |
|          | 680      | 8×12          | 0.130                        | 650  | ERE1AM681F12---T |
|          | 1,000    | 8×16          | 0.087                        | 850  | ERE1AM102F16---T |
|          | 1,000    | 10×16         | 0.060                        | 1,210  | ERE1AM102G16---T |
|          | 1,500    | 10×16         | 0.050                        | 1,300  | ERE1AM152G16---T |
|          | 2,200    | 10×20         | 0.045                        | 1,400  | ERE1AM222G20---T |
|          | 3,300    | 13×25         | 0.030                        | 2,130  | ERE1AM332K25---T |
| 16       | 220      | 8×11          | 0.250                        | 650  | ERE1CM221F11---T |
|          | 330      | 8×11          | 0.130                        | 650  | ERE1CM331F11---T |
|          | 470      | 8×12          | 0.130                        | 650  | ERE1CM471F12--T  |
|          | 470      | 10×13         | 0.080                        | 870  | ERE1CM471G13---T |
|          | 560      | 8×12          | 0.130                        | 650  | ERE1CM561F12--T  |
|          | 680      | 8×16          | 0.087                        | 850  | ERE1CM681F16--T  |
|          | 680      | 10×13         | 0.080                        | 870  | ERE1CM681G13---T |
|          | 1,000    | 8×20          | 0.060                        | 1,210  | ERE1CM102F20--T  |
|          | 1,000    | 10×13         | 0.080                        | 870  | ERE1CM102G13---T |
|          | 1,500    | 10×20         | 0.045                        | 1,400  | ERE1CM152G20---T |
|          | 2,200    | 13×20         | 0.035                        | 1,900  | ERE1CM222K20---T |
|          | 3,300    | 12.5×35       | 0.027                        | 2,500  | ERE1CM332W35---T |
|          | 25       | 100           | 6.3×11                       | 0.250  | 340              |
| 220      |          | 6.3×11        | 0.210                        | 350  | ERE1EM221E11---T |
| 220      |          | 8×12          | 0.130                        | 650  | ERE1EM221F12---T |
| 330      |          | 8×12          | 0.130                        | 650  | ERE1EM331F12---T |
| 470      |          | 8×16          | 0.087                        | 840  | ERE1EM471F16---T |
| 470      |          | 10×13         | 0.080                        | 870  | ERE1EM471G13---T |
| 560      |          | 10×13         | 0.078                        | 960  | ERE1EM561G13---T |
| 680      |          | 8×16          | 0.080                        | 870  | ERE1EM681F16---T |
| 680      |          | 10×16         | 0.060                        | 1,210  | ERE1EM681G16---T |
| 1,000    |          | 10×20         | 0.045                        | 1,400  | ERE1EM102G20---T |
| 1,000    |          | 12.5×13       | 0.050                        | 1,250  | ERE1EM102W13---T |
| 1,500    |          | 13×20         | 0.035                        | 1,900  | ERE1EM152K20---T |
| 2,200    |          | 12.5×25       | 0.030                        | 2,130  | ERE1EM222W25---T |
| 3,300    |          | 12.5×30       | 0.025                        | 2,600  | ERE1EM332W30---T |
| 3,300    |          | 16×20         | 0.025                        | 2,600  | ERE1EM332L20---T |
| 4,700    | 16×25    | 0.023         | 2,860                        | ERE1EM472L25--T  |                  |

RE series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |                  |
|----------|----------|---------------|------------------------------|--|------------------|------------------|
| 35       | 56       | 5×12          | 0.800                        | 200  | ERE1VM560D12---T |                  |
|          | 68       | 5×12          | 0.720                        | 220  | ERE1VM680D12---T |                  |
|          | 100      | 6.3×11        | 0.350                        | 350  | ERE1VM101E11---T |                  |
|          | 100      | 8×11          | 0.130                        | 650  | ERE1VM101F11---T |                  |
|          | 150      | 8×12          | 0.130                        | 650  | ERE1VM151F12---T |                  |
|          | 220      | 8×12          | 0.130                        | 650  | ERE1VM221F12---T |                  |
|          | 330      | 8×16          | 0.072                        | 840  | ERE1VM331F16---T |                  |
|          | 330      | 10×13         | 0.080                        | 870  | ERE1VM331G13---T |                  |
|          | 470      | 10×16         | 0.060                        | 1,210  | ERE1VM471G16---T |                  |
|          | 560      | 10×16         | 0.060                        | 1,210  | ERE1VM561G16---T |                  |
|          | 680      | 10×20         | 0.045                        | 1,400  | ERE1VM681G20---T |                  |
|          | 680      | 12.5×16       | 0.058                        | 1,380  | ERE1VM681W16---T |                  |
|          | 1,000    | 12.5×20       | 0.035                        | 1,900  | ERE1VM102W20---T |                  |
|          | 1,500    | 12.5×25       | 0.030                        | 2,124  | ERE1VM152W25---T |                  |
|          | 2,200    | 16×25         | 0.029                        | 2,450  | ERE1VM222L25---T |                  |
| 50       | 47       | 6.3×11        | 0.300                        | 295  | ERE1HM470E11---T |                  |
|          | 100      | 6.3×12        | 0.280                        | 375  | ERE1HM101E12---T |                  |
|          | 100      | 8×12          | 0.130                        | 620  | ERE1HM101F12--T  |                  |
|          | 150      | 8×12          | 0.130                        | 620  | ERE1HM151F12--T  |                  |
|          | 220      | 8×16          | 0.100                        | 840  | ERE1HM221F16--T  |                  |
|          | 220      | 10×16         | 0.084                        | 1,050  | ERE1HM221G16--T  |                  |
|          | 330      | 10×16         | 0.080                        | 1,100  | ERE1HM331G16--T  |                  |
|          | 470      | 10×20         | 0.075                        | 1,200  | ERE1HM471G20---T |                  |
|          | 560      | 12.5×16       | 0.061                        | 1,750  | ERE1HM561W16---T |                  |
|          | 820      | 12.5×20       | 0.040                        | 1,900  | ERE1HM821W20---T |                  |
|          | 820      | 16×20         | 0.032                        | 2,130  | ERE1HM821L20---T |                  |
|          | 1,000    | 12.5×25       | 0.034                        | 2,100  | ERE1HM102W25---T |                  |
|          | 1,000    | 16×20         | 0.034                        | 2,100  | ERE1HM102L20--T  |                  |
|          | 63       | 68            | 8×12                         | 0.510  | 235              | ERE1JM680F12---T |
|          |          | 100           | 8×12                         | 0.500  | 235              | ERE1JM101F12---T |
| 150      |          | 10×13         | 0.380                        | 320  | ERE1JM151G13---T |                  |
| 220      |          | 10×16         | 0.170                        | 450  | ERE1JM221G16--T  |                  |
| 470      |          | 13×20         | 0.085                        | 950  | ERE1JM471K20--T  |                  |
| 560      |          | 16×18         | 0.079                        | 1,020  | ERE1JM561L18--T  |                  |
| 680      |          | 16×20         | 0.070                        | 1,280  | ERE1JM681L20--T  |                  |
| 820      |          | 12.5×30       | 0.071                        | 1,200  | ERE1JM821W30---T |                  |
| 820      |          | 16×20         | 0.070                        | 1,280  | ERE1JM821L20--T  |                  |
| 1,000    |          | 16×25         | 0.045                        | 1,900  | ERE1JM102L25---T |                  |
| 80       |          | 56            | 8×12                         | 0.490  | 260              | ERE1BM560F12---T |
|          | 68       | 8×12          | 0.400                        | 290  | ERE1BM680F12---T |                  |
|          | 100      | 10×13         | 0.300                        | 330  | ERE1BM101G13---T |                  |
|          | 150      | 10×16         | 0.240                        | 440  | ERE1BM151G16---T |                  |
|          | 220      | 10×20         | 0.180                        | 510  | ERE1BM221G20---T |                  |
|          | 220      | 12.5×16       | 0.180                        | 530  | ERE1BM221W16---T |                  |

RE series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 80       | 330      | 12.5×20       | 0.150                        | 760                                       | ERE1BM331W20---T |
|          | 470      | 12.5×25       | 0.072                        | 980                                       | ERE1BM471W25---T |
|          | 560      | 16×20         | 0.070                        | 1,050                                     | ERE1BM561L20---T |
|          | 680      | 16×25         | 0.065                        | 1,250                                     | ERE1BM681L25---T |
|          | 1,000    | 16×35         | 0.052                        | 1,320                                     | ERE1BM102L35---T |
| 100      | 22       | 6.3×12        | 0.920                        | 150                                       | ERE1KM220E12--T  |
|          | 47       | 8×12          | 0.910                        | 260                                       | ERE1KM470F12---T |
|          | 47       | 10×13         | 0.340                        | 315                                       | ERE1KM470G13---T |
|          | 68       | 8×16          | 0.320                        | 360                                       | ERE1KM680F16---T |
|          | 68       | 10×13         | 0.320                        | 360                                       | ERE1KM680G13---T |
|          | 100      | 10×16         | 0.200                        | 450                                       | ERE1KM101G16---T |
|          | 150      | 10×20         | 0.170                        | 500                                       | ERE1KM151G20--T  |
|          | 220      | 13×20         | 0.095                        | 930                                       | ERE1KM221K20---T |
|          | 330      | 12.5×25       | 0.092                        | 950                                       | ERE1KM331W25---T |
|          | 330      | 16×20         | 0.088                        | 1,050                                     | ERE1KM331L20---T |
|          | 470      | 16×25         | 0.078                        | 1,250                                     | ERE1KM471L25---T |
|          | 470      | 18×20         | 0.070                        | 1,200                                     | ERE1KM471M20---T |
|          | 120      | 10            | 6.3×12                       | 6.000                                     | 75               |
| 15       |          | 6.3×12        | 5.000                        | 96  | ERE2BM150E12---T |
| 22       |          | 8×12          | 4.000                        | 123                                       | ERE2BM220F12---T |
| 33       |          | 8×16          | 3.500                        | 212                                       | ERE2BM330F16---T |
| 33       |          | 10×13         | 3.000                        | 212                                       | ERE2BM330G13--T  |
| 47       |          | 8×20          | 2.800                        | 250                                       | ERE2BM470F20---T |
| 47       |          | 10×16         | 2.800                        | 265                                       | ERE2BM470G16--T  |
| 56       |          | 10×16         | 2.500                        | 270                                       | ERE2BM560G16--T  |
| 68       |          | 10×16         | 2.200                        | 270                                       | ERE2BM680G16--T  |
| 82       |          | 10×20         | 2.000                        | 290                                       | ERE2BM820G20--T  |
| 100      |          | 10×25         | 1.700                        | 360                                       | ERE2BM101G25--T  |
| 100      |          | 12.5×16       | 1.900                        | 370                                       | ERE2BM101W16---T |
| 120      |          | 12.5×20       | 1.500                        | 495                                       | ERE2BM121W20---T |
| 150      |          | 12.5×25       | 1.100                        | 540                                       | ERE2BM151W25---T |
| 220      |          | 16×20         | 0.820                        | 660                                       | ERE2BM221L20---T |
| 270      |          | 16×25         | 0.600                        | 750                                       | ERE2BM271L25---T |
| 270      |          | 18×20         | 0.600                        | 750                                       | ERE2BM271M20---T |
| 330      |          | 16×30         | 0.450                        | 810                                       | ERE2BM331L30---T |
| 330      | 18×25    | 0.450         | 810                          | ERE2BM331M25--T                           |                  |
| 470      | 16×40    | 0.350         | 900                          | ERE2BM471L40---T                          |                  |
| 470      | 18×30    | 0.350         | 900                          | ERE2BM471M30---T                          |                  |

※Specifications subject to change without notice

RF series

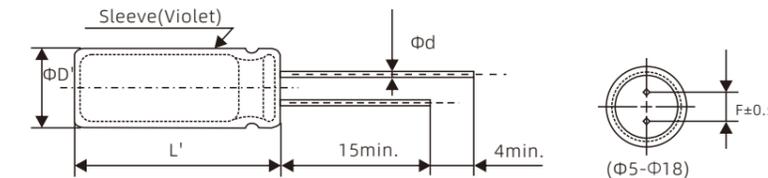
- Endurance : 3,000~ 6,000 hours at 105°C
- Ultra-low impedance, high ripple current
- RoHS Compliant



SPECIFICATIONS

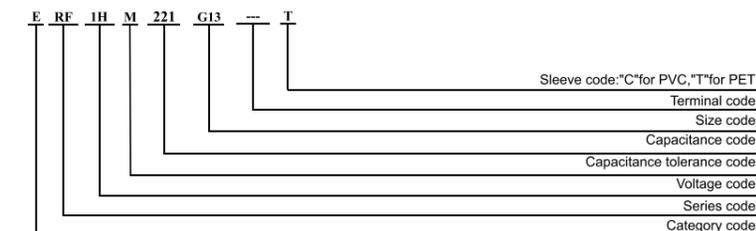
| Items  | Characteristics  |                                      |      |      |      |      |      |      |      |      |           |                   |       |
|--|--|--------------------------------------|------|------|------|------|------|------|------|------|-----------|-------------------|-------|
| Category Temperature Range                             | -40~+105°C   |                                      |      |      |      |      |      |      |      |      |           |                   |       |
| Rated Voltage Range                                    | 6.3~120Vdc   |                                      |      |      |      |      |      |      |      |      |           |                   |       |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C,120Hz)  |                                      |      |      |      |      |      |      |      |      |           |                   |       |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                               |                                      |      |      |      |      |      |      |      |      |           |                   |       |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100  | 120       | (at 20°C,120Hz)   |       |
|  | Dissipation Factor(Max.)   | 0.15                                 | 0.14 | 0.12 | 0.10 | 0.10 | 0.08 | 0.08 | 0.08 | 0.08 | 0.12      |                   |       |
|  | When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μF increase.   |                                      |      |      |      |      |      |      |      |      |           |                   |       |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100  | 120       | (120Hz)           |       |
|  | Z(-25°C)/ Z(+20°C)   | 5                                    | 4    | 3    |      |      |      |      |      | 3    |           |                   |       |
|  | Z(-40°C)/ Z(+20°C)   | 10                                   | 8    | 5    | 4    |      |      |      |      |      | 6         |                   |       |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105°C. |                                      |      |      |      |      |      |      |      |      | Case Dia. | Life time (hours) |       |
|  | Capacitance Change   | ≤±25% of the initial value           |      |      |      |      |      |      |      |      |           | ØD≤6.3            | 3,000 |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |           | ØD=8              | 4,000 |
|  | Leakage Current  | ≤The initial specified value         |      |      |      |      |      |      |      |      |           | ØD≥12.5           | 6,000 |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.  |                                      |      |      |      |      |      |      |      |      |           |                   |       |
|  | Capacitance Change   | ≤±25% of the initial value           |      |      |      |      |      |      |      |      |           |                   |       |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |           |                   |       |
|  | Leakage Current  | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |           |                   |       |

DIMENSIONS [mm]



| ΦD  | 5          | 6.3 | 8   | 10  | 12.5 | 13  | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|-----|
| Φd  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 5.0 | 7.5 | 7.5 |
| ΦD* | ØD+0.5max. |     |     |     |      |     |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)         | Freq. (Hz) |      |      |      |
|-------------------|------------|------|------|------|
|                   | 120        | 1K   | 10K  | 100K |
| Cap. <220         | 0.40       | 0.75 | 0.90 | 1.00 |
| 220≤Cap. <680     | 0.50       | 0.85 | 0.94 | 1.00 |
| 680≤Cap. <2,200   | 0.60       | 0.87 | 0.95 | 1.00 |
| 2,200≤Cap. <4,700 | 0.75       | 0.90 | 0.95 | 1.00 |
| Cap. ≥4,700       | 0.85       | 0.95 | 0.98 | 1.00 |

Radial Type

RF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 6.3      | 150      | 5×11          | 0.290                        | 300                                       | ERF0JM151D11---T |
|          | 220      | 6.3×11        | 0.205                        | 377                                       | ERF0JM221E11---T |
|          | 330      | 6.3×11        | 0.120                        | 455                                       | ERF0JM331E11---T |
|          | 470      | 8×11          | 0.110                        | 632                                       | ERF0JM471F11---T |
|          | 1,000    | 8×16          | 0.052                        | 1,000                                     | ERF0JM102F16---T |
|          | 1,200    | 8×20          | 0.040                        | 1,300                                     | ERF0JM122F20---T |
|          | 1,200    | 10×16         | 0.037                        | 1,480                                     | ERF0JM122G16---T |
|          | 1,500    | 10×16         | 0.037                        | 1,480                                     | ERF0JM152G16---T |
|          | 2,200    | 10×20         | 0.021                        | 2,200                                     | ERF0JM222G20---T |
|          | 3,300    | 12.5×20       | 0.020                        | 2,410                                     | ERF0JM332W20---T |
|          | 4,700    | 12.5×30       | 0.015                        | 3,340                                     | ERF0JM472W30---T |
|          | 6,800    | 16×25         | 0.015                        | 3,510                                     | ERF0JM682L25---T |
| 10       | 100      | 5×11          | 0.290                        | 300                                       | ERF1AM101D11---T |
|          | 100      | 6.3×9         | 0.290                        | 300                                       | ERF1AM101E09---T |
|          | 220      | 6.3×11        | 0.120                        | 455                                       | ERF1AM221E11---T |
|          | 470      | 8×12          | 0.071                        | 810                                       | ERF1AM471F12---T |
|          | 470      | 10×9          | 0.092                        | 720                                       | ERF1AM471G09---T |
|          | 680      | 8×16          | 0.055                        | 1,046                                     | ERF1AM681F16---T |
|          | 680      | 10×13         | 0.052                        | 1,080                                     | ERF1AM681G13---T |
|          | 1,000    | 8×20          | 0.040                        | 1,300                                     | ERF1AM102F20---T |
|          | 1,000    | 10×16         | 0.037                        | 1,480                                     | ERF1AM102G16---T |
|          | 1,500    | 10×20         | 0.032                        | 2,220                                     | ERF1AM152G20---T |
|          | 2,200    | 12.5×20       | 0.020                        | 2,410                                     | ERF1AM222W20---T |
|          | 3,300    | 12.5×25       | 0.017                        | 2,820                                     | ERF1AM332W25---T |
|          | 3,900    | 12.5×30       | 0.015                        | 3,340                                     | ERF1AM392W30---T |
|          | 4,700    | 12.5×35       | 0.014                        | 3,450                                     | ERF1AM472W35---T |
|          | 5,600    | 16×25         | 0.015                        | 3,510                                     | ERF1AM562L25---T |
| 16       | 100      | 5×11          | 0.210                        | 320                                       | ERF1CM101D11---T |
|          | 220      | 6.3×12        | 0.084                        | 721                                       | ERF1CM221E12---T |
|          | 330      | 8×12          | 0.071                        | 810                                       | ERF1CM331F12---T |
|          | 330      | 10×9          | 0.092                        | 720                                       | ERF1CM331G09---T |
|          | 470      | 8×16          | 0.055                        | 1,045                                     | ERF1CM471F16---T |
|          | 470      | 10×13         | 0.052                        | 1,080                                     | ERF1CM471G13---T |
|          | 680      | 8×20          | 0.040                        | 1,300                                     | ERF1CM681F20---T |
|          | 680      | 10×16         | 0.040                        | 1,480                                     | ERF1CM681G16---T |
|          | 1,000    | 10×20         | 0.023                        | 1,870                                     | ERF1CM102G20---T |
|          | 1,200    | 10×25         | 0.021                        | 2,200                                     | ERF1CM122G25---T |
|          | 1,500    | 12.5×20       | 0.020                        | 2,410                                     | ERF1CM152W20---T |
|          | 2,200    | 12.5×25       | 0.017                        | 2,820                                     | ERF1CM222W25---T |
|          | 2,700    | 12.5×30       | 0.015                        | 3,340                                     | ERF1CM272W30---T |
|          | 2,700    | 16×20         | 0.017                        | 3,190                                     | ERF1CM272L20---T |
|          | 3,300    | 12.5×35       | 0.014                        | 3,450                                     | ERF1CM332W35---T |

RF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 16       | 3,300    | 16×25         | 0.016                        | 3,350                                     | ERF1CM332L25---T |
|          | 3,900    | 16×25         | 0.015                        | 3,510                                     | ERF1CM392L25---T |
| 25       | 47       | 5×11          | 0.290                        | 300                                       | ERF1EM470D11---T |
|          | 100      | 5×11          | 0.260                        | 320                                       | ERF1EM101D11---T |
|          | 100      | 6.3×11        | 0.140                        | 455                                       | ERF1EM101E11---T |
|          | 220      | 6.3×11        | 0.150                        | 455                                       | ERF1EM221E11---T |
|          | 220      | 8×12          | 0.071                        | 810                                       | ERF1EM221F12---T |
|          | 330      | 8×16          | 0.055                        | 1,045                                     | ERF1EM331F16---T |
|          | 330      | 10×13         | 0.052                        | 1,080                                     | ERF1EM331G13---T |
|          | 390      | 8×20          | 0.044                        | 1,236                                     | ERF1EM391F20---T |
|          | 470      | 8×16          | 0.045                        | 1,120                                     | ERF1EM471F16---T |
|          | 470      | 10×16         | 0.037                        | 1,480                                     | ERF1EM471G16---T |
|          | 560      | 10×16         | 0.030                        | 1,675                                     | ERF1EM561G16---T |
|          | 680      | 8×16          | 0.050                        | 1,250                                     | ERF1EM681F16---T |
|          | 680      | 10×20         | 0.027                        | 1,870                                     | ERF1EM681G20---T |
|          | 820      | 10×16         | 0.030                        | 1,600                                     | ERF1EM821G16---T |
|          | 820      | 10×25         | 0.021                        | 2,200                                     | ERF1EM821G25---T |
| 35       | 1,000    | 10×20         | 0.045                        | 1,948                                     | ERF1EM102G20---T |
|          | 1,000    | 12.5×20       | 0.019                        | 2,550                                     | ERF1EM102W20---T |
|          | 1,500    | 12.5×20       | 0.040                        | 2,720                                     | ERF1EM152W20---T |
|          | 1,500    | 12.5×25       | 0.017                        | 2,820                                     | ERF1EM152W25---T |
|          | 2,200    | 12.5×25       | 0.027                        | 2,820                                     | ERF1EM222W25---T |
|          | 2,700    | 16×25         | 0.015                        | 3,510                                     | ERF1EM272L25---T |
|          | 33       | 5×11          | 0.570                        | 300                                       | ERF1VM330D11---T |
|          | 100      | 6.3×12        | 0.450                        | 440                                       | ERF1VM101E12---T |
|          | 100      | 8×11          | 0.200                        | 632                                       | ERF1VM101F11---T |
|          | 220      | 8×12          | 0.100                        | 810                                       | ERF1VM221F12---T |
|          | 220      | 10×9          | 0.120                        | 720                                       | ERF1VM221G09---T |
|          | 330      | 10×16         | 0.037                        | 1,480                                     | ERF1VM331G16---T |
|          | 470      | 10×16         | 0.055                        | 1,526                                     | ERF1VM471G16---T |
|          | 680      | 12.5×20       | 0.020                        | 2,410                                     | ERF1VM681W20---T |
|          | 1,000    | 12.5×25       | 0.017                        | 2,820                                     | ERF1VM102W25---T |
| 1,200    | 12.5×30  | 0.015         | 3,340                        | ERF1VM122W30---T                          |                  |
| 1,200    | 16×20    | 0.017         | 3,190                        | ERF1VM122L20---T                          |                  |
| 1,500    | 12.5×35  | 0.014         | 3,450                        | ERF1VM152W35---T                          |                  |
| 50       | 22       | 5×11          | 0.540                        | 288                                       | ERF1HM220D11---T |
|          | 56       | 6.3×12        | 0.300                        | 435                                       | ERF1HM560E12---T |
|          | 100      | 8×12          | 0.160                        | 774                                       | ERF1HM101F12---T |
|          | 120      | 8×16          | 0.130                        | 1,000                                     | ERF1HM121F16---T |
|          | 150      | 10×13         | 0.110                        | 1,029                                     | ERF1HM151G13---T |
|          | 180      | 8×20          | 0.085                        | 1,240                                     | ERF1HM181F20---T |
| 220      | 10×13    | 0.110         | 1,029                        | ERF1HM221G13---T                          |                  |

RF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|--|------------------|
| 50       | 220      | 10×16         | 0.055                        | 1,420  | ERF1HM221G16---T |
|          | 270      | 10×13         | 0.120                        | 1,020  | ERF1HM271G13---T |
|          | 270      | 10×20         | 0.053                        | 1,630  | ERF1HM271G20---T |
|          | 330      | 10×16         | 0.045                        | 1,450  | ERF1HM331G16---T |
|          | 470      | 10×20         | 0.036                        | 1,500  | ERF1HM471G20---T |
|          | 470      | 12.5×20       | 0.026                        | 2,100  | ERF1HM471W20---T |
|          | 560      | 12.5×20       | 0.035                        | 2,150  | ERF1HM561W20---T |
|          | 560      | 12.5×25       | 0.022                        | 2,460  | ERF1HM561W25---T |
|          | 680      | 12.5×20       | 0.040                        | 2,100  | ERF1HM681W20---T |
|          | 680      | 12.5×30       | 0.020                        | 2,910  | ERF1HM681W30---T |
|          | 820      | 13×20         | 0.040                        | 2,100  | ERF1HM821K20---T |
|          | 820      | 16×20         | 0.022                        | 2,780  | ERF1HM821L20---T |
|          | 1,000    | 16×25         | 0.020                        | 3,060  | ERF1HM102L25---T |
| 63       | 33       | 6.3×11        | 0.950                        | 265  | ERF1JM330E11---T |
|          | 47       | 6.3×12        | 0.800                        | 500  | ERF1JM470E12---T |
|          | 82       | 8×12          | 0.480                        | 600  | ERF1JM820F12---T |
|          | 82       | 10×13         | 0.420                        | 690  | ERF1JM820G13---T |
|          | 100      | 8×12          | 0.500                        | 580  | ERF1JM101F12---T |
|          | 100      | 10×13         | 0.300                        | 720  | ERF1JM101G13---T |
|          | 120      | 8×16          | 0.350                        | 650  | ERF1JM121F16---T |
|          | 150      | 10×13         | 0.300                        | 720  | ERF1JM151G13---T |
|          | 180      | 12.5×13       | 0.130                        | 900  | ERF1JM181W13---T |
|          | 220      | 10×16         | 0.160                        | 800  | ERF1JM221G16---T |
|          | 330      | 10×20         | 0.160                        | 800  | ERF1JM331G20---T |
|          | 470      | 13×20         | 0.100                        | 880  | ERF1JM471K20---T |
|          | 560      | 13×20         | 0.086                        | 1,180  | ERF1JM561K20---T |
|          | 680      | 16×20         | 0.085                        | 1,250  | ERF1JM681L20---T |
|          | 820      | 16×25         | 0.057                        | 1,570  | ERF1JM821L25---T |
|          | 1,000    | 16×25         | 0.045                        | 1,800  | ERF1JM102L25---T |
| 1,000    | 18×20    | 0.050         | 1,780                        | ERF1JM102M20---T                                       |                  |
| 1,500    | 18×30    | 0.036         | 2,150                        | ERF1JM152M30---T                                       |                  |
| 1,800    | 18×40    | 0.032         | 2,280                        | ERF1JM182M40---T                                       |                  |
| 80       | 150      | 10×16         | 0.240                        | 600  | ERF1BM151G16---T |
|          | 220      | 10×20         | 0.150                        | 680  | ERF1BM221G20---T |
|          | 330      | 12.5×20       | 0.120                        | 750  | ERF1BM331W20---T |
|          | 470      | 16×20         | 0.080                        | 1,150  | ERF1BM471L20---T |
|          | 680      | 16×25         | 0.075                        | 1,600  | ERF1BM681L25---T |
|          | 680      | 18×25         | 0.036                        | 1,750  | ERF1BM681M25---T |
|          | 1,000    | 16×40         | 0.029                        | 2,200  | ERF1BM102L40---T |
| 1,000    | 18×35    | 0.027         | 2,200                        | ERF1BM102M35---T                                       |                  |
| 100      | 6.8      | 5×11          | 1.400                        | 125  | ERF1KM6R8D11---T |
|          | 6.8      | 6.3×9         | 1.800                        | 110  | ERF1KM6R8E09---T |

RF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|--|------------------|
| 100      | 22       | 6.3×12        | 0.570                        | 385  | ERF1KM220E12---T |
|          | 27       | 10×9          | 0.470                        | 320  | ERF1KM270G09---T |
|          | 39       | 8×16          | 0.360                        | 450  | ERF1KM390F16---T |
|          | 47       | 10×13         | 0.320                        | 480  | ERF1KM470G13---T |
|          | 56       | 8×20          | 0.260                        | 565  | ERF1KM560F20---T |
|          | 68       | 10×16         | 0.220                        | 600  | ERF1KM680G16---T |
|          | 100      | 10×16         | 0.200                        | 750  | ERF1KM101G16---T |
|          | 150      | 10×20         | 0.170                        | 850  | ERF1KM151G20---T |
|          | 220      | 13×20         | 0.150                        | 860  | ERF1KM221K20---T |
|          | 330      | 12.5×25       | 0.100                        | 1,000  | ERF1KM331W25---T |
|          | 330      | 16×20         | 0.070                        | 1,350  | ERF1KM331L20---T |
|          | 470      | 16×25         | 0.055                        | 1,640  | ERF1KM471L25---T |
|          | 560      | 18×25         | 0.050                        | 1,800  | ERF1KM561M25---T |
|          | 680      | 16×40         | 0.034                        | 2,200  | ERF1KM681L40---T |
|          | 680      | 18×35         | 0.034                        | 2,200  | ERF1KM681M35---T |
|          | 820      | 18×40         | 0.032                        | 2,700  | ERF1KM821M40---T |
| 120      | 10       | 6.3×11        | 5.500                        | 80   | ERF2BM100E11---T |
|          | 22       | 8×12          | 3.500                        | 130  | ERF2BM220F12---T |
|          | 33       | 8×16          | 3.000                        | 220  | ERF2BM330F16---T |
|          | 33       | 10×13         | 3.000                        | 220  | ERF2BM330G13---T |
|          | 47       | 10×16         | 2.500                        | 270  | ERF2BM470G16---T |
|          | 56       | 10×16         | 2.200                        | 285  | ERF2BM560G16---T |
|          | 68       | 10×16         | 2.000                        | 285  | ERF2BM680G16---T |
|          | 82       | 10×20         | 1.800                        | 300  | ERF2BM820G20---T |
|          | 100      | 10×25         | 1.500                        | 380  | ERF2BM101G25---T |
|          | 120      | 13×20         | 1.300                        | 520  | ERF2BM121K20---T |
|          | 150      | 12.5×25       | 1.000                        | 570  | ERF2BM151W25---T |
|          | 220      | 12.5×30       | 0.750                        | 700  | ERF2BM221W30---T |
|          | 220      | 16×20         | 0.750                        | 700  | ERF2BM221L20---T |
|          | 270      | 16×25         | 0.550                        | 800  | ERF2BM271L25---T |
|          | 270      | 18×20         | 0.550                        | 800  | ERF2BM271M20---T |
|          | 330      | 16×30         | 0.420                        | 860  | ERF2BM331L30---T |
| 330      | 18×25    | 0.420         | 860                          | ERF2BM331M25---T                                       |                  |
| 470      | 16×40    | 0.300         | 960                          | ERF2BM471L40---T                                       |                  |
| 470      | 18×30    | 0.300         | 960                          | ERF2BM471M30---T                                       |                  |

※Specifications subject to change without notice

RS series

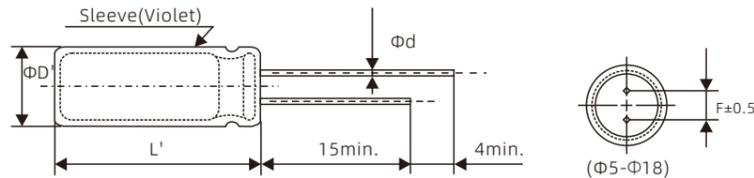
- Endurance: 4,000~ 10,000 hours at 105°C
- Low impedance, high ripple current, long life
- High performance, high reliability
- RoHS Compliant



SPECIFICATIONS

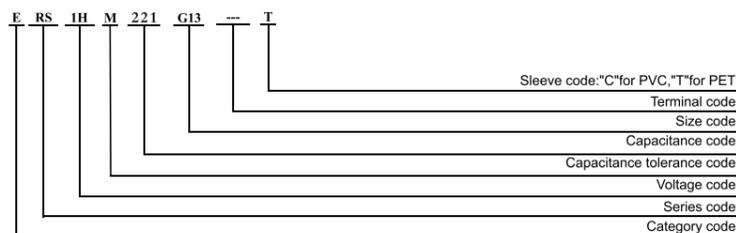
| Items  | Characteristics  |  |      |      |      |      |      |      |      |          |           |                   |  |
|--|--|--|------|------|------|------|------|------|------|----------|-----------|-------------------|--|
| Category Temperature Range                             | -40~+105°C   |  |      |      |      |      |      |      |      |          |           |                   |  |
| Rated Voltage Range                                    | 6.3~120Vdc   |  |      |      |      |      |      |      |      |          |           |                   |  |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |  |      |      |      |      |      |      |      |          |           |                   |  |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                            |  |      |      |      |      |      |      |      |          |           |                   |  |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)  | 6.3  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100      | 120       | (at 20°C, 120Hz)  |  |
|  | Dissipation Factor (Max.)  | 0.22   | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | 0.08     | 0.12      |                   |  |
|  | When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μF increase.   |  |      |      |      |      |      |      |      |          |           |                   |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  | 6.3  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100      | 120       | (120Hz)           |  |
|  | Z(-25°C)/Z(+20°C)  | 4  | 3    |      |      |      |      |      |      | 3        |           |                   |  |
|  | Z(-40°C)/Z(+20°C)  | 8  | 6    | 4    |      |      |      |      |      |          | 6         |                   |  |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105°C. |  |      |      |      |      |      |      |      |          | Case Dia. | Life time (hours) |  |
|  | Capacitance Change   | ≤±20% of the initial value(6.3V, 10V: ≤±30%) |      |      |      |      |      |      |      | ∅D≤6.3   | 4,000     | 5,000             |  |
|  | Dissipation Factor   | ≤200% of the initial specified value         |      |      |      |      |      |      |      | ∅D=8&10  | 6,000     | 7,000             |  |
|  | Leakage Current  | ≤The initial specified value                 |      |      |      |      |      |      |      | ∅D≥ 12.5 | 8,000     | 10,000            |  |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.  |  |      |      |      |      |      |      |      |          |           |                   |  |
|  | Capacitance Change   | ≤±20% of the initial value(6.3V, 10V: ≤±30%) |      |      |      |      |      |      |      |          |           |                   |  |
|  | Dissipation Factor   | ≤200% of the initial specified value         |      |      |      |      |      |      |      |          |           |                   |  |
|  | Leakage Current  | ≤200% of the initial specified value         |      |      |      |      |      |      |      |          |           |                   |  |

DIMENSIONS [mm]



| ∅D  | 5          | 6.3 | 8   | 10  | 12.5 | 13  | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|-----|
| ∅d  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 5.0 | 7.5 | 7.5 |
| ∅D' | ∅D+0.5max. |     |     |     |      |     |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)         | Freq. (Hz) | 120  | 1K   | 10K  | 100K |
|-------------------|------------|------|------|------|------|
| Cap. <220         |            | 0.40 | 0.75 | 0.90 | 1.00 |
| 220≤Cap. <680     |            | 0.50 | 0.85 | 0.94 | 1.00 |
| 680≤Cap. <2,200   |            | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200≤Cap. <4,700 |            | 0.75 | 0.90 | 0.95 | 1.00 |
| Cap. ≥4,700       |            | 0.85 | 0.95 | 0.98 | 1.00 |

RS series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ∅D×L(mm) | Impeance (Ωmax/20°C, 100kHz) | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 6.3      | 150      | 5×11          | 0.570                        | 200   | ERS0JM151D11---T |
|          | 220      | 6.3×9         | 0.480                        | 220   | ERS0JM221E09---T |
|          | 330      | 6.3×11        | 0.210                        | 350   | ERS0JM331E11---T |
|          | 470      | 6.3×12        | 0.150                        | 350   | ERS0JM471E12---T |
|          | 680      | 8×12          | 0.130                        | 660   | ERS0JM681F12---T |
|          | 820      | 10×13         | 0.080                        | 870   | ERS0JM821G13---T |
|          | 1,000    | 8×16          | 0.086                        | 850   | ERS0JM102F16---T |
|          | 1,500    | 10×20         | 0.046                        | 1,400                                       | ERS0JM152G20---T |
|          | 1,800    | 12.5×16       | 0.049                        | 1,450                                       | ERS0JM182W16---T |
|          | 2,200    | 10×20         | 0.042                        | 1,650                                       | ERS0JM222G20---T |
|          | 3,300    | 10×25         | 0.038                        | 1,800                                       | ERS0JM332G25---T |
|          | 3,300    | 12.5×20       | 0.035                        | 1,910                                       | ERS0JM332W20---T |
|          | 3,900    | 12.5×25       | 0.026                        | 2,230                                       | ERS0JM392W25---T |
|          | 4,700    | 12.5×30       | 0.024                        | 2,650                                       | ERS0JM472W30---T |
|          | 5,600    | 12.5×35       | 0.020                        | 2,880                                       | ERS0JM562W35---T |
|          | 5,600    | 16×20         | 0.027                        | 2,530                                       | ERS0JM562L20---T |
|          | 6,800    | 12.5×40       | 0.017                        | 3,350                                       | ERS0JM682W40---T |
|          | 6,800    | 16×25         | 0.020                        | 2,930                                       | ERS0JM682L25---T |
|          | 6,800    | 18×20         | 0.026                        | 2,860                                       | ERS0JM682M20---T |
|          | 8,200    | 16×30         | 0.017                        | 3,450                                       | ERS0JM822L30---T |
|          | 10,000   | 16×35         | 0.015                        | 3,610                                       | ERS0JM103L35---T |
|          | 10,000   | 18×25         | 0.019                        | 3,140                                       | ERS0JM103M25---T |
|          | 12,000   | 16×40         | 0.013                        | 4,100                                       | ERS0JM123L40---T |
|          | 12,000   | 18×30         | 0.015                        | 4,170                                       | ERS0JM123M30---T |
| 15,000   | 18×35    | 0.014         | 4,220                        | ERS0JM153M35---T                            |                  |
| 18,000   | 18×40    | 0.012         | 4,300                        | ERS0JM183M40---T                            |                  |
| 10       | 100      | 5×11          | 0.570                        | 200   | ERS1AM101D11---T |
|          | 220      | 6.3×11        | 0.210                        | 350   | ERS1AM221E11---T |
|          | 330      | 6.3×12        | 0.190                        | 400   | ERS1AM331E12---T |
|          | 470      | 8×12          | 0.130                        | 660   | ERS1AM471F12---T |
|          | 680      | 8×16          | 0.086                        | 850   | ERS1AM681F16---T |
|          | 680      | 10×13         | 0.080                        | 870   | ERS1AM681G13---T |
|          | 1,000    | 8×20          | 0.069                        | 1,050                                       | ERS1AM102F20---T |
|          | 1,000    | 10×16         | 0.060                        | 1,230                                       | ERS1AM102G16---T |
|          | 1,200    | 10×20         | 0.046                        | 1,400                                       | ERS1AM122G20---T |
|          | 1,500    | 10×25         | 0.042                        | 1,650                                       | ERS1AM152G25---T |
|          | 1,500    | 12.5×16       | 0.049                        | 1,450                                       | ERS1AM152W16---T |
|          | 2,200    | 10×25         | 0.040                        | 1,640                                       | ERS1AM222G25---T |
|          | 2,200    | 12.5×20       | 0.035                        | 1,910                                       | ERS1AM222W20---T |
|          | 2,200    | 16×15         | 0.041                        | 1,950                                       | ERS1AM222L15---T |
|          | 3,300    | 12.5×25       | 0.031                        | 2,230                                       | ERS1AM332W25---T |
|          | 3,900    | 12.5×30       | 0.029                        | 2,650                                       | ERS1AM392W30---T |

Radial Type

RS series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 10       | 3,900    | 16×20         | 0.027                        | 2,530                                     | ERS1AM392L20---T |
|          | 4,700    | 12.5×35       | 0.020                        | 2,880                                     | ERS1AM472W35---T |
|          | 5,600    | 12.5×40       | 0.017                        | 3,350                                     | ERS1AM562W40---T |
|          | 5,600    | 16×25         | 0.021                        | 2,930                                     | ERS1AM562L25---T |
|          | 5,600    | 18×20         | 0.026                        | 2,860                                     | ERS1AM562M20---T |
|          | 6,800    | 16×30         | 0.017                        | 3,450                                     | ERS1AM682L30---T |
|          | 6,800    | 18×25         | 0.019                        | 3,140                                     | ERS1AM682M25---T |
|          | 8,200    | 16×35         | 0.015                        | 3,610                                     | ERS1AM822L35---T |
|          | 8,200    | 18×30         | 0.015                        | 4,170                                     | ERS1AM822M30---T |
|          | 10,000   | 16×40         | 0.013                        | 4,100                                     | ERS1AM103L40---T |
|          | 10,000   | 18×35         | 0.014                        | 4,220                                     | ERS1AM103M35---T |
|          | 12,000   | 18×40         | 0.012                        | 4,300                                     | ERS1AM123M40---T |
| 16       | 56       | 5×11          | 0.570                        | 200                                       | ERS1CM560D11---T |
|          | 100      | 5×11          | 0.550                        | 272                                       | ERS1CM101D11---T |
|          | 120      | 6.3×11        | 0.210                        | 350                                       | ERS1CM121E11---T |
|          | 220      | 6.3×11        | 0.140                        | 450                                       | ERS1CM221E11---T |
|          | 330      | 8×12          | 0.130                        | 660                                       | ERS1CM331F12---T |
|          | 470      | 8×12          | 0.130                        | 800                                       | ERS1CM471F12---T |
|          | 470      | 8×16          | 0.087                        | 850                                       | ERS1CM471F16---T |
|          | 470      | 10×13         | 0.080                        | 870                                       | ERS1CM471G13---T |
|          | 680      | 8×16          | 0.100                        | 976                                       | ERS1CM681F16---T |
|          | 680      | 10×16         | 0.060                        | 1,230                                     | ERS1CM681G16---T |
|          | 1,000    | 10×16         | 0.075                        | 1,269                                     | ERS1CM102G16---T |
|          | 1,000    | 10×20         | 0.046                        | 1,400                                     | ERS1CM102G20---T |
|          | 1,200    | 10×25         | 0.042                        | 1,650                                     | ERS1CM122G25---T |
|          | 1,500    | 12.5×20       | 0.035                        | 1,910                                     | ERS1CM152W20---T |
|          | 2,200    | 12.5×20       | 0.031                        | 1,720                                     | ERS1CM222W20---T |
|          | 3,300    | 12.5×35       | 0.024                        | 2,880                                     | ERS1CM332W35---T |
|          | 3,900    | 12.5×40       | 0.021                        | 3,350                                     | ERS1CM392W40---T |
|          | 3,900    | 16×25         | 0.021                        | 2,930                                     | ERS1CM392L25---T |
|          | 3,900    | 18×20         | 0.026                        | 2,860                                     | ERS1CM392M20---T |
|          | 4,700    | 16×30         | 0.017                        | 3,450                                     | ERS1CM472L30---T |
| 4,700    | 18×25    | 0.019         | 3,140                        | ERS1CM472M25---T                          |                  |
| 5,600    | 16×35    | 0.015         | 3,610                        | ERS1CM562L35---T                          |                  |
| 5,600    | 18×30    | 0.015         | 4,170                        | ERS1CM562M30---T                          |                  |
| 6,800    | 16×40    | 0.013         | 4,100                        | ERS1CM682L40---T                          |                  |
| 8,200    | 18×35    | 0.014         | 4,220                        | ERS1CM822M35---T                          |                  |
| 10,000   | 18×40    | 0.012         | 4,300                        | ERS1CM103M40---T                          |                  |
| 25       | 47       | 5×11          | 0.570                        | 200                                       | ERS1EM470D11---T |
|          | 47       | 6.3×9         | 0.740                        | 180                                       | ERS1EM470E09---T |
|          | 100      | 6.3×11        | 0.210                        | 350                                       | ERS1EM101E11---T |
|          | 220      | 8×12          | 0.130                        | 660                                       | ERS1EM221F12---T |

