

# Double Metallized Polypropylene Film Snubber Capacitors

## FSB Series - 850 ~ 2000VDC (Lug Terminal)



### Overview

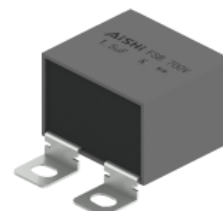
The FSB capacitor is constructed of metallized polypropylene film with double-sided metallized film encapsulated with epoxy resin in a rectangular plastic case, with lug terminals.

### Applications

Widely used in high voltage, high frequency, high current, pulse circuit and IGBT protection.

### Features

- High ripple current
- Self-healing property
- Low losses
- Small inherent temperature rise
- Suitable for high frequency applications
- High contact reliability

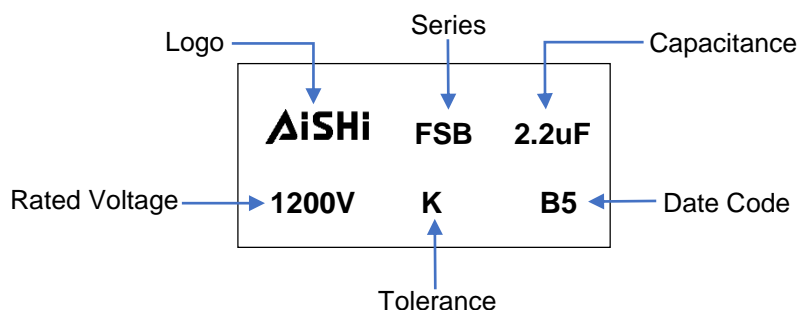


### Qualification

Reference Standard	IEC 61071
Climate Category	40/85/56 IEC 60068-1



### Marking



### Manufacturing Date Code

Year	Code	Month	Code
2018	A	Jan	1
2019	B	Feb	2
2020	C	Mar	3
2021	D	Apr	4
2022	E	May	5
2023	F	Jun	6

Year	Code	Month	Code
2024	G	Jul	7
2025	H	Aug	8
2026	J	Sep	9
2027	K	Oct	A
2028	L	Nov	N
2029	M	Dec	D

**Part Number System**

<b>F</b>	<b>SB</b>	<b>3B</b>	<b>K</b>	<b>225</b>	<b>N19</b>	<b>SN6</b>	<b>G</b>
Capacitor Type	Series	Voltage (VDC)	Tolerance	Capacitance (pF)	Size Code	Terminal Code	Solder slice Code
F = Film	Snubber Capacitor, Lug Terminal type, Metallized PP Film	850=2P 1000=3K 1200=3B 1600=3W 2000=3D	J = ±5% K = ±10%	First two digits = significant figures. Third digit = Number of zeros.	Refer to Size Code Table	Refer to Terminal Code Table	Refer to Solder slice Code Table

**Terminal Code**

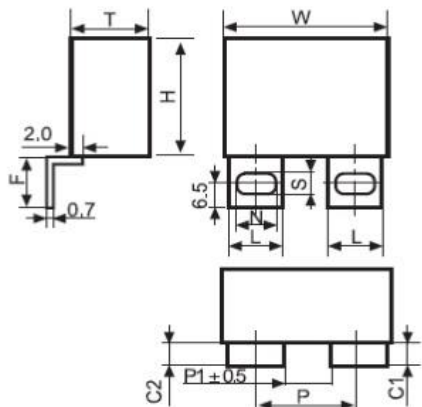
Digit One (Lead/Terminal Type)		Digit Two (Distance of hole for fixing)		Digit Three (Distance of solder slice)	
Style S	S	16~24	A	6	6
Style N	N	17~25	B	7	7
Style W	W	21~29	C	11	A
Style U	U	22~30	D	12	B
		30~38	E	20	C
		31~39	F	21	D
		35~43,	G	25	E
		36~44,	H	26	F
		52~62	J	33	G
		56~66,	K	37	H
		57~67	L	38	J
		70~80	M	51	K
		71~81	N	52	L

**Solder slice Code**

Size of solder slice	
M5	5
M6	6
M8	8
M10	H
M12	J