RS series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 25       | 330      | 8×12          | 0.100                        | 700                                       | ERS1EM331F12---T |
|          | 330      | 8×16          | 0.086                        | 850                                       | ERS1EM331F16---T |
|          | 330      | 10×13         | 0.080                        | 870                                       | ERS1EM331G13---T |
|          | 470      | 8×16          | 0.075                        | 950                                       | ERS1EM471F16---T |
|          | 470      | 8×20          | 0.069                        | 1,050                                     | ERS1EM471F20---T |
|          | 470      | 10×16         | 0.060                        | 1,230                                     | ERS1EM471G16---T |
|          | 680      | 10×20         | 0.046                        | 1,400                                     | ERS1EM681G20---T |
|          | 680      | 12.5×16       | 0.049                        | 1,450                                     | ERS1EM681W16---T |
|          | 820      | 10×25         | 0.042                        | 1,650                                     | ERS1EM821G25---T |
|          | 1,000    | 10×30         | 0.035                        | 1,920                                     | ERS1EM102G30---T |
|          | 1,000    | 12.5×20       | 0.035                        | 1,910                                     | ERS1EM102W20---T |
|          | 1,500    | 12.5×25       | 0.032                        | 2,230                                     | ERS1EM152W25---T |
|          | 2,200    | 12.5×25       | 0.030                        | 2,230                                     | ERS1EM222W25---T |
|          | 2,200    | 18×20         | 0.026                        | 2,860                                     | ERS1EM222M20---T |
|          | 3,300    | 16×30         | 0.017                        | 3,450                                     | ERS1EM332L30---T |
|          | 3,300    | 18×25         | 0.019                        | 3,140                                     | ERS1EM332M25---T |
|          | 4,700    | 16×40         | 0.013                        | 4,100                                     | ERS1EM472L40---T |
|          | 4,700    | 18×35         | 0.014                        | 4,220                                     | ERS1EM472M35---T |
| 5,600    | 18×40    | 0.012         | 4,300                        | ERS1EM562M40---T                          |                  |
| 35       | 33       | 5×11          | 0.570                        | 200                                       | ERS1VM330D11---T |
|          | 33       | 6.3×9         | 0.740                        | 180                                       | ERS1VM330E09---T |
|          | 56       | 6.3×11        | 0.210                        | 350                                       | ERS1VM560E11---T |
|          | 100      | 6.3×12        | 0.250                        | 400                                       | ERS1VM101E12---T |
|          | 150      | 8×9           | 0.170                        | 560                                       | ERS1VM151F09---T |
|          | 150      | 8×12          | 0.130                        | 660                                       | ERS1VM151F12---T |
|          | 220      | 8×12          | 0.100                        | 660                                       | ERS1VM221F12---T |
|          | 220      | 8×16          | 0.086                        | 850                                       | ERS1VM221F16---T |
|          | 220      | 10×13         | 0.080                        | 870                                       | ERS1VM221G13---T |
|          | 330      | 10×16         | 0.060                        | 1,230                                     | ERS1VM331G16---T |
|          | 470      | 10×20         | 0.046                        | 1,400                                     | ERS1VM471G20---T |
|          | 560      | 10×20         | 0.060                        | 1,400                                     | ERS1VM561G20---T |
|          | 560      | 10×25         | 0.042                        | 1,650                                     | ERS1VM561G25---T |
|          | 680      | 10×20         | 0.042                        | 1,700                                     | ERS1VM681G20---T |
|          | 680      | 12.5×20       | 0.035                        | 1,910                                     | ERS1VM681W20---T |
|          | 1,000    | 12.5×20       | 0.030                        | 2,210                                     | ERS1VM102W20---T |
|          | 1,200    | 12.5×25       | 0.032                        | 2,200                                     | ERS1VM122W25---T |
|          | 1,200    | 16×20         | 0.028                        | 2,247                                     | ERS1VM122L20---T |
|          | 1,500    | 12.5×25       | 0.032                        | 2,250                                     | ERS1VM152W25---T |
|          | 1,500    | 13×20         | 0.035                        | 2,050                                     | ERS1VM152K20---T |
| 1,800    | 16×20    | 0.030         | 2,930                        | ERS1VM182L20---T                          |                  |
| 2,200    | 16×25    | 0.030         | 2,980                        | ERS1VM222L25---T                          |                  |
| 2,200    | 16×30    | 0.022         | 3,450                        | ERS1VM222L30---T                          |                  |

RS series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 35       | 2,200    | 18×25         | 0.019                        | 3,140                                     | ERS1VM222M25---T |
|          | 2,700    | 16×25         | 0.030                        | 3,410                                     | ERS1VM272L25---T |
|          | 2,700    | 16×35         | 0.015                        | 3,610                                     | ERS1VM272L35---T |
|          | 3,300    | 16×40         | 0.012                        | 4,100                                     | ERS1VM332L40---T |
|          | 3,300    | 18×35         | 0.014                        | 4,220                                     | ERS1VM332M35---T |
|          | 3,900    | 18×40         | 0.011                        | 4,300                                     | ERS1VM392M40---T |
| 50       | 22       | 5×12          | 0.680                        | 190                                       | ERS1HM220D12---T |
|          | 22       | 6.3×9         | 0.890                        | 170                                       | ERS1HM220E09---T |
|          | 47       | 6.3×11        | 0.350                        | 260                                       | ERS1HM470E11---T |
|          | 56       | 6.3×11        | 0.300                        | 300                                       | ERS1HM560E11---T |
|          | 100      | 8×12          | 0.170                        | 560                                       | ERS1HM101F12---T |
|          | 100      | 10×9          | 0.220                        | 500                                       | ERS1HM101G09---T |
|          | 150      | 8×12          | 0.180                        | 560                                       | ERS1HM151F12---T |
|          | 150      | 10×13         | 0.120                        | 760                                       | ERS1HM151G13---T |
|          | 180      | 8×20          | 0.090                        | 910                                       | ERS1HM181F20---T |
|          | 220      | 10×13         | 0.120                        | 760                                       | ERS1HM221G13---T |
|          | 220      | 10×16         | 0.084                        | 1,050                                     | ERS1HM221G16---T |
|          | 270      | 10×13         | 0.150                        | 650                                       | ERS1HM271G13---T |
|          | 330      | 10×16         | 0.065                        | 1,150                                     | ERS1HM331G16---T |
|          | 470      | 10×20         | 0.055                        | 1,500                                     | ERS1HM471G20---T |
|          | 470      | 12.5×20       | 0.045                        | 1,660                                     | ERS1HM471W20---T |
|          | 470      | 16×15         | 0.055                        | 1,690                                     | ERS1HM471L15---T |
|          | 560      | 12.5×16       | 0.060                        | 1,520                                     | ERS1HM561W16---T |
|          | 560      | 12.5×25       | 0.034                        | 1,960                                     | ERS1HM561W25---T |
|          | 680      | 12.5×20       | 0.045                        | 1,720                                     | ERS1HM681W20---T |
|          | 680      | 12.5×25       | 0.035                        | 2,022                                     | ERS1HM681W25---T |
|          | 820      | 12.5×20       | 0.045                        | 1,800                                     | ERS1HM821W20---T |
|          | 820      | 12.5×25       | 0.035                        | 2,030                                     | ERS1HM821W25---T |
|          | 820      | 16×20         | 0.034                        | 2,210                                     | ERS1HM821L20---T |
|          | 1,000    | 12.5×25       | 0.035                        | 2,030                                     | ERS1HM102W25---T |
| 1,000    | 16×25    | 0.025         | 2,560                        | ERS1HM102L25---T                          |                  |
| 1,200    | 16×25    | 0.032         | 2,600                        | ERS1HM122L25---T                          |                  |
| 1,200    | 18×20    | 0.036         | 2,490                        | ERS1HM122M20---T                          |                  |
| 1,500    | 18×25    | 0.028         | 2,740                        | ERS1HM152M25---T                          |                  |
| 1,800    | 16×40    | 0.016         | 3,710                        | ERS1HM182L40---T                          |                  |
| 1,800    | 18×30    | 0.021         | 3,640                        | ERS1HM182M30---T                          |                  |
| 2,200    | 18×35    | 0.017         | 3,680                        | ERS1HM222M35---T                          |                  |
| 2,700    | 18×40    | 0.014         | 3,800                        | ERS1HM272M40---T                          |                  |
| 63       | 15       | 5×11          | 1.800                        | 165                                       | ERS1JM150D11---T |
|          | 15       | 6.3×9         | 1.150                        | 145                                       | ERS1JM150E09---T |
|          | 33       | 6.3×12        | 1.000                        | 265                                       | ERS1JM330E12---T |
|          | 47       | 6.3×12        | 0.800                        | 300                                       | ERS1JM470E12---T |

RS series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 63       | 56       | 8×12          | 0.500                        | 500                                       | ERS1JM560F12---T |
|          | 100      | 8×12          | 0.450                        | 550                                       | ERS1JM101F12---T |
|          | 100      | 10×13         | 0.350                        | 580                                       | ERS1JM101G13---T |
|          | 120      | 10×13         | 0.330                        | 600                                       | ERS1JM121G13---T |
|          | 180      | 10×16         | 0.310                        | 650                                       | ERS1JM181G16---T |
|          | 220      | 10×16         | 0.160                        | 680                                       | ERS1JM221G16---T |
|          | 220      | 10×20         | 0.160                        | 700                                       | ERS1JM221G20---T |
|          | 330      | 12.5×20       | 0.096                        | 1,500                                     | ERS1JM331W20---T |
|          | 390      | 12.5×25       | 0.090                        | 1,900                                     | ERS1JM391W25---T |
|          | 470      | 12.5×25       | 0.088                        | 1,950                                     | ERS1JM471W25---T |
|          | 470      | 16×20         | 0.080                        | 2,000                                     | ERS1JM471L20---T |
|          | 560      | 12.5×30       | 0.077                        | 2,060                                     | ERS1JM561W30---T |
|          | 680      | 12.5×30       | 0.077                        | 2,060                                     | ERS1JM681W30---T |
|          | 680      | 16×20         | 0.070                        | 2,150                                     | ERS1JM681L20---T |
|          | 820      | 18×20         | 0.065                        | 2,300                                     | ERS1JM821M20---T |
|          | 1,000    | 18×25         | 0.042                        | 2,900                                     | ERS1JM102M25---T |
|          | 1,200    | 16×40         | 0.028                        | 3,400                                     | ERS1JM122L40---T |
|          | 1,200    | 18×30         | 0.036                        | 3,300                                     | ERS1JM122M30---T |
| 1,500    | 18×35    | 0.032         | 3,400                        | ERS1JM152M35---T                          |                  |
| 1,800    | 18×40    | 0.030         | 3,500                        | ERS1JM182M40---T                          |                  |
| 80       | 68       | 8×12          | 0.400                        | 340                                       | ERS1BM680F12---T |
|          | 100      | 8×16          | 0.270                        | 460                                       | ERS1BM101F16---T |
|          | 100      | 10×13         | 0.250                        | 490                                       | ERS1BM101G13---T |
|          | 120      | 10×13         | 0.220                        | 520                                       | ERS1BM121G13---T |
|          | 150      | 10×16         | 0.210                        | 520                                       | ERS1BM151G16---T |
|          | 150      | 12.5×13       | 0.200                        | 580                                       | ERS1BM151W13---T |
|          | 220      | 10×20         | 0.130                        | 850                                       | ERS1BM221G20---T |
|          | 220      | 12.5×20       | 0.100                        | 1,100                                     | ERS1BM221W20---T |
|          | 330      | 12.5×20       | 0.090                        | 1,150                                     | ERS1BM331W20---T |
|          | 330      | 12.5×25       | 0.090                        | 1,250                                     | ERS1BM331W25---T |
|          | 470      | 12.5×25       | 0.072                        | 1,300                                     | ERS1BM471W25---T |
|          | 470      | 16×20         | 0.070                        | 1,350                                     | ERS1BM471L20---T |
|          | 680      | 16×25         | 0.068                        | 1,600                                     | ERS1BM681L25---T |
|          | 820      | 18×25         | 0.060                        | 1,750                                     | ERS1BM821M25---T |
|          | 1,000    | 16×40         | 0.050                        | 2,200                                     | ERS1BM102L40---T |
|          | 1,000    | 18×35         | 0.050                        | 2,200                                     | ERS1BM102M35---T |
|          | 1,200    | 18×40         | 0.040                        | 2,700                                     | ERS1BM122M40---T |
|          | 100      | 6.8           | 5×11                         | 1.400                                     | 125              |
| 10       |          | 6.3×11        | 1.200                        | 140                                       | ERS1KM100E11---T |
| 22       |          | 6.3×12        | 0.900                        | 150                                       | ERS1KM220E12---T |
| 22       |          | 8×12          | 0.900                        | 197                                       | ERS1KM220F12---T |
| 27       |          | 8×12          | 0.630                        | 260                                       | ERS1KM270F12---T |

RS series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ØD×L(mm) | Impeance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA rms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|-----------------------------|--|------------------|
| 100      | 47       | 8×12          | 0.560                       | 300  | ERS1KM470F12---T |
|          | 47       | 10×13         | 0.340                       | 480  | ERS1KM470G13---T |
|          | 68       | 8×16          | 0.310                       | 500  | ERS1KM680F16---T |
|          | 68       | 10×13         | 0.320                       | 490  | ERS1KM680G13---T |
|          | 82       | 10×13         | 0.280                       | 525  | ERS1KM820G13---T |
|          | 82       | 10×16         | 0.180                       | 550  | ERS1KM820G16---T |
|          | 100      | 10×16         | 0.180                       | 550  | ERS1KM101G16---T |
|          | 100      | 10×20         | 0.170                       | 560  | ERS1KM101G20---T |
|          | 120      | 12.5×16       | 0.160                       | 700  | ERS1KM121W16---T |
|          | 150      | 10×20         | 0.160                       | 700  | ERS1KM151G20---T |
|          | 150      | 12.5×20       | 0.140                       | 895  | ERS1KM151W20---T |
|          | 220      | 12.5×25       | 0.080                       | 1,250                                      | ERS1KM221W25---T |
|          | 220      | 13×20         | 0.140                       | 895  | ERS1KM221K20---T |
|          | 270      | 12.5×30       | 0.070                       | 1,500                                      | ERS1KM271W30---T |
|          | 330      | 12.5×30       | 0.070                       | 1,500                                      | ERS1KM331W30---T |
|          | 330      | 16×20         | 0.068                       | 1,550                                      | ERS1KM331L20---T |
|          | 470      | 16×25         | 0.050                       | 1,640                                      | ERS1KM471L25---T |
|          | 680      | 16×35         | 0.042                       | 1,850                                      | ERS1KM681L35---T |
| 820      | 18×30    | 0.032         | 2,080                       | ERS1KM821M30---T                           |                  |
| 120      | 10       | 6.3×11        | 6.000                       | 85   | ERS2BM100E11---T |
|          | 15       | 6.3×12        | 5.000                       | 110  | ERS2BM150E12---T |
|          | 22       | 8×12          | 4.000                       | 140  | ERS2BM220F12---T |
|          | 33       | 8×16          | 3.500                       | 245  | ERS2BM330F16---T |
|          | 33       | 10×13         | 3.500                       | 245  | ERS2BM330G13---T |
|          | 47       | 8×20          | 2.800                       | 300  | ERS2BM470F20---T |
|          | 47       | 10×16         | 2.800                       | 315  | ERS2BM470G16---T |
|          | 56       | 10×16         | 2.500                       | 315  | ERS2BM560G16---T |
|          | 68       | 10×16         | 2.200                       | 315  | ERS2BM680G16---T |
|          | 82       | 10×20         | 2.000                       | 330  | ERS2BM820G20---T |
|          | 100      | 10×25         | 1.700                       | 410  | ERS2BM101G25---T |
|          | 120      | 12.5×20       | 1.500                       | 470  | ERS2BM121W20---T |
|          | 150      | 12.5×25       | 1.000                       | 620  | ERS2BM151W25---T |
|          | 220      | 12.5×30       | 0.850                       | 760  | ERS2BM221W30---T |
|          | 220      | 16×20         | 0.850                       | 760  | ERS2BM221L20---T |
|          | 270      | 16×25         | 0.600                       | 860  | ERS2BM271L25---T |
|          | 270      | 18×20         | 0.600                       | 860  | ERS2BM271M20---T |
|          | 330      | 16×30         | 0.460                       | 930  | ERS2BM331L30---T |
| 330      | 18×25    | 0.460         | 930                         | ERS2BM331M25---T                           |                  |
| 470      | 16×40    | 0.330         | 1,035                       | ERS2BM471L40---T                           |                  |
| 470      | 18×30    | 0.330         | 1,035                       | ERS2BM471M30---T                           |                  |

※Specifications subject to change without notice

RZ series

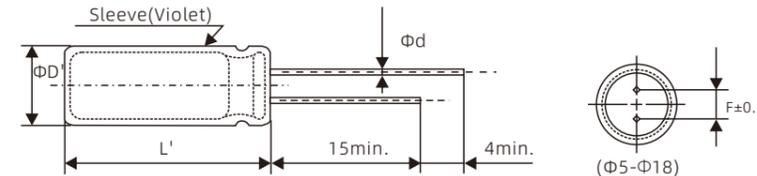
- Endurance: 6,000~10,000 hours at 105°C
- High ripple, high reliability
- Miniaturized, long life, low impedance
- RoHS Compliant



SPECIFICATIONS

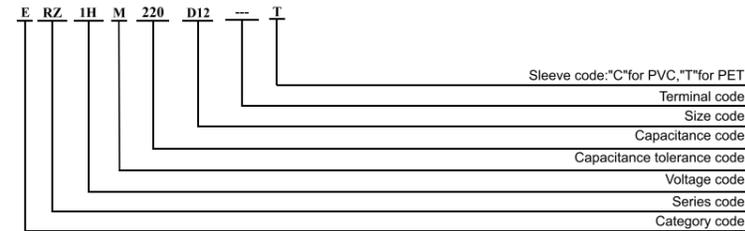
| Items  | Characteristics   |   |
|--|---|---|
| Category Temperature Range   | -40~+105°C  |   |
| Rated Working Voltage Range  | 6.3~50 Vdc  |   |
| Capacitance Tolerance  | ±20%(M) (at 20°C,120Hz)   |   |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater. (at 20°C after 2 minutes)<br>Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)                                       |   |
| Dissipation Factor (tanδ)  | Rated Voltage(Vdc)  | 6.3 10 16 25 35 50                            |
|  | tanδ (max.)   | 0.22 0.19 0.16 0.14 0.12 0.10                 |
| When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz) |   |   |
| Low Temperature Characteristics (Max.Impedance Ratio)  | Rated Voltage(Vdc)  | 6.3 10 16~50                                  |
|  | Z(-25°C)/Z(+20°C)   | 3   |
|  | Z(-40°C)/Z(+20°C)   | 6 4 3   |
| Endurance  | The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for the specified period of time at 105°C. |   |
|  | Capacitance Change  | ≤ ±25% of the initial value (6.3,10V: ≤ ±30%) |
|  | Dissipation Factor  | ≤ 200% of the initial specified value         |
|  | Leakage Current   | ≤ The initial specified value                 |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.                                |   |
|  | Capacitance Change  | ≤ ±25% of the initial value (6.3,10V: ≤ ±30%) |
|  | Dissipation Factor  | ≤ 200% of the initial specified value         |
|  | Leakage Current   | ≤ 200% of the initial specified value         |

DIMENSIONS [mm]



| ØD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| Ød  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| ØD' | ØD+0.5max. |     |     |     |      |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)         | Freq. (Hz) |      |      |      |
|-------------------|------------|------|------|------|
|                   | 120        | 1K   | 10K  | 100K |
| Cap. <220         | 0.40       | 0.75 | 0.90 | 1.00 |
| 220≤Cap. <680     | 0.50       | 0.85 | 0.94 | 1.00 |
| 680≤Cap. <2,200   | 0.60       | 0.87 | 0.95 | 1.00 |
| 2,200≤Cap. <4,700 | 0.75       | 0.90 | 0.95 | 1.00 |
| Cap. ≥4,700       | 0.85       | 0.95 | 0.98 | 1.00 |

RZ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impeance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|-----------------------------|---|------------------|
| 6.3      | 220      | 5×12          | 0.22                        | 345                                       | ERZ0JM221D12---T |
|          | 220      | 6.3×9         | 0.30                        | 310                                       | ERZ0JM221E09---T |
|          | 470      | 6.3×12        | 0.094                       | 540                                       | ERZ0JM471E12---T |
|          | 470      | 8×9           | 0.120                       | 485                                       | ERZ0JM471F09---T |
|          | 820      | 8×12          | 0.056                       | 945                                       | ERZ0JM821F12---T |
|          | 820      | 10×9          | 0.072                       | 850                                       | ERZ0JM821G09---T |
|          | 1,200    | 8×16          | 0.045                       | 1,250                                     | ERZ0JM122F16---T |
|          | 1,200    | 10×13         | 0.039                       | 1,330                                     | ERZ0JM122G13---T |
|          | 1,500    | 8×20          | 0.029                       | 1,500                                     | ERZ0JM152F20---T |
|          | 1,800    | 10×16         | 0.028                       | 1,760                                     | ERZ0JM182G16---T |
|          | 2,200    | 10×20         | 0.020                       | 1,960                                     | ERZ0JM222G20---T |
|          | 2,700    | 10×25         | 0.018                       | 2,250                                     | ERZ0JM272G25---T |
|          | 3,900    | 12.5×20       | 0.017                       | 2,480                                     | ERZ0JM392W20---T |
|          | 4,700    | 12.5×25       | 0.015                       | 2,900                                     | ERZ0JM472W25---T |
|          | 5,600    | 12.5×30       | 0.013                       | 3,450                                     | ERZ0JM562W30---T |
|          | 6,800    | 12.5×35       | 0.012                       | 3,570                                     | ERZ0JM682W35---T |
|          | 6,800    | 16×20         | 0.015                       | 3,250                                     | ERZ0JM682L20---T |
|          | 8,200    | 16×25         | 0.013                       | 3,630                                     | ERZ0JM822L25---T |
| 10,000   | 18×25    | 0.012         | 3,650                       | ERZ0JM103M25---T                          |                  |
| 10       | 150      | 5×12          | 0.22                        | 345                                       | ERZ1AM151D12---T |
|          | 150      | 6.3×9         | 0.30                        | 310                                       | ERZ1AM151E09---T |
|          | 330      | 6.3×12        | 0.094                       | 540                                       | ERZ1AM331E12---T |
|          | 330      | 8×9           | 0.120                       | 485                                       | ERZ1AM331F09---T |
|          | 680      | 8×11          | 0.056                       | 945                                       | ERZ1AM681F11---T |
|          | 680      | 10×9          | 0.072                       | 850                                       | ERZ1AM681G09---T |
|          | 1,000    | 8×16          | 0.045                       | 1,250                                     | ERZ1AM102F16---T |
|          | 1,000    | 10×13         | 0.039                       | 1,330                                     | ERZ1AM102G13---T |
|          | 1,500    | 8×20          | 0.029                       | 1,500                                     | ERZ1AM152F20---T |
|          | 1,500    | 10×16         | 0.028                       | 1,760                                     | ERZ1AM152G16---T |
|          | 1,800    | 10×20         | 0.024                       | 1,960                                     | ERZ1AM182G20---T |
|          | 2,200    | 10×25         | 0.021                       | 2,250                                     | ERZ1AM222G25---T |
|          | 3,300    | 12.5×20       | 0.020                       | 2,480                                     | ERZ1AM332W20---T |
|          | 3,900    | 12.5×25       | 0.018                       | 2,900                                     | ERZ1AM392W25---T |
|          | 4,700    | 12.5×30       | 0.018                       | 3,450                                     | ERZ1AM472W30---T |
|          | 4,700    | 16×20         | 0.020                       | 3,250                                     | ERZ1AM472L20---T |
|          | 5,600    | 12.5×35       | 0.017                       | 3,570                                     | ERZ1AM562W35---T |
|          | 6,800    | 16×25         | 0.018                       | 3,630                                     | ERZ1AM682L25---T |
| 8,200    | 18×25    | 0.017         | 3,650                       | ERZ1AM822M25---T                          |                  |
| 16       | 100      | 5×12          | 0.22                        | 345                                       | ERZ1CM101D12---T |
|          | 100      | 6.3×9         | 0.30                        | 310                                       | ERZ1CM101E09---T |
|          | 220      | 6.3×12        | 0.094                       | 540                                       | ERZ1CM221E12---T |
|          | 220      | 8×9           | 0.120                       | 485                                       | ERZ1CM221F09---T |

RZ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impeance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |                  |
|----------|----------|---------------|-----------------------------|---|------------------|------------------|
| 16       | 470      | 8×12          | 0.056                       | 945                                       | ERZ1CM471F12---T |                  |
|          | 470      | 10×9          | 0.072                       | 850                                       | ERZ1CM471G09---T |                  |
|          | 680      | 8×16          | 0.045                       | 1,250                                     | ERZ1CM681F16---T |                  |
|          | 680      | 10×13         | 0.039                       | 1,330                                     | ERZ1CM681G13---T |                  |
|          | 1,000    | 8×20          | 0.029                       | 1,500                                     | ERZ1CM102F20---T |                  |
|          | 1,000    | 10×16         | 0.028                       | 1,760                                     | ERZ1CM102G16---T |                  |
|          | 1,500    | 10×20         | 0.024                       | 1,960                                     | ERZ1CM152G20---T |                  |
|          | 1,800    | 10×25         | 0.021                       | 2,250                                     | ERZ1CM182G25---T |                  |
|          | 2,200    | 12.5×20       | 0.020                       | 2,480                                     | ERZ1CM222W20---T |                  |
|          | 2,700    | 12.5×25       | 0.018                       | 2,900                                     | ERZ1CM272W25---T |                  |
|          | 3,300    | 12.5×30       | 0.018                       | 3,450                                     | ERZ1CM332W30---T |                  |
|          | 3,300    | 16×20         | 0.020                       | 3,250                                     | ERZ1CM332L20---T |                  |
|          | 3,900    | 12.5×35       | 0.017                       | 3,570                                     | ERZ1CM392W35---T |                  |
|          | 4,700    | 16×25         | 0.018                       | 3,630                                     | ERZ1CM472L25---T |                  |
|          | 5,600    | 18×25         | 0.017                       | 3,650                                     | ERZ1CM562M25---T |                  |
|          | 25       | 68            | 5×12                        | 0.22                                      | 345              | ERZ1EM680D12---T |
|          |          | 68            | 6.3×9                       | 0.30                                      | 310              | ERZ1EM680E09---T |
|          |          | 150           | 6.3×12                      | 0.094                                     | 540              | ERZ1EM151E12---T |
| 150      |          | 8×9           | 0.120                       | 485                                       | ERZ1EM151F09---T |                  |
| 330      |          | 8×12          | 0.056                       | 945                                       | ERZ1EM331F12---T |                  |
| 330      |          | 10×9          | 0.072                       | 850                                       | ERZ1EM331G09---T |                  |
| 390      |          | 8×16          | 0.045                       | 1,250                                     | ERZ1EM391F16---T |                  |
| 470      |          | 10×13         | 0.039                       | 1,330                                     | ERZ1EM471G13---T |                  |
| 560      |          | 8×20          | 0.029                       | 1,500                                     | ERZ1EM561F20---T |                  |
| 680      |          | 10×16         | 0.028                       | 1,760                                     | ERZ1EM681G16---T |                  |
| 820      |          | 10×20         | 0.024                       | 1,960                                     | ERZ1EM821G20---T |                  |
| 1,000    |          | 10×25         | 0.021                       | 2,250                                     | ERZ1EM102G25---T |                  |
| 1,500    |          | 12.5×20       | 0.020                       | 2,480                                     | ERZ1EM152W20---T |                  |
| 1,800    |          | 12.5×25       | 0.020                       | 2,900                                     | ERZ1EM182W25---T |                  |
| 2,200    |          | 12.5×30       | 0.018                       | 3,450                                     | ERZ1EM222W30---T |                  |
| 2,200    |          | 16×20         | 0.020                       | 3,250                                     | ERZ1EM222L20---T |                  |
| 2,700    |          | 12.5×35       | 0.017                       | 3,570                                     | ERZ1EM272W35---T |                  |
| 3,300    |          | 16×25         | 0.018                       | 3,630                                     | ERZ1EM332L25---T |                  |
| 3,900    | 18×25    | 0.017         | 3,650                       | ERZ1EM392M25---T                          |                  |                  |
| 35       | 47       | 5×12          | 0.22                        | 345                                       | ERZ1VM470D12---T |                  |
|          | 47       | 6.3×9         | 0.30                        | 310                                       | ERZ1VM470E09---T |                  |
|          | 100      | 6.3×12        | 0.094                       | 540                                       | ERZ1VM101E12---T |                  |
|          | 100      | 8×9           | 0.120                       | 485                                       | ERZ1VM101F09---T |                  |
|          | 220      | 8×16          | 0.056                       | 945                                       | ERZ1VM221F16---T |                  |
|          | 270      | 8×20          | 0.045                       | 1,250                                     | ERZ1VM271F20---T |                  |
| 35       | 330      | 10×13         | 0.039                       | 1,330                                     | ERZ1VM331G13---T |                  |
|          | 390      | 8×20          | 0.029                       | 1,500                                     | ERZ1VM391F20---T |                  |

RZ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|--|------------------|
| 35       | 470      | 10×16         | 0.028                        | 1,760  | ERZ1VM471G16---T |
|          | 560      | 10×20         | 0.024                        | 1,960  | ERZ1VM561G20---T |
|          | 680      | 10×25         | 0.021                        | 2,250  | ERZ1VM681G25---T |
|          | 1,000    | 12.5×20       | 0.020                        | 2,480  | ERZ1VM102W20---T |
|          | 1,200    | 12.5×25       | 0.020                        | 2,900  | ERZ1VM122W25---T |
|          | 1,500    | 12.5×30       | 0.018                        | 3,450  | ERZ1VM152W30---T |
|          | 1,500    | 16×20         | 0.020                        | 3,250  | ERZ1VM152L20---T |
|          | 1,800    | 12.5×35       | 0.017                        | 3,570  | ERZ1VM182W35---T |
|          | 2,200    | 16×25         | 0.018                        | 3,630  | ERZ1VM222L25---T |
|          | 2,700    | 18×25         | 0.017                        | 3,650  | ERZ1VM272M25---T |
| 50       | 22       | 5×12          | 0.34                         | 238  | ERZ1HM220D12---T |
|          | 22       | 6.3×9         | 0.44                         | 214  | ERZ1HM220E09---T |
|          | 56       | 6.3×12        | 0.14                         | 385  | ERZ1HM560E12---T |
|          | 56       | 8×9           | 0.18                         | 345  | ERZ1HM560F09---T |
|          | 100      | 8×12          | 0.074                        | 724  | ERZ1HM101F12---T |
|          | 100      | 10×9          | 0.096                        | 650  | ERZ1HM101G09---T |
|          | 120      | 8×16          | 0.061                        | 950  | ERZ1HM121F16---T |
|          | 150      | 10×13         | 0.061                        | 979  | ERZ1HM151G13---T |
|          | 180      | 8×20          | 0.046                        | 1,190  | ERZ1HM181F20---T |
|          | 220      | 10×16         | 0.042                        | 1,370  | ERZ1HM221G16---T |
|          | 270      | 10×20         | 0.030                        | 1,580  | ERZ1HM271G20---T |
|          | 330      | 10×25         | 0.028                        | 1,870  | ERZ1HM331G25---T |
|          | 470      | 12.5×20       | 0.027                        | 2,050  | ERZ1HM471W20---T |
|          | 560      | 12.5×25       | 0.023                        | 2,410  | ERZ1HM561W25---T |
|          | 680      | 12.5×30       | 0.021                        | 2,860  | ERZ1HM681W30---T |
| 820      | 12.5×35  | 0.019         | 2,960                        | ERZ1HM821W35---T                                       |                  |
| 820      | 16×20    | 0.023         | 2,730                        | ERZ1HM821L20---T                                       |                  |
| 1,000    | 16×25    | 0.021         | 3,010                        | ERZ1HM102L25---T                                       |                  |
| 1,500    | 18×25    | 0.019         | 3,290                        | ERZ1HM152M25---T                                       |                  |

※Specifications subject to change without notice

RJ series

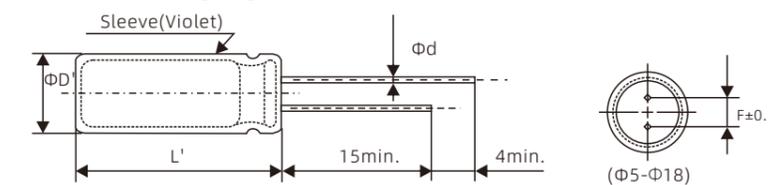


- Endurance: 8,000~ 12,000 hours at 105°C
- Low impedance, high ripple current, long life
- Miniaturized
- RoHS Compliant

SPECIFICATIONS

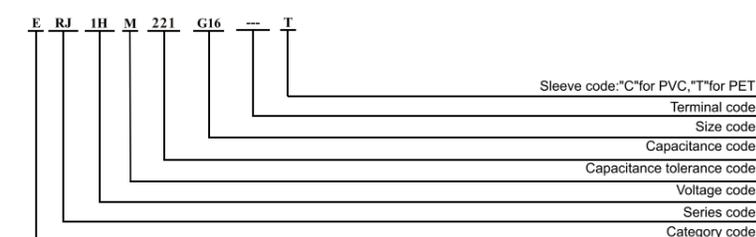
| Items  | Characteristics  |   |      |      |      |      |      |      |      |          |                   |
|--|--|---|------|------|------|------|------|------|------|----------|-------------------|
| Category Temperature Range   | -40~+105°C   |   |      |      |      |      |      |      |      |          |                   |
| Rated Voltage Range  | 10~120Vdc  |   |      |      |      |      |      |      |      |          |                   |
| Capacitance Tolerance  | ±20%(M) (at 20°C, 120Hz)   |   |      |      |      |      |      |      |      |          |                   |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                               |   |      |      |      |      |      |      |      |          |                   |
| Dissipation Factor (tanδ)  | Rated Voltage (Vdc)  | 10  | 16   | 25   | 35   | 50   | 63   | 80   | 100  | 120      | (at 20°C, 120Hz)  |
|  | Dissipation Factor(Max.)   | 0.19  | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.09 | 0.08 | 0.12     |                   |
| When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μF increase. |  |   |      |      |      |      |      |      |      |          |                   |
| Low Temperature Characteristics (Max. Impedance Ratio)   | Rated Voltage (Vdc)  | 10  | 16   | 25   | 35   | 50   | 63   | 80   | 100  | 120      | (120Hz)           |
|  | Z(-25°C)/ Z(+20°C)   | 2   |      |      |      |      |      |      |      | 3        |                   |
|  | Z(-40°C)/ Z(+20°C)   | 4   | 3    |      |      |      |      |      | 6    |          |                   |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105°C. |   |      |      |      |      |      |      |      |          |                   |
|  | Capacitance Change   | ≤±25% of the initial value (6.3V, 10V: ≤±30%) |      |      |      |      |      |      |      | Case Dia | Life time (hours) |
|  | Dissipation Factor   | ≤200% of the initial specified value          |      |      |      |      |      |      |      | ØD=8&10  | 10,000            |
|  | Leakage Current  | ≤The initial specified value                  |      |      |      |      |      |      |      | ØD≥ 12.5 | 12,000            |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.  |   |      |      |      |      |      |      |      |          |                   |
|  | Capacitance Change   | ≤±25% of the initial value (6.3V, 10V: ≤±30%) |      |      |      |      |      |      |      |          |                   |
|  | Dissipation Factor   | ≤200% of the initial specified value          |      |      |      |      |      |      |      |          |                   |
|  | Leakage Current  | ≤ 200% of the initial specified value         |      |      |      |      |      |      |      |          |                   |

DIMENSIONS [mm]



| ØD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| Ød  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| ØD' | ØD+0.5max. |     |     |     |      |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)          | Freq. (Hz) | 120  | 1K   | 10K  | 100K |
|--------------------|------------|------|------|------|------|
| Cap. < 47          |            | 0.42 | 0.70 | 0.90 | 1.00 |
| 47 ≥ Cap. < 330    |            | 0.50 | 0.73 | 0.92 | 1.00 |
| 330 ≤ Cap. < 820   |            | 0.55 | 0.77 | 0.94 | 1.00 |
| 820 ≤ Cap. < 2,200 |            | 0.60 | 0.80 | 0.96 | 1.00 |
| Cap. ≥ 2,200       |            | 0.70 | 0.85 | 0.98 | 1.00 |

RJ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA rms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|--|------------------|
| 10       | 150      | 5×12          | 0.400                        | 450  | ERJ1AM151D12---T |
|          | 330      | 6.3×12        | 0.170                        | 700  | ERJ1AM331E12---T |
|          | 560      | 8×12          | 0.075                        | 1,200                                      | ERJ1AM561F12---T |
|          | 680      | 8×16          | 0.059                        | 1,600                                      | ERJ1AM681F16---T |
|          | 820      | 10×13         | 0.053                        | 1,700                                      | ERJ1AM821G13---T |
|          | 1,000    | 8×20          | 0.041                        | 1,960                                      | ERJ1AM102F20---T |
|          | 1,200    | 10×16         | 0.038                        | 2,000                                      | ERJ1AM122G16---T |
|          | 1,800    | 10×20         | 0.028                        | 2,500                                      | ERJ1AM182G20---T |
|          | 2,200    | 10×25         | 0.024                        | 2,900                                      | ERJ1AM222G25---T |
|          | 2,700    | 12.5×20       | 0.025                        | 2,600                                      | ERJ1AM272W20---T |
|          | 3,300    | 12.5×25       | 0.019                        | 3,200                                      | ERJ1AM332W25---T |
|          | 4,700    | 12.5×30       | 0.018                        | 3,660                                      | ERJ1AM472W30---T |
|          | 4,700    | 16×20         | 0.021                        | 3,330                                      | ERJ1AM472L20---T |
|          | 5,600    | 12.5×35       | 0.016                        | 4,120                                      | ERJ1AM562W35---T |
|          | 5,600    | 16×25         | 0.017                        | 3,810                                      | ERJ1AM562L25---T |
| 16       | 120      | 5×11          | 0.400                        | 450  | ERJ1CM121D11---T |
|          | 270      | 6.3×12        | 0.170                        | 700  | ERJ1CM271E12---T |
|          | 270      | 8×9           | 0.220                        | 590  | ERJ1CM271F09---T |
|          | 470      | 8×12          | 0.075                        | 1,200                                      | ERJ1CM471F12---T |
|          | 560      | 8×16          | 0.059                        | 1,600                                      | ERJ1CM561F16---T |
|          | 680      | 10×13         | 0.053                        | 1,700                                      | ERJ1CM681G13---T |
|          | 820      | 8×20          | 0.041                        | 1,960                                      | ERJ1CM821F20---T |
|          | 1,000    | 10×16         | 0.038                        | 2,000                                      | ERJ1CM102G16---T |
|          | 1,500    | 10×20         | 0.028                        | 2,500                                      | ERJ1CM152G20---T |
|          | 1,800    | 10×25         | 0.024                        | 2,900                                      | ERJ1CM182G25---T |
|          | 2,200    | 12.5×20       | 0.025                        | 2,600                                      | ERJ1CM222W20---T |
|          | 2,700    | 12.5×25       | 0.019                        | 3,200                                      | ERJ1CM272W25---T |
|          | 3,300    | 12.5×30       | 0.018                        | 3,660                                      | ERJ1CM332W30---T |
|          | 3,300    | 16×20         | 0.021                        | 3,330                                      | ERJ1CM332L20---T |
|          | 3,900    | 12.5×35       | 0.016                        | 4,120                                      | ERJ1CM392W35---T |
| 4,700    | 16×25    | 0.017         | 3,810                        | ERJ1CM472L25---T                           |                  |
| 25       | 68       | 5×11          | 0.400                        | 450  | ERJ1EM680D11---T |
|          | 100      | 5×12          | 0.300                        | 460  | ERJ1EM101D12---T |
|          | 100      | 6.3×11        | 0.220                        | 550  | ERJ1EM101E11---T |
|          | 150      | 6.3×11        | 0.170                        | 700  | ERJ1EM151E11---T |
|          | 220      | 6.3×12        | 0.170                        | 700  | ERJ1EM221E12---T |
|          | 330      | 8×12          | 0.075                        | 1,200                                      | ERJ1EM331F12---T |
|          | 330      | 10×9          | 0.097                        | 1,020                                      | ERJ1EM331G09---T |
|          | 390      | 8×16          | 0.059                        | 1,600                                      | ERJ1EM391F16---T |
|          | 470      | 8×16          | 0.059                        | 1,600                                      | ERJ1EM471F16---T |
|          | 470      | 10×13         | 0.053                        | 1,700                                      | ERJ1EM471G13---T |
|          | 560      | 8×20          | 0.041                        | 1,960                                      | ERJ1EM561F20---T |

RJ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA rms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|--|------------------|
| 25       | 680      | 10×16         | 0.038                        | 2,000                                      | ERJ1EM681G16---T |
|          | 1,000    | 10×20         | 0.028                        | 2,500                                      | ERJ1EM102G20---T |
|          | 1,200    | 10×25         | 0.024                        | 2,900                                      | ERJ1EM122G25---T |
|          | 1,500    | 12.5×20       | 0.025                        | 2,600                                      | ERJ1EM152W20---T |
|          | 1,800    | 12.5×25       | 0.019                        | 3,200                                      | ERJ1EM182W25---T |
|          | 2,200    | 12.5×30       | 0.018                        | 3,660                                      | ERJ1EM222W30---T |
|          | 2,200    | 16×20         | 0.021                        | 3,330                                      | ERJ1EM222L20---T |
|          | 2,700    | 12.5×35       | 0.016                        | 4,120                                      | ERJ1EM272W35---T |
|          | 3,300    | 16×25         | 0.017                        | 3,810                                      | ERJ1EM332L25---T |
|          | 47       | 5×11          | 0.400                        | 450  | ERJ1VM470D11---T |
|          | 47       | 6.3×9         | 0.520                        | 380  | ERJ1VM470E09---T |
| 35       | 68       | 5×12          | 0.400                        | 460  | ERJ1VM680D12---T |
|          | 100      | 6.3×11        | 0.170                        | 700  | ERJ1VM101E11---T |
|          | 100      | 8×9           | 0.220                        | 590  | ERJ1VM101F09---T |
|          | 180      | 8×12          | 0.075                        | 1,200                                      | ERJ1VM181F12---T |
|          | 220      | 8×12          | 0.075                        | 1,210                                      | ERJ1VM221F12---T |
|          | 220      | 8×16          | 0.059                        | 1,600                                      | ERJ1VM221F16---T |
|          | 270      | 10×13         | 0.053                        | 1,700                                      | ERJ1VM271G13---T |
|          | 330      | 8×20          | 0.041                        | 1,960                                      | ERJ1VM331F20---T |
|          | 330      | 10×13         | 0.052                        | 1,780                                      | ERJ1VM331G13---T |
|          | 390      | 10×16         | 0.038                        | 2,000                                      | ERJ1VM391G16---T |
|          | 560      | 10×20         | 0.028                        | 2,500                                      | ERJ1VM561G20---T |
|          | 680      | 10×25         | 0.024                        | 2,900                                      | ERJ1VM681G25---T |
|          | 820      | 12.5×20       | 0.025                        | 2,600                                      | ERJ1VM821W20---T |
|          | 1,200    | 12.5×25       | 0.019                        | 3,200                                      | ERJ1VM122W25---T |
|          | 1,500    | 12.5×30       | 0.018                        | 3,660                                      | ERJ1VM152W30---T |
|          | 1,500    | 16×20         | 0.021                        | 3,330                                      | ERJ1VM152L20---T |
|          | 1,800    | 12.5×35       | 0.016                        | 4,120                                      | ERJ1VM182W35---T |
|          | 1,800    | 16×25         | 0.017                        | 3,810                                      | ERJ1VM182L25---T |
| 50       | 22       | 5×11          | 0.420                        | 255  | ERJ1HM220D11---T |
|          | 47       | 6.3×11        | 0.300                        | 320  | ERJ1HM470E11---T |
|          | 56       | 6.3×11        | 0.220                        | 500  | ERJ1HM560E11---T |
|          | 56       | 8×9           | 0.290                        | 425  | ERJ1HM560F09---T |
|          | 100      | 8×12          | 0.120                        | 950  | ERJ1HM101F12---T |
|          | 100      | 10×9          | 0.160                        | 800  | ERJ1HM101G09---T |
|          | 120      | 8×16          | 0.082                        | 1,230                                      | ERJ1HM121F16---T |
|          | 150      | 8×12          | 0.120                        | 950  | ERJ1HM151F12---T |
|          | 150      | 10×13         | 0.073                        | 1,280                                      | ERJ1HM151G13---T |
|          | 180      | 8×20          | 0.058                        | 1,580                                      | ERJ1HM181F20---T |
|          | 220      | 10×13         | 0.072                        | 1,290                                      | ERJ1HM221G13---T |
|          | 220      | 10×16         | 0.053                        | 1,650                                      | ERJ1HM221G16---T |
|          | 330      | 10×16         | 0.053                        | 1,650                                      | ERJ1HM331G16---T |

RJ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impeance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|-----------------------------|---|------------------|
| 50       | 330      | 10×20         | 0.038                       | 2,060                                     | ERJ1HM331G20---T |
|          | 390      | 10×25         | 0.032                       | 2,420                                     | ERJ1HM391G25---T |
|          | 470      | 10×20         | 0.038                       | 2,060                                     | ERJ1HM471G20---T |
|          | 470      | 12.5×20       | 0.032                       | 2,300                                     | ERJ1HM471W20---T |
|          | 680      | 12.5×25       | 0.025                       | 2,800                                     | ERJ1HM681W25---T |
|          | 820      | 12.5×30       | 0.023                       | 3,370                                     | ERJ1HM821W30---T |
|          | 820      | 16×20         | 0.026                       | 3,070                                     | ERJ1HM821L20---T |
|          | 1,000    | 12.5×35       | 0.021                       | 3,810                                     | ERJ1HM102W35---T |
|          | 1,000    | 16×25         | 0.022                       | 3,510                                     | ERJ1HM102L25---T |
|          | 63       | 10            | 5×11                        | 1.800                                     | 160              |
| 22       |          | 6.3×11        | 0.690                       | 275                                       | ERJ1JM220E11---T |
| 47       |          | 6.3×12        | 0.280                       | 420                                       | ERJ1JM470E12---T |
| 47       |          | 8×9           | 0.360                       | 350                                       | ERJ1JM470F09---T |
| 82       |          | 8×12          | 0.180                       | 720                                       | ERJ1JM820F12---T |
| 82       |          | 10×9          | 0.240                       | 610                                       | ERJ1JM820G09---T |
| 100      |          | 8×12          | 0.210                       | 720                                       | ERJ1JM101F12---T |
| 100      |          | 8×16          | 0.130                       | 990                                       | ERJ1JM101F16---T |
| 120      |          | 10×13         | 0.110                       | 990                                       | ERJ1JM121G13---T |
| 150      |          | 8×20          | 0.096                       | 1,200                                     | ERJ1JM151F20---T |
| 150      |          | 10×13         | 0.160                       | 950                                       | ERJ1JM151G13---T |
| 180      |          | 10×16         | 0.076                       | 1,200                                     | ERJ1JM181G16---T |
| 220      |          | 10×20         | 0.070                       | 1,420                                     | ERJ1JM221G20---T |
| 270      |          | 10×20         | 0.056                       | 1,570                                     | ERJ1JM271G20---T |
| 270      |          | 12.5×16       | 0.072                       | 1,570                                     | ERJ1JM271W16---T |
| 330      |          | 10×25         | 0.046                       | 1,990                                     | ERJ1JM331G25---T |
| 390      |          | 12.5×20       | 0.041                       | 1,990                                     | ERJ1JM391W20---T |
| 470      |          | 12.5×25       | 0.031                       | 2,460                                     | ERJ1JM471W25---T |
| 560      |          | 12.5×30       | 0.028                       | 2,760                                     | ERJ1JM561W30---T |
| 560      |          | 16×20         | 0.032                       | 2,380                                     | ERJ1JM561L20---T |
| 680      | 12.5×35  | 0.024         | 3,040                       | ERJ1JM681W35---T                          |                  |
| 820      | 16×25    | 0.025         | 2,890                       | ERJ1JM821L25---T                          |                  |
| 820      | 18×20    | 0.030         | 2,580                       | ERJ1JM821M20---T                          |                  |
| 80       | 12       | 5×11          | 1.200                       | 220                                       | ERJ1BM120D11---T |
|          | 27       | 6.3×11        | 0.460                       | 370                                       | ERJ1BM270E11---T |
|          | 47       | 8×12          | 0.290                       | 620                                       | ERJ1BM470F12---T |
|          | 47       | 10×9          | 0.380                       | 520                                       | ERJ1BM470G09---T |
|          | 56       | 8×16          | 0.200                       | 780                                       | ERJ1BM560F16---T |
|          | 68       | 10×13         | 0.170                       | 780                                       | ERJ1BM680G13---T |
|          | 82       | 8×20          | 0.160                       | 1,040                                     | ERJ1BM820F20---T |
|          | 100      | 10×13         | 0.200                       | 750                                       | ERJ1BM101G13---T |
|          | 100      | 10×16         | 0.110                       | 1,040                                     | ERJ1BM101G16---T |
|          | 150      | 10×20         | 0.084                       | 1,430                                     | ERJ1BM151G20---T |

RJ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impeance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|-----------------------------|---|------------------|
| 80       | 150      | 12.5×16       | 0.110                       | 1,430                                     | ERJ1BM151W16---T |
|          | 180      | 10×25         | 0.069                       | 1,620                                     | ERJ1BM181G25---T |
|          | 220      | 12.5×20       | 0.062                       | 1,750                                     | ERJ1BM221W20---T |
|          | 270      | 12.5×25       | 0.047                       | 2,210                                     | ERJ1BM271W25---T |
|          | 330      | 12.5×30       | 0.042                       | 2,400                                     | ERJ1BM331W30---T |
|          | 330      | 16×20         | 0.048                       | 1,950                                     | ERJ1BM331L20---T |
|          | 390      | 12.5×35       | 0.036                       | 2,600                                     | ERJ1BM391W35---T |
|          | 470      | 12.5×40       | 0.032                       | 2,860                                     | ERJ1BM471W40---T |
|          | 470      | 16×25         | 0.038                       | 2,430                                     | ERJ1BM471L25---T |
|          | 470      | 18×20         | 0.045                       | 2,270                                     | ERJ1BM471M20---T |
|          | 560      | 16×30         | 0.032                       | 2,640                                     | ERJ1BM561L30---T |
|          | 680      | 16×35         | 0.029                       | 2,860                                     | ERJ1BM681L35---T |
|          | 680      | 18×25         | 0.036                       | 2,500                                     | ERJ1BM681M25---T |
|          | 820      | 16×40         | 0.027                       | 3,510                                     | ERJ1BM821L40---T |
|          | 820      | 18×30         | 0.030                       | 2,860                                     | ERJ1BM821M30---T |
|          | 1,000    | 18×35         | 0.027                       | 3,510                                     | ERJ1BM102M35---T |
|          | 1,200    | 18×40         | 0.026                       | 3,860                                     | ERJ1BM122M40---T |
|          | 100      | 8.2           | 5×11                        | 1.200                                     | 220              |
| 18       |          | 6.3×11        | 0.460                       | 370                                       | ERJ1KM180E11---T |
| 22       |          | 8×12          | 0.320                       | 540                                       | ERJ1KM220F12---T |
| 33       |          | 8×12          | 0.290                       | 620                                       | ERJ1KM330F12---T |
| 33       |          | 10×9          | 0.380                       | 520                                       | ERJ1KM330G09---T |
| 47       |          | 8×12          | 0.290                       | 620                                       | ERJ1KM470F12---T |
| 47       |          | 8×16          | 0.200                       | 780                                       | ERJ1KM470F16---T |
| 56       |          | 10×13         | 0.170                       | 780                                       | ERJ1KM560G13---T |
| 68       |          | 8×16          | 0.200                       | 780                                       | ERJ1KM680F16---T |
| 82       |          | 10×16         | 0.110                       | 1,040                                     | ERJ1KM820G16---T |
| 100      |          | 10×16         | 0.140                       | 1,000                                     | ERJ1KM101G16---T |
| 100      |          | 10×20         | 0.084                       | 1,430                                     | ERJ1KM101G20---T |
| 120      |          | 10×20         | 0.084                       | 1,430                                     | ERJ1KM121G20---T |
| 150      |          | 10×20         | 0.120                       | 1,300                                     | ERJ1KM151G20---T |
| 150      |          | 12.5×20       | 0.062                       | 1,750                                     | ERJ1KM151W20---T |
| 220      |          | 12.5×25       | 0.047                       | 2,210                                     | ERJ1KM221W25---T |
| 270      |          | 12.5×30       | 0.042                       | 2,400                                     | ERJ1KM271W30---T |
| 270      |          | 16×20         | 0.048                       | 1,950                                     | ERJ1KM271L20---T |
| 330      |          | 12.5×35       | 0.036                       | 2,600                                     | ERJ1KM331W35---T |
| 390      |          | 12.5×40       | 0.032                       | 2,860                                     | ERJ1KM391W40---T |
| 390      | 16×25    | 0.038         | 2,430                       | ERJ1KM391L25---T                          |                  |
| 390      | 18×20    | 0.045         | 2,270                       | ERJ1KM391M20---T                          |                  |
| 470      | 16×30    | 0.032         | 2,640                       | ERJ1KM471L30---T                          |                  |
| 470      | 18×25    | 0.036         | 2,500                       | ERJ1KM471M25---T                          |                  |
| 560      | 16×35    | 0.029         | 2,860                       | ERJ1KM561L35---T                          |                  |

RJ series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impepdance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |
|----------|----------|---------------|-------------------------------|--|------------------|
| 100      | 560      | 18×30         | 0.030                         | 2,860  | ERJ1KM561M30---T |
|          | 680      | 16×40         | 0.027                         | 3,510  | ERJ1KM681L40---T |
|          | 680      | 18×35         | 0.027                         | 3,510  | ERJ1KM681M35---T |
|          | 820      | 18×40         | 0.026                         | 3,860  | ERJ1KM821M40---T |
| 120      | 10       | 6.3×11        | 4.600                         | 110  | ERJ2BM100E11---T |
|          | 15       | 6.3×12        | 3.800                         | 145  | ERJ2BM150E12---T |
|          | 18       | 8×9           | 3.500                         | 165  | ERJ2BM180F09---T |
|          | 22       | 8×12          | 3.000                         | 180  | ERJ2BM220F12---T |
|          | 33       | 8×16          | 2.500                         | 320  | ERJ2BM330F16---T |
|          | 33       | 10×13         | 2.500                         | 320  | ERJ2BM330G13---T |
|          | 47       | 8×20          | 2.200                         | 385  | ERJ2BM470F20---T |
|          | 47       | 10×16         | 2.000                         | 400  | ERJ2BM470G16---T |
|          | 56       | 10×16         | 1.900                         | 410  | ERJ2BM560G16---T |
|          | 68       | 10×16         | 1.800                         | 420  | ERJ2BM680G16---T |
|          | 82       | 10×20         | 1.600                         | 435  | ERJ2BM820G20---T |
|          | 100      | 10×25         | 1.300                         | 540  | ERJ2BM101G25---T |
|          | 120      | 12.5×20       | 1.100                         | 750  | ERJ2BM121W20---T |
|          | 150      | 12.5×25       | 0.850                         | 810  | ERJ2BM151W25---T |
|          | 220      | 12.5×30       | 0.650                         | 990  | ERJ2BM221W30---T |
|          | 220      | 16×20         | 0.650                         | 990  | ERJ2BM221L20---T |
|          | 270      | 16×25         | 0.470                         | 1,125  | ERJ2BM271L25---T |
|          | 270      | 18×20         | 0.470                         | 1,125  | ERJ2BM271M20---T |
|          | 330      | 16×30         | 0.360                         | 1,215  | ERJ2BM331L30---T |
|          | 330      | 18×25         | 0.360                         | 1,215  | ERJ2BM331M25---T |
| 470      | 16×40    | 0.260         | 1,350                         | ERJ2BM471L40---T                                       |                  |
| 470      | 18×30    | 0.260         | 1,350                         | ERJ2BM471M30---T                                       |                  |

※Specifications subject to change without notice

RH series

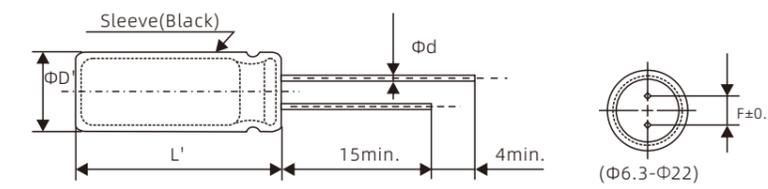
- Endurance:2,000~3,000 hours at 105°C
- High frequency, low impedance
- RoHS Compliant



SPECIFICATIONS

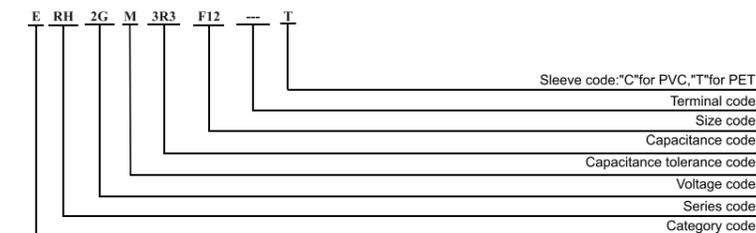
| Items  | Characteristics  |   |      |      |      |      |     |     |      |          |                   |
|--|--|---|------|------|------|------|-----|-----|------|----------|-------------------|
| Category Temperature Range                             | -40 ~ +105°C(160 to 450Vdc) -25 ~ +105°C(500 to 550Vdc)  |   |      |      |      |      |     |     |      |          |                   |
| Rated Working Voltage Range                            | 160 ~ 550Vdc   |   |      |      |      |      |     |     |      |          |                   |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |   |      |      |      |      |     |     |      |          |                   |
| Leakage Current  | I ≤ 0.02CV or 10μA, Whichever is greater(160 to 450Vdc) I ≤ 0.03CV or 10μA, Whichever is greater(500 to 550Vdc)<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes) |   |      |      |      |      |     |     |      |          |                   |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)  | 160   | 200  | 250  | 350  | 400  | 420 | 450 | 500  | 550      | (at 20°C, 120Hz)  |
|  | Dissipation Factor(Max.)   | 0.12  | 0.12 | 0.12 | 0.15 | 0.15 | 0.2 | 0.2 | 0.24 | 0.24     |                   |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  | 160   | 200  | 250  | 350  | 400  | 420 | 450 | 500  | 550      | (at 120Hz)        |
|  | Z(-25°C)/Z(+20°C)  | 3   | 5    | 5    | 5    | 5    | 6   | 6   | 8    | 15       |                   |
| Endurance  | Z(-40°C)/Z(+20°C)  | 4   | 7    | 7    | 7    | 7    | 10  | 10  | —    | —        |                   |
|  | The following specification shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for the specified period of time at 105°C.   |   |      |      |      |      |     |     |      |          |                   |
|  | Capacitance Change   | ≤±20% of the initial value(550Vdc:≤±30% of the initial value)                     |      |      |      |      |     |     |      | Case Dia | Life time (hours) |
|  | Dissipation Factor   | ≤200% of the initial specified value(550Vdc:≤300% of the initial specified value) |      |      |      |      |     |     |      | ∅D ≤ 8   | 2,000             |
| Shelf Life   | Leakage Current  | ≤The initial specified value  |      |      |      |      |     |     |      | ∅D ≥ 10  | 3,000             |
|  | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.   |   |      |      |      |      |     |     |      |          |                   |
|  | Capacitance Change   | ≤±20% of the initial value  |      |      |      |      |     |     |      |          |                   |
| Dissipation Factor                                     | ≤200% of the initial specified value   |   |      |      |      |      |     |     |      |          |                   |
| Leakage Current  | ≤200% of the initial specified value   |   |      |      |      |      |     |     |      |          |                   |

DIMENSIONS [mm]



| ∅D  | 6.3                            | 8   | 10  | 12.5 | 13  | 16  | 18  | 20   | 22※  |
|-----|--------------------------------|-----|-----|------|-----|-----|-----|------|------|
| ∅d  | 0.5                            | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8 | 0.8  | 0.8  |
| F   | 2.5                            | 3.5 | 5.0 | 5.0  | 5.0 | 7.5 | 7.5 | 10.0 | 10.0 |
| ∅D' | ∅D+0.5max.                     |     |     |      |     |     |     |      |      |
| L'  | L+2max.                        |     |     |      |     |     |     |      |      |
| ※   | 22×55/22×60 ∅d=1.0, L'=L+3max. |     |     |      |     |     |     |      |      |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)          | Freq. (Hz) |      |      |      |
|--------------------|------------|------|------|------|
|                    | 120        | 1K   | 10K  | 100K |
| Cap. < 10          | 0.40       | 0.70 | 0.92 | 1.00 |
| 10 ≤ Cap. < 100    | 0.56       | 0.83 | 0.95 | 1.00 |
| 100 ≤ Cap. ≤ 1,000 | 0.67       | 0.87 | 0.96 | 1.00 |

RH series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA <sub>rms</sub> /105°C, 100kHz) | Part Number      |
|----------|----------|---------------|---|------------------|
| 160      | 2.2      | 6.3×9         | 70  | ERH2CM2R2E09--T  |
|          | 3.3      | 6.3×11        | 103   | ERH2CM3R3E11--T  |
|          | 4.7      | 8×12          | 121   | ERH2CM4R7F12--T  |
|          | 10       | 10×12         | 150   | ERH2CM100G12--T  |
|          | 22       | 10×12         | 213   | ERH2CM220G12--T  |
|          | 33       | 10×16         | 283   | ERH2CM330G16--T  |
|          | 47       | 12.5×16       | 348   | ERH2CM470W16--T  |
|          | 100      | 12.5×20       | 567   | ERH2CM101W20--T  |
|          | 220      | 16×25         | 767   | ERH2CM221L25--T  |
| 200      | 2.2      | 6.3×11        | 77  | ERH2DM2R2E11--T  |
|          | 3.3      | 6.3×11        | 103   | ERH2DM3R3E11--T  |
|          | 4.7      | 8×12          | 121   | ERH2DM4R7F12--T  |
|          | 10       | 10×12         | 152   | ERH2DM100G12--T  |
|          | 22       | 10×12         | 196   | ERH2DM220G12--T  |
|          | 22       | 10×16         | 228   | ERH2DM220G16--T  |
|          | 33       | 10×16         | 304   | ERH2DM330G16--T  |
|          | 33       | 12.5×14       | 345   | ERH2DM330W14--T  |
|          | 47       | 12.5×16       | 395   | ERH2DM470W16--T  |
|          | 56       | 12.5×20       | 456   | ERH2DM560W20--T  |
|          | 68       | 10×25         | 464   | ERH2DM680G25--T  |
|          | 82       | 10×30         | 574   | ERH2DM820G30--T  |
|          | 100      | 16×20         | 600   | ERH2DM101L20--T  |
| 120      | 16×25    | 801           | ERH2DM121L25--T   |                  |
| 150      | 18×25    | 908           | ERH2DM151M25--T   |                  |
| 180      | 12.5×35  | 948           | ERH2DM181W35--T   |                  |
| 220      | 18×30    | 1,032         | ERH2DM221M30--T   |                  |
| 250      | 1        | 6.3×9         | 54  | ERH2EM010E09--T  |
|          | 2.2      | 6.3×11        | 77  | ERH2EM2R2E11--T  |
|          | 3.3      | 8×12          | 106   | ERH2EM3R3F12--T  |
|          | 4.7      | 8×12          | 124   | ERH2EM4R7F12--T  |
|          | 10       | 10×12         | 152   | ERH2EM100G12--T  |
|          | 22       | 10×16         | 205   | ERH2EM220G16--T  |
|          | 33       | 12.5×16       | 280   | ERH2EM330W160--T |
|          | 47       | 12.5×20       | 355   | ERH2EM470W20--T  |
|          | 56       | 12.5×20       | 452   | ERH2EM560W20--T  |
|          | 82       | 16×20         | 620   | ERH2EM820L20--T  |
|          | 100      | 16×25         | 780   | ERH2EM101L25--T  |
|          | 220      | 18×30         | 1,050   | ERH2EM221M30--T  |
|          | 330      | 18×40         | 1,150   | ERH2EM331M40--T  |
| 470      | 22×46    | 1,290         | ERH2EM471O46--T   |                  |
| 350      | 1        | 6.3×9         | 54  | ERH2VM010E09--T  |
|          | 2.2      | 8×12          | 80  | ERH2VM2R2F12--T  |
|          | 3.3      | 8×12          | 109   | ERH2VM3R3F12--T  |
|          | 3.3      | 10×12         | 118   | ERH2VM3R3G12--T  |
|          | 4.7      | 10×12         | 143   | ERH2VM4R7G12--T  |
|          | 10       | 10×16         | 179   | ERH2VM100G16--T  |
|          | 22       | 12.5×20       | 301   | ERH2VM220W20--T  |
|          | 47       | 16×25         | 480   | ERH2VM470L25--T  |
|          | 400      | 1             | 6.3×11  | 41               |
| 2.2      |          | 6.3×11        | 63  | ERH2GM2R2E11--T  |
| 3.3      |          | 6.3×12        | 93  | ERH2GM3R3E12--T  |
| 3.3      |          | 8×12          | 100   | ERH2GM3R3F12--T  |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA <sub>rms</sub> /105°C, 100kHz) | Part Number       |
|----------|----------|---------------|---|-------------------|
| 400      | 4.7      | 8×12          | 117   | ERH2GM4R7F12--T   |
|          | 10       | 10×14         | 166   | ERH2GM100G14--T   |
|          | 10       | 10×16         | 177   | ERH2GM100G16--T   |
|          | 22       | 10×18         | 233   | ERH2GM220G18--T   |
|          | 27       | 10×18         | 280   | ERH2GM270G18--T   |
|          | 33       | 13×20         | 390   | ERH2GM330K20--T   |
|          | 33       | 16×20         | 487   | ERH2GM330L20--T   |
|          | 39       | 10×30         | 422   | ERH2GM390G30--T   |
|          | 47       | 16×20         | 652   | ERH2GM470L20--T   |
|          | 56       | 12.5×30       | 700   | ERH2GM560W30--T   |
|          | 56       | 16×20         | 620   | ERH2GM560L20--T   |
|          | 68       | 16×25         | 800   | ERH2GM680L25--T   |
|          | 68       | 18×25         | 870   | ERH2GM680M25--T   |
|          | 82       | 12.5×40       | 880   | ERH2GM820W40--T   |
|          | 82       | 18×25         | 880   | ERH2GM820M25--T   |
|          | 100      | 12.5×50       | 900   | ERH2GM101W50--T   |
|          | 100      | 18×30         | 900   | ERH2GM101M30--T   |
|          | 120      | 18×30         | 950   | ERH2GM121M30--T   |
|          | 150      | 18×35         | 1,024   | ERH2GM151M35--T   |
|          | 150      | 22×31         | 1,050   | ERH2GM151O31--T   |
|          | 180      | 18×40         | 1,119   | ERH2GM181M40--T   |
| 180      | 22×31    | 1,125         | ERH2GM181O31--T   |                   |
| 220      | 18×50    | 1,288         | ERH2GM221M50--T   |                   |
| 220      | 22×35    | 1,282         | ERH2GM221O35--T   |                   |
| 250      | 20×45    | 1,376         | ERH2GM251N45--T   |                   |
| 250      | 22×40    | 1,376         | ERH2GM251O40--T   |                   |
| 270      | 20×50    | 1,458         | ERH2GM271N50--T   |                   |
| 270      | 22×46    | 1,452         | ERH2GM271O46--T   |                   |
| 300      | 20×55    | 1,540         | ERH2GM301N55--T   |                   |
| 300      | 22×50    | 1,533         | ERH2GM301O50--T   |                   |
| 330      | 22×55    | 1,601         | ERH2GM331O55--THO                                       |                   |
| 350      | 20×60    | 1,655         | ERH2GM351N60--T   |                   |
| 390      | 22×60    | 1,703         | ERH2GM391O60--THO                                       |                   |
| 420      | 120      | 18×30         | 960   | ERH2TM121M30--T   |
|          | 150      | 18×35         | 1,024   | ERH2TM151M35--T   |
|          | 180      | 18×40         | 1,119   | ERH2TM181M40--T   |
|          | 180      | 20×35         | 1,133   | ERH2TM181N35--T   |
|          | 180      | 22×30         | 1,125   | ERH2TM181O30--T   |
|          | 220      | 18×45         | 1,288   | ERH2TM221M45--T   |
|          | 220      | 20×40         | 1,295   | ERH2TM221N40--T   |
|          | 220      | 22×35         | 1,282   | ERH2TM221O35--T   |
|          | 250      | 20×45         | 1,328   | ERH2TM251N45--T   |
|          | 250      | 22×40         | 1,328   | ERH2TM251O40--T   |
|          | 270      | 18×50         | 1,388   | ERH2TM271M50--T   |
|          | 270      | 20×50         | 1,407   | ERH2TM271N50--T   |
|          | 270      | 22×46         | 1,401   | ERH2TM271O46--T   |
|          | 300      | 18×55         | 1,547   | ERH2TM301M55--T   |
|          | 300      | 20×55         | 1,569   | ERH2TM301N55--T   |
|          | 300      | 22×50         | 1,561   | ERH2TM301O50--T   |
|          | 330      | 18×60         | 1,631   | ERH2TM331M60--T   |
|          | 330      | 22×55         | 1,631   | ERH2TM331O55--THO |

RH series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA <sub>rms</sub> /105°C, 100kHz) | Part Number       |
|----------|----------|---------------|---|-------------------|
| 420      | 350      | 20×60         | 1,685   | ERH2TM351N60--THO |
|          | 390      | 22×60         | 1,734   | ERH2TM391O60--T   |
| 450      | 1        | 8×9           | 54  | ERH2WM010F09--T   |
|          | 2.2      | 8×12          | 72  | ERH2WM2R2F12--T   |
|          | 3.3      | 8×12          | 83  | ERH2WM3R3F12--T   |
|          | 4.7      | 8×12          | 85  | ERH2WM4R7F12--T   |
|          | 8.2      | 10×12         | 92  | ERH2WM8R2G12--T   |
|          | 10       | 10×14         | 98  | ERH2WM100G14--T   |
|          | 10       | 10×16         | 101   | ERH2WM100G16--T   |
|          | 18       | 10×18         | 145   | ERH2WM180G18--T   |
|          | 22       | 13×16         | 221   | ERH2WM220K16--T   |
|          | 22       | 16×20         | 338   | ERH2WM220L20--T   |
|          | 33       | 10×35         | 430   | ERH2WM330G35--T   |
|          | 33       | 18×20         | 420   | ERH2WM330M20--T   |
|          | 39       | 10×40         | 500   | ERH2WM390G40--T   |
|          | 47       | 10×45         | 600   | ERH2WM470G45--T   |
|          | 47       | 12.5×30       | 600   | ERH2WM470W30--T   |
|          | 47       | 16×25         | 592   | ERH2WM470L25--T   |
|          | 56       | 12.5×35       | 670   | ERH2WM560W35--T   |
|          | 56       | 18×20         | 656   | ERH2WM560M20--T   |
|          | 68       | 12.5×40       | 740   | ERH2WM680W40--T   |
|          | 68       | 18×25         | 704   | ERH2WM680M25--T   |
|          | 82       | 12.5×45       | 850   | ERH2WM820W45--T   |
| 82       | 18×30    | 853           | ERH2WM820M30--T   |                   |
| 100      | 18×30    | 900           | ERH2WM101M30--T   |                   |
| 120      | 18×35    | 960           | ERH2WM121M35--T   |                   |
| 120      | 20×30    | 960           | ERH2WM121N30--T   |                   |
| 150      | 18×40    | 1,045         | ERH2WM151M40--T   |                   |
| 150      | 20×35    | 987           | ERH2WM151N35--T   |                   |
| 150      | 22×30    | 958           | ERH2WM151O30--T   |                   |
| 200      | 18×45    | 1,164         | ERH2WM201M45--T   |                   |
| 200      | 20×40    | 1,179         | ERH2WM201N40--T   |                   |
| 200      | 22×35    | 1,041         | ERH2WM201O35--T   |                   |
| 220      | 20×45    | 1,288         | ERH2WM221N45--T   |                   |
| 220      | 22×40    | 1,273         | ERH2WM221O40--T   |                   |
| 250      | 18×50    | 1,273         | ERH2WM251M50--T   |                   |
| 250      | 20×50    | 1,350         | ERH2WM251N50--T   |                   |
| 250      | 22×46    | 1,350         | ERH2WM251O46--T   |                   |
| 270      | 18×55    | 1,374         | ERH2WM271M55--T   |                   |
| 270      | 20×55    | 1,491         | ERH2WM271N55--T   |                   |
| 270      | 22×50    | 1,550         | ERH2WM271O50--T   |                   |
| 300      | 18×60    | 1,600         | ERH2WM301M60--T   |                   |
| 300      | 22×55    | 1,650         | ERH2WM301O55--THO                                       |                   |
| 330      | 20×60    | 1,700         | ERH2WM331N60--T   |                   |
| 350      | 22×60    | 1,758         | ERH2WM351O60--THO                                       |                   |
| 500      | 68       | 18×30         | 785   | ERH2HM680M30--T   |
|          | 82       | 18×35         | 843   | ERH2HM820M35--T   |
|          | 82       | 20×30         | 843   | ERH2HM820N30--T   |
|          | 100      | 18×40         | 925   | ERH2HM101M40--T   |
|          | 100      | 20×35         | 932   | ERH2HM101N35--T   |
|          | 120      | 18×45         | 970   | ERH2HM121M45--T   |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA <sub>rms</sub> /105°C, 100kHz) | Part Number       |
|----------|----------|---------------|---|-------------------|
| 500      | 120      | 18×50         | 1,000   | ERH2HM121M50--T   |
|          | 120      | 20×40         | 970   | ERH2HM121N40--T   |
|          | 120      | 20×45         | 970   | ERH2HM121N45--T   |
|          | 120      | 22×35         | 992   | ERH2HM121O35--T   |
|          | 150      | 18×55         | 1,119   | ERH2HM151M55--T   |
|          | 150      | 18×60         | 1,119   | ERH2HM151M60--T   |
|          | 150      | 20×50         | 1,119   | ERH2HM151N50--T   |
|          | 150      | 22×40         | 1,119   | ERH2HM151O40--T   |
|          | 180      | 20×55         | 1,268   | ERH2HM181N55--T   |
|          | 180      | 20×60         | 1,268   | ERH2HM181N60--T   |
|          | 180      | 22×46         | 1,268   | ERH2HM181O46--T   |
| 550      | 200      | 22×50         | 1,417   | ERH2HM201O50--T   |
|          | 220      | 22×55         | 1,492   | ERH2HM221O55--THO |
|          | 250      | 22×60         | 1,641   | ERH2HM251O60--THO |
|          | 47       | 18×30         | 589   | ERH2JM470M30--T   |
|          | 56       | 18×35         | 650   | ERH2JM560M35--T   |
|          | 56       | 20×30         | 650   | ERH2JM560N30--T   |
|          | 68       | 18×40         | 720   | ERH2JM680M40--T   |
|          | 68       | 20×35         | 720   | ERH2JM680N35--T   |
| 82       | 18×45    | 780           | ERH2JM820M45--T   |                   |
| 82       | 20×40    | 780           | ERH2JM820N40--T   |                   |
| 82       | 22×30    | 780           | ERH2JM820O30--T   |                   |
| 100      | 18×50    | 832           | ERH2JM101M50--T   |                   |
| 100      | 20×45    | 832           | ERH2JM101N45--T   |                   |
| 100      | 22×35    | 835           | ERH2JM101O35--T   |                   |
| 120      | 18×55    | 873           | ERH2JM121M55--T   |                   |
| 120      | 20×50    | 873           | ERH2JM121N50--T   |                   |
| 120      | 20×55    | 895           | ERH2JM121N55--T   |                   |
| 120      | 22×40    | 873           | ERH2JM121O40--T   |                   |
| 120      | 22×46    | 895           | ERH2JM121O46--T   |                   |
| 150      | 18×60    | 1,007         | ERH2JM151M60--T   |                   |
| 150      | 20×60    | 1,007         | ERH2JM151N60--T   |                   |
| 150      | 22×50    | 1,007         | ERH2JM151O50--T   |                   |
| 180      | 22×55    | 1,141         | ERH2JM181O55--THO                                       |                   |
| 180      | 22×60    | 1,164         | ERH2JM181O60--THO                                       |                   |

\*Specifications subject to change without notice

Radial Type

HS series

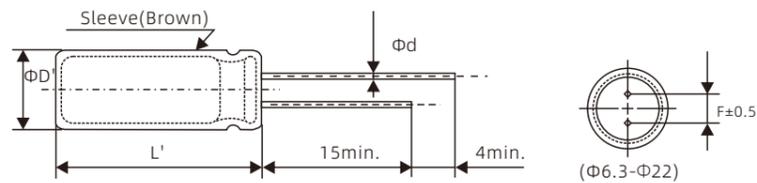
- Endurance: 3,000~5,000 hours at 105°C
- High ripple current, for power supply
- RoHS Compliant



SPECIFICATIONS

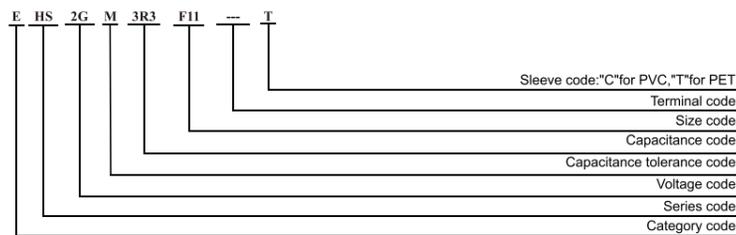
| Items   | Characteristics  |   |                  |      |      |                 |                           |      |      |      |      |          |                  |
|---|--|---|------------------|------|------|-----------------|---------------------------|------|------|------|------|----------|------------------|
| Category Temperature Range  | -40 ~ +105°C (160 ~450Vdc)   |   |                  |      |      |                 | -25 ~ +105°C(500 ~550Vdc) |      |      |      |      |          |                  |
| Rated Working Voltage Range   | 160 ~550Vdc  |   |                  |      |      |                 |                           |      |      |      |      |          |                  |
| Capacitance Tolerance   | ±20%(M) (at 20°C, 120Hz)   |   |                  |      |      |                 |                           |      |      |      |      |          |                  |
| Leakage Current   |  |   | After 1 minute   |      |      | After 5 minutes |                           |      |      |      |      |          |                  |
|   | CV ≤ 1,000   |   | I ≤ 0.1CV+40μA   |      |      | I ≤ 0.03CV+15μA |                           |      |      |      |      |          |                  |
|   | CV > 1,000   |   | I ≤ 0.04CV+100μA |      |      | I ≤ 0.02CV+25μA |                           |      |      |      |      |          |                  |
| Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C) |  |   |                  |      |      |                 |                           |      |      |      |      |          |                  |
| Dissipation Factor (tanδ)   | Rated Voltage (Vdc)  | 160   | 200              | 250  | 350  | 400             | 420                       | 450  | 475  | 500  | 525  | 550      | (at 20°C, 120Hz) |
|   | Dissipation Factor(Max)  | 0.15  | 0.15             | 0.15 | 0.20 | 0.20            | 0.20                      | 0.24 | 0.24 | 0.24 | 0.24 | 0.24     |                  |
| Low Temperature Characteristics (Max. Impedance Ratio)  | Rated Voltage (Vdc)  | 160   | 200              | 250  | 350  | 400             | 420                       | 450  | 475  | 500  | 525  | 550      | (at 120Hz)       |
|   | Z(-25°C)/Z(+20°C)  | 3   | 3                | 3    | 6    | 6               | 6                         | 6    | 8    | 8    | 8    | 8        |                  |
|   | Z(-40°C)/Z(+20°C)  | 8   | 8                | 8    | 10   | 10              | 12                        | 15   | /    | /    | /    | /        |                  |
| Endurance   | The following specification shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for the specified period of time at 105°C. |   |                  |      |      |                 |                           |      |      |      |      |          |                  |
|   | Capacitance Change   | ≤±20% of the initial value (525 ~550Vdc:≤±30% of the initial value)                     |                  |      |      |                 |                           |      |      |      |      | Case Dia | Load life(hours) |
|   | Dissipation Factor   | ≤200% of the initial specified value (525 ~550Vdc:≤300% of the initial specified value) |                  |      |      |                 |                           |      |      |      |      | ∅D ≤ 8   | 3,000            |
|   | Leakage Current  | ≤The initial specified value  |                  |      |      |                 |                           |      |      |      |      | ∅D ≥ 10  | 5,000            |
| Shelf Life  | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.                               |   |                  |      |      |                 |                           |      |      |      |      |          |                  |
|   | Capacitance Change   | ≤±20% of the initial value  |                  |      |      |                 |                           |      |      |      |      |          |                  |
|   | Dissipation Factor   | ≤200% of the initial specified value  |                  |      |      |                 |                           |      |      |      |      |          |                  |
|   | Leakage Current  | ≤200% of the initial specified value  |                  |      |      |                 |                           |      |      |      |      |          |                  |

DIMENSIONS [mm]



| ∅D  | 6.3                            | 8   | 10  | 12.5 | 13  | 16  | 18  | 20   | 22*  |
|-----|--------------------------------|-----|-----|------|-----|-----|-----|------|------|
| ∅d  | 0.5                            | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8 | 0.8  | 0.8  |
| F   | 2.5                            | 3.5 | 5.0 | 5.0  | 5.0 | 7.5 | 7.5 | 10.0 | 10.0 |
| ∅D' | ∅D+0.5max.                     |     |     |      |     |     |     |      |      |
| L'  | L+2max.                        |     |     |      |     |     |     |      |      |
| *   | 22x55/22x60 ∅d=1.0, L'=L+3max. |     |     |      |     |     |     |      |      |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)  | Freq. (Hz) | 120  | 1K   | 10K  | 100K |
|------------|------------|------|------|------|------|
| Cap. < 100 |            | 1.00 | 1.75 | 2.25 | 2.50 |
| Cap. ≥ 100 |            | 1.00 | 1.67 | 2.05 | 2.25 |

HS series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ∅D*L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number     |                 |
|----------|----------|---------------|--|-----------------|-----------------|
| 160      | 1        | 6.3x9         | 15   | EHS2CM010E09--T |                 |
|          | 2.2      | 6.3x9         | 22   | EHS2CM2R2E09--T |                 |
|          | 3.3      | 6.3x9         | 30   | EHS2CM3R3E09--T |                 |
|          | 4.7      | 6.3x9         | 37   | EHS2CM4R7E09--T |                 |
|          | 6.8      | 8x9           | 62   | EHS2CM6R8F09--T |                 |
|          | 8.2      | 8x9           | 70   | EHS2CM8R2F09--T |                 |
|          | 10       | 8x9           | 72   | EHS2CM100F09--T |                 |
|          | 15       | 8x11          | 100  | EHS2CM150F11--T |                 |
|          | 18       | 8x12          | 125  | EHS2CM180F12--T |                 |
|          | 22       | 8x12          | 140  | EHS2CM220F12--T |                 |
|          | 22       | 10x10         | 145  | EHS2CM220G10--T |                 |
|          | 33       | 10x12         | 180  | EHS2CM330G12--T |                 |
|          | 47       | 10x14         | 210  | EHS2CM470G14--T |                 |
|          | 68       | 10x18         | 320  | EHS2CM680G18--T |                 |
|          | 68       | 12.5x16       | 370  | EHS2CM680W16--T |                 |
|          | 82       | 12.5x16       | 385  | EHS2CM820W16--T |                 |
|          | 82       | 12.5x18       | 395  | EHS2CM820W18--T |                 |
|          | 100      | 12.5x20       | 430  | EHS2CM101W20--T |                 |
|          | 100      | 16x16         | 445  | EHS2CM101L16--T |                 |
|          | 150      | 12.5x25       | 465  | EHS2CM151W25--T |                 |
| 150      | 16x20    | 500           | EHS2CM151L20--T                            |                 |                 |
| 220      | 16x25    | 815           | EHS2CM221L25--T                            |                 |                 |
| 270      | 16x30    | 880           | EHS2CM271L30--T                            |                 |                 |
| 270      | 18x25    | 890           | EHS2CM271M25--T                            |                 |                 |
| 200      | 1        | 6.3x9         | 15   | EHS2DM010E09--T |                 |
|          | 2.2      | 6.3x9         | 20   | EHS2DM2R2E09--T |                 |
|          | 3.3      | 6.3x9         | 28   | EHS2DM3R3E09--T |                 |
|          | 4.7      | 6.3x9         | 35   | EHS2DM4R7E09--T |                 |
|          | 6.8      | 8x9           | 60   | EHS2DM6R8F09--T |                 |
|          | 8.2      | 8x9           | 65   | EHS2DM8R2F09--T |                 |
|          | 10       | 8x9           | 70   | EHS2DM100F09--T |                 |
|          | 15       | 8x11          | 80   | EHS2DM150F11--T |                 |
|          | 18       | 8x14          | 95   | EHS2DM180F14--T |                 |
|          | 22       | 8x16          | 140  | EHS2DM220F16--T |                 |
|          | 22       | 10x12         | 155  | EHS2DM220G12--T |                 |
|          | 33       | 10x14         | 160  | EHS2DM330G14--T |                 |
|          | 47       | 10x16         | 215  | EHS2DM470G16--T |                 |
|          | 68       | 12.5x18       | 310  | EHS2DM680W18--T |                 |
|          | 82       | 12.5x20       | 355  | EHS2DM820W20--T |                 |
|          | 100      | 12.5x22       | 395  | EHS2DM101W22--T |                 |
|          | 100      | 16x16         | 450  | EHS2DM101L16--T |                 |
|          | 150      | 12.5x35       | 600  | EHS2DM151W35--T |                 |
|          | 150      | 16x25         | 620  | EHS2DM151L25--T |                 |
|          | 220      | 18x25         | 680  | EHS2DM221M25--T |                 |
| 270      | 18x30    | 750           | EHS2DM271M30--T                            |                 |                 |
| 250      | 1        | 6.3x9         | 15   | EHS2EM010E09--T |                 |
|          | 2.2      | 6.3x9         | 20   | EHS2EM2R2E09--T |                 |
|          | 3.3      | 6.3x9         | 25   | EHS2EM3R3E09--T |                 |
|          | 4.7      | 6.3x12        | 55   | EHS2EM4R7E12--T |                 |
|          | 6.8      | 8x9           | 65   | EHS2EM6R8F09--T |                 |
|          | 8.2      | 8x9           | 75   | EHS2EM8R2F09--T |                 |
|          | 10       | 8x12          | 95   | EHS2EM100F12--T |                 |
|          | 350      | 1             | 6.3x9                                      | 20              | EHS2VM010E09--T |
|          |          | 2.2           | 6.3x11                                     | 30              | EHS2VM2R2E11--T |
|          |          | 3.3           | 6.3x12                                     | 40              | EHS2VM3R3E12--T |
| 4.7      |          | 8x9           | 47   | EHS2VM4R7F09--T |                 |
| 6.8      |          | 8x11          | 65   | EHS2VM6R8F11--T |                 |
| 8.2      |          | 8x12          | 78   | EHS2VM8R2F12--T |                 |
| 10       |          | 8x14          | 83   | EHS2VM100F14--T |                 |
| 15       |          | 10x12         | 125  | EHS2VM150G12--T |                 |
| 18       |          | 10x14         | 160  | EHS2VM180G14--T |                 |
| 22       |          | 10x16         | 175  | EHS2VM220G16--T |                 |
| 33       |          | 12.5x18       | 240  | EHS2VM330W18--T |                 |
| 47       |          | 12.5x22       | 275  | EHS2VM470W22--T |                 |
| 68       |          | 12.5x35       | 395  | EHS2VM680W35--T |                 |
| 82       |          | 16x25         | 475  | EHS2VM820L25--T |                 |
| 100      |          | 16x30         | 520  | EHS2VM101L30--T |                 |
| 100      |          | 18x25         | 530  | EHS2VM101M25--T |                 |
| 150      |          | 18x30         | 570  | EHS2VM151M30--T |                 |
| 220      |          | 18x40         | 720  | EHS2VM221M40--T |                 |
| 400      |          | 1             | 6.3x9                                      | 20              | EHS2GM010E09--T |
|          |          | 2.2           | 6.3x11                                     | 30              | EHS2GM2R2E11--T |
|          | 3.3      | 6.3x12        | 40   | EHS2GM3R3E12--T |                 |
|          | 4.7      | 8x9           | 47   | EHS2GM4R7F09--T |                 |
|          | 6.8      | 8x11          | 65   | EHS2GM6R8F11--T |                 |
|          | 8.2      | 8x12          | 78   | EHS2GM8R2F12--T |                 |
|          | 10       | 8x16          | 95   | EHS2GM100F16--T |                 |
|          | 10       | 10x10         | 100  | EHS2GM100G10--T |                 |
|          | 15       | 10x12         | 130  | EHS2GM150G12--T |                 |
|          | 15       | 10x14         | 140  | EHS2GM150G14--T |                 |
|          | 18       | 10x16         | 165  | EHS2GM180G16--T |                 |
|          | 22       | 10x16         | 180  | EHS2GM220G16--T |                 |
|          | 22       | 12.5x16       | 210  | EHS2GM220W16--T |                 |
|          | 33       | 12.5x18       | 260  | EHS2GM330W18--T |                 |
|          | 33       | 12.5x20       | 275  | EHS2GM330W20--T |                 |
|          | 47       | 12.5x25       | 350  | EHS2GM470W25--T |                 |
|          | 47       | 16x18         | 365  | EHS2GM470L18--T |                 |
|          | 56       | 12.5x30       | 385  | EHS2GM560W30--T |                 |
|          | 68       | 16x25         | 420  | EHS2GM680L25--T |                 |
|          | 82       | 16x30         | 475  | EHS2GM820L30--T |                 |

Radial Type

HS series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number       |                 |
|----------|----------|---------------|--|-------------------|-----------------|
| 400      | 82       | 18x25         | 500  | EHS2GM820M25--T   |                 |
|          | 100      | 18x25         | 540  | EHS2GM101M25--T   |                 |
|          | 100      | 18x30         | 560  | EHS2GM101M30--T   |                 |
|          | 150      | 18x40         | 750  | EHS2GM151M40--T   |                 |
|          | 180      | 18x40         | 850  | EHS2GM181M40--T   |                 |
|          | 200      | 18x45         | 886  | EHS2GM201M45--T   |                 |
|          | 200      | 20x40         | 886  | EHS2GM201N40--T   |                 |
|          | 220      | 18x50         | 932  | EHS2GM221M50--T   |                 |
|          | 220      | 20x45         | 932  | EHS2GM221N45--T   |                 |
|          | 250      | 22x40         | 1,025                                      | EHS2GM251O40--T   |                 |
|          | 270      | 20x50         | 1,119                                      | EHS2GM271N50--T   |                 |
|          | 300      | 18x60         | 1,212                                      | EHS2GM301M60--T   |                 |
|          | 300      | 20x55         | 1,212                                      | EHS2GM301N55--T   |                 |
|          | 300      | 22x46         | 1,165                                      | EHS2GM301O46--T   |                 |
|          | 330      | 20x60         | 1,280                                      | EHS2GM331N60--T   |                 |
|          | 330      | 22x50         | 1,280                                      | EHS2GM331O50--T   |                 |
| 350      | 22x55    | 1,300         | EHS2GM351O55--THO                          |                   |                 |
| 420      | 22x60    | 1,400         | EHS2GM421O60--THO                          |                   |                 |
| 420      | 1        | 6.3x9         | 20   | EHS2TM010E09--T   |                 |
|          | 2.2      | 6.3x11        | 30   | EHS2TM2R2E11--T   |                 |
|          | 3.3      | 6.3x12        | 40   | EHS2TM3R3E12--T   |                 |
|          | 4.7      | 8x9           | 47   | EHS2TM4R7F09--T   |                 |
|          | 6.8      | 8x11          | 65   | EHS2TM6R8F11--T   |                 |
|          | 8.2      | 8x12          | 80   | EHS2TM8R2F12--T   |                 |
|          | 8.2      | 10x10         | 82   | EHS2TM8R2G10--T   |                 |
|          | 10       | 8x16          | 95   | EHS2TM100F16--T   |                 |
|          | 10       | 10x12         | 100  | EHS2TM100G12--T   |                 |
|          | 15       | 10x14         | 140  | EHS2TM150G14--T   |                 |
|          | 15       | 10x16         | 145  | EHS2TM150G16--T   |                 |
|          | 18       | 10x16         | 165  | EHS2TM180G16--T   |                 |
|          | 22       | 10x18         | 180  | EHS2TM220G18--T   |                 |
|          | 22       | 12.5x16       | 210  | EHS2TM220W16--T   |                 |
|          | 33       | 12.5x20       | 260  | EHS2TM330W20--T   |                 |
|          | 33       | 13x18         | 260  | EHS2TM330K18--T   |                 |
|          | 47       | 12.5x25       | 355  | EHS2TM470W25--T   |                 |
|          | 47       | 16x20         | 370  | EHS2TM470L20--T   |                 |
|          | 56       | 16x25         | 420  | EHS2TM560L25--T   |                 |
|          | 82       | 16x30         | 540  | EHS2TM820L30--T   |                 |
| 82       | 18x25    | 550           | EHS2TM820M25--T                            |                   |                 |
| 100      | 18x30    | 580           | EHS2TM101M30--T                            |                   |                 |
| 150      | 18x40    | 750           | EHS2TM151M40--T                            |                   |                 |
| 450      | 1        | 6.3x9         | 20   | EHS2WM010E09--T   |                 |
|          | 2.2      | 6.3x11        | 30   | EHS2WM2R2E11--T   |                 |
|          | 3.3      | 8x9           | 40   | EHS2WM3R3F09--T   |                 |
|          | 3.3      | 8x11          | 45   | EHS2WM3R3F11--T   |                 |
|          | 4.7      | 8x11          | 50   | EHS2WM4R7F11--T   |                 |
|          | 6.8      | 8x12          | 68   | EHS2WM6R8F12--T   |                 |
|          | 8.2      | 10x10         | 85   | EHS2WM8R2G10--T   |                 |
|          | 10       | 8x16          | 100  | EHS2WM100F16--T   |                 |
|          | 10       | 10x12         | 105  | EHS2WM100G12--T   |                 |
|          | 15       | 10x16         | 150  | EHS2WM150G16--T   |                 |
|          | 18       | 10x18         | 170  | EHS2WM180G18--T   |                 |
|          | 450      | 22            | 12.5x16                                    | 185               | EHS2WM220W16--T |
|          |          | 33            | 12.5x22                                    | 235               | EHS2WM330W22--T |
|          |          | 33            | 16x18                                      | 290               | EHS2WM330L18--T |
| 47       |          | 16x20         | 370  | EHS2WM470L20--T   |                 |
| 47       |          | 16x25         | 390  | EHS2WM470L25--T   |                 |
| 56       |          | 18x20         | 430  | EHS2WM560M20--T   |                 |
| 82       |          | 16x35         | 550  | EHS2WM820L35--T   |                 |
| 82       |          | 18x30         | 560  | EHS2WM820M30--T   |                 |
| 100      |          | 18x31         | 600  | EHS2WM101M31--T   |                 |
| 150      |          | 18x40         | 800  | EHS2WM151M40--T   |                 |
| 180      |          | 18x45         | 864  | EHS2WM181M45--T   |                 |
| 180      |          | 20x40         | 864  | EHS2WM181N40--T   |                 |
| 200      |          | 18x50         | 905  | EHS2WM201M50--T   |                 |
| 200      |          | 20x45         | 905  | EHS2WM201N45--T   |                 |
| 200      |          | 22x40         | 905  | EHS2WM201O40--T   |                 |
| 220      |          | 18x55         | 1,000                                      | EHS2WM221M55--T   |                 |
| 220      | 20x50    | 1,000         | EHS2WM221N50--T                            |                   |                 |
| 250      | 18x60    | 1,027         | EHS2WM251M60--T                            |                   |                 |
| 250      | 20x55    | 1,027         | EHS2WM251N55--T                            |                   |                 |
| 250      | 22x46    | 1,027         | EHS2WM251O46--T                            |                   |                 |
| 270      | 20x60    | 1,110         | EHS2WM271N60--T                            |                   |                 |
| 270      | 22x50    | 1,110         | EHS2WM271O50--T                            |                   |                 |
| 330      | 22x55    | 1,280         | EHS2WM331O55--THO                          |                   |                 |
| 350      | 22x60    | 1,320         | EHS2WM351O60--THO                          |                   |                 |
| 475      | 150      | 18x50         | 800  | EHS3DM151M50--T   |                 |
|          | 150      | 20x40         | 820  | EHS3DM151N40--T   |                 |
|          | 180      | 18x55         | 883  | EHS3DM181M55--T   |                 |
|          | 200      | 18x60         | 902  | EHS3DM201M60--T   |                 |
|          | 200      | 20x50         | 912  | EHS3DM201N50--T   |                 |
|          | 200      | 22x46         | 923  | EHS3DM201O46--T   |                 |
|          | 220      | 20x55         | 1,000                                      | EHS3DM221N55--T   |                 |
|          | 250      | 20x60         | 1,050                                      | EHS3DM251N60--T   |                 |
|          | 250      | 22x55         | 1,050                                      | EHS3DM251O55--THO |                 |
|          | 270      | 22x60         | 1,110                                      | EHS3DM271O60--THO |                 |
|          | 4.7      | 8x14          | 30   | EHS2HM4R7F14--T   |                 |
|          | 5.6      | 10x12         | 50   | EHS2HM5R6G12--T   |                 |
| 6.8      | 10x14    | 60            | EHS2HM6R8G14--T                            |                   |                 |
| 8.2      | 10x14    | 65            | EHS2HM8R2G14--T                            |                   |                 |
| 10       | 10x16    | 70            | EHS2HM100G16--T                            |                   |                 |
| 10       | 12.5x16  | 100           | EHS2HM100W16--T                            |                   |                 |
| 15       | 12.5x16  | 130           | EHS2HM150W16--T                            |                   |                 |
| 15       | 12.5x18  | 135           | EHS2HM150W18--T                            |                   |                 |
| 500      | 22       | 13x20         | 170  | EHS2HM220K20--T   |                 |
|          | 22       | 12.5x22       | 185  | EHS2HM220W22--T   |                 |
|          | 33       | 16x20         | 280  | EHS2HM330L20--T   |                 |
|          | 33       | 16x25         | 290  | EHS2HM330L25--T   |                 |
|          | 47       | 18x25         | 370  | EHS2HM470M25--T   |                 |
|          | 47       | 16x30         | 390  | EHS2HM470L30--T   |                 |
|          | 56       | 18x25         | 440  | EHS2HM560M25--T   |                 |
|          | 68       | 18x30         | 480  | EHS2HM680M30--T   |                 |
|          | 68       | 16x35         | 500  | EHS2HM680L35--T   |                 |
|          | 82       | 18x35         | 560  | EHS2HM820M35--T   |                 |
|          | 500      | 100           | 18x40                                      | 620               | EHS2HM101M40--T |
|          |          | 120           | 18x45                                      | 650               | EHS2HM121M45--T |
|          |          | 120           | 18x50                                      | 670               | EHS2HM121M50--T |
|          |          | 120           | 20x40                                      | 670               | EHS2HM121N40--T |
| 120      |          | 20x45         | 690  | EHS2HM121N45--T   |                 |
| 150      |          | 18x55         | 710  | EHS2HM151M55--T   |                 |
| 150      |          | 18x60         | 720  | EHS2HM151M60--T   |                 |
| 150      |          | 20x50         | 720  | EHS2HM151N50--T   |                 |
| 150      |          | 22x40         | 720  | EHS2HM151O40--T   |                 |
| 180      |          | 20x55         | 800  | EHS2HM181N55--T   |                 |
| 180      |          | 20x60         | 820  | EHS2HM181N60--T   |                 |
| 180      |          | 22x46         | 820  | EHS2HM181O46--T   |                 |
| 200      |          | 22x50         | 872  | EHS2HM201O50--T   |                 |
| 220      |          | 22x55         | 904  | EHS2HM221O55--THO |                 |
| 250      |          | 22x60         | 973  | EHS2HM251O60--THO |                 |
| 525      |          | 82            | 18x40                                      | 530               | EHS2YM820M40--T |
|          | 100      | 18x45         | 590  | EHS2YM101M45--T   |                 |
|          | 100      | 20x40         | 590  | EHS2YM101N40--T   |                 |
|          | 120      | 18x50         | 640  | EHS2YM121M50--T   |                 |
|          | 120      | 18x55         | 660  | EHS2YM121M55--T   |                 |
|          | 120      | 20x45         | 640  | EHS2YM121N45--T   |                 |
|          | 120      | 20x50         | 660  | EHS2YM121N50--T   |                 |
|          | 120      | 22x40         | 660  | EHS2YM121O40--T   |                 |
|          | 150      | 18x60         | 700  | EHS2YM151M60--T   |                 |
|          | 150      | 20x55         | 700  | EHS2YM151N55--T   |                 |
|          | 150      | 22x46         | 700  | EHS2YM151O46--T   |                 |
|          | 180      | 20x60         | 790  | EHS2YM181N60--T   |                 |
|          | 180      | 22x50         | 790  | EHS2YM181O50--T   |                 |
|          | 200      | 22x55         | 855  | EHS2YM201O55--THO |                 |
| 220      | 22x60    | 900           | EHS2YM221O60--THO                          |                   |                 |
| 550      | 10       | 12.5x16       | 85   | EHS2JM100W16--T   |                 |
|          | 12       | 12.5x16       | 90   | EHS2JM120W16--T   |                 |
|          | 15       | 12.5x18       | 100  | EHS2JM150W18--T   |                 |
|          | 22       | 16x20         | 190  | EHS2JM220L20--T   |                 |
|          | 33       | 16x25         | 280  | EHS2JM330L25--T   |                 |
|          | 33       | 18x20         | 295  | EHS2JM330M20--T   |                 |
|          | 47       | 18x30         | 400  | EHS2JM470M30--T   |                 |
|          | 56       | 18x35         | 440  | EHS2JM560M35--T   |                 |
|          | 68       | 18x40         | 470  | EHS2JM680M40--T   |                 |
|          | 82       | 18x45         | 510  | EHS2JM820M45--T   |                 |
|          | 82       | 20x40         | 510  | EHS2JM820N40--T   |                 |
|          | 100      | 18x50         | 650  | EHS2JM101M50--T   |                 |
|          | 100      | 20x45         | 650  | EHS2JM101N45--T   |                 |
|          | 120      | 18x55         | 710  | EHS2JM121M55--T   |                 |
|          | 120      | 20x50         | 720  | EHS2JM121N50--T   |                 |
|          | 120      | 20x55         | 730  | EHS2JM121N55--T   |                 |
|          | 120      | 22x46         | 720  | EHS2JM121O46--T   |                 |
|          | 150      | 20x60         | 760  | EHS2JM151N60--T   |                 |
| 150      | 22x50    | 800           | EHS2JM151O50--T                            |                   |                 |
| 180      | 22x55    | 840           | EHS2JM181O55--THO                          |                   |                 |
| 180      | 22x60    | 860           | EHS2JM181O60--THO                          |                   |                 |

HS series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number       |                 |
|----------|----------|---------------|--|-------------------|-----------------|
| 400      | 82       | 18x25         | 500  | EHS2GM820M25--T   |                 |
|          | 100      | 18x25         | 540  | EHS2GM101M25--T   |                 |
|          | 100      | 18x30         | 560  | EHS2GM101M30--T   |                 |
|          | 150      | 18x40         | 750  | EHS2GM151M40--T   |                 |
|          | 180      | 18x40         | 850  | EHS2GM181M40--T   |                 |
|          | 200      | 18x45         | 886  | EHS2GM201M45--T   |                 |
|          | 200      | 20x40         | 886  | EHS2GM201N40--T   |                 |
|          | 220      | 18x50         | 932  | EHS2GM221M50--T   |                 |
|          | 220      | 20x45         | 932  | EHS2GM221N45--T   |                 |
|          | 250      | 22x40         | 1,025                                      | EHS2GM251O40--T   |                 |
|          | 270      | 20x50         | 1,119                                      | EHS2GM271N50--T   |                 |
|          | 300      | 18x60         | 1,212                                      | EHS2GM301M60--T   |                 |
|          | 300      | 20x55         | 1,212                                      | EHS2GM301N55--T   |                 |
|          | 300      | 22x46         | 1,165                                      | EHS2GM301O46--T   |                 |
|          | 330      | 20x60         | 1,280                                      | EHS2GM331N60--T   |                 |
|          | 330      | 22x50         | 1,280                                      | EHS2GM331O50--T   |                 |
| 350      | 22x55    | 1,300         | EHS2GM351O55--THO                          |                   |                 |
| 420      | 22x60    | 1,400         | EHS2GM421O60--THO                          |                   |                 |
| 420      | 1        | 6.3x9         | 20   | EHS2TM010E09--T   |                 |
|          | 2.2      | 6.3x11        | 30   | EHS2TM2R2E11--T   |                 |
|          | 3.3      | 6.3x12        | 40   | EHS2TM3R3E12--T   |                 |
|          | 4.7      | 8x9           | 47   | EHS2TM4R7F09--T   |                 |
|          | 6.8      | 8x11          | 65   | EHS2TM6R8F11--T   |                 |
|          | 8.2      | 8x12          | 80   | EHS2TM8R2F12--T   |                 |
|          | 8.2      | 10x10         | 82   | EHS2TM8R2G10--T   |                 |
|          | 10       | 8x16          | 95   | EHS2TM100F16--T   |                 |
|          | 10       | 10x12         | 100  | EHS2TM100G12--T   |                 |
|          | 15       | 10x14         | 140  | EHS2TM150G14--T   |                 |
|          | 15       | 10x16         | 145  | EHS2TM150G16--T   |                 |
|          | 18       | 10x16         | 165  | EHS2TM180G16--T   |                 |
|          | 22       | 10x18         | 180  | EHS2TM220G18--T   |                 |
|          | 22       | 12.5x16       | 210  | EHS2TM220W16--T   |                 |
|          | 33       | 12.5x20       | 260  | EHS2TM330W20--T   |                 |
|          | 33       | 13x18         | 260  | EHS2TM330K18--T   |                 |
|          | 47       | 12.5x25       | 355  | EHS2TM470W25--T   |                 |
|          | 47       | 16x20         | 370  | EHS2TM470L20--T   |                 |
|          | 56       | 16x25         | 420  | EHS2TM560L25--T   |                 |
|          | 82       | 16x30         | 540  | EHS2TM820L30--T   |                 |
| 82       | 18x25    | 550           | EHS2TM820M25--T                            |                   |                 |
| 100      | 18x30    | 580           | EHS2TM101M30--T                            |                   |                 |
| 150      | 18x40    | 750           | EHS2TM151M40--T                            |                   |                 |
| 450      | 1        | 6.3x9         | 20   | EHS2WM010E09--T   |                 |
|          | 2.2      | 6.3x11        | 30   | EHS2WM2R2E11--T   |                 |
|          | 3.3      | 8x9           | 40   | EHS2WM3R3F09--T   |                 |
|          | 3.3      | 8x11          | 45   | EHS2WM3R3F11--T   |                 |
|          | 4.7      | 8x11          | 50   | EHS2WM4R7F11--T   |                 |
|          | 6.8      | 8x12          | 68   | EHS2WM6R8F12--T   |                 |
|          | 8.2      | 10x10         | 85   | EHS2WM8R2G10--T   |                 |
|          | 10       | 8x16          | 100  | EHS2WM100F16--T   |                 |
|          | 10       | 10x12         | 105  | EHS2WM100G12--T   |                 |
|          | 15       | 10x16         | 150  | EHS2WM150G16--T   |                 |
|          | 18       | 10x18         | 170  | EHS2WM180G18--T   |                 |
|          | 450      | 22            | 12.5x16                                    | 185               | EHS2WM220W16--T |
|          |          | 33            | 12.5x22                                    | 235               | EHS2WM330W22--T |
|          |          | 33            | 16x18                                      | 290               | EHS2WM330L18--T |
| 47       |          | 16x20         | 370  | EHS2WM470L20--T   |                 |
| 47       |          | 16x25         | 390  | EHS2WM470L25--T   |                 |
| 56       |          | 18x20         | 430  | EHS2WM560M20--T   |                 |
| 82       |          | 16x35         | 550  | EHS2WM820L35--T   |                 |
| 82       |          | 18x30         | 560  | EHS2WM820M30--T   |                 |
| 100      |          | 18x31         | 600  | EHS2WM101M31--T   |                 |
| 150      |          | 18x40         | 800  | EHS2WM151M40--T   |                 |
| 180      |          | 18x45         | 864  | EHS2WM181M45--T   |                 |
| 180      |          | 20x40         | 864  | EHS2WM181N40--T   |                 |
| 200      |          | 18x50         | 905  | EHS2WM201M50--T   |                 |
| 200      |          | 20x45         | 905  | EHS2WM201N45--T   |                 |
| 200      |          | 22x40         | 905  | EHS2WM201O40--T   |                 |
| 220      |          | 18x55         | 1,000                                      | EHS2WM221M55--T   |                 |
| 220      | 20x50    | 1,000         | EHS2WM221N50--T                            |                   |                 |
| 250      | 18x60    | 1,027         | EHS2WM251M60--T                            |                   |                 |
| 250      | 20x55    | 1,027         | EHS2WM251N55--T                            |                   |                 |
| 250      | 22x46    | 1,027         | EHS2WM251O46--T                            |                   |                 |
| 270      | 20x60    | 1,110         | EHS2WM271N60--T                            |                   |                 |
| 270      | 22x50    | 1,110         | EHS2WM271O50--T                            |                   |                 |
| 330      | 22x55    | 1,280         | EHS2WM331O55--THO                          |                   |                 |
| 350      | 22x60    | 1,320         | EHS2WM351O60--THO                          |                   |                 |
| 475      | 150      | 18x50         | 800  | EHS3DM151M50--T   |                 |
|          | 150      | 20x40         | 820  | EHS3DM151N40--T   |                 |
|          | 180      | 18x55         | 883  | EHS3DM181M55--T   |                 |
|          | 200      | 18x60         | 902  | EHS3DM201M60--T   |                 |
|          | 200      | 20x50         | 912  | EHS3DM201N50--T   |                 |
|          | 200      | 22x46         | 923  | EHS3DM201O46--T   |                 |
|          | 220      | 20x55         | 1,000                                      | EHS3DM221N55--T   |                 |
|          | 250      | 20x60         | 1,050                                      | EHS3DM251N60--T   |                 |
|          | 250      | 22x55         | 1,050                                      | EHS3DM251O55--THO |                 |
|          | 270      | 22x60         | 1,110                                      | EHS3DM271O60--THO |                 |
|          | 4.7      | 8x14          | 30   | EHS2HM4R7F14--T   |                 |
|          | 5.6      | 10x12         | 50   | EHS2HM5R6G12--T   |                 |
| 6.8      | 10x14    | 60            | EHS2HM6R8G14--T                            |                   |                 |
| 8.2      | 10x14    | 65            | EHS2HM8R2G14--T                            |                   |                 |
| 10       | 10x16    | 70            | EHS2HM100G16--T                            |                   |                 |
| 10       | 12.5x16  | 100           | EHS2HM100W16--T                            |                   |                 |
| 15       | 12.5x16  | 130           | EHS2HM150W16--T                            |                   |                 |
| 15       | 12.5x18  | 135           |  |                   |                 |

HF series

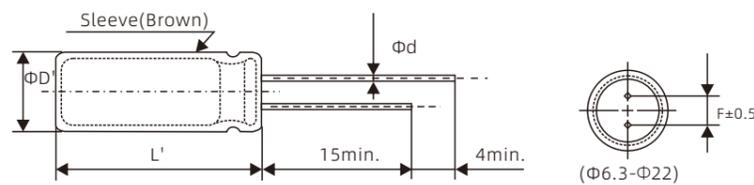
- Endurance: 5,000~10,000 hours at 105°C
- Long Life, high ripple current, for power supply
- RoHS Compliant



SPECIFICATIONS

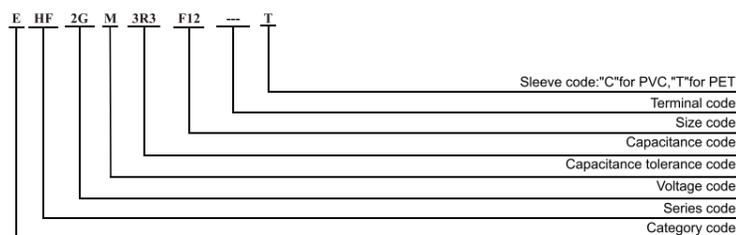
| Items   | Characteristics   |   |      |                  |     |     |     |      |      |      |          |                  |               |
|---|---|---|------|------------------|-----|-----|-----|------|------|------|----------|------------------|---------------|
| Category Temperature Range  | -40 ~ +105°C (160 to 450Vdc) -25 ~ +105°C (475 to 550Vdc)   |   |      |                  |     |     |     |      |      |      |          |                  |               |
| Rated Working Voltage Range   | 160 ~ 550Vdc  |   |      |                  |     |     |     |      |      |      |          |                  |               |
| Capacitance Tolerance   | ±20%(M) (at 20°C, 120Hz)  |   |      |                  |     |     |     |      |      |      |          |                  |               |
| Leakage Current   |   | After 1 minute  |      | After 5 minutes  |     |     |     |      |      |      |          |                  |               |
|   | CV ≤ 1,000  | ≤ 0.1CV + 40 μA   |      | ≤ 0.03CV + 15 μA |     |     |     |      |      |      |          |                  |               |
|   | CV > 1,000  | ≤ 0.04CV + 100 μA   |      | ≤ 0.02CV + 25 μA |     |     |     |      |      |      |          |                  |               |
| Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C) |   |   |      |                  |     |     |     |      |      |      |          |                  |               |
| Dissipation Factor (tanδ)   | Rated Voltage (Vdc)   | 160   | 200  | 250              | 350 | 400 | 450 | 475  | 500  | 525  | 550      |                  |               |
|   | Dissipation Factor (Max.)   | 0.15  | 0.15 | 0.15             | 0.2 | 0.2 | 0.2 | 0.24 | 0.24 | 0.24 | 0.24     | (at 20°C, 120Hz) |               |
| Low Temperature Characteristics (Max. Impedance Ratio)  | Rated Voltage (Vdc)   | 160   | 200  | 250              | 350 | 400 | 450 | 475  | 500  | 525  | 550      |                  |               |
|   | Z(-25°C)/Z(+20°C)   | 3   | 3    | 3                | 6   | 6   | 6   | 6    | 6    | 15   | 15       | (at 120Hz)       |               |
| Endurance   | The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for the specified period of time at 105°C. |   |      |                  |     |     |     |      |      |      |          |                  |               |
|   | Capacitance Change  | ≤ ±20% of the initial value (525 ~ 550Vdc: ≤ ±30% of the initial value)                     |      |                  |     |     |     |      |      |      | Case Dia | 160 to 475Vdc    | 500 to 550Vdc |
|   | Dissipation Factor  | ≤ 200% of the initial specified value (525 ~ 550Vdc: ≤ 300% of the initial specified value) |      |                  |     |     |     |      |      |      | ØD = 8   | 5,000            | 5,000         |
|   | Leakage Current   | ≤ The initial specified value   |      |                  |     |     |     |      |      |      | ØD = 10  | 8,000            | 8,000         |
| Shelf Life  | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.                                |   |      |                  |     |     |     |      |      |      |          |                  |               |
|   | Capacitance Change  | ≤ ±20% of the initial value   |      |                  |     |     |     |      |      |      |          |                  |               |
|   | Dissipation Factor  | ≤ 200% of the initial specified value   |      |                  |     |     |     |      |      |      |          |                  |               |
|   | Leakage Current   | ≤ 200% of the initial specified value   |      |                  |     |     |     |      |      |      |          |                  |               |

DIMENSIONS [mm]



| ØD  | 6.3                            | 8   | 10  | 12.5 | 13  | 16  | 18  | 20   | 22*  |
|-----|--------------------------------|-----|-----|------|-----|-----|-----|------|------|
| Ød  | 0.5                            | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8 | 0.8  | 0.8  |
| F   | 2.5                            | 3.5 | 5.0 | 5.0  | 5.0 | 7.5 | 7.5 | 10.0 | 10.0 |
| ØD' | ØD + 0.5max.                   |     |     |      |     |     |     |      |      |
| L'  | L + 2max.                      |     |     |      |     |     |     |      |      |
| ※   | 22x55/22x60 Ød=1.0, L'=L+3max. |     |     |      |     |     |     |      |      |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)  | Freq. (Hz) | 120  | 1K   | 10K  | 100K |
|------------|------------|------|------|------|------|
| Cap. < 100 | 120        | 1.00 | 1.75 | 2.25 | 2.50 |
|            | 1000       | 1.00 | 1.67 | 2.05 | 2.25 |

HF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|--|-----------------|
| 160      | 10       | 8x12          | 78   | EHF2CM100F12--T |
|          | 12       | 8x12          | 88   | EHF2CM120F12--T |
|          | 15       | 8x14          | 97   | EHF2CM150F14--T |
|          | 22       | 10x12         | 139  | EHF2CM220G12--T |
|          | 33       | 10x16         | 210  | EHF2CM330G16--T |
|          | 39       | 10x16         | 220  | EHF2CM390G16--T |
|          | 47       | 8x20          | 230  | EHF2CM470F20--T |
|          | 47       | 10x16         | 230  | EHF2CM470G16--T |
|          | 56       | 10x20         | 267  | EHF2CM560G20--T |
|          | 68       | 12.5x20       | 470  | EHF2CM680W20--T |
|          | 82       | 10x25         | 480  | EHF2CM820G25--T |
|          | 82       | 12.5x20       | 510  | EHF2CM820W20--T |
|          | 100      | 12.5x25       | 630  | EHF2CM101W25--T |
|          | 100      | 16x20         | 635  | EHF2CM101L20--T |
| 200      | 10       | 8x12          | 77   | EHF2DM100F12--T |
|          | 12       | 10x12         | 113  | EHF2DM120G12--T |
|          | 15       | 8x16          | 115  | EHF2DM150F16--T |
|          | 22       | 10x14         | 152  | EHF2DM220G14--T |
|          | 33       | 10x18         | 225  | EHF2DM330G18--T |
|          | 33       | 12.5x16       | 225  | EHF2DM330W16--T |
|          | 39       | 12.5x16       | 263  | EHF2DM390W16--T |
|          | 47       | 12.5x18       | 362  | EHF2DM470W18--T |
|          | 68       | 12.5x20       | 470  | EHF2DM680W20--T |
|          | 68       | 12.5x25       | 485  | EHF2DM680W25--T |
|          | 82       | 16x20         | 530  | EHF2DM820L20--T |
|          | 100      | 12.5x25       | 551  | EHF2DM101W25--T |
|          | 100      | 16x20         | 556  | EHF2DM101L20--T |
|          | 150      | 16x25         | 840  | EHF2DM151L25--T |
| 150      | 16x30    | 865           | EHF2DM151L30--T                            |                 |
| 150      | 18x25    | 870           | EHF2DM151M25--T                            |                 |
| 220      | 18x25    | 1,050         | EHF2DM221M25--T                            |                 |
| 220      | 18x30    | 1,080         | EHF2DM221M30--T                            |                 |
| 330      | 18x35    | 1,430         | EHF2DM331M35--T                            |                 |
| 330      | 16x45    | 1,404         | EHF2DM331L45--T                            |                 |
| 250      | 4.7      | 8x11          | 49   | EHF2EM4R7F11--T |
|          | 5.6      | 8x11          | 55   | EHF2EM5R6F11--T |
|          | 6.8      | 10x10         | 80   | EHF2EM6R8G10--T |
|          | 10       | 10x12         | 95   | EHF2EM100G12--T |
|          | 22       | 10x16         | 172  | EHF2EM220G16--T |
|          | 33       | 10x20         | 248  | EHF2EM330G20--T |
|          | 47       | 10x25         | 315  | EHF2EM470G25--T |
|          | 47       | 12.5x20       | 328  | EHF2EM470W20--T |
|          | 56       | 12.5x20       | 340  | EHF2EM560W20--T |
|          | 68       | 16x20         | 528  | EHF2EM680L20--T |
|          | 82       | 16x20         | 550  | EHF2EM820L20--T |
|          | 82       | 16x25         | 560  | EHF2EM820L25--T |
|          | 100      | 12.5x30       | 584  | EHF2EM101W30--T |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|--|-----------------|
| 250      | 100      | 16x25         | 604  | EHF2EM101L25--T |
|          | 150      | 18x25         | 866  | EHF2EM151M25--T |
|          | 180      | 18x25         | 890  | EHF2EM221M25--T |
|          | 220      | 18x30         | 923  | EHF2EM221M30--T |
|          | 350      | 4.7           | 10x10                                      | 50              |
| 5.6      |          | 10x12         | 90   | EHF2VM5R6G12--T |
| 6.8      |          | 10x12         | 95   | EHF2VM6R8G12--T |
| 10       |          | 10x16         | 110  | EHF2VM100G16--T |
| 22       |          | 12.5x16       | 205  | EHF2VM220W16--T |
| 33       |          | 16x20         | 364  | EHF2VM330L20--T |
| 39       |          | 16x20         | 385  | EHF2VM390L20--T |
| 47       |          | 16x20         | 430  | EHF2VM470L20--T |
| 47       |          | 16x25         | 445  | EHF2VM470L25--T |
| 68       |          | 16x25         | 560  | EHF2VM680L25--T |
| 68       |          | 18x20         | 550  | EHF2VM680M20--T |
| 68       |          | 18x25         | 570  | EHF2VM680M25--T |
| 82       |          | 18x25         | 618  | EHF2VM820M25--T |
| 100      |          | 18x25         | 700  | EHF2VM101M25--T |
| 100      | 18x30    | 725           | EHF2VM101M30--T                            |                 |
| 120      | 18x30    | 836           | EHF2VM121M30--T                            |                 |
| 150      | 18x35    | 970           | EHF2VM151M35--T                            |                 |
| 400      | 1        | 6.3x9         | 18   | EHF2GM010E09--T |
|          | 2.2      | 6.3x12        | 34   | EHF2GM2R2E12--T |
|          | 3.3      | 8x12          | 60   | EHF2GM3R3F12--T |
|          | 4.7      | 8x12          | 65   | EHF2GM4R7F12--T |
|          | 6.8      | 8x12          | 70   | EHF2GM6R8F12--T |
|          | 10       | 10x16         | 121  | EHF2GM100G16--T |
|          | 15       | 10x16         | 142  | EHF2GM150G16--T |
|          | 22       | 10x18         | 182  | EHF2GM220G18--T |
|          | 22       | 12.5x16       | 196  | EHF2GM220W16--T |
|          | 33       | 16x20         | 368  | EHF2GM330L20--T |
|          | 39       | 12.5x25       | 370  | EHF2GM390W25--T |
|          | 47       | 16x20         | 400  | EHF2GM470L20--T |
|          | 47       | 16x25         | 460  | EHF2GM470L25--T |
|          | 47       | 18x20         | 412  | EHF2GM470M20--T |
| 56       | 16x25    | 500           | EHF2GM560L25--T                            |                 |
| 68       | 12.5x40  | 600           | EHF2GM680W40--T                            |                 |
| 68       | 18x25    | 590           | EHF2GM680M25--T                            |                 |
| 82       | 12.5x45  | 625           | EHF2GM820W45--T                            |                 |
| 82       | 18x25    | 610           | EHF2GM820M25--T                            |                 |
| 82       | 18x30    | 630           | EHF2GM820M30--T                            |                 |
| 100      | 12.5x50  | 790           | EHF2GM101W50--T                            |                 |
| 100      | 18x30    | 745           | EHF2GM101M30--T                            |                 |
| 100      | 18x35    | 785           | EHF2GM101M35--T                            |                 |
| 120      | 18x35    | 870           | EHF2GM121M35--T                            |                 |
| 150      | 18x40    | 985           | EHF2GM151M40--T                            |                 |
| 180      | 18x45    | 1,020         | EHF2GM181M45--T                            |                 |
| 200      | 20x40    | 1,045         | EHF2GM201N40--T                            |                 |
| 220      | 18x50    | 1,100         | EHF2GM221M50--T                            |                 |
| 220      | 20x45    | 1,100         | EHF2GM221N45--T                            |                 |
| 250      | 22x46    | 1,210         | EHF2GM251O46--T                            |                 |
| 300      | 20x55    | 1,375         | EHF2GM301N55--T                            |                 |

Radial Type

HF series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number        |
|----------|----------|---------------|--|--------------------|
| 400      | 330      | 22x55         | 1,430                                      | EHF2GM331O55---THO |
|          | 390      | 22x60         | 1,540                                      | EHF2GM391O60---THO |
| 450      | 6.8      | 8x12          | 60   | EHF2WM6R8F12---T   |
|          | 10       | 10x16         | 120  | EHF2WM100G16---T   |
|          | 10       | 12.5x16       | 125  | EHF2WM100W16---T   |
|          | 15       | 16x16         | 245  | EHF2WM150L16---T   |
|          | 22       | 16x20         | 295  | EHF2WM220L20---T   |
|          | 27       | 12.5x25       | 305  | EHF2WM270W25---T   |
|          | 33       | 16x20         | 338  | EHF2WM330L20---T   |
|          | 33       | 16x25         | 390  | EHF2WM330L25---T   |
|          | 47       | 16x25         | 400  | EHF2WM470L25---T   |
|          | 47       | 18x20         | 456  | EHF2WM470M20---T   |
|          | 47       | 18x25         | 496  | EHF2WM470M25---T   |
|          | 56       | 12.5x40       | 550  | EHF2WM560W40---T   |
|          | 68       | 18x25         | 558  | EHF2WM680M25---T   |
|          | 82       | 12.5x50       | 682  | EHF2WM820W50---T   |
|          | 82       | 18x30         | 638  | EHF2WM820M30---T   |
| 100      | 18x35    | 750           | EHF2WM101M35---T                           |                    |
| 120      | 22x30    | 826           | EHF2WM121O30---T                           |                    |
| 150      | 18x45    | 900           | EHF2WM151M45---T                           |                    |
| 180      | 18x55    | 950           | EHF2WM181M55---T                           |                    |
| 200      | 20x45    | 995           | EHF2WM201N45---T                           |                    |
| 220      | 20x55    | 1,050         | EHF2WM221N55---T                           |                    |
| 250      | 20x60    | 1,110         | EHF2WM251N60---T                           |                    |
| 250      | 22x50    | 1,110         | EHF2WM251O50---T                           |                    |
| 300      | 22x55    | 1,325         | EHF2WM301O55---THO                         |                    |
| 475      | 100      | 18x40         | 750  | EHF3DM101M40---T   |
|          | 120      | 18x45         | 825  | EHF3DM121M45---T   |
|          | 120      | 20x40         | 825  | EHF3DM121N40---T   |
|          | 150      | 18x50         | 880  | EHF3DM151M50---T   |
|          | 150      | 18x55         | 910  | EHF3DM151M55---T   |
|          | 150      | 20x45         | 890  | EHF3DM151N45---T   |
|          | 150      | 20x50         | 910  | EHF3DM151N50---T   |
|          | 150      | 22x40         | 900  | EHF3DM151O40---T   |
|          | 180      | 18x60         | 950  | EHF3DM181M60---T   |
|          | 180      | 20x55         | 950  | EHF3DM181N55---T   |
|          | 180      | 22x46         | 950  | EHF3DM181O46---T   |
|          | 200      | 20x60         | 995  | EHF3DM201N60---T   |
|          | 200      | 22x50         | 995  | EHF3DM201O50---T   |
|          | 220      | 22x55         | 1,050                                      | EHF3DM221O55---THO |
|          | 250      | 22x60         | 1,100                                      | EHF3DM251O60---THO |
| 500      | 56       | 16x40         | 430  | EHF2HM560L40---T   |
|          | 68       | 16x45         | 520  | EHF2HM680L45---T   |
|          | 68       | 18x30         | 480  | EHF2HM680M30---T   |
|          | 82       | 18x35         | 560  | EHF2HM820M35---T   |
|          | 82       | 18x40         | 580  | EHF2HM820M40---T   |
|          | 100      | 18x40         | 660  | EHF2HM101M40---T   |
|          | 100      | 18x45         | 680  | EHF2HM101M45---T   |
|          | 100      | 20x40         | 680  | EHF2HM101N40---T   |
|          | 120      | 18x50         | 740  | EHF2HM121M50---T   |
|          | 120      | 20x45         | 740  | EHF2HM121N45---T   |
| 150      | 18x60    | 800           | EHF2HM151M60---T                           |                    |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number        |
|----------|----------|---------------|--|--------------------|
| 500      | 150      | 20x50         | 780  | EHF2HM151N50---T   |
|          | 150      | 20x55         | 800  | EHF2HM151N55---T   |
|          | 150      | 22x46         | 800  | EHF2HM151O46---T   |
|          | 180      | 20x60         | 880  | EHF2HM181N60---T   |
|          | 180      | 22x50         | 880  | EHF2HM181O50---T   |
|          | 200      | 22x55         | 920  | EHF2HM201O55---THO |
| 525      | 220      | 22x60         | 960  | EHF2HM221O60---THO |
|          | 82       | 18x40         | 530  | EHF2YM820M40---T   |
|          | 100      | 18x45         | 590  | EHF2YM101M45---T   |
|          | 100      | 20x40         | 590  | EHF2YM101N40---T   |
|          | 120      | 18x55         | 660  | EHF2YM121M55---T   |
|          | 120      | 20x45         | 640  | EHF2YM121N45---T   |
|          | 120      | 20x50         | 660  | EHF2YM121N50---T   |
|          | 120      | 22x40         | 660  | EHF2YM121O40---T   |
|          | 150      | 20x55         | 700  | EHF2YM151N55---T   |
|          | 150      | 22x46         | 700  | EHF2YM151O46---T   |
| 550      | 180      | 20x60         | 790  | EHF2YM181N60---T   |
|          | 200      | 22x55         | 855  | EHF2YM201O55---THO |
|          | 220      | 22x60         | 900  | EHF2YM221O60---THO |
|          | 68       | 18x40         | 470  | EHF2JM680M40---T   |
|          | 82       | 18x45         | 510  | EHF2JM820M45---T   |
|          | 82       | 18x50         | 530  | EHF2JM820M50---T   |
|          | 82       | 20x40         | 510  | EHF2JM820N40---T   |
|          | 82       | 20x45         | 530  | EHF2JM820N45---T   |
|          | 100      | 18x55         | 590  | EHF2JM101M55---T   |
|          | 100      | 20x50         | 590  | EHF2JM101N50---T   |
| 110      | 18x60    | 610           | EHF2JM111M60---T                           |                    |
| 120      | 20x55    | 620           | EHF2JM121N55---T                           |                    |
| 120      | 20x60    | 640           | EHF2JM121N60---T                           |                    |
| 120      | 22x46    | 620           | EHF2JM121O46---T                           |                    |
| 120      | 22x50    | 640           | EHF2JM121O50---T                           |                    |
| 150      | 22x55    | 700           | EHF2JM151O55---THO                         |                    |
| 180      | 22x60    | 790           | EHF2JM181O60---THO                         |                    |

※Specifications subject to change without notice

HT series

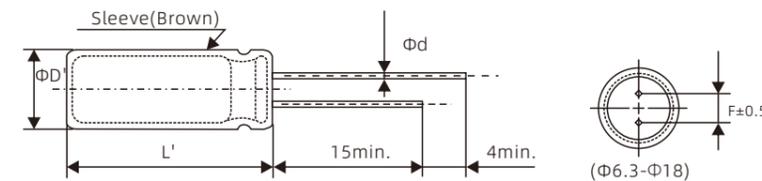
- Endurance: 2,000 hours at 125°C
- High temperature, high ripple current, for power supply
- RoHS Compliant



SPECIFICATIONS

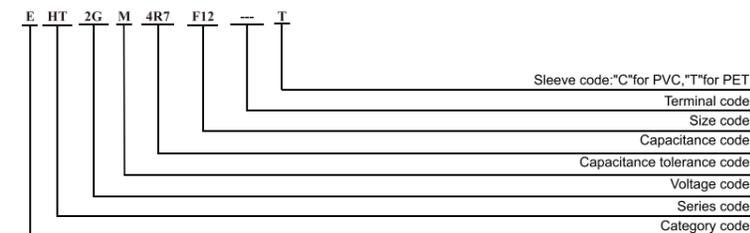
| Items   | Characteristics   |                                      |                  |      |      |                       |      |      |      |                  |  |
|---|---|--------------------------------------|------------------|------|------|-----------------------|------|------|------|------------------|--|
| Category Temperature Range  | -40 ~ +125°C (160 ~450Vdc)  |                                      |                  |      |      | -25 ~ +125°C (500Vdc) |      |      |      |                  |  |
| Rated Working Voltage Range   | 160 ~500Vdc   |                                      |                  |      |      |                       |      |      |      |                  |  |
| Capacitance Tolerance   | ±20%(M) (at 20°C, 120Hz)  |                                      |                  |      |      |                       |      |      |      |                  |  |
| Leakage Current   | CV ≤ 1,000  |                                      | After 1 minute   |      |      | After 5 minutes       |      |      |      |                  |  |
|   | CV > 1,000  |                                      | I ≤ 0.1CV+40μA   |      |      | I ≤ 0.03CV+15μA       |      |      |      |                  |  |
|   |   |                                      | I ≤ 0.04CV+100μA |      |      | I ≤ 0.02CV+25μA       |      |      |      |                  |  |
| Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C) |   |                                      |                  |      |      |                       |      |      |      |                  |  |
| Dissipation Factor (tanδ)   | Rated Voltage (Vdc)   | 160                                  | 200              | 250  | 350  | 400                   | 420  | 450  | 500  |                  |  |
|   | Dissipation Factor(Max.)  | 0.18                                 | 0.18             | 0.18 | 0.24 | 0.24                  | 0.24 | 0.24 | 0.24 | (at 20°C, 120Hz) |  |
| Low Temperature Characteristics (Max. Impedance Ratio)  | Rated Voltage (Vdc)   | 160                                  | 200              | 250  | 350  | 400                   | 420  | 450  | 500  |                  |  |
|   | Z(-25°C)/Z(+20°C)   | 3                                    | 3                | 3    | 6    | 6                     | 6    | 6    | 8    | (at 120Hz)       |  |
| Endurance   | Z(-40°C)/Z(+20°C)   | 8                                    | 8                | 8    | 10   | 10                    | 12   | 15   | /    |                  |  |
|   | The following specification shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 125°C. |                                      |                  |      |      |                       |      |      |      |                  |  |
| Shelf Life  | Capacitance Change  | ≤±30% of the initial value           |                  |      |      |                       |      |      |      |                  |  |
|   | Dissipation Factor  | ≤300% of the initial specified value |                  |      |      |                       |      |      |      |                  |  |
|   | Leakage Current   | ≤The initial specified value         |                  |      |      |                       |      |      |      |                  |  |
| Shelf Life  | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.              |                                      |                  |      |      |                       |      |      |      |                  |  |
|   | Capacitance Change  | ≤±20% of the initial value           |                  |      |      |                       |      |      |      |                  |  |
|   | Dissipation Factor  | ≤200% of the initial specified value |                  |      |      |                       |      |      |      |                  |  |
|   | Leakage Current   | ≤200% of the initial specified value |                  |      |      |                       |      |      |      |                  |  |

DIMENSIONS [mm]



| ΦD  | 6.3        | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|------|-----|-----|
| Φd  | 0.5        | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.5        | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| ΦD' | ΦD+0.5max. |     |     |      |     |     |
| L'  | L+2max.    |     |     |      |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)  | Freq. (Hz) |      |      |      |
|------------|------------|------|------|------|
|            | 120        | 1K   | 10K  | 100K |
| Cap. < 100 | 1.00       | 1.75 | 2.25 | 2.50 |
| Cap. ≥ 100 | 1.00       | 1.67 | 2.05 | 2.25 |

HT series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/125°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 160      | 4.7      | 8x9           | 20  | EHT2CM4R7F09--T |
|          | 5.6      | 8x11          | 28  | EHT2CM5R6F11--T |
|          | 5.6      | 8x12          | 32  | EHT2CM5R6F12--T |
|          | 6.8      | 8x11          | 33  | EHT2CM6R8F11--T |
|          | 6.8      | 8x12          | 35  | EHT2CM6R8F12--T |
|          | 8.2      | 8x12          | 45  | EHT2CM8R2F12--T |
|          | 10       | 8x12          | 55  | EHT2CM100F12--T |
|          | 10       | 10x10         | 58  | EHT2CM100G10--T |
|          | 15       | 8x14          | 60  | EHT2CM150F14--T |
|          | 15       | 10x12         | 78  | EHT2CM150G12--T |
|          | 22       | 10x12         | 110                                       | EHT2CM220G12--T |
|          | 33       | 10x16         | 136                                       | EHT2CM330G16--T |
|          | 47       | 10x18         | 155                                       | EHT2CM470G18--T |
|          | 47       | 12.5x16       | 160                                       | EHT2CM470W16--T |
|          | 68       | 12.5x18       | 190                                       | EHT2CM680W18--T |
|          | 82       | 12.5x20       | 210                                       | EHT2CM820W20--T |
|          | 100      | 12.5x25       | 285                                       | EHT2CM101W25--T |
|          | 100      | 16x18         | 292                                       | EHT2CM101L18--T |
| 120      | 16x20    | 325           | EHT2CM121L20--T                           |                 |
| 150      | 16x25    | 350           | EHT2CM151L25--T                           |                 |
| 150      | 18x20    | 365           | EHT2CM151M20--T                           |                 |
| 200      | 4.7      | 8x9           | 35  | EHT2DM4R7F09--T |
|          | 4.7      | 8x11          | 38  | EHT2DM4R7F11--T |
|          | 5.6      | 8x11          | 40  | EHT2DM5R6F11--T |
|          | 6.8      | 8x11          | 45  | EHT2DM6R8F11--T |
|          | 6.8      | 8x12          | 46  | EHT2DM6R8F12--T |
|          | 8.2      | 8x12          | 58  | EHT2DM8R2F12--T |
|          | 10       | 8x14          | 66  | EHT2DM100F14--T |
|          | 10       | 10x12         | 90  | EHT2DM100G12--T |
|          | 15       | 10x12         | 95  | EHT2DM150G12--T |
|          | 22       | 10x14         | 115                                       | EHT2DM220G14--T |
|          | 33       | 10x18         | 145                                       | EHT2DM330G18--T |
|          | 33       | 12.5x16       | 150                                       | EHT2DM330W16--T |
|          | 47       | 12.5x18       | 165                                       | EHT2DM470W18--T |
|          | 56       | 12.5x20       | 180                                       | EHT2DM560W20--T |
|          | 68       | 12.5x22       | 200                                       | EHT2DM680W22--T |
|          | 68       | 16x18         | 225                                       | EHT2DM680L18--T |
|          | 82       | 16x20         | 240                                       | EHT2DM820L20--T |
|          | 100      | 16x25         | 310                                       | EHT2DM101L25--T |
| 120      | 18x25    | 350           | EHT2DM121M25--T                           |                 |
| 150      | 16x30    | 375           | EHT2DM151L30--T                           |                 |
| 250      | 4.7      | 8x9           | 38  | EHT2EM4R7F09--T |
|          | 4.7      | 8x11          | 40  | EHT2EM4R7F11--T |
|          | 5.6      | 8x11          | 45  | EHT2EM5R6F11--T |
|          | 6.8      | 8x12          | 52  | EHT2EM6R8F12--T |
|          | 8.2      | 8x14          | 65  | EHT2EM8R2F14--T |
|          | 10       | 8x16          | 80  | EHT2EM100F16--T |
|          | 10       | 10x12         | 85  | EHT2EM100G12--T |
|          | 15       | 10x14         | 95  | EHT2EM150G14--T |
|          | 22       | 10x16         | 115                                       | EHT2EM220G16--T |
|          | 33       | 12.5x16       | 145                                       | EHT2EM330W16--T |
|          | 33       | 12.5x18       | 160                                       | EHT2EM330W18--T |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/125°C, 120Hz) | Part Number     |                 |
|----------|----------|---------------|---|-----------------|-----------------|
| 250      | 47       | 12.5x20       | 175                                       | EHT2EM470W20--T |                 |
|          | 56       | 12.5x25       | 190                                       | EHT2EM560W25--T |                 |
|          | 56       | 16x18         | 205                                       | EHT2EM560L18--T |                 |
|          | 68       | 12.5x30       | 225                                       | EHT2EM680W30--T |                 |
|          | 68       | 16x20         | 235                                       | EHT2EM680L20--T |                 |
|          | 82       | 12.5x35       | 260                                       | EHT2EM820W35--T |                 |
|          | 82       | 16x25         | 275                                       | EHT2EM820L25--T |                 |
|          | 100      | 16x30         | 325                                       | EHT2EM101L30--T |                 |
|          | 100      | 18x25         | 350                                       | EHT2EM101M25--T |                 |
|          | 120      | 16x30         | 375                                       | EHT2EM121L30--T |                 |
|          | 120      | 18x25         | 385                                       | EHT2EM121M25--T |                 |
|          | 150      | 18x30         | 400                                       | EHT2EM151M30--T |                 |
|          | 350      | 4.7           | 8x11                                      | 40              | EHT2VM4R7F11--T |
|          |          | 4.7           | 8x12                                      | 42              | EHT2VM4R7F12--T |
|          |          | 5.6           | 8x12                                      | 45              | EHT2VM5R6F12--T |
|          |          | 5.6           | 8x14                                      | 50              | EHT2VM5R6F14--T |
|          |          | 6.8           | 8x14                                      | 52              | EHT2VM6R8F14--T |
|          |          | 6.8           | 8x16                                      | 55              | EHT2VM6R8F16--T |
| 8.2      |          | 8x16          | 65  | EHT2VM8R2F16--T |                 |
| 10       |          | 10x12         | 80  | EHT2VM100G12--T |                 |
| 10       |          | 10x14         | 85  | EHT2VM100G14--T |                 |
| 15       |          | 10x16         | 95  | EHT2VM150G16--T |                 |
| 22       |          | 10x18         | 125                                       | EHT2VM220G18--T |                 |
| 33       |          | 12.5x20       | 145                                       | EHT2VM330W20--T |                 |
| 33       |          | 12.5x22       | 160                                       | EHT2VM330W22--T |                 |
| 47       |          | 12.5x25       | 175                                       | EHT2VM470W25--T |                 |
| 47       |          | 16x20         | 185                                       | EHT2VM470L20--T |                 |
| 56       |          | 16x25         | 205                                       | EHT2VM560L25--T |                 |
| 68       |          | 16x25         | 225                                       | EHT2VM680L25--T |                 |
| 68       |          | 18x20         | 235                                       | EHT2VM680M20--T |                 |
| 82       | 18x25    | 275           | EHT2VM820M25--T                           |                 |                 |
| 100      | 16x30    | 325           | EHT2VM101L30--T                           |                 |                 |
| 100      | 18x25    | 350           | EHT2VM101M25--T                           |                 |                 |
| 120      | 16x35    | 375           | EHT2VM121L35--T                           |                 |                 |
| 120      | 18x30    | 385           | EHT2VM121M30--T                           |                 |                 |
| 150      | 18x35    | 400           | EHT2VM151M35--T                           |                 |                 |
| 400      | 4.7      | 8x12          | 40  | EHT2GM4R7F12--T |                 |
|          | 5.6      | 8x14          | 45  | EHT2GM5R6F14--T |                 |
|          | 5.6      | 8x16          | 50  | EHT2GM5R6F16--T |                 |
|          | 6.8      | 8x16          | 52  | EHT2GM6R8F16--T |                 |
|          | 6.8      | 10x12         | 55  | EHT2GM6R8G12--T |                 |
|          | 8.2      | 10x12         | 65  | EHT2GM8R2G12--T |                 |
|          | 10       | 10x14         | 80  | EHT2GM100G14--T |                 |
|          | 10       | 10x16         | 85  | EHT2GM100G16--T |                 |
|          | 15       | 10x18         | 100                                       | EHT2GM150G18--T |                 |
|          | 22       | 10x18         | 125                                       | EHT2GM220G18--T |                 |
|          | 22       | 12.5x18       | 130                                       | EHT2GM220W18--T |                 |
|          | 33       | 12.5x20       | 150                                       | EHT2GM330W20--T |                 |
|          | 33       | 12.5x22       | 165                                       | EHT2GM330W22--T |                 |
|          | 47       | 16x20         | 200                                       | EHT2GM470L20--T |                 |
|          | 47       | 16x25         | 210                                       | EHT2GM470L25--T |                 |
|          | 56       | 16x25         | 235                                       | EHT2GM560L25--T |                 |

HT series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/125°C, 120Hz) | Part Number     |                 |
|----------|----------|---------------|---|-----------------|-----------------|
| 400      | 56       | 18x20         | 240                                       | EHT2GM560M20--T |                 |
|          | 68       | 16x30         | 265                                       | EHT2GM680L30--T |                 |
|          | 68       | 18x25         | 280                                       | EHT2GM680M25--T |                 |
|          | 82       | 18x25         | 325                                       | EHT2GM820M25--T |                 |
|          | 100      | 18x30         | 395                                       | EHT2GM101M30--T |                 |
|          | 120      | 18x35         | 420                                       | EHT2GM121M35--T |                 |
|          | 150      | 18x40         | 465                                       | EHT2GM151M40--T |                 |
|          | 420      | 4.7           | 8x12                                      | 40              | EHT2TM4R7F12--T |
|          |          | 5.6           | 8x16                                      | 45              | EHT2TM5R6F16--T |
|          |          | 5.6           | 10x12                                     | 50              | EHT2TM5R6G12--T |
| 6.8      |          | 10x12         | 55  | EHT2TM6R8G12--T |                 |
| 8.2      |          | 10x14         | 65  | EHT2TM8R2G14--T |                 |
| 10       |          | 10x14         | 85  | EHT2TM100G14--T |                 |
| 10       |          | 10x16         | 90  | EHT2TM100G16--T |                 |
| 15       |          | 10x18         | 105                                       | EHT2TM150G18--T |                 |
| 22       |          | 12.5x18       | 135                                       | EHT2TM220W18--T |                 |
| 22       |          | 12.5x20       | 140                                       | EHT2TM220W20--T |                 |
| 450      | 33       | 12.5x22       | 165                                       | EHT2TM330W22--T |                 |
|          | 33       | 12.5x25       | 175                                       | EHT2TM330W25--T |                 |
|          | 47       | 16x25         | 205                                       | EHT2TM470L25--T |                 |
|          | 47       | 18x20         | 215                                       | EHT2TM470M20--T |                 |
|          | 56       | 18x25         | 240                                       | EHT2TM560M25--T |                 |
|          | 68       | 16x30         | 275                                       | EHT2TM680L30--T |                 |
|          | 82       | 16x35         | 345                                       | EHT2TM820L35--T |                 |
|          | 82       | 18x30         | 355                                       | EHT2TM820M30--T |                 |
|          | 100      | 16x40         | 405                                       | EHT2TM101L40--T |                 |
|          | 100      | 18x35         | 415                                       | EHT2TM101M35--T |                 |
| 500      | 120      | 16x45         | 420                                       | EHT2TM121L45--T |                 |
|          | 120      | 18x40         | 430                                       | EHT2TM121M40--T |                 |
|          | 150      | 18x45         | 465                                       | EHT2TM151M45--T |                 |
|          | 4.7      | 8x16          | 40  | EHT2WM4R7F16--T |                 |
|          | 5.6      | 10x12         | 45  | EHT2WM5R6G12--T |                 |
|          | 5.6      | 10x14         | 50  | EHT2WM5R6G14--T |                 |
|          | 6.8      | 10x14         | 55  | EHT2WM6R8G14--T |                 |
|          | 8.2      | 10x16         | 70  | EHT2WM8R2G16--T |                 |
|          | 10       | 10x18         | 85  | EHT2WM100G18--T |                 |
|          | 10       | 12.5x16       | 90  | EHT2WM100W16--T |                 |
| 500      | 15       | 12.5x16       | 110                                       | EHT2WM150W16--T |                 |
|          | 15       | 12.5x18       | 115                                       | EHT2WM150W18--T |                 |
|          | 22       | 13x20         | 135                                       | EHT2WM220K20--T |                 |
|          | 22       | 12.5x22       | 140                                       | EHT2WM220W22--T |                 |
|          | 33       | 16x20         | 175                                       | EHT2WM330L20--T |                 |
|          | 33       | 16x25         | 185                                       | EHT2WM330L25--T |                 |
|          | 47       | 18x25         | 215                                       | EHT2WM470M25--T |                 |
|          | 47       | 16x30         | 225                                       | EHT2WM470L30--T |                 |
|          | 56       | 18x25         | 255                                       | EHT2WM560M25--T |                 |
|          | 68       | 18x30         | 285                                       | EHT2WM680M30--T |                 |
| 500      | 68       | 16x35         | 305                                       | EHT2WM680L35--T |                 |
|          | 82       | 18x35         | 355                                       | EHT2WM820M35--T |                 |
|          | 100      | 18x40         | 415                                       | EHT2WM101M40--T |                 |
|          | 120      | 18x45         | 420                                       | EHT2WM121M45--T |                 |
|          | 10       | 12.5x16       | 80  | EHT2HM100W16--T |                 |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/125°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 500      | 10       | 12.5x18       | 90  | EHT2HM100W18--T |
|          | 12       | 12.5x18       | 100                                       | EHT2HM120W18--T |
|          | 15       | 12.5x20       | 110                                       | EHT2HM150W20--T |
|          | 15       | 12.5x30       | 125                                       | EHT2HM150W30--T |
|          | 22       | 16x20         | 150                                       | EHT2HM220L20--T |
|          | 33       | 16x25         | 175                                       | EHT2HM330L25--T |
|          | 33       | 18x20         | 185                                       | EHT2HM330M20--T |
|          | 47       | 18x30         | 215                                       | EHT2HM470M30--T |
|          | 56       | 18x35         | 260                                       | EHT2HM560M35--T |

\*Specifications subject to change without notice

Radial Type

# HL series

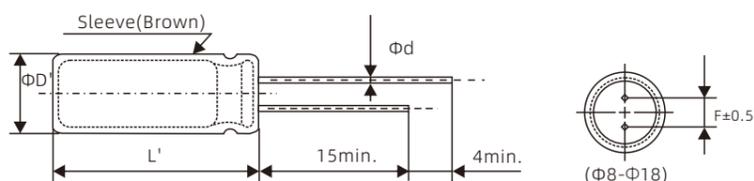
- Endurance: 8,000~12,000 hours at 105°C
- Long life, downsized, high ripple current, for power supply
- RoHS Compliant



## SPECIFICATIONS

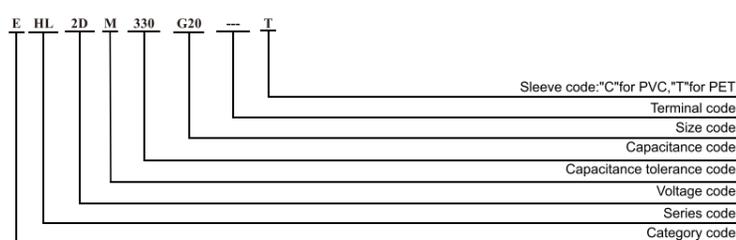
| Items   | Characteristics   |                                      |      |                 |                      |               |                      |                    |                  |
|---|---|--------------------------------------|------|-----------------|----------------------|---------------|----------------------|--------------------|------------------|
| Category Temperature Range  | -40 ~ +105°C(160 to 450Vdc)   |                                      |      |                 | -25 ~ +105°C(500Vdc) |               |                      |                    |                  |
| Rated Working Voltage Range   | 160 ~ 500Vdc  |                                      |      |                 |                      |               |                      |                    |                  |
| Capacitance Tolerance   | ±20%(M) (at 20°C, 120Hz)  |                                      |      |                 |                      |               |                      |                    |                  |
| Leakage Current   | CV≤1,000  | After 1 minute                       |      | After 5 minutes |                      |               |                      |                    |                  |
|   |   | I≤0.1CV+40μA                         |      | I≤0.03CV+15μA   |                      |               |                      |                    |                  |
|   |   | CV > 1,000                           |      | I≤0.04CV+100μA  |                      |               |                      |                    |                  |
| Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C) |   |                                      |      |                 |                      |               |                      |                    |                  |
| Dissipation Factor (tanδ)   | Rated Voltage (Vdc)   | 160                                  | 200  | 250             | 350                  | 400           | 450                  | 500                | (at 20°C, 120Hz) |
|   | Dissipation Factor(Max.)  | 0.18                                 | 0.18 | 0.18            | 0.24                 | 0.24          | 0.24                 | 0.24               |                  |
| Low Temperature Characteristics (Max. Impedance Ratio)  | Rated Voltage (Vdc)   | 160                                  | 200  | 250             | 350                  | 400           | 450                  | 500                | (at 120Hz)       |
|   | Z(-25°C)/Z(+20°C)   | 3                                    | 3    | 3               | 6                    | 6             | 6                    | 6                  |                  |
| Endurance   | The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for the specified period of time at 105°C. |                                      |      |                 |                      |               |                      |                    |                  |
|   | Capacitance Change  | ≤±20% of the initial value           |      |                 |                      | Rated Voltage |                      | 160 to 450Vdc      | 500Vdc           |
| Shelf Life  | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.                                |                                      |      |                 |                      |               |                      |                    |                  |
|   | Capacitance Change  | ≤±20% of the initial value           |      |                 |                      | Life Time     |                      | L≤20: 10,000 hours | Φ10: 8,000 hours |
| Leakage Current   | ≤The initial specified value  |                                      |      |                 | L>20: 12,000 hours   |               | Φ≥12.5: 10,000 hours |                    |                  |
|   | Dissipation Factor  | ≤200% of the initial specified value |      |                 |                      |               |                      |                    |                  |
| Leakage Current   | ≤200% of the initial specified value  |                                      |      |                 |                      |               |                      |                    |                  |

## DIMENSIONS [mm]



|     |            |     |      |     |     |      |
|-----|------------|-----|------|-----|-----|------|
| ∅D  | 8          | 10  | 12.5 | 16  | 18  | 22   |
| ∅d  | 0.5        | 0.6 | 0.6  | 0.6 | 0.8 | 0.8  |
| F   | 3.5        | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 |
| ∅D' | ∅D+0.5max. |     |      |     |     |      |
| L'  | L+2max.    |     |      |     |     |      |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)  | Freq. (Hz) | 120  | 1K   | 10K  | 100K |
|------------|------------|------|------|------|------|
| Cap. < 100 | 120        | 1.00 | 1.75 | 2.25 | 2.50 |
|            | 1000       | 1.00 | 1.67 | 2.05 | 2.25 |

# HL series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mArms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 160      | 33       | 10x14         | 180                                       | EHL2CM330G14--T |
|          | 47       | 10x20         | 300                                       | EHL2CM470G20--T |
|          | 56       | 10x20         | 318                                       | EHL2CM560G20--T |
|          | 68       | 12.5x20       | 377                                       | EHL2CM680W20--T |
|          | 82       | 10x25         | 416                                       | EHL2CM820G25--T |
|          | 82       | 10x30         | 448                                       | EHL2CM820G30--T |
|          | 100      | 12.5x20       | 520                                       | EHL2CM101W20--T |
|          | 120      | 10x35         | 572                                       | EHL2CM121G35--T |
|          | 150      | 10x45         | 696                                       | EHL2CM151G45--T |
|          | 150      | 12.5x25       | 767                                       | EHL2CM151W25--T |
|          | 180      | 12.5x30       | 885                                       | EHL2CM181W30--T |
|          | 180      | 16x20         | 858                                       | EHL2CM181L20--T |
|          | 220      | 12.5x35       | 1,044                                     | EHL2CM221W35--T |
|          | 220      | 16x25         | 1,022                                     | EHL2CM221L25--T |
|          | 270      | 12.5x40       | 1,196                                     | EHL2CM271W40--T |
|          | 270      | 12.5x45       | 1,230                                     | EHL2CM271W45--T |
|          | 330      | 16x30         | 1,355                                     | EHL2CM331L30--T |
|          | 330      | 18x25         | 1,292                                     | EHL2CM331M25--T |
|          | 390      | 16x35         | 1,505                                     | EHL2CM391L35--T |
|          | 470      | 18x35         | 1,722                                     | EHL2CM471M35--T |
| 560      | 16x50    | 1,924         | EHL2CM561L50--T                           |                 |
| 560      | 18x40    | 1,910         | EHL2CM561M40--T                           |                 |
| 680      | 18x45    | 2,135         | EHL2CM681M45--T                           |                 |
| 680      | 18x50    | 2,148         | EHL2CM681M50--T                           |                 |
| 200      | 33       | 10x18         | 225                                       | EHL2DM330G18--T |
|          | 39       | 10x20         | 268                                       | EHL2DM390G20--T |
|          | 47       | 10x20         | 302                                       | EHL2DM470G20--T |
|          | 56       | 10x25         | 346                                       | EHL2DM560G25--T |
|          | 68       | 10x30         | 406                                       | EHL2DM680G30--T |
|          | 82       | 12.5x20       | 522                                       | EHL2DM820W20--T |
|          | 100      | 12.5x25       | 628                                       | EHL2DM101W25--T |
|          | 120      | 12.5x30       | 728                                       | EHL2DM121W30--T |
|          | 120      | 16x20         | 698                                       | EHL2DM121L20--T |
|          | 150      | 16x25         | 840                                       | EHL2DM151L25--T |
|          | 180      | 16x25         | 928                                       | EHL2DM181L25--T |
|          | 180      | 18x20         | 895                                       | EHL2DM181M20--T |
|          | 220      | 12.5x45       | 1,116                                     | EHL2DM221W45--T |
|          | 220      | 18x25         | 1,050                                     | EHL2DM221M25--T |
|          | 270      | 16x35         | 1,252                                     | EHL2DM271L35--T |
|          | 330      | 16x40         | 1,428                                     | EHL2DM331L40--T |
|          | 390      | 16x45         | 1,575                                     | EHL2DM391L45--T |
|          | 470      | 18x45         | 1,775                                     | EHL2DM471M45--T |
|          | 560      | 18x50         | 1,952                                     | EHL2DM561M50--T |
|          | 250      | 27            | 10x16                                     | 172             |
| 33       |          | 10x20         | 242                                       | EHL2EM330G20--T |
| 47       |          | 10x25         | 316                                       | EHL2EM470G25--T |
| 47       |          | 12.5x20       | 321                                       | EHL2EM470W20--T |
| 56       |          | 12.5x20       | 430                                       | EHL2EM560W20--T |
| 68       |          | 10x35         | 432                                       | EHL2EM680G35--T |
| 82       |          | 10x45         | 518                                       | EHL2EM820G45--T |
| 82       |          | 12.5x25       | 565                                       | EHL2EM820W25--T |
| 100      |          | 12.5x30       | 662                                       | EHL2EM101W30--T |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mArms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 250      | 100      | 16x20         | 638                                       | EHL2EM101L20--T |
|          | 120      | 16x25         | 758                                       | EHL2EM121L25--T |
|          | 120      | 18x20         | 732                                       | EHL2EM121M20--T |
|          | 150      | 12.5x40       | 892                                       | EHL2EM151W40--T |
|          | 150      | 12.5x45       | 922                                       | EHL2EM151W45--T |
|          | 180      | 12.5x50       | 1,040                                     | EHL2EM181W50--T |
|          | 180      | 16x30         | 995                                       | EHL2EM181L30--T |
|          | 180      | 18x25         | 955                                       | EHL2EM181M25--T |
|          | 220      | 16x35         | 1,130                                     | EHL2EM221L35--T |
|          | 220      | 18x30         | 1,138                                     | EHL2EM221M30--T |
|          | 270      | 16x45         | 1,315                                     | EHL2EM271L45--T |
|          | 270      | 18x35         | 1,300                                     | EHL2EM271M35--T |
|          | 330      | 16x50         | 1,480                                     | EHL2EM331L50--T |
|          | 330      | 18x40         | 1,466                                     | EHL2EM331M40--T |
|          | 390      | 18x50         | 1,630                                     | EHL2EM391M50--T |
| 350      | 15       | 10x16         | 150                                       | EHL2VM150G16--T |
|          | 18       | 10x20         | 165                                       | EHL2VM180G20--T |
|          | 22       | 10x20         | 200                                       | EHL2VM220G20--T |
|          | 27       | 10x25         | 242                                       | EHL2VM270G25--T |
|          | 27       | 10x30         | 256                                       | EHL2VM270G30--T |
|          | 33       | 12.5x20       | 280                                       | EHL2VM330W20--T |
|          | 39       | 10x35         | 326                                       | EHL2VM390G35--T |
|          | 47       | 10x40         | 376                                       | EHL2VM470G40--T |
|          | 47       | 12.5x25       | 425                                       | EHL2VM470W25--T |
|          | 56       | 10x45         | 426                                       | EHL2VM560G45--T |
|          | 56       | 12.5x30       | 498                                       | EHL2VM560W30--T |
|          | 56       | 16x20         | 476                                       | EHL2VM560L20--T |
|          | 68       | 12.5x35       | 583                                       | EHL2VM680W35--T |
|          | 68       | 18x20         | 550                                       | EHL2VM680M20--T |
|          | 82       | 12.5x40       | 658                                       | EHL2VM820W40--T |
| 82       | 16x25    | 628           | EHL2VM820L25--T                           |                 |
| 100      | 12.5x45  | 752           | EHL2VM101W45--T                           |                 |
| 100      | 16x30    | 744           | EHL2VM101L30--T                           |                 |
| 100      | 18x25    | 710           | EHL2VM101M25--T                           |                 |
| 120      | 16x35    | 832           | EHL2VM121L35--T                           |                 |
| 150      | 16x40    | 964           | EHL2VM151L40--T                           |                 |
| 150      | 16x45    | 978           | EHL2VM151L45--T                           |                 |
| 150      | 18x30    | 944           | EHL2VM151M30--T                           |                 |
| 180      | 16x50    | 1,095         | EHL2VM181L50--T                           |                 |
| 180      | 18x40    | 1,086         | EHL2VM181M40--T                           |                 |
| 220      | 18x45    | 1,215         | EHL2VM221M45--T                           |                 |
| 220      | 18x50    | 1,222         | EHL2VM221M50--T                           |                 |
| 400      | 12       | 10x16         | 135                                       | EHL2GM120G16--T |
|          | 15       | 10x20         | 155                                       | EHL2GM150G20--T |
|          | 18       | 10x20         | 180                                       | EHL2GM180G20--T |
|          | 22       | 10x25         | 216                                       | EHL2GM220G25--T |
|          | 27       | 10x30         | 256                                       | EHL2GM270G30--T |
|          | 27       | 12.5x20       | 300                                       | EHL2GM270W20--T |
|          | 33       | 16x20         | 320                                       | EHL2GM330L20--T |
|          | 39       | 12.5x25       | 390                                       | EHL2GM390W25--T |
|          | 47       | 12.5x30       | 456                                       | EHL2GM470W30--T |
|          | 47       | 16x20         | 438                                       | EHL2GM470L20--T |

Radial Type

HL series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|--|-----------------|
| 400      | 56       | 12.5x35       | 528  | EHL2GM560W35--T |
|          | 56       | 18x20         | 502  | EHL2GM560M20--T |
|          | 68       | 12.5x40       | 600  | EHL2GM680W40--T |
|          | 68       | 16x25         | 572  | EHL2GM680L25--T |
|          | 82       | 16x30         | 672  | EHL2GM820L30--T |
|          | 82       | 18x25         | 644  | EHL2GM820M25--T |
|          | 100      | 16x35         | 760  | EHL2GM101L35--T |
|          | 100      | 16x40         | 770  | EHL2GM101L40--T |
|          | 120      | 16x40         | 797  | EHL2GM121L40--T |
|          | 120      | 18x31         | 840  | EHL2GM121M31--T |
|          | 120      | 18x35         | 875  | EHL2GM121M35--T |
|          | 150      | 16x50         | 1,000                                      | EHL2GM151L50--T |
|          | 150      | 18x40         | 985  | EHL2GM151M40--T |
|          | 180      | 18x45         | 1,098                                      | EHL2GM181M45--T |
|          | 220      | 18x50         | 1,225                                      | EHL2GM221M50--T |
| 450      | 10       | 10x16         | 120  | EHL2WM100G16--T |
|          | 12       | 10x20         | 150  | EHL2WM120G20--T |
|          | 15       | 10x22         | 161  | EHL2WM150G22--T |
|          | 18       | 10x30         | 216  | EHL2WM180G30--T |
|          | 18       | 12.5x20       | 256  | EHL2WM180W20--T |
|          | 22       | 16x20         | 282  | EHL2WM220L20--T |
|          | 27       | 10x40         | 292  | EHL2WM270G40--T |
|          | 27       | 10x45         | 306  | EHL2WM270G45--T |
|          | 27       | 12.5x25       | 342  | EHL2WM270W25--T |
|          | 33       | 12.5x30       | 400  | EHL2WM330W30--T |
|          | 33       | 16x20         | 386  | EHL2WM330L20--T |
|          | 39       | 10x50         | 378  | EHL2WM390G50--T |
|          | 39       | 12.5x35       | 462  | EHL2WM390W35--T |
|          | 39       | 18x20         | 440  | EHL2WM390M20--T |
|          | 47       | 12.5x40       | 528  | EHL2WM470W40--T |
|          | 47       | 16x25         | 500  | EHL2WM470L25--T |
|          | 56       | 12.5x45       | 592  | EHL2WM560W45--T |
|          | 56       | 16x30         | 588  | EHL2WM560L30--T |
|          | 56       | 18x25         | 562  | EHL2WM560M25--T |
|          | 68       | 12.5x50       | 672  | EHL2WM680W50--T |
|          | 68       | 16x35         | 664  | EHL2WM680L35--T |
|          | 82       | 16x40         | 750  | EHL2WM820L40--T |
|          | 82       | 18x30         | 734  | EHL2WM820M30--T |
|          | 100      | 16x50         | 858  | EHL2WM101L50--T |
|          | 100      | 18x35         | 836  | EHL2WM101M35--T |
| 120      | 18x40    | 935           | EHL2WM121M40--T                            |                 |
| 120      | 22x31    | 901           | EHL2WM121O31--T                            |                 |
| 150      | 18x50    | 1,065         | EHL2WM151M50--T                            |                 |
| 500      | 6.8      | 10x16         | 45   | EHL2HM6R8G16--T |
|          | 10       | 10x30         | 130  | EHL2HM100G30--T |
|          | 10       | 12.5x16       | 111  | EHL2HM100W16--T |
|          | 12       | 12.5x18       | 125  | EHL2HM120W18--T |
|          | 15       | 10x35         | 170  | EHL2HM150G35--T |
|          | 15       | 12.5x20       | 155  | EHL2HM150W20--T |
|          | 18       | 10x45         | 190  | EHL2HM180G45--T |
| 18       | 12.5x30  | 190           | EHL2HM180W30--T                            |                 |
| 22       | 10x50    | 230           | EHL2HM220G50--T                            |                 |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|--|-----------------|
| 500      | 22       | 12.5x35       | 225  | EHL2HM220W35--T |
|          | 22       | 16x20         | 220  | EHL2HM220L20--T |
|          | 33       | 16x25         | 246  | EHL2HM330L25--T |
|          | 47       | 18x30         | 400  | EHL2HM470M30--T |

※Specifications subject to change without notice

RK series

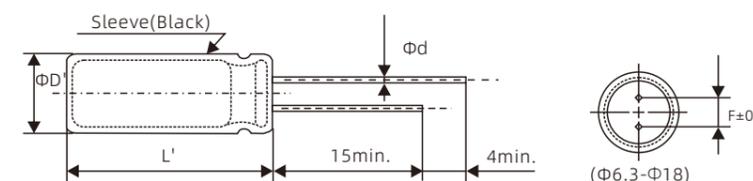


- Endurance: 2,000 hours at 105°C
- Especially designed for charger
- Miniaturized, high voltage
- RoHS Compliant

SPECIFICATIONS

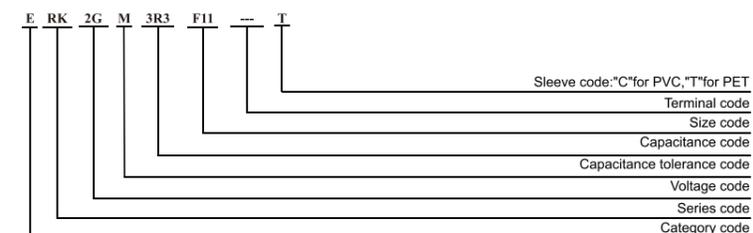
| Items   | Characteristics  |                                       |      |      |      |                             |      |      |      |      |                  |
|---|--|---------------------------------------|------|------|------|-----------------------------|------|------|------|------|------------------|
| Category Temperature Range  | -40 ~ +105°C (160 ~ 450Vdc)  |                                       |      |      |      | -25 ~ +105°C (500 ~ 600Vdc) |      |      |      |      |                  |
| Rated Working Voltage Range   | 160 ~ 600Vdc   |                                       |      |      |      |                             |      |      |      |      |                  |
| Capacitance Tolerance   | ±20%(M) (at 20°C, 120Hz)   |                                       |      |      |      |                             |      |      |      |      |                  |
| Leakage Current   | 160~450Vdc   |                                       |      |      |      | 500~600Vdc                  |      |      |      |      |                  |
|   | I ≤ 0.02CV + 10μA  |                                       |      |      |      | I ≤ 0.03CV + 40μA           |      |      |      |      |                  |
| Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes) |  |                                       |      |      |      |                             |      |      |      |      |                  |
| Dissipation Factor (tanδ)   | Rated Voltage (Vdc)  | 160                                   | 200  | 250  | 350  | 400                         | 450  | 500  | 550  | 600  | (at 20°C, 120Hz) |
|   | Dissipation Factor(Max.)   | 0.15                                  | 0.15 | 0.15 | 0.15 | 0.2                         | 0.24 | 0.24 | 0.24 | 0.24 |                  |
| Low Temperature Characteristics (Max. Impedance Ratio)  | Rated Voltage (Vdc)  | 160                                   | 200  | 250  | 350  | 400                         | 450  | 500  | 550  | 600  | (at 120Hz)       |
|   | Z(-25°C)/Z(+20°C)  | 3                                     | 3    | 3    | 6    | 6                           | 6    | 8    | 15   | 15   |                  |
|   | Z(-40°C)/Z(+20°C)  | 8                                     | 8    | 8    | 10   | 10                          | 15   | —    | —    | —    |                  |
| Endurance   | The following specification shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2000 hours at 105°C. |                                       |      |      |      |                             |      |      |      |      |                  |
|   | Capacitance Change   | ≤ ±30% of the initial value           |      |      |      |                             |      |      |      |      |                  |
|   | Dissipation Factor   | ≤ 200% of the initial specified value |      |      |      |                             |      |      |      |      |                  |
|   | Leakage Current  | ≤ The initial specified value         |      |      |      |                             |      |      |      |      |                  |
| Shelf Life  | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.             |                                       |      |      |      |                             |      |      |      |      |                  |
|   | Capacitance Change   | ≤ ±20% of the initial value           |      |      |      |                             |      |      |      |      |                  |
|   | Dissipation Factor   | ≤ 200% of the initial specified value |      |      |      |                             |      |      |      |      |                  |
|   | Leakage Current  | ≤ 200% of the initial specified value |      |      |      |                             |      |      |      |      |                  |

DIMENSIONS [mm]



|     |            |     |     |      |     |     |
|-----|------------|-----|-----|------|-----|-----|
| ΦD  | 6.3        | 8   | 10  | 12.5 | 16  | 18  |
| Φd  | 0.5        | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.5        | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| ΦD' | ΦD+0.5max. |     |     |      |     |     |
| L'  | L+2max.    |     |     |      |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| WV (Vdc) | Freq. (Hz) |     |     |      |
|----------|------------|-----|-----|------|
|          | 120        | 1K  | 10K | 100K |
| 160~600  | 0.5        | 0.8 | 0.9 | 1    |

Radial Type

RK series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 160      | 3.3      | 6.3x9         | 55  | ERK2CM3R3E09--T |
|          | 4.7      | 6.3x9         | 65  | ERK2CM4R7E09--T |
|          | 6.8      | 6.3x12        | 85  | ERK2CM6R8E12--T |
|          | 8.2      | 8x9           | 100   | ERK2CM8R2F09--T |
|          | 10       | 8x9           | 125   | ERK2CM100F09--T |
|          | 15       | 8x10          | 175   | ERK2CM150F10--T |
|          | 15       | 8x11          | 185   | ERK2CM150F11--T |
|          | 22       | 8x12          | 210   | ERK2CM220F12--T |
|          | 33       | 8x16          | 255   | ERK2CM330F16--T |
|          | 33       | 10x12         | 275   | ERK2CM330G12--T |
|          | 47       | 10x14         | 350   | ERK2CM470G14--T |
|          | 47       | 10x16         | 365   | ERK2CM470G16--T |
|          | 68       | 10x18         | 430   | ERK2CM680G18--T |
|          | 68       | 10x20         | 450   | ERK2CM680G20--T |
| 200      | 4.7      | 6.3x11        | 60  | ERK2DM4R7E11--T |
|          | 6.8      | 6.3x12        | 75  | ERK2DM6R8E12--T |
|          | 8.2      | 8x11          | 90  | ERK2DM8R2F11--T |
|          | 10       | 8x11          | 135   | ERK2DM100F11--T |
|          | 15       | 8x12          | 190   | ERK2DM150F12--T |
|          | 15       | 10x10         | 195   | ERK2DM150G10--T |
|          | 22       | 10x12         | 230   | ERK2DM220G12--T |
|          | 33       | 10x14         | 270   | ERK2DM330G14--T |
|          | 47       | 10x16         | 365   | ERK2DM470G16--T |
|          | 47       | 12.5x14       | 385   | ERK2DM470W14--T |
| 68       | 12.5x18  | 455           | ERK2DM680W18--T                             |                 |
| 250      | 4.7      | 8x9           | 75  | ERK2EM4R7F09--T |
|          | 6.8      | 8x10          | 80  | ERK2EM6R8F10--T |
|          | 8.2      | 8x11          | 100   | ERK2EM8R2F11--T |
|          | 10       | 8x12          | 150   | ERK2EM100F12--T |
|          | 15       | 10x10         | 200   | ERK2EM150G10--T |
|          | 15       | 10x12         | 210   | ERK2EM150G12--T |
|          | 22       | 10x14         | 255   | ERK2EM220G14--T |
|          | 33       | 10x16         | 290   | ERK2EM330G16--T |
|          | 47       | 12.5x16       | 380   | ERK2EM470W16--T |
|          | 47       | 12.5x18       | 400   | ERK2EM470W18--T |
| 68       | 12.5x20  | 475           | ERK2EM680W20--T                             |                 |
| 350      | 4.7      | 8x10          | 80  | ERK2VM4R7F10--T |
|          | 6.8      | 8x11          | 85  | ERK2VM6R8F11--T |
|          | 8.2      | 8x12          | 105   | ERK2VM8R2F12--T |
|          | 10       | 8x12          | 160   | ERK2VM100F12--T |
|          | 15       | 10x12         | 210   | ERK2VM150G12--T |
|          | 18       | 10x14         | 240   | ERK2VM180G14--T |
|          | 22       | 10x16         | 265   | ERK2VM220G16--T |
|          | 33       | 10x20         | 315   | ERK2VM330G20--T |
|          | 47       | 12.5x20       | 420   | ERK2VM470W20--T |
|          | 56       | 12.5x25       | 475   | ERK2VM560W25--T |
|          | 68       | 16x20         | 520   | ERK2VM680L20--T |
|          | 82       | 16x25         | 580   | ERK2VM820L25--T |
| 400      | 1        | 6.3x9         | 46  | ERK2GM010E09--T |
|          | 1.8      | 6.3x9         | 56  | ERK2GM1R8E09--T |
|          | 2.2      | 6.3x11        | 64  | ERK2GM2R2E11--T |
|          | 2.2      | 8x9           | 66  | ERK2GM2R2F09--T |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 400      | 3.3      | 6.3x11        | 74  | ERK2GM3R3E11--T |
|          | 3.3      | 8x9           | 76  | ERK2GM3R3F09--T |
|          | 3.3      | 8x11          | 80  | ERK2GM3R3F11--T |
|          | 4.7      | 6.3x12        | 90  | ERK2GM4R7E12--T |
|          | 4.7      | 8x9           | 94  | ERK2GM4R7F09--T |
|          | 4.7      | 8x11          | 98  | ERK2GM4R7F11--T |
|          | 4.7      | 10x9          | 102   | ERK2GM4R7G09--T |
|          | 6.8      | 8x12          | 126   | ERK2GM6R8F12--T |
|          | 6.8      | 10x9          | 132   | ERK2GM6R8G09--T |
|          | 8.2      | 8x12          | 145   | ERK2GM8R2F12--T |
|          | 8.2      | 10x9          | 150   | ERK2GM8R2G09--T |
|          | 8.2      | 10x11         | 158   | ERK2GM8R2G11--T |
|          | 10       | 8x14          | 180   | ERK2GM100F14--T |
|          | 10       | 10x9          | 172   | ERK2GM100G09--T |
|          | 15       | 10x14         | 210   | ERK2GM150G14--T |
|          | 22       | 10x16         | 250   | ERK2GM220G16--T |
|          | 33       | 12.5x18       | 520   | ERK2GM330W18--T |
|          | 47       | 12.5x22       | 670   | ERK2GM470W22--T |
|          | 56       | 13x25         | 780   | ERK2GM560K25--T |
|          | 68       | 16x20         | 840   | ERK2GM680L20--T |
|          | 68       | 18x20         | 880   | ERK2GM680M20--T |
|          | 82       | 16x25         | 920   | ERK2GM820L25--T |
| 82       | 18x20    | 950           | ERK2GM820M20--T                             |                 |
| 100      | 18x25    | 1,060         | ERK2GM101M25--T                             |                 |
| 100      | 18x30    | 1,120         | ERK2GM101M30--T                             |                 |
| 450      | 1        | 6.3x9         | 46  | ERK2WM010E09--T |
|          | 1        | 8x9           | 54  | ERK2WM010F09--T |
|          | 1.8      | 6.3x11        | 62  | ERK2WM1R8E11--T |
|          | 1.8      | 8x9           | 65  | ERK2WM1R8F09--T |
|          | 2.2      | 8x9           | 70  | ERK2WM2R2F09--T |
|          | 2.2      | 8x11          | 72  | ERK2WM2R2F11--T |
|          | 3.3      | 8x11          | 82  | ERK2WM3R3F11--T |
|          | 4.7      | 8x12          | 100   | ERK2WM4R7F12--T |
|          | 4.7      | 10x10         | 100   | ERK2WM4R7G10--T |
|          | 6.8      | 8x14          | 125   | ERK2WM6R8F14--T |
|          | 6.8      | 10x12         | 148   | ERK2WM6R8G12--T |
|          | 8.2      | 10x12         | 180   | ERK2WM8R2G12--T |
|          | 10       | 10x14         | 200   | ERK2WM100G14--T |
|          | 10       | 10x16         | 220   | ERK2WM100G16--T |
|          | 15       | 10x16         | 230   | ERK2WM150G16--T |
|          | 15       | 12.5x16       | 250   | ERK2WM150W16--T |
|          | 22       | 12.5x16       | 295   | ERK2WM220W16--T |
|          | 33       | 12.5x20       | 495   | ERK2WM330W20--T |
|          | 33       | 16x16         | 495   | ERK2WM330L16--T |
|          | 33       | 16x20         | 550   | ERK2WM330L20--T |
|          | 47       | 16x20         | 620   | ERK2WM470L20--T |
|          | 47       | 16x25         | 640   | ERK2WM470L25--T |
| 47       | 18x20    | 640           | ERK2WM470M20--T                             |                 |
| 68       | 18x20    | 870           | ERK2WM680M20--T                             |                 |
| 68       | 18x25    | 970           | ERK2WM680M25--T                             |                 |
| 82       | 18x25    | 1,065         | ERK2WM820M25--T                             |                 |
| 100      | 18x30    | 1,120         | ERK2WM101M30--T                             |                 |

RK series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number     |                 |
|----------|----------|---------------|---|-----------------|-----------------|
| 450      | 100      | 18x35         | 1,240                                       | ERK2WM101M35--T |                 |
|          | 120      | 18x35         | 1,300                                       | ERK2WM121M35--T |                 |
| 500      | 3.3      | 8x12          | 65  | ERK2HM3R3F12--T |                 |
|          | 4.7      | 8x14          | 110   | ERK2HM4R7F14--T |                 |
|          | 5.6      | 10x12         | 130   | ERK2HM5R6G12--T |                 |
|          | 6.8      | 10x12         | 150   | ERK2HM6R8G12--T |                 |
|          | 8.2      | 10x12         | 160   | ERK2HM8R2G12--T |                 |
|          | 8.2      | 10x16         | 190   | ERK2HM8R2G16--T |                 |
|          | 10       | 10x16         | 215   | ERK2HM100G16--T |                 |
|          | 15       | 10x18         | 235   | ERK2HM150G18--T |                 |
|          | 15       | 12.5x16       | 250   | ERK2HM150W16--T |                 |
|          | 22       | 12.5x20       | 310   | ERK2HM220W20--T |                 |
|          | 33       | 12.5x25       | 510   | ERK2HM330W25--T |                 |
|          | 47       | 16x25         | 655   | ERK2HM470L25--T |                 |
|          | 47       | 18x20         | 655   | ERK2HM470M20--T |                 |
|          | 68       | 16x30         | 910   | ERK2HM680L30--T |                 |
| 100      | 18x35    | 1,120         | ERK2HM101M35--T                             |                 |                 |
| 550      | 3.3      | 8x12          | 65  | ERK2JM3R3F12--T |                 |
|          | 4.7      | 8x14          | 100   | ERK2JM4R7F14--T |                 |
|          | 5.6      | 10x12         | 135   | ERK2JM5R6G12--T |                 |
|          | 6.8      | 10x14         | 145   | ERK2JM6R8G14--T |                 |
|          | 8.2      | 10x16         | 190   | ERK2JM8R2G16--T |                 |
|          | 10       | 10x16         | 215   | ERK2JM100G16--T |                 |
|          | 10       | 13x14         | 220   | ERK2JM100K14--T |                 |
|          | 15       | 13x16         | 245   | ERK2JM150K16--T |                 |
|          | 22       | 12.5x25       | 330   | ERK2JM220W25--T |                 |
|          | 47       | 18x25         | 685   | ERK2JM470M25--T |                 |
|          | 56       | 18x30         | 800   | ERK2JM560M30--T |                 |
|          | 68       | 18x35         | 850   | ERK2JM680M35--T |                 |
|          | 600      | 4.7           | 10x12                                       | 105             | ERK2KM4R7G12--T |
|          |          | 6.8           | 10x16                                       | 110             | ERK2KM6R8G16--T |
| 8.2      |          | 10x18         | 130   | ERK2KM8R2G18--T |                 |
| 10       |          | 12.5x16       | 150   | ERK2KM100W16--T |                 |
| 15       |          | 13x20         | 190   | ERK2KM150K20--T |                 |
| 22       |          | 13x25         | 260   | ERK2KM220K25--T |                 |

\*Specifications subject to change without notice

ML series

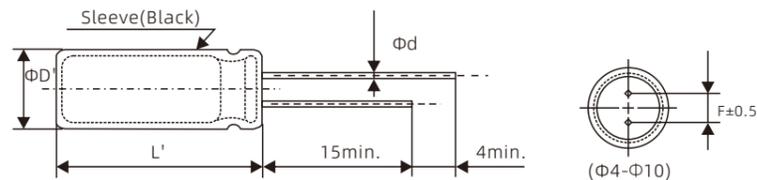
- Endurance: 5,000 hours at 105°C
- Long life with 7mm to 9mm height.
- RoHS Compliant



SPECIFICATIONS

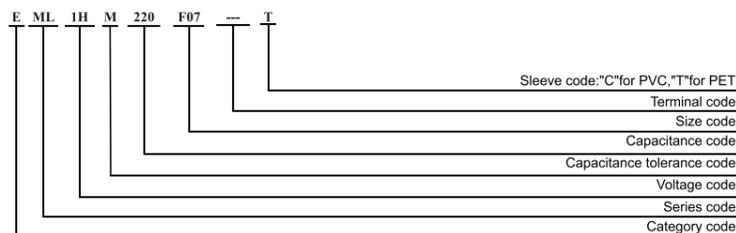
| Items  | Characteristics   |                                      |      |      |      |      |  |  |      |                   |       |
|--|---|--------------------------------------|------|------|------|------|--|--|------|-------------------|-------|
| Category Temperature Range                             | -40~+105°C  |                                      |      |      |      |      |  |  |      |                   |       |
| Rated Voltage Range                                    | 6.3~50 Vdc  |                                      |      |      |      |      |  |  |      |                   |       |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)  |                                      |      |      |      |      |  |  |      |                   |       |
| Leakage Current  | ≤0.01CV or 3μA, whichever is greater.<br>Where, I: Max. leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V) (at 20°C after 2 minutes)                                     |                                      |      |      |      |      |  |  |      |                   |       |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)   | 6.3                                  | 10   | 16   | 25   | 35   | 50   |  |      |                   |       |
|  | tanδ (max.)   | 0.40                                 | 0.35 | 0.30 | 0.25 | 0.20 | 0.20   |  |      |                   |       |
|  | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)   |                                      |      |      |      |      |  |  |      |                   |       |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)   | 6.3                                  | 10   | 16   | 25   | 35   | 50   |  |      |                   |       |
|  | Z(-25°C)/Z(+20°C)   | 6                                    | 4    | 4    | 3    | 2    | 2  |  |      |                   |       |
|  | Z(-40°C)/Z(+20°C)   | 12                                   | 10   | 8    | 6    | 4    | 4  |  |      |                   |       |
| Endurance  | The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for the specified period of time at 105°C. |                                      |      |      |      |      |  |  |      |                   |       |
|  | Capacitance Change  | ≤±30% of the initial value           |      |      |      |      |  |  |      |                   |       |
|  | Dissipation Factor  | ≤300% of the initial specified value |      |      |      |      |  |  |      |                   |       |
|  | Leakage Current   | ≤The initial specified value         |      |      |      |      | <table border="1"> <tr> <th>Size</th> <th>Load life (hours)</th> </tr> <tr> <td>L≥7mm</td> <td>5,000</td> </tr> </table> |  | Size | Load life (hours) | L≥7mm |
| Size   | Load life (hours)   |                                      |      |      |      |      |  |  |      |                   |       |
| L≥7mm  | 5,000   |                                      |      |      |      |      |  |  |      |                   |       |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.                                |                                      |      |      |      |      |  |  |      |                   |       |
|  | Capacitance Change  | ≤±30% of the initial value           |      |      |      |      |  |  |      |                   |       |
|  | Dissipation Factor  | ≤300% of the initial specified value |      |      |      |      |  |  |      |                   |       |
|  | Leakage Current   | ≤200% of the initial specified value |      |      |      |      |  |  |      |                   |       |

DIMENSIONS [mm]



| ΦD  | 4          | 5    | 6.3 | 8   |     | 10×9 |
|-----|------------|------|-----|-----|-----|------|
|     |            |      |     | 8×7 | 8×9 |      |
| Φd  | 0.45       | 0.45 | 0.5 | 0.5 | 0.5 | 0.6  |
| F   | 1.5        | 2.0  | 2.5 | 3.5 | 3.5 | 5.0  |
| ΦD' | ΦD+0.5MAX. |      |     |     |     |      |
| L'  | L+2MAX.    |      |     |     |     |      |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)     | Freq. (Hz) |      |      |      |      |
|---------------|------------|------|------|------|------|
|               | 60(50)     | 120  | 500  | 1k   | 10k≤ |
| Cap. < 2.2    | 0.50       | 1.00 | 1.20 | 1.30 | 1.5  |
| 2.2≤Cap. < 10 | 0.65       | 1.00 | 1.20 | 1.30 | 1.5  |
| 10≤Cap. < 100 | 0.80       | 1.00 | 1.20 | 1.30 | 1.5  |
| Cap. ≥100     | 0.80       | 1.00 | 1.10 | 1.15 | 1.2  |

ML series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|--|-----------------|
| 6.3      | 82       | 5×7           | 75   | EML0JM820D07--T |
|          | 180      | 6.3×7         | 110  | EML0JM181E07--T |
|          | 270      | 8×7           | 165  | EML0JM271F07--T |
|          | 470      | 8×7           | 190  | EML0JM471F07--T |
|          | 560      | 8×9           | 230  | EML0JM561F09--T |
| 10       | 1,000    | 10×9          | 480  | EML0JM102G09--T |
|          | 33       | 4×7           | 43   | EML1AM330C07--T |
|          | 56       | 5×7           | 68   | EML1AM560D07--T |
|          | 120      | 6.3×7         | 100  | EML1AM121E07--T |
|          | 220      | 8×7           | 160  | EML1AM221F07--T |
|          | 330      | 8×7           | 180  | EML1AM331F07--T |
|          | 470      | 8×9           | 210  | EML1AM471F09--T |
| 16       | 680      | 10×9          | 470  | EML1AM681G09--T |
|          | 22       | 4×7           | 40   | EML1CM220C07--T |
|          | 39       | 5×7           | 65   | EML1CM390D07--T |
|          | 100      | 6.3×7         | 95   | EML1CM101E07--T |
|          | 150      | 8×7           | 125  | EML1CM151F07--T |
|          | 220      | 8×7           | 170  | EML1CM221F07--T |
| 25       | 330      | 8×9           | 195  | EML1CM331F09--T |
|          | 470      | 10×9          | 460  | EML1CM471G09--T |
|          | 15       | 4×7           | 35   | EML1EM150C07--T |
|          | 27       | 5×7           | 57   | EML1EM270D07--T |
|          | 56       | 6.3×7         | 85   | EML1EM560E07--T |
|          | 100      | 8×7           | 112  | EML1EM101F07--T |
|          | 150      | 8×7           | 140  | EML1EM151F07--T |
| 35       | 220      | 8×9           | 190  | EML1EM221F09--T |
|          | 330      | 10×9          | 450  | EML1EM331G09--T |
|          | 10       | 4×7           | 28   | EML1VM100C07--T |
|          | 18       | 5×7           | 48   | EML1VM180D07--T |
|          | 39       | 6.3×7         | 76   | EML1VM390E07--T |
|          | 56       | 8×7           | 105  | EML1VM560F07--T |
|          | 100      | 8×7           | 125  | EML1VM101F07--T |
|          | 150      | 8×9           | 180  | EML1VM151F09--T |
| 50       | 220      | 10×9          | 360  | EML1VM221G09--T |
|          | 4.7      | 4×7           | 23   | EML1HM4R7C07--T |
|          | 10       | 5×7           | 30   | EML1HM100D07--T |
|          | 18       | 6.3×7         | 50   | EML1HM180E07--T |
|          | 33       | 8×7           | 75   | EML1HM330F07--T |
|          | 56       | 8×7           | 115  | EML1HM560F07--T |
|          | 82       | 8×9           | 160  | EML1HM820F09--T |
|          | 120      | 10×9          | 315  | EML1HM121G09--T |

※ Specifications subject to change without notice

# RM series

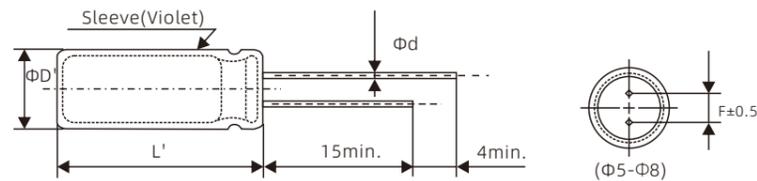
- Endurance: 10,000 hours at 105°C
- Miniaturized, long life
- RoHS Compliant



## SPECIFICATIONS

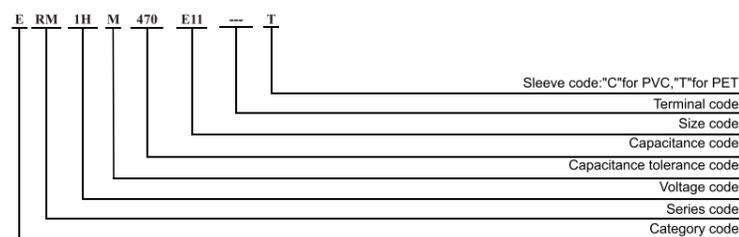
| Items  | Characteristics  |                                      |      |      |      |      |      |      |
|--|--|--------------------------------------|------|------|------|------|------|------|
| Category Temperature Range                             | -40~+105°C   |                                      |      |      |      |      |      |      |
| Rated Voltage Range                                    | 10~100Vdc  |                                      |      |      |      |      |      |      |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |                                      |      |      |      |      |      |      |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)              |                                      |      |      |      |      |      |      |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)  | 10                                   | 16   | 25   | 35   | 50   | 63   | 100  |
|  | Dissipation Factor(Max.)   | 0.45                                 | 0.35 | 0.30 | 0.22 | 0.19 | 0.17 | 0.15 |
|  | When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μF increase.   |                                      |      |      |      |      |      |      |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  | 10                                   | 16   | 25   | 35   | 50   | 63   | 100  |
|  | Z(-25°C)/Z(+20°C)  | 8                                    | 6    | 4    | 3    |      |      |      |
|  | Z(-40°C)/Z(+20°C)  | 13                                   | 10   | 8    | 7    |      |      |      |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 10,000 hours at 105°C. |                                      |      |      |      |      |      |      |
|  | Capacitance Change   | ≤±25% of the initial value           |      |      |      |      |      |      |
|  | Dissipation Factor   | ≤300% of the initial specified value |      |      |      |      |      |      |
|  | Leakage Current  | ≤The initial specified value         |      |      |      |      |      |      |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.                          |                                      |      |      |      |      |      |      |
|  | Capacitance Change   | ≤±20% of the initial value           |      |      |      |      |      |      |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |      |
|  | Leakage Current  | ≤200% of the initial specified value |      |      |      |      |      |      |

## DIMENSIONS [mm]



|     |            |     |     |
|-----|------------|-----|-----|
| ΦD  | 5          | 6.3 | 8   |
| Φd  | 0.5        | 0.5 | 0.5 |
| F   | 2.0        | 2.5 | 3.5 |
| ΦD' | ΦD+0.5max. |     |     |
| L'  | L+2max.    |     |     |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)      | Freq. (Hz) |      |      |      |
|----------------|------------|------|------|------|
|                | 120        | 1k   | 10k  | 100k |
| Cap. < 22      | 0.42       | 0.60 | 0.80 | 1.00 |
| 22 ≤ Cap. < 47 | 0.55       | 0.75 | 0.90 | 1.00 |
| Cap. ≥ 47      | 0.70       | 0.85 | 0.95 | 1.00 |

# RM series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number     |                 |
|----------|----------|---------------|---|-----------------|-----------------|
| 10       | 100      | 5×11          | 130   | ERM1AM101D11--T |                 |
|          | 220      | 6.3×11        | 210   | ERM1AM221E11--T |                 |
|          | 330      | 6.3×12        | 220   | ERM1AM331E12--T |                 |
|          | 330      | 8×11          | 330   | ERM1AM331F11--T |                 |
| 16       | 47       | 5×11          | 130   | ERM1CM470D11--T |                 |
|          | 100      | 6.3×11        | 210   | ERM1CM101E11--T |                 |
|          | 220      | 6.3×11        | 250   | ERM1CM221E11--T |                 |
| 25       | 220      | 8×11          | 330   | ERM1CM221F11--T |                 |
|          | 33       | 5×11          | 130   | ERM1EM330D11--T |                 |
|          | 47       | 5×11          | 130   | ERM1EM470D11--T |                 |
| 68       | 5×12     | 140           | ERM1EM680D12--T                             |                 |                 |
|          | 100      | 6.3×11        | 210   | ERM1EM101E11--T |                 |
|          | 35       | 33            | 5×11  | 130             | ERM1VM330D11--T |
| 47       |          | 6.3×11        | 210   | ERM1VM470E11--T |                 |
| 100      |          | 6.3×12        | 260   | ERM1VM101E12--T |                 |
| 100      |          | 8×11          | 330   | ERM1VM101F11--T |                 |
| 220      | 8×12     | 380           | ERM1VM221F12--T                             |                 |                 |
|          | 50       | 0.47          | 5×11  | 12              | ERM1HMR47D11--T |
|          |          | 1             | 5×11  | 25              | ERM1HM010D11--T |
|          |          | 2.2           | 5×11  | 35              | ERM1HM2R2D11--T |
| 3.3      |          | 5×11          | 70  | ERM1HM3R3D11--T |                 |
| 4.7      |          | 5×11          | 80  | ERM1HM4R7D11--T |                 |
| 10       |          | 5×11          | 90  | ERM1HM100D11--T |                 |
| 22       |          | 5×12          | 110   | ERM1HM220D12--T |                 |
| 33       | 6.3×11   | 190           | ERM1HM330E11--T                             |                 |                 |
|          | 47       | 6.3×11        | 190   | ERM1HM470E11--T |                 |
|          | 100      | 8×12          | 270   | ERM1HM101F12--T |                 |
|          | 63       | 10            | 5×11  | 80              | ERM1JM100D11--T |
| 22       |          | 6.3×11        | 170   | ERM1JM220E11--T |                 |
| 33       |          | 6.3×12        | 170   | ERM1JM330E12--T |                 |
| 47       |          | 8×12          | 240   | ERM1JM470F12--T |                 |
| 100      | 8×12     | 270           | ERM1JM101F12--T                             |                 |                 |
| 100      | 0.47     | 5×11          | 20  | ERM1KMR47D11--T |                 |
|          | 1        | 5×11          | 40  | ERM1KM010D11--T |                 |
|          | 2.2      | 5×11          | 50  | ERM1KM2R2D11--T |                 |
|          | 3.3      | 5×11          | 60  | ERM1KM3R3D11--T |                 |
|          | 4.7      | 5×11          | 70  | ERM1KM4R7D11--T |                 |
|          | 10       | 6.3×12        | 150   | ERM1KM100E12--T |                 |
|          | 22       | 8×12          | 230   | ERM1KM220F12--T |                 |

※ Specifications subject to change without notice

# NB series

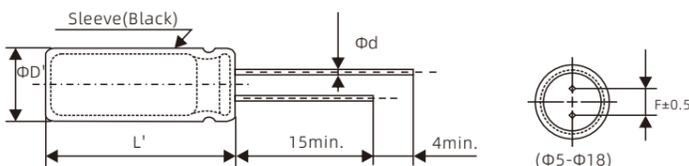
- Endurance: 2,000~ 5,000 hours at 130°C
- High reliability, high temperature
- RoHS Compliant



## SPECIFICATIONS

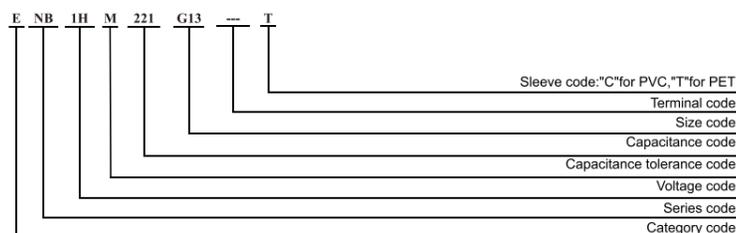
| Items  | Characteristics  |  |
|--|--|--|
| Category Temperature Range                             | -25~+130°C   |  |
| Rated Voltage Range                                    | 10~120Vdc  |  |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |  |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                            |  |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)  | 10 16 25 35 50 63 80 100 120                 |
|  | Dissipation Factor (Max.)  | 0.24 0.20 0.18 0.16 0.14 0.12 0.12 0.10 0.12 |
|  | When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μF increase.   |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  | 10 16 25 35 50 63 80 100 120                 |
|  | Z(-25°C)/Z(+20°C)  | 3 2 3  |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 130°C. |  |
|  | Case Dia   | Life time (hours)                            |
|  | Capacitance Change   | ≤±30% of the initial value                   |
|  | Dissipation Factor   | ≤300% of the initial specified value         |
|  | Leakage Current  | ≤The initial specified value                 |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 130°C for 1,000 hours.  |  |
|  | Capacitance Change   | ≤±30% of the initial value                   |
|  | Dissipation Factor   | ≤300% of the initial specified value         |
|  | Leakage Current  | ≤500% of the initial specified value         |

## DIMENSIONS [mm]



| ΦD  | 5          | 6.3 | 8   | 10  | 12.5 | 13  | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|-----|
| Φd  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 3.5 | 5.0  | 5.0 | 7.5 | 7.5 |
| ΦD' | ØD+0.5max. |     |     |     |      |     |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |     |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)          | Freq. (Hz) | 50/60 | 120  | 1k   | 10k  | 100k |
|--------------------|------------|-------|------|------|------|------|
| Cap. < 10          |            | 0.35  | 0.42 | 0.60 | 0.80 | 1.00 |
| 10 ≤ Cap. < 47     |            | 0.45  | 0.55 | 0.75 | 0.90 | 1.00 |
| 47 ≤ Cap. < 470    |            | 0.60  | 0.70 | 0.85 | 0.95 | 1.00 |
| 470 ≤ Cap. < 2,200 |            | 0.65  | 0.75 | 0.90 | 0.98 | 1.00 |
| Cap. ≥ 2,200       |            | 0.75  | 0.80 | 0.95 | 1.00 | 1.00 |

# NB series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/130°C, 100kHz) | Part Number     |                 |
|----------|----------|---------------|---|-----------------|-----------------|
| 10       | 100      | 5×11          | 80  | ENB1AM101D11--T |                 |
|          | 330      | 6.3×12        | 180   | ENB1AM331E12--T |                 |
|          | 330      | 8×11          | 360   | ENB1AM331F11--T |                 |
|          | 470      | 8×12          | 360   | ENB1AM471F12--T |                 |
|          | 470      | 10×13         | 620   | ENB1AM471G13--T |                 |
|          | 680      | 8×12          | 400   | ENB1AM681F12--T |                 |
|          | 680      | 10×13         | 620   | ENB1AM681G13--T |                 |
|          | 1,000    | 10×16         | 660   | ENB1AM102G16--T |                 |
|          | 1,000    | 10×20         | 960   | ENB1AM102G20--T |                 |
|          | 2,200    | 12.5×25       | 1,430                                       | ENB1AM222W25--T |                 |
|          | 3,300    | 16×25         | 1,900                                       | ENB1AM332L25--T |                 |
|          | 4,700    | 16×30         | 2,300                                       | ENB1AM472L30--T |                 |
| 16       | 100      | 5×11          | 90  | ENB1CM101D11--T |                 |
|          | 220      | 6.3×11        | 125   | ENB1CM221E11--T |                 |
|          | 330      | 8×12          | 360   | ENB1CM331F12--T |                 |
|          | 470      | 8×12          | 360   | ENB1CM471F12--T |                 |
|          | 470      | 10×13         | 620   | ENB1CM471G13--T |                 |
|          | 1,000    | 10×20         | 960   | ENB1CM102G20--T |                 |
|          | 2,200    | 10×25         | 980   | ENB1CM222G25--T |                 |
|          | 2,200    | 12.5×25       | 1,430                                       | ENB1CM222W25--T |                 |
|          | 3,300    | 16×30         | 2,300                                       | ENB1CM332L30--T |                 |
|          | 4,700    | 16×35         | 2,550                                       | ENB1CM472L35--T |                 |
|          | 25       | 47            | 5×11  | 60              | ENB1EM470D11--T |
|          |          | 68            | 5×12  | 90              | ENB1EM680D12--T |
| 100      |          | 6.3×11        | 145   | ENB1EM101E11--T |                 |
| 220      |          | 8×12          | 360   | ENB1EM221F12--T |                 |
| 330      |          | 8×12          | 360   | ENB1EM331F12--T |                 |
| 330      |          | 10×13         | 620   | ENB1EM331G13--T |                 |
| 470      |          | 8×16          | 610   | ENB1EM471F16--T |                 |
| 470      |          | 10×13         | 640   | ENB1EM471G13--T |                 |
| 1,000    |          | 10×20         | 960   | ENB1EM102G20--T |                 |
| 1,000    |          | 12.5×20       | 1,100                                       | ENB1EM102W20--T |                 |
| 2,200    |          | 16×30         | 2,300                                       | ENB1EM222L30--T |                 |
| 3,300    |          | 16×35         | 2,550                                       | ENB1EM332L35--T |                 |
| 35       | 47       | 6.3×11        | 110   | ENB1VM470E11--T |                 |
|          | 100      | 6.3×12        | 210   | ENB1VM101E12--T |                 |
|          | 100      | 8×11          | 360   | ENB1VM101F11--T |                 |
|          | 220      | 8×12          | 375   | ENB1VM221F12--T |                 |
|          | 220      | 10×13         | 620   | ENB1VM221G13--T |                 |
|          | 330      | 8×16          | 550   | ENB1VM331F16--T |                 |
|          | 330      | 10×13         | 620   | ENB1VM331G13--T |                 |
|          | 330      | 10×16         | 800   | ENB1VM331G16--T |                 |
|          | 470      | 10×16         | 705   | ENB1VM471G16--T |                 |
|          | 470      | 10×20         | 960   | ENB1VM471G20--T |                 |
|          | 680      | 12.5×20       | 990   | ENB1VM681W20--T |                 |
|          | 1,000    | 12.5×20       | 1,180                                       | ENB1VM102W20--T |                 |
| 1,000    | 12.5×25  | 1,430         | ENB1VM102W25--T                             |                 |                 |
| 2,200    | 16×35    | 2,550         | ENB1VM222L35--T                             |                 |                 |
| 3,300    | 18×35    | 2,800         | ENB1VM332M35--T                             |                 |                 |
| 50       | 1        | 5×11          | 26  | ENB1HM010D11--T |                 |
|          | 2.2      | 5×11          | 35  | ENB1HM2R2D11--T |                 |
|          | 2.2      | 8×11          | 50  | ENB1HM2R2F11--T |                 |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/130°C, 100kHz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 50       | 3.3      | 5×11          | 40  | ENB1HM3R3D11--T |
|          | 3.3      | 8×11          | 70  | ENB1HM3R3F11--T |
|          | 4.7      | 5×11          | 42  | ENB1HM4R7D11--T |
|          | 4.7      | 8×11          | 100   | ENB1HM4R7F11--T |
|          | 10       | 5×11          | 90  | ENB1HM100D11--T |
|          | 10       | 8×11          | 200   | ENB1HM100F11--T |
|          | 22       | 5×12          | 110   | ENB1HM220D12--T |
|          | 22       | 8×11          | 260   | ENB1HM220F11--T |
|          | 33       | 6.3×11        | 150   | ENB1HM330E11--T |
|          | 33       | 8×11          | 300   | ENB1HM330F11--T |
|          | 47       | 6.3×11        | 180   | ENB1HM470E11--T |
|          | 47       | 8×11          | 300   | ENB1HM470F11--T |
| 63       | 100      | 8×12          | 340   | ENB1HM101F12--T |
|          | 100      | 10×13         | 520   | ENB1HM101G13--T |
|          | 220      | 8×16          | 520   | ENB1HM221F16--T |
|          | 220      | 10×13         | 520   | ENB1HM221G13--T |
|          | 330      | 10×16         | 530   | ENB1HM331G16--T |
|          | 330      | 12.5×20       | 1,000                                       | ENB1HM331W20--T |
|          | 470      | 10×20         | 950   | ENB1HM471G20--T |
|          | 470      | 12.5×25       | 1,200                                       | ENB1HM471W25--T |
|          | 680      | 12.5×20       | 1,060                                       | ENB1HM681W20--T |
|          | 680      | 16×20         | 1,250                                       | ENB1HM681L20--T |
|          | 1,000    | 12.5×25       | 1,500                                       | ENB1HM102W25--T |
|          | 1,000    | 16×30         | 2,180                                       | ENB1HM102L30--T |
| 80       | 2,200    | 18×40         | 2,800                                       | ENB1HM222M40--T |
|          | 33       | 6.3×12        | 150   | ENB1JM330E12--T |
|          | 33       | 8×11          | 250   | ENB1JM330F11--T |
|          | 47       | 8×12          | 250   | ENB1JM470F12--T |
|          | 47       | 10×13         | 400   | ENB1JM470G13--T |
|          | 100      | 8×12          | 340   | ENB1JM101F12--T |
|          | 100      | 10×16         | 450   | ENB1JM101G16--T |
|          | 220      | 10×16         | 450   | ENB1JM221G16--T |
|          | 220      | 12.5×20       | 820   | ENB1JM221W20--T |
|          | 330      | 12.5×20       | 850   | ENB1JM331W20--T |
|          | 330      | 12.5×25       | 1,000                                       | ENB1JM331W25--T |
|          | 470      | 13×25         | 1,000                                       | ENB1JM471K25--T |
| 470      | 16×25    | 1,500         | ENB1JM471L25--T                             |                 |
| 1,000    | 16×30    | 1,850         | ENB1JM102L30--T                             |                 |
| 100      | 4.7      | 5×11          | 26  | ENB1BM4R7D11--T |
|          | 10       | 5×11          | 68  | ENB1BM100D11--T |
|          | 22       | 6.3×11        | 105   | ENB1BM220E11--T |
|          | 33       | 6.3×12        | 135   | ENB1BM330E12--T |
|          | 33       | 8×12          | 250   | ENB1BM330F12--T |
|          | 68       | 8×12          | 250   | ENB1BM680F12--T |
|          | 100      | 8×16          | 400   | ENB1BM101F16--T |
|          | 150      | 10×16         | 450   | ENB1BM151G16--T |
|          | 220      | 10×20         | 750   | ENB1BM221G20--T |
|          | 330      | 12.5×20       | 850   | ENB1BM331W20--T |
|          | 470      | 16×20         | 1,200                                       | ENB1BM471L20--T |
|          | 4.7      | 5×11          | 40  | ENB1KM4R7D11--T |
| 4.7      | 8×11     | 100           | ENB1KM4R7F11--T                             |                 |
| 10       | 6.3×11   | 130           | ENB1KM100E11--T                             |                 |

Radial Type

# NB series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/130°C, 100kHz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 100      | 10       | 8×11          | 200   | ENB1KM100F11--T |
|          | 22       | 6.3×12        | 150   | ENB1KM220E12--T |
|          | 22       | 8×12          | 220   | ENB1KM220F12--T |
|          | 33       | 8×12          | 220   | ENB1KM330F12--T |
|          | 33       | 10×13         | 260   | ENB1KM330G13--T |
|          | 47       | 8×16          | 240   | ENB1KM470F16--T |
|          | 47       | 10×16         | 330   | ENB1KM470G16--T |
|          | 100      | 10×16         | 350   | ENB1KM101G16--T |
|          | 100      | 12.5×20       | 670   | ENB1KM101W20--T |
|          | 220      | 13×20         | 720   | ENB1KM221K20--T |
|          | 220      | 16×25         | 1,100                                       | ENB1KM221L25--T |
|          | 330      | 16×25         | 1,300                                       | ENB1KM331L25--T |
|          | 330      | 16×30         | 1,300                                       | ENB1KM331L30--T |
|          | 470      | 18×30         | 1,600                                       | ENB1KM471M30--T |
| 120      | 22       | 8×12          | 115   | ENB2BM220F12--T |
|          | 33       | 8×16          | 200   | ENB2BM330F16--T |
|          | 33       | 10×13         | 200   | ENB2BM330G13--T |
|          | 47       | 8×20          | 240   | ENB2BM470F20--T |
|          | 47       | 10×16         | 240   | ENB2BM470G16--T |
|          | 56       | 10×16         | 255   | ENB2BM560G16--T |
|          | 68       | 10×16         | 255   | ENB2BM680G16--T |
|          | 82       | 10×20         | 270   | ENB2BM820G20--T |
|          | 100      | 10×25         | 340   | ENB2BM101G25--T |
|          | 120      | 12.5×20       | 465   | ENB2BM121W20--T |
|          | 150      | 12.5×25       | 515   | ENB2BM151W25--T |
|          | 220      | 12.5×30       | 630   | ENB2BM221W30--T |
|          | 220      | 16×20         | 630   | ENB2BM221L20--T |
|          | 270      | 16×25         | 720   | ENB2BM271L25--T |
|          | 270      | 18×20         | 720   | ENB2BM271M20--T |
|          | 330      | 16×30         | 775   | ENB2BM331L30--T |
| 330      | 18×25    | 775           | ENB2BM331M25--T                             |                 |
| 470      | 16×40    | 865           | ENB2BM471L40--T                             |                 |
| 470      | 18×30    | 865           | ENB2BM471M30--T                             |                 |

※Specifications subject to change without notice

# RD series

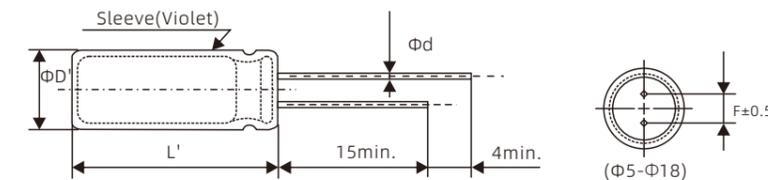


- Endurance: 2,000~5,000 hours at 105°C
- High frequency, low impedance
- RoHS Compliant

## SPECIFICATIONS

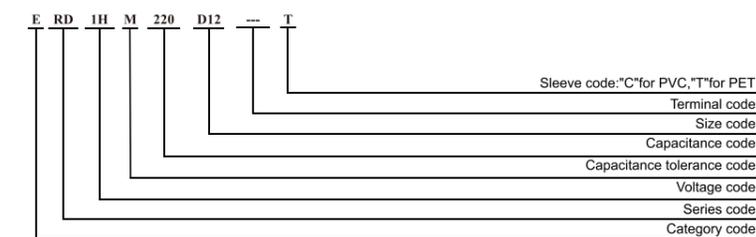
| Items   | Characteristics   |                                      |      |      |      |      |      |      |           |                   |
|---|---|--------------------------------------|------|------|------|------|------|------|-----------|-------------------|
| Category Temperature Range  | -40~+105°C  |                                      |      |      |      |      |      |      |           |                   |
| Rated Working Voltage Range   | 6.3~100 Vdc   |                                      |      |      |      |      |      |      |           |                   |
| Capacitance Tolerance   | ±20%(M) (at 20°C, 120Hz)  |                                      |      |      |      |      |      |      |           |                   |
| Leakage Current   | I ≤ 0.01CV or 3μA, whichever is greater. Where, I: Max. leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V) (at 20°C after 2 minutes)                                     |                                      |      |      |      |      |      |      |           |                   |
| Dissipation Factor (tanδ)   | Rated Voltage(Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 100       |                   |
|   | tanδ (max.)   | 0.22                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08      |                   |
| When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz) |   |                                      |      |      |      |      |      |      |           |                   |
| Low Temperature Characteristics (Max. Impedance Ratio)  | Rated Voltage(Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 100       |                   |
|   | Z(-25°C)/Z(+20°C)   | 4                                    | 3    | 2    |      |      |      |      |           |                   |
|   | Z(-40°C)/Z(+20°C)   | 8                                    | 6    | 4    | 3    |      |      |      |           |                   |
| Endurance   | The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for the specified period of time at 105°C. |                                      |      |      |      |      |      |      |           |                   |
|   | Capacitance Change  | ≤±25% of the initial value           |      |      |      |      |      |      | Case size | Load life (hours) |
|   | Dissipation Factor  | ≤200% of the initial specified value |      |      |      |      |      |      | ΦD≤6.3    | 2,000             |
|   | Leakage Current   | ≤The initial specified value         |      |      |      |      |      |      | ΦD=8      | 3,000             |
|   |   |                                      |      |      |      |      |      |      | ΦD≥10     | 5,000             |
| Shelf Life  | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.                                |                                      |      |      |      |      |      |      |           |                   |
|   | Capacitance Change  | ≤±25% of the initial value           |      |      |      |      |      |      |           |                   |
|   | Dissipation Factor  | ≤200% of the initial specified value |      |      |      |      |      |      |           |                   |
|   | Leakage Current   | ≤200% of the initial specified value |      |      |      |      |      |      |           |                   |

## DIMENSIONS [mm]



| ΦD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| Φd  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 3.5 | 5.0  | 7.5 | 7.5 |
| ΦD' | ΦD+0.5MAX. |     |     |     |      |     |     |
| L'  | L+2MAX.    |     |     |     |      |     |     |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)            | 120  | 1k   | 10k  | 100k |
|----------------------|------|------|------|------|
| Cap. < 220           | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 ≤ Cap. < 680     | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 ≤ Cap. < 2,200   | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 ≤ Cap. < 4,700 | 0.75 | 0.90 | 0.95 | 1.00 |
| Cap. ≥ 4,700         | 0.85 | 0.95 | 0.98 | 1.00 |

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STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 6.3      | 100      | 5×11          | 1.0                          | 170                                       | ERD0JM101D11---T |
|          | 120      | 5×11          | 0.92                         | 175                                       | ERD0JM121D11---T |
|          | 150      | 6.3×11        | 0.81                         | 220                                       | ERD0JM151E11---T |
|          | 180      | 6.3×11        | 0.76                         | 210                                       | ERD0JM181E11---T |
|          | 220      | 6.3×11        | 0.65                         | 310                                       | ERD0JM221E11---T |
|          | 270      | 6.3×11        | 0.54                         | 320                                       | ERD0JM271E11---T |
|          | 330      | 8×11          | 0.42                         | 390                                       | ERD0JM331F11---T |
|          | 470      | 8×11          | 0.25                         | 450                                       | ERD0JM471F11---T |
|          | 560      | 8×11          | 0.23                         | 490                                       | ERD0JM561F11---T |
|          | 680      | 8×11          | 0.21                         | 520                                       | ERD0JM681F11---T |
|          | 820      | 8×16          | 0.20                         | 620                                       | ERD0JM821F16---T |
|          | 1,000    | 10×13         | 0.17                         | 750                                       | ERD0JM102G13---T |
|          | 1,200    | 10×16         | 0.16                         | 860                                       | ERD0JM122G16---T |
|          | 1,500    | 10×16         | 0.14                         | 1,100                                     | ERD0JM152G16---T |
|          | 1,800    | 10×20         | 0.11                         | 1,250                                     | ERD0JM182G20---T |
|          | 2,200    | 10×25         | 0.095                        | 1,470                                     | ERD0JM222G25---T |
|          | 2,700    | 12.5×20       | 0.075                        | 1,500                                     | ERD0JM272W20---T |
|          | 3,300    | 12.5×20       | 0.036                        | 1,650                                     | ERD0JM332W20---T |
|          | 4,700    | 12.5×30       | 0.036                        | 2,100                                     | ERD0JM472W30---T |
|          | 5,600    | 12.5×30       | 0.034                        | 2,340                                     | ERD0JM562W30---T |
| 10       | 6,800    | 16×25         | 0.032                        | 2,450                                     | ERD0JM682L25---T |
|          | 8,200    | 16×30         | 0.027                        | 2,650                                     | ERD0JM822L30---T |
|          | 10,000   | 16×35         | 0.024                        | 2,700                                     | ERD0JM103L35---T |
|          | 15,000   | 18×35         | 0.023                        | 2,950                                     | ERD0JM153M35---T |
|          | 22       | 5×11          | 2.7                          | 98  | ERD1AM220D11---T |
|          | 33       | 5×11          | 2.6                          | 100                                       | ERD1AM330D11---T |
|          | 47       | 5×11          | 1.34                         | 150                                       | ERD1AM470D11---T |
|          | 56       | 5×11          | 1.23                         | 160                                       | ERD1AM560D11---T |
|          | 68       | 5×11          | 1.05                         | 170                                       | ERD1AM680D11---T |
|          | 100      | 5×11          | 0.80                         | 210                                       | ERD1AM101D11---T |
|          | 120      | 6.3×11        | 0.75                         | 250                                       | ERD1AM121E11---T |
|          | 150      | 6.3×11        | 0.61                         | 290                                       | ERD1AM151E11---T |
|          | 180      | 6.3×11        | 0.46                         | 320                                       | ERD1AM181E11---T |
|          | 220      | 6.3×11        | 0.35                         | 340                                       | ERD1AM221E11---T |
|          | 270      | 8×11          | 0.30                         | 400                                       | ERD1AM271F11---T |
|          | 330      | 8×11          | 0.27                         | 460                                       | ERD1AM331F11---T |
|          | 470      | 8×11          | 0.25                         | 580                                       | ERD1AM471F11---T |
|          | 560      | 10×13         | 0.16                         | 635                                       | ERD1AM561G13---T |
|          | 680      | 10×13         | 0.11                         | 765                                       | ERD1AM681G13---T |
|          | 820      | 10×16         | 0.10                         | 890                                       | ERD1AM821G16---T |
| 1,000    | 10×16    | 0.076         | 1,040                        | ERD1AM102G16---T                          |                  |
| 1,200    | 10×16    | 0.067         | 1,200                        | ERD1AM122G16---T                          |                  |

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STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 10       | 1,500    | 10×20         | 0.062                        | 1,400                                     | ERD1AM152G20---T |
|          | 1,800    | 10×25         | 0.058                        | 1,550                                     | ERD1AM182G25---T |
|          | 2,200    | 12.5×20       | 0.041                        | 1,750                                     | ERD1AM222W20---T |
|          | 2,700    | 12.5×20       | 0.035                        | 1,900                                     | ERD1AM272W20---T |
|          | 3,300    | 12.5×25       | 0.031                        | 2,000                                     | ERD1AM332W25---T |
|          | 4,700    | 16×25         | 0.030                        | 2,100                                     | ERD1AM472L25---T |
|          | 5,600    | 16×25         | 0.028                        | 2,290                                     | ERD1AM562L25---T |
|          | 6,800    | 16×30         | 0.026                        | 2,650                                     | ERD1AM682L30---T |
|          | 8,200    | 16×35         | 0.026                        | 2,770                                     | ERD1AM822L35---T |
|          | 10,000   | 18×35         | 0.024                        | 2,580                                     | ERD1AM103M35---T |
| 16       | 10       | 5×11          | 4.7                          | 74  | ERD1CM100D11---T |
|          | 22       | 5×11          | 2.6                          | 100                                       | ERD1CM220D11---T |
|          | 33       | 5×11          | 2.0                          | 114                                       | ERD1CM330D11---T |
|          | 47       | 5×11          | 1.1                          | 155                                       | ERD1CM470D11---T |
|          | 56       | 5×11          | 0.82                         | 180                                       | ERD1CM560D11---T |
|          | 68       | 5×11          | 0.69                         | 195                                       | ERD1CM680D11---T |
|          | 100      | 6.3×11        | 0.50                         | 265                                       | ERD1CM101E11---T |
|          | 120      | 6.3×11        | 0.47                         | 270                                       | ERD1CM121E11---T |
|          | 150      | 6.3×11        | 0.41                         | 290                                       | ERD1CM151E11---T |
|          | 180      | 8×11          | 0.34                         | 370                                       | ERD1CM181F11---T |
|          | 220      | 8×11          | 0.25                         | 480                                       | ERD1CM221F11---T |
|          | 270      | 8×11          | 0.21                         | 520                                       | ERD1CM271F11---T |
|          | 330      | 8×12          | 0.156                        | 290                                       | ERD1CM331F12---T |
|          | 470      | 10×13         | 0.124                        | 750                                       | ERD1CM471G13---T |
|          | 560      | 10×13         | 0.105                        | 785                                       | ERD1CM561G13---T |
|          | 680      | 10×16         | 0.092                        | 1,100                                     | ERD1CM681G16---T |
|          | 820      | 10×16         | 0.078                        | 1,140                                     | ERD1CM821G16---T |
|          | 1,000    | 10×20         | 0.065                        | 1,350                                     | ERD1CM102G20---T |
|          | 1,200    | 10×25         | 0.061                        | 1,500                                     | ERD1CM122G25---T |
|          | 1,500    | 12.5×20       | 0.060                        | 1,380                                     | ERD1CM152W20---T |
| 1,800    | 12.5×20  | 0.047         | 1,800                        | ERD1CM182W20---T                          |                  |
| 2,200    | 12.5×25  | 0.038         | 2,000                        | ERD1CM222W25---T                          |                  |
| 2,700    | 12.5×25  | 0.033         | 2,450                        | ERD1CM272W25---T                          |                  |
| 3,300    | 16×25    | 0.030         | 2,790                        | ERD1CM332L25---T                          |                  |
| 4,700    | 16×30    | 0.026         | 2,880                        | ERD1CM472L30---T                          |                  |
| 5,600    | 16×35    | 0.03          | 2,990                        | ERD1CM562L35---T                          |                  |
| 6,800    | 18×35    | 0.024         | 3,200                        | ERD1CM682M35---T                          |                  |
| 8,200    | 18×35    | 0.024         | 3,320                        | ERD1CM822M35---T                          |                  |
| 10,000   | 18×40    | 0.024         | 3,550                        | ERD1CM103M40---T                          |                  |
| 25       | 10       | 5×11          | 2.56                         | 85  | ERD1EM100D11---T |
|          | 22       | 5×11          | 1.95                         | 125                                       | ERD1EM220D11---T |
|          | 33       | 5×11          | 1.42                         | 155                                       | ERD1EM330D11---T |

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STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 25       | 47       | 6.3×11        | 1.00                         | 220                                       | ERD1EM470E11---T |
|          | 56       | 6.3×11        | 0.79                         | 250                                       | ERD1EM560E11---T |
|          | 68       | 6.3×11        | 0.65                         | 280                                       | ERD1EM680E11---T |
|          | 100      | 6.3×11        | 0.35                         | 370                                       | ERD1EM101E11---T |
|          | 120      | 6.3×11        | 0.33                         | 380                                       | ERD1EM121E11---T |
|          | 150      | 8×11          | 0.31                         | 410                                       | ERD1EM151F11---T |
|          | 180      | 8×11          | 0.25                         | 455                                       | ERD1EM181F11---T |
|          | 220      | 8×11          | 0.15                         | 550                                       | ERD1EM221F11---T |
|          | 270      | 10×13         | 0.125                        | 720                                       | ERD1EM271G13---T |
|          | 330      | 10×13         | 0.114                        | 820                                       | ERD1EM331G13---T |
|          | 470      | 10×16         | 0.076                        | 1,200                                     | ERD1EM471G16---T |
|          | 560      | 10×16         | 0.072                        | 1,250                                     | ERD1EM561G16---T |
|          | 680      | 10×20         | 0.065                        | 1,320                                     | ERD1EM681G20---T |
|          | 820      | 10×25         | 0.052                        | 1,530                                     | ERD1EM821G25---T |
|          | 1,000    | 12.5×20       | 0.045                        | 1,650                                     | ERD1EM102W20---T |
|          | 1,200    | 12.5×25       | 0.041                        | 1,980                                     | ERD1EM122W25---T |
|          | 1,500    | 12.5×25       | 0.038                        | 2,210                                     | ERD1EM152W25---T |
|          | 1,800    | 16×25         | 0.032                        | 2,510                                     | ERD1EM182L25---T |
|          | 2,200    | 16×25         | 0.036                        | 2,650                                     | ERD1EM222L25---T |
|          | 2,700    | 16×25         | 0.031                        | 2,820                                     | ERD1EM272L25---T |
| 3,300    | 16×30    | 0.026         | 3,240                        | ERD1EM332L30---T                          |                  |
| 4,700    | 16×35    | 0.024         | 3,650                        | ERD1EM472L35---T                          |                  |
| 5,600    | 18×35    | 0.024         | 3,720                        | ERD1EM562M35---T                          |                  |
| 6,800    | 18×40    | 0.024         | 3,850                        | ERD1EM682M40---T                          |                  |
| 35       | 10       | 5×11          | 2.37                         | 105                                       | ERD1VM100D11---T |
|          | 22       | 5×11          | 1.50                         | 150                                       | ERD1VM220D11---T |
|          | 33       | 5×11          | 1.21                         | 180                                       | ERD1VM330D11---T |
|          | 47       | 6.3×11        | 0.80                         | 280                                       | ERD1VM470E11---T |
|          | 56       | 6.3×11        | 0.64                         | 310                                       | ERD1VM560E11---T |
|          | 68       | 8×11          | 0.52                         | 350                                       | ERD1VM680F11---T |
|          | 100      | 8×11          | 0.25                         | 450                                       | ERD1VM101F11---T |
|          | 120      | 8×11          | 0.22                         | 510                                       | ERD1VM121F11---T |
|          | 150      | 8×12          | 0.191                        | 540                                       | ERD1VM151F12---T |
|          | 180      | 10×13         | 0.172                        | 650                                       | ERD1VM181G13---T |
|          | 220      | 10×13         | 0.114                        | 750                                       | ERD1VM221G13---T |
|          | 270      | 10×16         | 0.095                        | 910                                       | ERD1VM271G16---T |
|          | 330      | 10×16         | 0.079                        | 1,050                                     | ERD1VM331G16---T |
|          | 470      | 10×20         | 0.065                        | 1,200                                     | ERD1VM471G20---T |
|          | 560      | 10×25         | 0.061                        | 1,500                                     | ERD1VM561G25---T |
|          | 680      | 12.5×20       | 0.056                        | 1,570                                     | ERD1VM681W20---T |
|          | 820      | 12.5×20       | 0.048                        | 1,700                                     | ERD1VM821W20---T |
|          | 1,000    | 12.5×25       | 0.042                        | 1,900                                     | ERD1VM102W25---T |

RD series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 35       | 1,200    | 12.5×30       | 0.039                        | 2,130                                     | ERD1VM122W30---T |
|          | 1,500    | 16×25         | 0.036                        | 2,270                                     | ERD1VM152L25---T |
|          | 1,800    | 16×30         | 0.035                        | 2,700                                     | ERD1VM182L30---T |
|          | 2,200    | 16×30         | 0.034                        | 2,780                                     | ERD1VM222L30---T |
|          | 2,700    | 16×35         | 0.029                        | 2,850                                     | ERD1VM272L35---T |
|          | 3,300    | 18×35         | 0.026                        | 3,100                                     | ERD1VM332M35---T |
|          | 4,700    | 18×40         | 0.024                        | 3,500                                     | ERD1VM472M40---T |
|          | 50       | 0.47          | 5×11                         | 5.4                                       | 25               |
| 1        |          | 5×11          | 4.0                          | 40  | ERD1HM010D11---T |
| 2.2      |          | 5×11          | 2.8                          | 55  | ERD1HM2R2D11---T |
| 3.3      |          | 5×11          | 2.2                          | 60  | ERD1HM3R3D11---T |
| 4.7      |          | 5×11          | 2.0                          | 90  | ERD1HM4R7D11---T |
| 5.6      |          | 5×11          | 1.93                         | 105                                       | ERD1HM5R6D11---T |
| 6.8      |          | 5×11          | 1.89                         | 110                                       | ERD1HM6R8D11---T |
| 10       |          | 5×11          | 1.82                         | 120                                       | ERD1HM100D11---T |
| 22       |          | 6.3×11        | 1.25                         | 150                                       | ERD1HM220E11---T |
| 33       |          | 6.3×11        | 0.8                          | 250                                       | ERD1HM330E11---T |
| 47       |          | 6.3×11        | 0.65                         | 290                                       | ERD1HM470E11---T |
| 56       |          | 8×11          | 0.49                         | 310                                       | ERD1HM560F11---T |
| 68       |          | 8×11          | 0.33                         | 375                                       | ERD1HM680F11---T |
| 100      |          | 10×13         | 0.17                         | 480                                       | ERD1HM101G13---T |
| 120      |          | 10×13         | 0.156                        | 530                                       | ERD1HM121G13---T |
| 150      |          | 10×13         | 0.132                        | 590                                       | ERD1HM151G13---T |
| 180      |          | 10×16         | 0.114                        | 860                                       | ERD1HM181G16---T |
| 220      |          | 10×16         | 0.096                        | 830                                       | ERD1HM221G16---T |
| 270      |          | 10×20         | 0.078                        | 960                                       | ERD1HM271G20---T |
| 330      |          | 10×25         | 0.065                        | 1,150                                     | ERD1HM331G25---T |
| 470      | 12.5×20  | 0.055         | 1,590                        | ERD1HM471W20---T                          |                  |
| 560      | 12.5×20  | 0.050         | 1,660                        | ERD1HM561W20---T                          |                  |
| 680      | 12.5×25  | 0.044         | 1,930                        | ERD1HM681W25---T                          |                  |
| 820      | 12.5×30  | 0.039         | 2,100                        | ERD1HM821W30---T                          |                  |
| 1,000    | 16×25    | 0.036         | 2,300                        | ERD1HM102L25---T                          |                  |
| 1,200    | 16×30    | 0.036         | 2,650                        | ERD1HM122L30---T                          |                  |
| 1,500    | 16×35    | 0.034         | 2,750                        | ERD1HM152L35---T                          |                  |
| 1,800    | 16×35    | 0.034         | 2,850                        | ERD1HM182L35---T                          |                  |
| 2,200    | 18×35    | 0.032         | 3,040                        | ERD1HM222M35---T                          |                  |
| 2,700    | 18×40    | 0.027         | 3,070                        | ERD1HM272M40---T                          |                  |
| 3,300    | 18×40    | 0.025         | 3,100                        | ERD1HM332M40---T                          |                  |
| 63       | 0.47     | 5×11          | 5.4                          | 25  | ERD1JMR47D11---T |
|          | 1        | 5×11          | 4.0                          | 33  | ERD1JM010D11---T |
|          | 2.2      | 5×11          | 2.8                          | 45  | ERD1JM2R2D11---T |
|          | 3.3      | 5×11          | 2.2                          | 58  | ERD1JM3R3D11---T |

RD series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impeance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |
|----------|----------|---------------|-----------------------------|--|------------------|
| 63       | 4.7      | 5×11          | 2.0                         | 65   | ERD1JM4R7D11---T |
|          | 5.6      | 5×11          | 1.9                         | 95   | ERD1JM5R6D11---T |
|          | 6.8      | 5×11          | 1.82                        | 100  | ERD1JM6R8D11---T |
|          | 10       | 5×11          | 1.75                        | 110  | ERD1JM100D11---T |
|          | 22       | 6.3×11        | 0.80                        | 240  | ERD1JM220E11---T |
|          | 33       | 8×11          | 0.61                        | 270  | ERD1JM330F11---T |
|          | 47       | 8×12          | 0.56                        | 300  | ERD1JM470F12---T |
|          | 56       | 8×12          | 0.38                        | 330  | ERD1JM560F12---T |
|          | 68       | 10×13         | 0.21                        | 480  | ERD1JM680G13---T |
|          | 100      | 10×16         | 0.14                        | 610  | ERD1JM101G16---T |
|          | 120      | 10×16         | 0.13                        | 620  | ERD1JM121G16---T |
|          | 150      | 10×16         | 0.11                        | 700  | ERD1JM151G16---T |
|          | 180      | 10×20         | 0.10                        | 800  | ERD1JM181G20---T |
|          | 220      | 10×20         | 0.08                        | 1,100  | ERD1JM221G20---T |
|          | 270      | 12.5×20       | 0.065                       | 1,150  | ERD1JM271W20---T |
|          | 330      | 12.5×20       | 0.055                       | 1,250  | ERD1JM331W20---T |
|          | 470      | 12.5×25       | 0.053                       | 1,620  | ERD1JM471W25---T |
|          | 560      | 12.5×25       | 0.049                       | 1,630  | ERD1JM561W25---T |
|          | 680      | 12.5×30       | 0.043                       | 1,950  | ERD1JM681W30---T |
|          | 820      | 16×25         | 0.038                       | 2,150  | ERD1JM821L25---T |
| 1,000    | 16×30    | 0.034         | 2,350                       | ERD1JM102L30---T                                       |                  |
| 1,200    | 16×35    | 0.032         | 2,550                       | ERD1JM122L35---T                                       |                  |
| 1,500    | 18×35    | 0.031         | 2,710                       | ERD1JM152M35---T                                       |                  |
| 1,800    | 18×40    | 0.027         | 3,000                       | ERD1JM182M40---T                                       |                  |
| 100      | 0.47     | 5×11          | 5.9                         | 20   | ERD1KMR47D11---T |
|          | 1        | 5×11          | 4.4                         | 30   | ERD1KM010D11---T |
|          | 2.2      | 5×11          | 3.3                         | 42   | ERD1KM2R2D11---T |
|          | 3.3      | 5×11          | 2.8                         | 55   | ERD1KM3R3D11---T |
|          | 4.7      | 5×11          | 2.6                         | 72   | ERD1KM4R7D11---T |
|          | 5.6      | 5×11          | 2.33                        | 100  | ERD1KM5R6D11---T |
|          | 6.8      | 6.3×11        | 1.95                        | 115  | ERD1KM6R8E11---T |
|          | 10       | 6.3×11        | 1.77                        | 130  | ERD1KM100E11---T |
|          | 22       | 8×12          | 0.85                        | 220  | ERD1KM220F12---T |
|          | 33       | 10×13         | 0.69                        | 320  | ERD1KM330G13---T |
|          | 47       | 10×13         | 0.58                        | 370  | ERD1KM470G13---T |
|          | 56       | 10×16         | 0.42                        | 440  | ERD1KM560G16---T |
|          | 68       | 10×16         | 0.35                        | 470  | ERD1KM680G16---T |
|          | 100      | 10×25         | 0.3                         | 560  | ERD1KM101G25---T |
|          | 120      | 10×25         | 0.22                        | 660  | ERD1KM121G25---T |
|          | 150      | 12.5×20       | 0.174                       | 780  | ERD1KM151W20---T |
|          | 180      | 12.5×20       | 0.142                       | 820  | ERD1KM181W20---T |
|          | 220      | 12.5×25       | 0.13                        | 880  | ERD1KM221W25---T |

RD series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Impeance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA <sub>rms</sub> /105°C,100kHz) | Part Number      |
|----------|----------|---------------|-----------------------------|--|------------------|
| 100      | 270      | 12.5×30       | 0.11                        | 1,120  | ERD1KM271W30---T |
|          | 330      | 16×25         | 0.10                        | 1,440  | ERD1KM331L25---T |
|          | 470      | 16×30         | 0.09                        | 1,650  | ERD1KM471L30---T |
|          | 560      | 16×35         | 0.085                       | 1,720  | ERD1KM561L35---T |
|          | 680      | 18×35         | 0.080                       | 1,790  | ERD1KM681M35---T |
|          | 820      | 18×35         | 0.071                       | 1,840  | ERD1KM821M35---T |
|          | 1,000    | 18×40         | 0.066                       | 1,930  | ERD1KM102M40---T |

※Specifications subject to change without notice

GH series

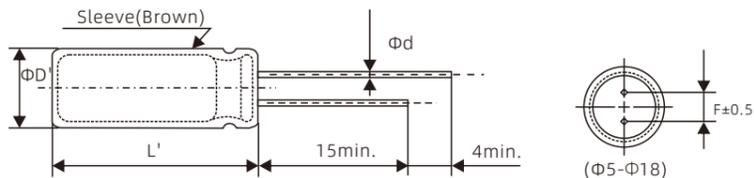
- Endurance: 5,000~ 10,000 hours at 105°C
- Especially designed for electronic ballast, intelligent instrument, etc.
- RoHS Compliant



SPECIFICATIONS

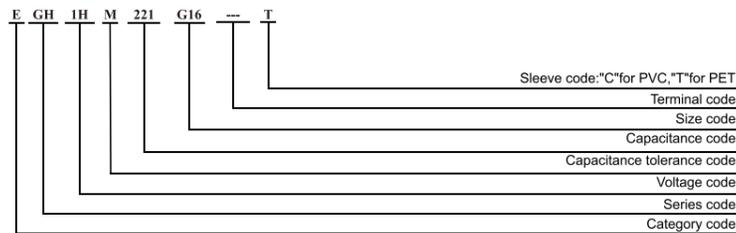
| Items  | Characteristics  |  |
|--|--|--|
| Category Temperature Range                             | -40~+105°C   |  |
| Rated Voltage Range                                    | 6.3~450Vdc   |  |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |  |
| Leakage Current  | 6.3 to 100Vdc  |  |
|  | CV   | After 2 minutes                            |
|  | CV ≤ 1,000   | I ≤ 0.01 CV or 3uA<br>Whichever is greater |
|  | CV > 1,000   | I ≤ 0.006CV + 4uA                          |
| Dissipation Factor (tanδ)                              | 160~450Vdc   |  |
|  | I: leakage current(μA),<br>C: Nominal capacitance(μF)<br>V: Rated voltage(V) (at 20°C)   |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  |  |
|  | Z(-25°C)/Z(+20°C)  |  |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105°C. |  |
|  | Life time (hours)  |  |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.  |  |
|  | Capacitance Change   |  |

DIMENSIONS [mm]



| ΦD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| Φd  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 3.5 | 5.0  | 5.0 | 7.5 |
| ΦD' | ΦD+0.5MAX. |     |     |     |      |     |     |
| L'  | L+2MAX.    |     |     |     |      |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

| Cap. (μF)          | 50/60 | 100/200 | 1k   | 10k  | 100k |
|--------------------|-------|---------|------|------|------|
| Cap. ≤ 330         | 0.35  | 0.5     | 0.75 | 0.85 | 1.00 |
| 330 < Cap. ≤ 1,500 | 0.45  | 0.65    | 0.85 | 0.90 | 1.00 |
| Cap. > 1,500       | 0.53  | 0.75    | 0.90 | 0.95 | 1.00 |

GH series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 6.3      | 150      | 5×11          | 91  | EGH0JM151D11--T |
|          | 330      | 6.3×11        | 151   | EGH0JM331E11--T |
|          | 680      | 8×12          | 228   | EGH0JM681F12--T |
|          | 820      | 10×13         | 256   | EGH0JM821G13--T |
|          | 1,000    | 8×16          | 272   | EGH0JM102F16--T |
|          | 1,200    | 8×20          | 386   | EGH0JM122F20--T |
|          | 1,200    | 10×16         | 386   | EGH0JM122G16--T |
|          | 1,500    | 10×20         | 513   | EGH0JM152G20--T |
|          | 1,800    | 12.5×16       | 513   | EGH0JM182W16--T |
|          | 2,200    | 10×25         | 580   | EGH0JM222G25--T |
|          | 2,700    | 10×30         | 630   | EGH0JM272G30--T |
|          | 3,300    | 12.5×20       | 665   | EGH0JM332W20--T |
|          | 3,900    | 12.5×25       | 807   | EGH0JM392W25--T |
|          | 4,700    | 12.5×30       | 902   | EGH0JM472W30--T |
|          | 5,600    | 12.5×35       | 1,034                                       | EGH0JM562W35--T |
|          | 5,600    | 16×20         | 1,034                                       | EGH0JM562L20--T |
|          | 6,800    | 12.5×40       | 1,190                                       | EGH0JM682W40--T |
|          | 6,800    | 16×25         | 1,190                                       | EGH0JM682L25--T |
|          | 6,800    | 18×20         | 1,190                                       | EGH0JM682M20--T |
|          | 8,200    | 16×30         | 1,400                                       | EGH0JM822L30--T |
| 10,000   | 16×35    | 1,600         | EGH0JM103L35--T                             |                 |
| 10,000   | 18×25    | 1,600         | EGH0JM103M25--T                             |                 |
| 12,000   | 16×40    | 1,850         | EGH0JM123L40--T                             |                 |
| 12,000   | 18×30    | 1,850         | EGH0JM123M30--T                             |                 |
| 15,000   | 18×35    | 1,850         | EGH0JM153M35--T                             |                 |
| 18,000   | 18×40    | 2,000         | EGH0JM183M40--T                             |                 |
| 10       | 100      | 5×11          | 91  | EGH1AM101D11--T |
|          | 220      | 6.3×11        | 151   | EGH1AM221E11--T |
|          | 470      | 8×12          | 228   | EGH1AM471F12--T |
|          | 680      | 8×16          | 256   | EGH1AM681F16--T |
|          | 680      | 10×13         | 272   | EGH1AM681G13--T |
|          | 1,000    | 8×20          | 400   | EGH1AM102F20--T |
|          | 1,000    | 10×16         | 430   | EGH1AM102G16--T |
|          | 1,200    | 10×20         | 513   | EGH1AM122G20--T |
|          | 1,500    | 10×25         | 580   | EGH1AM152G25--T |
|          | 1,500    | 12.5×16       | 580   | EGH1AM152W16--T |
|          | 2,200    | 10×30         | 630   | EGH1AM222G30--T |
|          | 2,200    | 12.5×20       | 681   | EGH1AM222W20--T |
|          | 3,300    | 12.5×25       | 807   | EGH1AM332W25--T |
|          | 3,900    | 12.5×30       | 902   | EGH1AM392W30--T |
|          | 3,900    | 16×20         | 902   | EGH1AM392L20--T |
|          | 4,700    | 16×25         | 1,116                                       | EGH1AM472L25--T |
|          | 5,600    | 12.5×40       | 1,190                                       | EGH1AM562W40--T |
|          | 5,600    | 16×25         | 1,190                                       | EGH1AM562L25--T |
|          | 5,600    | 18×20         | 1,190                                       | EGH1AM562M20--T |
|          | 6,800    | 16×30         | 1,400                                       | EGH1AM682L30--T |
| 6,800    | 18×25    | 1,400         | EGH1AM682M25--T                             |                 |
| 8,200    | 16×35    | 1,600         | EGH1AM822L35--T                             |                 |
| 8,200    | 18×30    | 1,600         | EGH1AM822M30--T                             |                 |
| 10,000   | 16×40    | 1,850         | EGH1AM103L40--T                             |                 |
| 10,000   | 18×35    | 1,850         | EGH1AM103M35--T                             |                 |
| 12,000   | 18×40    | 2,000         | EGH1AM123M40--T                             |                 |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 100kHz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 16       | 56       | 5×11          | 100   | EGH1CM560D11--T |
|          | 120      | 6.3×11        | 118   | EGH1CM121E11--T |
|          | 330      | 8×12          | 205   | EGH1CM331F12--T |
|          | 470      | 8×16          | 256   | EGH1CM471F16--T |
|          | 470      | 10×13         | 272   | EGH1CM471G13--T |
|          | 680      | 8×20          | 386   | EGH1CM681F20--T |
|          | 680      | 10×16         | 386   | EGH1CM681G16--T |
|          | 1,000    | 10×20         | 513   | EGH1CM102G20--T |
|          | 1,000    | 12.5×16       | 513   | EGH1CM102W16--T |
|          | 1,200    | 10×25         | 580   | EGH1CM122G25--T |
|          | 1,500    | 10×30         | 630   | EGH1CM152G30--T |
|          | 1,500    | 12.5×20       | 665   | EGH1CM152W20--T |
|          | 2,200    | 12.5×25       | 807   | EGH1CM222W25--T |
|          | 2,700    | 12.5×30       | 902   | EGH1CM272W30--T |
|          | 2,700    | 16×20         | 902   | EGH1CM272L20--T |
|          | 3,300    | 12.5×35       | 1,034                                       | EGH1CM332W35--T |
|          | 3,900    | 12.5×40       | 1,190                                       | EGH1CM392W40--T |
|          | 3,900    | 16×25         | 1,190                                       | EGH1CM392L25--T |
|          | 3,900    | 18×20         | 1,190                                       | EGH1CM392M20--T |
|          | 4,700    | 16×30         | 1,400                                       | EGH1CM472L30--T |
| 4,700    | 18×25    | 1,400         | EGH1CM472M25--T                             |                 |
| 5,600    | 16×35    | 1,600         | EGH1CM562L35--T                             |                 |
| 5,600    | 18×30    | 1,600         | EGH1CM562M30--T                             |                 |
| 6,800    | 16×40    | 1,850         | EGH1CM682L40--T                             |                 |
| 8,200    | 18×35    | 1,850         | EGH1CM822M35--T                             |                 |
| 10,000   | 18×40    | 2,000         | EGH1CM103M40--T                             |                 |
| 25       | 47       | 5×11          | 124   | EGH1EM470D11--T |
|          | 100      | 6.3×11        | 138   | EGH1EM101E11--T |
|          | 220      | 8×12          | 205   | EGH1EM221F12--T |
|          | 330      | 8×16          | 225   | EGH1EM331F16--T |
|          | 330      | 10×13         | 245   | EGH1EM331G13--T |
|          | 470      | 8×20          | 320   | EGH1EM471F20--T |
|          | 470      | 10×16         | 340   | EGH1EM471G16--T |
|          | 680      | 10×20         | 345   | EGH1EM681G20--T |
|          | 680      | 12.5×16       | 345   | EGH1EM681W16--T |
|          | 820      | 10×25         | 450   | EGH1EM821G25--T |
|          | 1,000    | 10×30         | 540   | EGH1EM102G30--T |
|          | 1,000    | 12.5×20       | 540   | EGH1EM102W20--T |
|          | 1,500    | 12.5×25       | 665   | EGH1EM152W25--T |
|          | 1,800    | 12.5×30       | 790   | EGH1EM182W30--T |
|          | 1,800    | 16×20         | 800   | EGH1EM182L20--T |
|          | 2,200    | 12.5×35       | 860   | EGH1EM222W35--T |
|          | 2,200    | 18×20         | 880   | EGH1EM222M20--T |
|          | 2,700    | 12.5×40       | 960   | EGH1EM272W40--T |
|          | 2,700    | 16×25         | 980   | EGH1EM272L25--T |
|          | 3,300    | 16×30         | 1,190                                       | EGH1EM332L30--T |
| 3,300    | 18×25    | 1,190         | EGH1EM332M25--T                             |                 |
| 3,900    | 16×35    | 1,400         | EGH1EM392L35--T                             |                 |
| 3,900    | 18×30    | 1,400         | EGH1EM392M30--T                             |                 |
| 4,700    | 16×40    | 1,600         | EGH1EM472L40--T                             |                 |
| 4,700    | 18×35    | 1,600         | EGH1EM472M35--T                             |                 |
| 5,600    | 18×40    | 1,850         | EGH1EM562M40--T                             |                 |

Radial Type

GH series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/105°C, 100kHz) | Part Number      |
|----------|----------|---------------|--|------------------|
| 35       | 33       | 5×11          | 90   | EGH1VM330D11---T |
|          | 56       | 6.3×11        | 110  | EGH1VM560E11---T |
|          | 150      | 8×12          | 180  | EGH1VM151F12---T |
|          | 220      | 8×16          | 240  | EGH1VM221F16---T |
|          | 220      | 10×13         | 252  | EGH1VM221G13---T |
|          | 270      | 8×20          | 280  | EGH1VM271F20---T |
|          | 330      | 10×16         | 312  | EGH1VM331G16---T |
|          | 470      | 10×20         | 386  | EGH1VM471G20---T |
|          | 470      | 12.5×16       | 394  | EGH1VM471W16---T |
|          | 560      | 10×25         | 450  | EGH1VM561G25---T |
|          | 680      | 10×30         | 496  | EGH1VM681G30---T |
|          | 680      | 12.5×20       | 520  | EGH1VM681W20---T |
|          | 1,000    | 12.5×25       | 810  | EGH1VM102W25---T |
|          | 1,200    | 12.5×30       | 860  | EGH1VM122W30---T |
|          | 1,200    | 16×25         | 880  | EGH1VM122L25---T |
|          | 1,500    | 12.5×35       | 880  | EGH1VM152W35---T |
|          | 1,800    | 12.5×40       | 960  | EGH1VM182W40---T |
|          | 1,800    | 16×20         | 900  | EGH1VM182L20---T |
|          | 1,800    | 18×20         | 960  | EGH1VM182M20---T |
|          | 2,200    | 16×30         | 1,190                                      | EGH1VM222L30---T |
|          | 2,200    | 18×25         | 1,190                                      | EGH1VM222M25---T |
|          | 2,700    | 16×35         | 1,400                                      | EGH1VM272L35---T |
|          | 2,700    | 18×30         | 1,400                                      | EGH1VM272M30---T |
|          | 3,300    | 16×40         | 1,600                                      | EGH1VM332L40---T |
| 3,300    | 18×35    | 1,600         | EGH1VM332M35---T                           |                  |
| 3,900    | 18×40    | 1,850         | EGH1VM392M40---T                           |                  |
| 50       | 22       | 5×11          | 84   | EGH1HM220D11---T |
|          | 56       | 6.3×11        | 146  | EGH1HM560E11---T |
|          | 100      | 8×12          | 152  | EGH1HM101F12---T |
|          | 120      | 8×16          | 180  | EGH1HM121F16---T |
|          | 150      | 10×13         | 215  | EGH1HM151G13---T |
|          | 180      | 8×20          | 246  | EGH1HM181F20---T |
|          | 220      | 10×16         | 291  | EGH1HM221G16---T |
|          | 270      | 10×20         | 330  | EGH1HM271G20---T |
|          | 270      | 12.5×16       | 330  | EGH1HM271W16---T |
|          | 330      | 10×25         | 386  | EGH1HM331G25---T |
|          | 470      | 10×30         | 460  | EGH1HM471G30---T |
|          | 470      | 12.5×20       | 475  | EGH1HM471W20---T |
|          | 560      | 12.5×25       | 520  | EGH1HM561W25---T |
|          | 680      | 12.5×30       | 665  | EGH1HM681W30---T |
|          | 820      | 12.5×35       | 800  | EGH1HM821W35---T |
|          | 820      | 16×20         | 800  | EGH1HM821L20---T |
|          | 1,000    | 12.5×40       | 880  | EGH1HM102W40---T |
|          | 1,000    | 16×25         | 880  | EGH1HM102L25---T |
|          | 1,000    | 18×20         | 880  | EGH1HM102M20---T |
|          | 1,200    | 16×30         | 1,190                                      | EGH1HM122L30---T |
|          | 1,200    | 18×25         | 1,190                                      | EGH1HM122M25---T |
|          | 1,500    | 16×35         | 1,400                                      | EGH1HM152L35---T |
|          | 1,800    | 16×40         | 1,600                                      | EGH1HM182L40---T |
|          | 1,800    | 18×30         | 1,600                                      | EGH1HM182M30---T |
| 2,200    | 18×35    | 1,800         | EGH1HM222M35---T                           |                  |
| 2,700    | 18×40    | 1,850         | EGH1HM272M40---T                           |                  |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/105°C, 100kHz) | Part Number      |
|----------|----------|---------------|--|------------------|
| 63       | 15       | 5×11          | 62   | EGH1JM150D11---T |
|          | 33       | 6.3×11        | 126  | EGH1JM330E11---T |
|          | 56       | 8×12          | 198  | EGH1JM560F12---T |
|          | 82       | 8×16          | 246  | EGH1JM820F16---T |
|          | 82       | 10×13         | 252  | EGH1JM820G13---T |
|          | 120      | 8×20          | 300  | EGH1JM121F20---T |
|          | 120      | 10×16         | 310  | EGH1JM121G16---T |
|          | 180      | 10×20         | 386  | EGH1JM181G20---T |
|          | 180      | 12.5×16       | 394  | EGH1JM181W16---T |
|          | 220      | 10×25         | 450  | EGH1JM221G25---T |
|          | 270      | 12.5×20       | 520  | EGH1JM271W20---T |
|          | 330      | 12.5×25       | 665  | EGH1JM331W25---T |
|          | 470      | 12.5×30       | 790  | EGH1JM471W30---T |
|          | 470      | 16×20         | 800  | EGH1JM471L20---T |
|          | 560      | 12.5×35       | 860  | EGH1JM561W35---T |
|          | 560      | 16×25         | 880  | EGH1JM561L25---T |
|          | 680      | 12.5×40       | 960  | EGH1JM681W40---T |
|          | 680      | 18×20         | 980  | EGH1JM681M20---T |
|          | 820      | 16×30         | 1,190                                      | EGH1JM821L30---T |
|          | 820      | 18×25         | 1,190                                      | EGH1JM821M25---T |
|          | 1,000    | 16×35         | 1,400                                      | EGH1JM102L35---T |
|          | 1,000    | 18×30         | 1,400                                      | EGH1JM102M30---T |
|          | 1,200    | 16×40         | 1,600                                      | EGH1JM122L40---T |
|          | 1,200    | 18×35         | 1,600                                      | EGH1JM122M35---T |
| 1,500    | 18×40    | 1,850         | EGH1JM152M40---T                           |                  |
| 100      | 6.8      | 5×11          | 62   | EGH1KM6R8D11---T |
|          | 15       | 6.3×11        | 126  | EGH1KM150E11---T |
|          | 27       | 8×12          | 198  | EGH1KM270F12---T |
|          | 39       | 8×16          | 246  | EGH1KM390F16---T |
|          | 47       | 10×13         | 252  | EGH1KM470G13---T |
|          | 56       | 8×20          | 300  | EGH1KM560F20---T |
|          | 68       | 10×16         | 330  | EGH1KM680G16---T |
|          | 82       | 10×20         | 386  | EGH1KM820G20---T |
|          | 82       | 12.5×16       | 394  | EGH1KM820W16---T |
|          | 100      | 10×25         | 450  | EGH1KM101G25---T |
|          | 120      | 12.5×20       | 520  | EGH1KM121W20---T |
|          | 180      | 12.5×25       | 665  | EGH1KM181W25---T |
|          | 220      | 16×20         | 800  | EGH1KM221L20---T |
|          | 220      | 12.5×30       | 790  | EGH1KM221W30---T |
|          | 270      | 12.5×35       | 860  | EGH1KM271W35---T |
|          | 270      | 16×25         | 880  | EGH1KM271L25---T |
|          | 330      | 18×20         | 980  | EGH1KM331M20---T |
|          | 330      | 12.5×40       | 960  | EGH1KM331W40---T |
|          | 390      | 16×30         | 1,190                                      | EGH1KM391L30---T |
|          | 390      | 18×25         | 1,190                                      | EGH1KM391M25---T |
|          | 470      | 16×35         | 1,400                                      | EGH1KM471L35---T |
|          | 470      | 18×30         | 1,400                                      | EGH1KM471M30---T |
|          | 560      | 16×40         | 1,600                                      | EGH1KM561L40---T |
|          | 680      | 18×35         | 1,600                                      | EGH1KM681M35---T |
| 820      | 18×40    | 1,850         | EGH1KM821M40---T                           |                  |
| 160      | 4.7      | 8×9           | 90   | EGH2CM4R7F09---T |
|          | 4.7      | 8×11          | 100  | EGH2CM4R7F11---T |

GH series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/105°C, 100kHz) | Part Number      |                  |
|----------|----------|---------------|--|------------------|------------------|
| 160      | 5.6      | 8×12          | 115  | EGH2CM5R6F12---T |                  |
|          | 6.8      | 8×12          | 125  | EGH2CM6R8F12---T |                  |
|          | 8.2      | 8×12          | 135  | EGH2CM8R2F12---T |                  |
|          | 10       | 8×12          | 150  | EGH2CM100F12---T |                  |
|          | 12       | 10×12         | 180  | EGH2CM120G12---T |                  |
|          | 15       | 10×16         | 230  | EGH2CM150G16---T |                  |
|          | 22       | 10×16         | 280  | EGH2CM220G16---T |                  |
|          | 33       | 10×18         | 350  | EGH2CM330G18---T |                  |
|          | 39       | 10×20         | 390  | EGH2CM390G20---T |                  |
|          | 47       | 10×20         | 440  | EGH2CM470G20---T |                  |
|          | 47       | 12.5×16       | 480  | EGH2CM470W16---T |                  |
|          | 56       | 12.5×18       | 600  | EGH2CM560W18---T |                  |
|          | 68       | 12.5×20       | 740  | EGH2CM680W20---T |                  |
|          | 82       | 12.5×20       | 780  | EGH2CM820W20---T |                  |
|          | 82       | 16×20         | 800  | EGH2CM820L20---T |                  |
|          | 100      | 12.5×25       | 850  | EGH2CM101W25---T |                  |
|          | 100      | 16×20         | 860  | EGH2CM101L20---T |                  |
|          | 150      | 16×20         | 1,000                                      | EGH2CM151L20---T |                  |
|          | 150      | 16×25         | 1,040                                      | EGH2CM151L25---T |                  |
|          | 220      | 16×25         | 1,560                                      | EGH2CM221L25---T |                  |
|          | 220      | 18×25         | 1,600                                      | EGH2CM221M25---T |                  |
|          | 330      | 18×30         | 1,880                                      | EGH2CM331M30---T |                  |
|          | 200      | 10            | 10×12                                      | 170              | EGH2DM100G12---T |
|          |          | 12            | 10×16                                      | 200              | EGH2DM120G16---T |
| 15       |          | 10×16         | 236  | EGH2DM150G16---T |                  |
| 22       |          | 10×20         | 280  | EGH2DM220G20---T |                  |
| 33       |          | 10×20         | 320  | EGH2DM330G20---T |                  |
| 33       |          | 12.5×20       | 340  | EGH2DM330W20---T |                  |
| 39       |          | 12.5×20       | 400  | EGH2DM390W20---T |                  |
| 47       |          | 12.5×20       | 500  | EGH2DM470W20---T |                  |
| 68       |          | 12.5×20       | 620  | EGH2DM680W20---T |                  |
| 68       |          | 12.5×25       | 660  | EGH2DM680W25---T |                  |
| 82       |          | 16×20         | 760  | EGH2DM820L20---T |                  |
| 100      |          | 16×20         | 840  | EGH2DM101L20---T |                  |
| 100      |          | 16×25         | 880  | EGH2DM101L25---T |                  |
| 150      |          | 16×25         | 1,160                                      | EGH2DM151L25---T |                  |
| 150      |          | 16×30         | 1,200                                      | EGH2DM151L30---T |                  |
| 150      |          | 18×25         | 1,200                                      | EGH2DM151M25---T |                  |
| 220      |          | 18×25         | 1,400                                      | EGH2DM221M25---T |                  |
| 220      |          | 18×30         | 1,440                                      | EGH2DM221M30---T |                  |
| 330      |          | 18×35         | 1,800                                      | EGH2DM331M35---T |                  |
| 330      |          | 18×40         | 1,840                                      | EGH2DM331M40---T |                  |
| 250      |          | 4.7           | 8×12                                       | 116              | EGH2EM4R7F12---T |
|          |          | 5.6           | 10×12                                      | 130              | EGH2EM5R6G12---T |
|          |          | 6.8           | 10×12                                      | 144              | EGH2EM6R8G12---T |
|          |          | 10            | 10×20                                      | 200              | EGH2EM100G20---T |
|          | 22       | 10×20         | 336  | EGH2EM220G20---T |                  |
|          | 33       | 12.5×20       | 420  | EGH2EM330W20---T |                  |
|          | 39       | 12.5×20       | 496  | EGH2EM390W20---T |                  |
|          | 47       | 12.5×20       | 600  | EGH2EM470W20---T |                  |
|          | 47       | 12.5×25       | 640  | EGH2EM470W25---T |                  |
|          | 68       | 16×20         | 800  | EGH2EM680L20---T |                  |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mAmps/105°C, 100kHz) | Part Number      |
|----------|----------|---------------|--|------------------|
| 250      | 82       | 16×20         | 880  | EGH2EM820L20---T |
|          | 82       | 16×30         | 920  | EGH2EM820L30---T |
|          | 100      | 16×25         | 1,020                                      | EGH2EM101L25---T |
|          | 100      | 18×25         | 1,060                                      | EGH2EM101M25---T |
|          | 150      | 18×25         | 1,200                                      | EGH2EM151M25---T |
|          | 220      | 18×31         | 1,440                                      | EGH2EM221M31---T |
|          | 220      | 18×40         | 1,480                                      | EGH2EM221M40---T |
|          | 350      | 4.7           | 8×12                                       | 110              |
| 5.6      |          | 10×12         | 130  | EGH2VM5R6G12---T |
| 6.8      |          | 10×12         | 160  | EGH2VM6R8G12---T |
| 10       |          | 10×16         | 200  | EGH2VM100G16---T |
| 22       |          | 12.5×20       | 364  | EGH2VM220W20---T |
| 33       |          | 16×20         | 480  | EGH2VM330L20---T |
| 39       |          | 16×20         | 530  | EGH2VM390L20---T |
| 47       |          | 16×20         | 580  | EGH2VM470L20---T |
| 47       |          | 16×25         | 610  | EGH2VM470L25---T |
| 68       |          | 16×25         | 740  | EGH2VM680L25---T |
| 68       |          | 18×20         | 740  | EGH2VM680M20---T |
| 68       |          | 18×25         | 780  | EGH2VM680M25---T |
| 400      | 82       | 18×25         | 860  | EGH2VM820M25---T |
|          | 100      | 18×25         | 960  | EGH2VM101M25---T |
|          | 100      | 18×30         | 1,000                                      | EGH2VM101M30---T |
|          | 120      | 18×30         | 1,100                                      | EGH2VM121M30---T |
|          | 150      | 18×35         | 1,200                                      | EGH2VM151M35---T |
|          | 1        | 8×12          | 50   | EGH2GM010F12---T |
|          | 2.2      | 8×12          | 70   | EGH2GM2R2F12---T |
|          | 3.3      | 8×12          | 110  | EGH2GM3R3F12---T |
|          | 4.7      | 10×12         | 130  | EGH2GM4R7G12---T |
|          | 6.8      | 10×12         | 150  | EGH2GM6R8G12---T |
|          | 10       | 10×16         | 200  | EGH2GM100G16---T |
|          | 15       | 12.5×16       | 270  | EGH2GM150W16---T |
| 450      | 22       | 12.5×20       | 350  | EGH2GM220W20---T |
|          | 22       | 12.5×25       | 370  | EGH2GM220W25---T |
|          | 33       | 16×20         | 510  | EGH2GM330L20---T |
|          | 39       | 16×25         | 580  | EGH2GM390L25---T |
|          | 47       | 16×25         | 660  | EGH2GM470L25---T |
|          | 47       | 18×20         | 660  | EGH2GM470M20---T |
|          | 47       | 16×30         | 700  | EGH2GM470L30---T |
|          | 56       | 10×50         | 780  | EGH2GM560G50---T |
|          | 68       | 12.5×40       | 880  | EGH2GM680W40---T |
|          | 68       | 18×25         | 880  | EGH2GM680M25---T |
|          | 82       | 12.5×45       | 900  | EGH2GM820W45---T |
|          | 82       | 18×25         | 960  | EGH2GM820M25---T |

Radial Type

# GH series

## STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA <sub>rms</sub> /105°C, 100kHz) | Part Number     |
|----------|----------|---------------|---|-----------------|
| 450      | 22       | 16x20         | 380   | EGH2WM220L20--T |
|          | 33       | 10x40         | 510   | EGH2WM330G40--T |
|          | 33       | 16x25         | 520   | EGH2WM330L25--T |
|          | 33       | 18x20         | 550   | EGH2WM330M20--T |
|          | 39       | 10x45         | 620   | EGH2WM390G45--T |
|          | 39       | 18x25         | 620   | EGH2WM390M25--T |
|          | 47       | 12.5x40       | 700   | EGH2WM470W40--T |
|          | 47       | 18x25         | 700   | EGH2WM470M25--T |
|          | 56       | 12.5x40       | 780   | EGH2WM560W40--T |
|          | 68       | 18x30         | 880   | EGH2WM680M30--T |
|          | 82       | 12.5x50       | 1,000   | EGH2WM820W50--T |
|          | 82       | 18x35         | 1,000   | EGH2WM820M35--T |
| 100      | 18x40    | 1,120         | EGH2WM101M40--T   |                 |

※Specifications subject to change without notice

# LL series

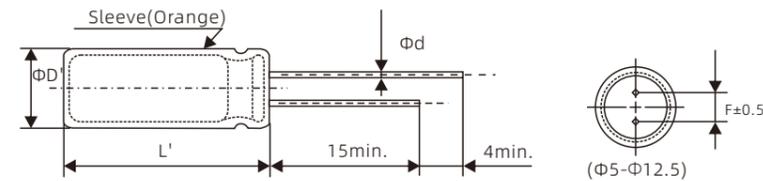


- Endurance: 2,000 hours at 105°C
- Stable and extremely low leakage current characteristics
- Wide temperature range of -40°C to +105°C
- RoHS Compliant

## SPECIFICATIONS

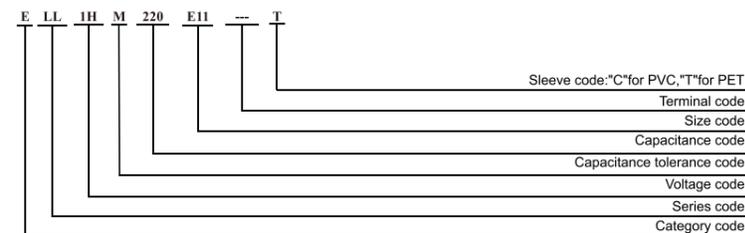
| Items  | Characteristics  |                                      |      |      |      |      |      |      |      |            |
|--|--|--------------------------------------|------|------|------|------|------|------|------|------------|
| Category Temperature Range                             | -40~+105°C   |                                      |      |      |      |      |      |      |      |            |
| Rated Working Voltage Range                            | 6.3~100 Vdc  |                                      |      |      |      |      |      |      |      |            |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |                                      |      |      |      |      |      |      |      |            |
| Leakage Current  | I ≤ 0.002CV or 0.4μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)                      |                                      |      |      |      |      |      |      |      |            |
| Dissipation Factor (tanδ)                              | Rated Voltage(Vdc)   | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 100  |            |
|  | tanδ (max.)  | 0.22                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 | 0.10 |            |
|  | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)  |                                      |      |      |      |      |      |      |      |            |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage(Vdc)   | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 100  |            |
|  | Z(-25°C)/Z(+20°C)  | 4                                    | 3    | 3    | 2    | 2    | 2    | 2    | 2    | (at 120Hz) |
|  | Z(-40°C)/Z(+20°C)  | 8                                    | 6    | 6    | 4    | 4    | 3    | 3    | 3    |            |
| Endurance  | The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105°C. |                                      |      |      |      |      |      |      |      |            |
|  | Capacitance Change   | ≤±20% of the initial value           |      |      |      |      |      |      |      |            |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |      |      |            |
|  | Leakage Current  | ≤The initial specified value         |      |      |      |      |      |      |      |            |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied.                 |                                      |      |      |      |      |      |      |      |            |
|  | Capacitance Change   | ≤±20% of the initial value           |      |      |      |      |      |      |      |            |
|  | Dissipation Factor   | ≤200% of the initial specified value |      |      |      |      |      |      |      |            |
|  | Leakage Current  | ≤200% of the initial specified value |      |      |      |      |      |      |      |            |

## DIMENSIONS [mm]



| ΦD  | 4          | 5    | 6.3 | 8   | 10  | 12.5 |
|-----|------------|------|-----|-----|-----|------|
| Φd  | 0.45       | 0.45 | 0.5 | 0.5 | 0.6 | 0.6  |
| F   | 1.5        | 2.0  | 2.5 | 3.5 | 5.0 | 5.0  |
| ΦD' | ΦD+0.5MAX. |      |     |     |     |      |
| L'  | L+2MAX.    |      |     |     |     |      |

## PART NUMBERING SYSTEM



## RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)        | Freq. (Hz) | 50/60 | 120  | 1k   | 10k  | 100k |
|------------------|------------|-------|------|------|------|------|
| Cap. < 110       |            | 0.80  | 1.00 | 1.45 | 1.65 | 1.70 |
| 110≤Cap. < 1,000 |            | 0.80  | 1.00 | 1.36 | 1.48 | 1.53 |
| Cap. ≥1,000      |            | 0.85  | 1.00 | 1.25 | 1.35 | 1.38 |

LL series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA <sub>rms</sub> /105°C, 120Hz) | Part Number     |
|----------|----------|---------------|--|-----------------|
| 6.3      | 22       | 5×11          | 36   | ELL0JM220D11--T |
|          | 33       | 5×11          | 44   | ELL0JM330D11--T |
|          | 47       | 5×11          | 53   | ELL0JM470D11--T |
|          | 100      | 5×11          | 74   | ELL0JM101D11--T |
|          | 220      | 6.3×11        | 131  | ELL0JM221E11--T |
|          | 330      | 6.3×11        | 161  | ELL0JM331E11--T |
|          | 470      | 8×11          | 242  | ELL0JM471F11--T |
|          | 1,000    | 10×13         | 390  | ELL0JM102G13--T |
|          | 2,200    | 12.5×20       | 665  | ELL0JM222W20--T |
| 10       | 22       | 5×11          | 50   | ELL1AM220D11--T |
|          | 33       | 5×11          | 66   | ELL1AM330D11--T |
|          | 47       | 5×11          | 75   | ELL1AM470D11--T |
|          | 100      | 5×11          | 104  | ELL1AM101D11--T |
|          | 220      | 8×11          | 193  | ELL1AM221F11--T |
|          | 330      | 8×11          | 256  | ELL1AM331F11--T |
|          | 470      | 8×11          | 319  | ELL1AM471F11--T |
|          | 1,000    | 10×16         | 605  | ELL1AM102G16--T |
|          | 2,200    | 12.5×20       | 860  | ELL1AM222W20--T |
| 16       | 10       | 5×11          | 39   | ELL1CM100D11--T |
|          | 22       | 5×11          | 62   | ELL1CM220D11--T |
|          | 33       | 5×11          | 68   | ELL1CM330D11--T |
|          | 47       | 5×11          | 105  | ELL1CM470D11--T |
|          | 100      | 6.3×11        | 138  | ELL1CM101E11--T |
|          | 220      | 8×11          | 220  | ELL1CM221F11--T |
|          | 330      | 8×11          | 268  | ELL1CM331F11--T |
|          | 470      | 10×13         | 407  | ELL1CM471G13--T |
|          | 1,000    | 10×20         | 704  | ELL1CM102G20--T |
| 2,200    | 12.5×25  | 890           | ELL1CM222W25--T  |                 |
| 25       | 10       | 5×11          | 43   | ELL1EM100D11--T |
|          | 22       | 5×11          | 65   | ELL1EM220D11--T |
|          | 33       | 5×11          | 76   | ELL1EM330D11--T |
|          | 47       | 6.3×11        | 116  | ELL1EM470E11--T |
|          | 100      | 8×11          | 149  | ELL1EM101F11--T |
|          | 220      | 10×13         | 246  | ELL1EM221G13--T |
|          | 330      | 10×13         | 352  | ELL1EM331G13--T |
|          | 470      | 10×16         | 484  | ELL1EM471G16--T |
|          | 1,000    | 12.5×20       | 847  | ELL1EM102W20--T |
| 35       | 10       | 5×11          | 48   | ELL1VM100D11--T |
|          | 22       | 6.3×11        | 71   | ELL1VM220E11--T |
|          | 33       | 6.3×11        | 83   | ELL1VM330E11--T |
|          | 47       | 6.3×11        | 125  | ELL1VM470E11--T |
|          | 100      | 8×11          | 187  | ELL1VM101F11--T |
|          | 220      | 10×13         | 330  | ELL1VM221G13--T |
|          | 330      | 10×16         | 440  | ELL1VM331G16--T |
|          | 470      | 12.5×20       | 590  | ELL1VM471W20--T |
|          | 1,000    | 12.5×25       | 1,012  | ELL1VM102W25--T |
| 50       | 0.47     | 5×11          | 12   | ELL1HMR47D11--T |
|          | 1        | 5×11          | 17   | ELL1HM010D11--T |
|          | 2.2      | 5×11          | 24   | ELL1HM2R2D11--T |
|          | 3.3      | 5×11          | 29   | ELL1HM3R3D11--T |
|          | 4.7      | 5×11          | 36   | ELL1HM4R7D11--T |
|          | 10       | 5×11          | 52   | ELL1HM100D11--T |

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Rated Ripple Current (mA <sub>rms</sub> /105°C, 120Hz) | Part Number     |
|----------|----------|---------------|--|-----------------|
| 50       | 22       | 6.3×11        | 77   | ELL1HM220E11--T |
|          | 33       | 6.3×11        | 99   | ELL1HM330E11--T |
|          | 47       | 8×11          | 138  | ELL1HM470F11--T |
|          | 100      | 10×13         | 217  | ELL1HM101G13--T |
|          | 220      | 10×20         | 380  | ELL1HM221G20--T |
|          | 330      | 12.5×20       | 506  | ELL1HM331W20--T |
|          | 470      | 12.5×25       | 705  | ELL1HM471W25--T |
| 63       | 0.47     | 5×11          | 12   | ELL1JMR47D11--T |
|          | 1        | 5×11          | 17   | ELL1JM010D11--T |
|          | 2.2      | 5×11          | 24   | ELL1JM2R2D11--T |
|          | 3.3      | 5×11          | 32   | ELL1JM3R3D11--T |
|          | 4.7      | 5×11          | 39   | ELL1JM4R7D11--T |
|          | 10       | 6.3×11        | 58   | ELL1JM100E11--T |
|          | 22       | 6.3×11        | 94   | ELL1JM220E11--T |
|          | 33       | 8×11          | 110  | ELL1JM330F11--T |
|          | 47       | 8×11          | 152  | ELL1JM470F11--T |
|          | 100      | 10×16         | 260  | ELL1JM101G16--T |
| 100      | 0.47     | 5×11          | 12   | ELL1KMR47D11--T |
|          | 1        | 5×11          | 17   | ELL1KM010D11--T |
|          | 2.2      | 5×11          | 24   | ELL1KM2R2D11--T |
|          | 3.3      | 5×11          | 32   | ELL1KM3R3D11--T |
|          | 4.7      | 6.3×11        | 39   | ELL1KM4R7E11--T |
|          | 10       | 8×11          | 61   | ELL1KM100F11--T |
|          | 22       | 8×11          | 106  | ELL1KM220F11--T |
|          | 33       | 10×13         | 142  | ELL1KM330G13--T |
|          | 47       | 10×16         | 184  | ELL1KM470G16--T |
|          | 100      | 12.5×20       | 300  | ELL1KM101W20--T |
| 220      | 12.5×30  | 533           | ELL1KM221W30--T  |                 |

※Specifications subject to change without notice

RG series

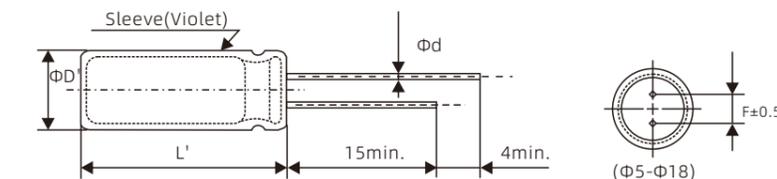


- Endurance: 2,000~ 8,000 hours at 105°C
- Low impedance, high frequency
- Good low temperature performance, high reliability
- RoHS Compliant

SPECIFICATIONS

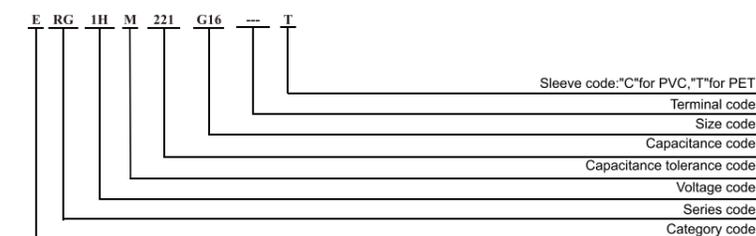
| Items  | Characteristics  |  |
|--|--|--|
| Category Temperature Range                             | -55~+105°C   |  |
| Rated Voltage Range                                    | 6.3~100Vdc   |  |
| Capacitance Tolerance                                  | ±20%(M) (at 20°C, 120Hz)   |  |
| Leakage Current  | I ≤ 0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                            |  |
| Dissipation Factor (tanδ)                              | Rated Voltage (Vdc)  | 6.3 10 16 25 35 50 63 100                                |
|  | Dissipation Factor(Max.)   | 0.22 0.19 0.16 0.14 0.12 0.10 0.08 0.08 (at 20°C, 120Hz) |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated Voltage (Vdc)  | 6.3 10 16 25 35 50 63 80                                 |
|  | Z(-25°C)/ Z(+20°C)   | 4 3 2  |
|  | Z(-55°C)/ Z(+20°C)   | 8 6 4 3  |
| Endurance  | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105°C. |  |
|  | Capacitance Change   | ≤±25% of the initial value                               |
|  | Dissipation Factor   | ≤200% of the initial specified value                     |
|  | Leakage Current  | ≤The initial specified value                             |
|  |  | Case Dia   |
|  | ØD≤6.3   | 2,000  |
|  | ØD=8   | 3,000  |
|  | ØD=10  | 5,000  |
|  | ØD=12.5  | 7,000  |
|  | ØD≥16  | 8,000  |
| Shelf Life   | The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.  |  |
|  | Capacitance Change   | ≤±25% of the initial value                               |
|  | Dissipation Factor   | ≤200% of the initial specified value                     |
|  | Leakage Current  | ≤200% of the initial specified value                     |

DIMENSIONS [mm]



| ØD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| Ød  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| ØD' | ØD+0.5max. |     |     |     |      |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (μF)            | Freq. (Hz) | 120  | 1k   | 10k  | 100k |
|----------------------|------------|------|------|------|------|
| Cap. < 220           |            | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 ≤ Cap. < 680     |            | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 ≤ Cap. < 2,200   |            | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 ≤ Cap. < 4,700 |            | 0.75 | 0.90 | 0.95 | 1.00 |
| Cap. ≥ 4,700         |            | 0.85 | 0.95 | 0.98 | 1.00 |

RG series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|---|------------------|
| 6.3      | 100      | 5×11          | 0.650                        | 155                                       | ERG0JM101D11---T |
|          | 220      | 6.3×11        | 0.400                        | 255                                       | ERG0JM221E11---T |
|          | 330      | 6.3×11        | 0.250                        | 290                                       | ERG0JM331E11---T |
|          | 470      | 8×11          | 0.180                        | 400                                       | ERG0JM471F11---T |
|          | 560      | 8×11          | 0.170                        | 460                                       | ERG0JM561F11---T |
|          | 680      | 8×11          | 0.130                        | 550                                       | ERG0JM681F11---T |
|          | 820      | 8×16          | 0.095                        | 730                                       | ERG0JM821F16---T |
|          | 1,000    | 8×16          | 0.090                        | 730                                       | ERG0JM102F16---T |
|          | 1,200    | 8×20          | 0.080                        | 810                                       | ERG0JM122F20---T |
|          | 1,500    | 10×20         | 0.052                        | 1,220                                     | ERG0JM152G20---T |
|          | 2,200    | 10×20         | 0.045                        | 1,440                                     | ERG0JM222G20---T |
|          | 2,700    | 10×30         | 0.037                        | 1,690                                     | ERG0JM272G30---T |
|          | 3,300    | 12.5×20       | 0.038                        | 1,660                                     | ERG0JM332W20---T |
|          | 3,900    | 12.5×25       | 0.030                        | 1,950                                     | ERG0JM392W25---T |
|          | 4,700    | 12.5×30       | 0.025                        | 2,310                                     | ERG0JM472W30---T |
|          | 5,600    | 12.5×35       | 0.022                        | 2,510                                     | ERG0JM562W35---T |
|          | 6,800    | 12.5×40       | 0.017                        | 2,870                                     | ERG0JM682W40---T |
|          | 8,200    | 16×30         | 0.019                        | 3,010                                     | ERG0JM822L30---T |
| 10,000   | 16×35    | 0.017         | 3,150                        | ERG0JM103L35---T                          |                  |
| 10       | 100      | 5×11          | 0.580                        | 175                                       | ERG1AM101D11---T |
|          | 220      | 6.3×11        | 0.250                        | 290                                       | ERG1AM221E11---T |
|          | 330      | 8×11          | 0.210                        | 410                                       | ERG1AM331F11---T |
|          | 470      | 8×11          | 0.130                        | 555                                       | ERG1AM471F11---T |
|          | 560      | 8×16          | 0.120                        | 675                                       | ERG1AM561F16---T |
|          | 680      | 8×16          | 0.090                        | 730                                       | ERG1AM681F16---T |
|          | 820      | 8×20          | 0.085                        | 875                                       | ERG1AM821F20---T |
|          | 1,000    | 10×16         | 0.068                        | 1,050                                     | ERG1AM102G16---T |
|          | 1,200    | 10×20         | 0.052                        | 1,220                                     | ERG1AM122G20---T |
|          | 1,500    | 10×20         | 0.045                        | 1,440                                     | ERG1AM152G20---T |
|          | 2,200    | 12.5×20       | 0.038                        | 1,660                                     | ERG1AM222W20---T |
|          | 2,700    | 12.5×25       | 0.034                        | 1,945                                     | ERG1AM272W25---T |
|          | 3,300    | 12.5×25       | 0.030                        | 1,950                                     | ERG1AM332W25---T |
|          | 3,900    | 12.5×30       | 0.025                        | 2,310                                     | ERG1AM392W30---T |
|          | 4,700    | 12.5×35       | 0.022                        | 2,510                                     | ERG1AM472W35---T |
|          | 5,600    | 12.5×40       | 0.017                        | 2,870                                     | ERG1AM562W40---T |
|          | 6,800    | 16×30         | 0.019                        | 3,010                                     | ERG1AM682L30---T |
|          | 8,200    | 16×35         | 0.017                        | 3,150                                     | ERG1AM822L35---T |
| 10,000   | 16×40    | 0.015         | 3,710                        | ERG1AM103L40---T                          |                  |
| 16       | 47       | 5×11          | 0.800                        | 120                                       | ERG1CM470D11---T |
|          | 68       | 6.3×11        | 0.560                        | 220                                       | ERG1CM680E11---T |
|          | 100      | 6.3×11        | 0.520                        | 255                                       | ERG1CM101E11---T |
|          | 150      | 8×11          | 0.210                        | 350                                       | ERG1CM151F11---T |

RG series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mArms/105°C,100kHz) | Part Number      |                  |
|----------|----------|---------------|------------------------------|---|------------------|------------------|
| 16       | 220      | 8×11          | 0.200                        | 405                                       | ERG1CM221F11---T |                  |
|          | 330      | 8×11          | 0.130                        | 555                                       | ERG1CM331F11---T |                  |
|          | 470      | 8×16          | 0.090                        | 730                                       | ERG1CM471F16---T |                  |
|          | 560      | 8×20          | 0.085                        | 810                                       | ERG1CM561F20---T |                  |
|          | 680      | 8×20          | 0.069                        | 1,050                                     | ERG1CM681F20---T |                  |
|          | 820      | 10×20         | 0.058                        | 1,220                                     | ERG1CM821G20---T |                  |
|          | 1,000    | 10×20         | 0.052                        | 1,220                                     | ERG1CM102G20---T |                  |
|          | 1,200    | 10×25         | 0.045                        | 1,440                                     | ERG1CM122G25---T |                  |
|          | 1,500    | 12.5×20       | 0.038                        | 1,660                                     | ERG1CM152W20---T |                  |
|          | 2,200    | 12.5×25       | 0.030                        | 1,950                                     | ERG1CM222W25---T |                  |
|          | 2,700    | 12.5×30       | 0.025                        | 2,310                                     | ERG1CM272W30---T |                  |
|          | 3,300    | 12.5×35       | 0.022                        | 2,510                                     | ERG1CM332W35---T |                  |
|          | 3,900    | 12.5×40       | 0.017                        | 2,870                                     | ERG1CM392W40---T |                  |
|          | 4,700    | 16×30         | 0.019                        | 3,010                                     | ERG1CM472L30---T |                  |
|          | 5,600    | 16×35         | 0.017                        | 3,150                                     | ERG1CM562L35---T |                  |
|          | 6,800    | 16×40         | 0.015                        | 3,710                                     | ERG1CM682L40---T |                  |
|          | 25       | 47            | 5×11                         | 0.580                                     | 175              | ERG1EM470D11---T |
|          |          | 68            | 6.3×11                       | 0.360                                     | 230              | ERG1EM680E11---T |
| 100      |          | 6.3×11        | 0.350                        | 290                                       | ERG1EM101E11---T |                  |
| 150      |          | 8×11          | 0.200                        | 405                                       | ERG1EM151F11---T |                  |
| 220      |          | 8×12          | 0.190                        | 555                                       | ERG1EM221F12---T |                  |
| 330      |          | 8×16          | 0.120                        | 730                                       | ERG1EM331F16---T |                  |
| 470      |          | 10×16         | 0.080                        | 1,050                                     | ERG1EM471G16---T |                  |
| 560      |          | 10×20         | 0.058                        | 1,220                                     | ERG1EM561G20---T |                  |
| 680      |          | 10×20         | 0.052                        | 1,220                                     | ERG1EM681G20---T |                  |
| 820      |          | 10×25         | 0.045                        | 1,440                                     | ERG1EM821G25---T |                  |
| 1,000    |          | 12.5×20       | 0.038                        | 1,660                                     | ERG1EM102W20---T |                  |
| 1,200    |          | 12.5×25       | 0.034                        | 1,936                                     | ERG1EM122W25---T |                  |
| 1,500    |          | 12.5×25       | 0.030                        | 1,950                                     | ERG1EM152W25---T |                  |
| 2,200    |          | 12.5×35       | 0.022                        | 2,510                                     | ERG1EM222W35---T |                  |
| 2,700    |          | 12.5×40       | 0.017                        | 2,870                                     | ERG1EM272W40---T |                  |
| 3,300    |          | 16×30         | 0.019                        | 3,010                                     | ERG1EM332L30---T |                  |
| 3,900    |          | 16×35         | 0.017                        | 3,150                                     | ERG1EM392L35---T |                  |
| 4,700    |          | 16×40         | 0.015                        | 3,710                                     | ERG1EM472L40---T |                  |
| 35       | 10       | 5×11          | 1.500                        | 100                                       | ERG1VM100D11---T |                  |
|          | 22       | 5×11          | 0.750                        | 160                                       | ERG1VM220D11---T |                  |
|          | 33       | 5×11          | 0.580                        | 210                                       | ERG1VM330D11---T |                  |
|          | 47       | 6.3×11        | 0.490                        | 215                                       | ERG1VM470E11---T |                  |
|          | 68       | 8×11          | 0.210                        | 350                                       | ERG1VM680F11---T |                  |
|          | 100      | 8×11          | 0.200                        | 405                                       | ERG1VM101F11---T |                  |
|          | 150      | 8×12          | 0.130                        | 555                                       | ERG1VM151F12---T |                  |
|          | 220      | 8×16          | 0.090                        | 730                                       | ERG1VM221F16---T |                  |

RG series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA rms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|--|------------------|
| 35       | 330      | 10×16         | 0.080                        | 1,050                                      | ERG1VM331G16---T |
|          | 470      | 10×20         | 0.065                        | 1,220                                      | ERG1VM471G20---T |
|          | 560      | 10×25         | 0.045                        | 1,440                                      | ERG1VM561G25---T |
|          | 680      | 10×30         | 0.037                        | 1,690                                      | ERG1VM681G30---T |
|          | 820      | 12.5×25       | 0.035                        | 1,938                                      | ERG1VM821W25---T |
|          | 1,000    | 12.5×25       | 0.030                        | 1,950                                      | ERG1VM102W25---T |
|          | 1,200    | 12.5×30       | 0.025                        | 2,310                                      | ERG1VM122W30---T |
|          | 1,500    | 12.5×35       | 0.022                        | 2,510                                      | ERG1VM152W35---T |
|          | 2,200    | 16×30         | 0.019                        | 3,010                                      | ERG1VM222L30---T |
|          | 2,700    | 16×35         | 0.017                        | 3,150                                      | ERG1VM272L35---T |
|          | 3,300    | 16×40         | 0.015                        | 3,710                                      | ERG1VM332L40---T |
|          | 3,900    | 18×40         | 0.015                        | 3,800                                      | ERG1VM392M40---T |
|          | 50       | 10            | 5×11                         | 2.000                                      | 105              |
| 22       |          | 5×11          | 1.100                        | 155  | ERG1HM220D11---T |
| 33       |          | 6.3×11        | 0.480                        | 215  | ERG1HM330E11---T |
| 47       |          | 6.3×11        | 0.400                        | 220  | ERG1HM470E11---T |
| 68       |          | 8×11          | 0.350                        | 355  | ERG1HM680F11---T |
| 100      |          | 8×12          | 0.230                        | 485  | ERG1HM101F12---T |
| 150      |          | 8×16          | 0.160                        | 635  | ERG1HM151F16---T |
| 220      |          | 10×16         | 0.088                        | 1,050                                      | ERG1HM221G16---T |
| 330      |          | 10×25         | 0.073                        | 1,250                                      | ERG1HM331G25---T |
| 470      |          | 12.5×20       | 0.059                        | 1,480                                      | ERG1HM471W20---T |
| 560      |          | 12.5×25       | 0.044                        | 1,840                                      | ERG1HM561W25---T |
| 680      |          | 12.5×30       | 0.039                        | 2,220                                      | ERG1HM681W30---T |
| 820      |          | 12.5×35       | 0.033                        | 2,290                                      | ERG1HM821W35---T |
| 1,000    |          | 16×25         | 0.034                        | 2,240                                      | ERG1HM102L25---T |
| 1,200    |          | 16×30         | 0.028                        | 2,700                                      | ERG1HM122L30---T |
| 1,500    |          | 16×35         | 0.025                        | 2,800                                      | ERG1HM152L35---T |
| 2,200    | 18×35    | 0.023         | 3,100                        | ERG1HM222M35---T                           |                  |
| 2,700    | 18×40    | 0.020         | 3,400                        | ERG1HM272M40---T                           |                  |
| 63       | 12       | 5×11          | 1.900                        | 145  | ERG1JM120D11---T |
|          | 22       | 6.3×11        | 1.000                        | 240  | ERG1JM220E11---T |
|          | 39       | 6.3×14        | 0.610                        | 330  | ERG1JM390E14---T |
|          | 68       | 8×12          | 0.340                        | 405  | ERG1JM680F12---T |
|          | 100      | 8×16          | 0.270                        | 535  | ERG1JM101F16---T |
|          | 100      | 10×13         | 0.255                        | 540  | ERG1JM101G13---T |
|          | 120      | 10×16         | 0.190                        | 600  | ERG1JM121G16---T |
|          | 150      | 8×20          | 0.210                        | 690  | ERG1JM151F20---T |
|          | 180      | 10×20         | 0.145                        | 890  | ERG1JM181G20---T |
|          | 220      | 10×25         | 0.130                        | 1,050                                      | ERG1JM221G25---T |
|          | 330      | 10×30         | 0.090                        | 1,300                                      | ERG1JM331G30---T |
|          | 330      | 12.5×20       | 0.085                        | 1,290                                      | ERG1JM331W20---T |

RG series

STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦD×L(mm) | Imdepance (Ωmax/20°C,100kHz) | Rated Ripple Current (mA rms/105°C,100kHz) | Part Number      |
|----------|----------|---------------|------------------------------|--|------------------|
| 63       | 390      | 12.5×25       | 0.070                        | 1720                                       | ERG1JM391W25---T |
|          | 470      | 12.5×30       | 0.055                        | 2,090                                      | ERG1JM471W30---T |
|          | 470      | 16×20         | 0.059                        | 1,770                                      | ERG1JM471L20---T |
|          | 680      | 12.5×35       | 0.047                        | 2,270                                      | ERG1JM681W35---T |
|          | 680      | 16×25         | 0.050                        | 2,160                                      | ERG1JM681L25---T |
|          | 680      | 18×20         | 0.055                        | 2,290                                      | ERG1JM681M20---T |
|          | 820      | 12.5×40       | 0.042                        | 2,560                                      | ERG1JM821W40---T |
|          | 820      | 16×30         | 0.043                        | 2,670                                      | ERG1JM821L30---T |
|          | 820      | 18×25         | 0.043                        | 2,590                                      | ERG1JM821M25---T |
|          | 1,000    | 16×35         | 0.036                        | 2,770                                      | ERG1JM102L35---T |
|          | 1,200    | 16×40         | 0.030                        | 2,850                                      | ERG1JM122L40---T |
|          | 1,200    | 18×30         | 0.032                        | 2,950                                      | ERG1JM122M30---T |
|          | 1,500    | 18×35         | 0.030                        | 3,100                                      | ERG1JM152M35---T |
|          | 1,800    | 18×40         | 0.025                        | 3,210                                      | ERG1JM182M40---T |
| 100      | 10       | 6.3×11        | 3.680                        | 110  | ERG1KM100E11---T |
|          | 22       | 6.3×12        | 3.500                        | 180  | ERG1KM220E12---T |
|          | 47       | 10×13         | 1.500                        | 395  | ERG1KM470G13---T |
|          | 100      | 10×16         | 1.250                        | 550  | ERG1KM101G16---T |
|          | 220      | 12.5×25       | 0.650                        | 900  | ERG1KM221W25---T |
|          | 330      | 16×25         | 0.400                        | 1,360                                      | ERG1KM331L25---T |
|          | 470      | 16×30         | 0.290                        | 1,650                                      | ERG1KM471L30---T |
|          | 680      | 18×35         | 0.280                        | 2,350                                      | ERG1KM681M35---T |

※Specifications subject to change without notice

HP series

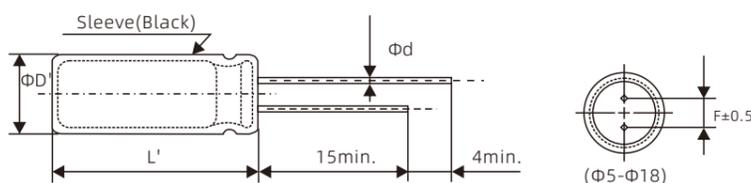
- Endurance: 1,000 hours at 105°C
- Standard bi-polarized series
- RoHS Compliant



SPECIFICATIONS

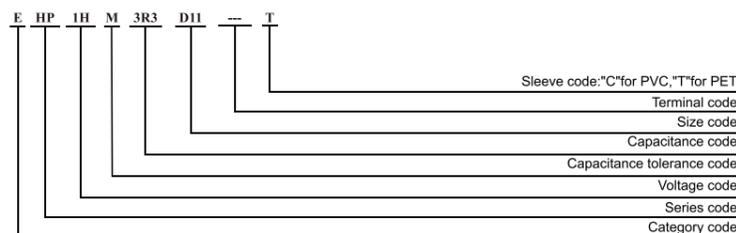
| Items   | Characteristics   |                                      |      |      |      |      |      |      |      |      |
|---|---|--------------------------------------|------|------|------|------|------|------|------|------|
| Category Temperature Range  | -40~+105°C  |                                      |      |      |      |      |      |      |      |      |
| Rated Working Voltage Range   | 6.3~100 Vdc   |                                      |      |      |      |      |      |      |      |      |
| Capacitance Tolerance   | ±20%(M) (at 20°C, 120Hz)  |                                      |      |      |      |      |      |      |      |      |
| Leakage Current   | I = 0.06CV or 10µA, whichever is greater. (at 20°C after 2 minutes)<br>I = 0.03CV or 3µA, whichever is greater. (at 20°C after 5 minutes)<br>Where, I: Max. leakage current (µA), C: Nominal capacitance (µF), V: Rated voltage (V) |                                      |      |      |      |      |      |      |      |      |
| Dissipation Factor (tanδ)   | Rated Voltage(Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100  |
|   | tanδ (max.)   | 0.24                                 | 0.24 | 0.20 | 0.20 | 0.16 | 0.14 | 0.12 | 0.12 | 0.10 |
| When nominal capacitance exceeds 1,000µF, add 0.02 to the value above for each 1,000µF increase. (at 20°C, 120Hz) |   |                                      |      |      |      |      |      |      |      |      |
| Low Temperature Characteristics (Max. Impedance Ratio)  | Rated Voltage(Vdc)  | 6.3                                  | 10   | 16   | 25   | 35   | 50   | 63   | 80   | 100  |
|   | Z(-25°C)/Z(+20°C)   | 4                                    | 3    | 2    |      |      |      |      |      |      |
| Z(-40°C)/Z(+20°C) 10 8 6 4 3  |   |                                      |      |      |      |      |      |      |      |      |
| Endurance   | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 105°C with the polarity inverted every 250 hours.                                    |                                      |      |      |      |      |      |      |      |      |
|   | Capacitance Change  | ≤±20% of the initial value           |      |      |      |      |      |      |      |      |
|   | Dissipation Factor  | ≤150% of the initial specified value |      |      |      |      |      |      |      |      |
|   | Leakage Current   | ≤The initial specified value         |      |      |      |      |      |      |      |      |
| Shelf Life  | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied.  |                                      |      |      |      |      |      |      |      |      |
|   | Capacitance Change  | ≤±20% of the initial value           |      |      |      |      |      |      |      |      |
|   | Dissipation Factor  | ≤150% of the initial specified value |      |      |      |      |      |      |      |      |
|   | Leakage Current   | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |

DIMENSIONS [mm]



| ΦD  | 5          | 6.3 | 8   | 10  | 12.5 | 18  |
|-----|------------|-----|-----|-----|------|-----|
| Φd  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 3.5 | 5.0  | 7.5 |
| ΦD' | ΦD+0.5MAX. |     |     |     |      |     |
| L'  | L+2MAX.    |     |     |     |      |     |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap. (µF)       | Freq. (Hz) |      |      |      |
|-----------------|------------|------|------|------|
|                 | 50         | 120  | 1k   | 10k  |
| Cap. ≤47        | 0.75       | 1.00 | 1.57 | 2.00 |
| 100 ≤ Cap. ≤470 | 0.80       | 1.00 | 1.34 | 1.50 |
| Cap. ≥1,000     | 0.85       | 1.00 | 1.13 | 1.15 |

HP series

STANDARD RATINGS

| WV (Vdc) | Cap (µF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number     |
|----------|----------|---------------|--|-----------------|
| 6.3      | 33       | 5×11          | 45   | EHP0JM330D11--T |
|          | 47       | 5×11          | 54   | EHP0JM470D11--T |
|          | 100      | 6.3×11        | 90   | EHP0JM101E11--T |
|          | 220      | 8×11          | 150  | EHP0JM221F11--T |
|          | 330      | 8×11          | 185  | EHP0JM331F11--T |
|          | 470      | 10×13         | 260  | EHP0JM471G13--T |
|          | 1,000    | 10×20         | 460  | EHP0JM102G20--T |
|          | 2,200    | 12.5×25       | 820  | EHP0JM222W25--T |
|          | 3,300    | 16×25         | 1,110                                      | EHP0JM332L25--T |
|          | 4,700    | 16×30         | 1,430                                      | EHP0JM472L30--T |
|          | 6,800    | 18×35         | 1,830                                      | EHP0JM682M35--T |
| 10       | 22       | 5×11          | 37   | EHP1AM220D11--T |
|          | 33       | 5×11          | 45   | EHP1AM330D11--T |
|          | 47       | 5×11          | 54   | EHP1AM470D11--T |
|          | 100      | 6.3×11        | 90   | EHP1AM101E11--T |
|          | 220      | 8×11          | 150  | EHP1AM221F11--T |
|          | 330      | 10×16         | 240  | EHP1AM331G16--T |
|          | 470      | 10×16         | 290  | EHP1AM471G16--T |
|          | 1,000    | 12.5×20       | 510  | EHP1AM102W20--T |
|          | 2,200    | 16×25         | 910  | EHP1AM222L25--T |
|          | 3,300    | 16×30         | 1,200                                      | EHP1AM332L30--T |
|          | 4,700    | 18×35         | 1,520                                      | EHP1AM472M35--T |
| 16       | 10       | 5×11          | 27   | EHP1CM100D11--T |
|          | 22       | 5×11          | 40   | EHP1CM220D11--T |
|          | 33       | 5×11          | 49   | EHP1CM330D11--T |
|          | 47       | 6.3×11        | 67   | EHP1CM470E11--T |
|          | 100      | 8×11          | 110  | EHP1CM101F11--T |
|          | 220      | 10×13         | 195  | EHP1CM221G13--T |
|          | 330      | 10×16         | 265  | EHP1CM331G16--T |
|          | 470      | 10×20         | 345  | EHP1CM471G20--T |
|          | 1,000    | 12.5×25       | 605  | EHP1CM102W25--T |
|          | 2,200    | 16×30         | 1,070                                      | EHP1CM222L30--T |
|          | 3,300    | 18×35         | 1,400                                      | EHP1CM332M35--T |
| 25       | 10       | 5×11          | 27   | EHP1EM100D11--T |
|          | 22       | 5×11          | 46   | EHP1EM220D11--T |
|          | 33       | 6.3×11        | 56   | EHP1EM330E11--T |
|          | 47       | 6.3×11        | 67   | EHP1EM470E11--T |
|          | 100      | 8×11          | 110  | EHP1EM101F11--T |
|          | 220      | 10×16         | 215  | EHP1EM221G16--T |
|          | 330      | 12.5×20       | 320  | EHP1EM331W20--T |
|          | 470      | 12.5×20       | 380  | EHP1EM471W20--T |
|          | 1,000    | 16×25         | 670  | EHP1EM102L25--T |
|          | 2,200    | 18×35         | 1,140                                      | EHP1EM222M35--T |
|          | 35       | 10            | 5×11                                       | 30              |
| 22       |          | 6.3×11        | 51   | EHP1VM220E11--T |
| 33       |          | 8×11          | 72   | EHP1VM330F11--T |
| 47       |          | 8×11          | 86   | EHP1VM470F11--T |
| 100      |          | 10×16         | 160  | EHP1VM101G16--T |
| 220      |          | 12.5×20       | 290  | EHP1VM221W20--T |
| 330      |          | 12.5×20       | 350  | EHP1VM331W20--T |
| 470      |          | 12.5×25       | 465  | EHP1VM471W25--T |
| 1,000    |          | 16×30         | 805  | EHP1VM102L30--T |

| WV (Vdc) | Cap (µF) | Size ΦD×L(mm) | Rated Ripple Current (mA rms/105°C, 120Hz) | Part Number     |                 |
|----------|----------|---------------|--|-----------------|-----------------|
| 50       | 0.47     | 5×11          | 7  | EHP1HMR47D11--T |                 |
|          | 1        | 5×11          | 10   | EHP1HM010D11--T |                 |
|          | 2.2      | 5×11          | 15   | EHP1HM2R2D11--T |                 |
|          | 3.3      | 5×11          | 18   | EHP1HM3R3D11--T |                 |
|          | 4.7      | 5×11          | 22   | EHP1HM4R7D11--T |                 |
|          | 10       | 6.3×11        | 37   | EHP1HM100E11--T |                 |
|          | 22       | 8×11          | 63   | EHP1HM220F11--T |                 |
|          | 33       | 8×11          | 77   | EHP1HM330F11--T |                 |
|          | 47       | 10×13         | 105  | EHP1HM470G13--T |                 |
|          | 100      | 10×20         | 190  | EHP1HM101G20--T |                 |
|          | 220      | 12.5×25       | 340  | EHP1HM221W25--T |                 |
| 63       | 330      | 16×25         | 460  | EHP1HM331L25--T |                 |
|          | 470      | 16×30         | 590  | EHP1HM471L30--T |                 |
|          | 80       | 3.3           | 5×11                                       | 20              | EHP1JM3R3D11--T |
|          |          | 4.7           | 6.3×11                                     | 24              | EHP1JM4R7E11--T |
|          |          | 10            | 6.3×11                                     | 40              | EHP1JM100E11--T |
|          |          | 22            | 8×11                                       | 68              | EHP1JM220F11--T |
|          |          | 33            | 10×13                                      | 98              | EHP1JM330G13--T |
|          |          | 47            | 10×16                                      | 130             | EHP1JM470G16--T |
|          |          | 100           | 12.5×20                                    | 225             | EHP1JM101W20--T |
|          |          | 220           | 16×25                                      | 405             | EHP1JM221L25--T |
|          |          | 330           | 16×30                                      | 535             | EHP1JM331L30--T |
| 470      |          | 18×35         | 680  | EHP1JM471M35--T |                 |
| 100      |          | 2.2           | 5×11                                       | 16              | EHP1BM2R2D11--T |
|          | 3.3      | 6.3×11        | 23   | EHP1BM3R3E11--T |                 |
|          | 4.7      | 6.3×11        | 27   | EHP1BM4R7E11--T |                 |
|          | 10       | 8×11          | 46   | EHP1BM100F11--T |                 |
|          | 22       | 10×16         | 89   | EHP1BM220G16--T |                 |
|          | 33       | 10×16         | 105  | EHP1BM330G16--T |                 |
|          | 47       | 10×20         | 140  | EHP1BM470G20--T |                 |
|          | 100      | 12.5×25       | 245  | EHP1BM101W25--T |                 |
|          | 220      | 16×30         | 435  | EHP1BM221L30--T |                 |
|          | 330      | 18×35         | 570  | EHP1BM331M35--T |                 |
|          | 100      | 0.47          | 5×11                                       | 8               | EHP1KMR47D11--T |
| 1        |          | 5×11          | 12   | EHP1KM010D11--T |                 |
| 2.2      |          | 6.3×11        | 20   | EHP1KM2R2E11--T |                 |
| 3.3      |          | 6.3×11        | 25   | EHP1KM3R3E11--T |                 |
| 4.7      |          | 6.3×11        | 30   | EHP1KM4R7E11--T |                 |
| 10       |          | 8×11          | 50   | EHP1KM100F11--T |                 |
| 22       |          | 10×16         | 97   | EHP1KM220G16--T |                 |
| 33       |          | 12.5×20       | 140  | EHP1KM330W20--T |                 |
| 47       |          | 12.5×20       | 170  | EHP1KM470W20--T |                 |
| 100      |          | 16×25         | 300  | EHP1KM101L25--T |                 |
| 220      |          | 18×35         | 510  | EHP1KM221M35--T |                 |

※Specifications subject to change without notice

Radial Type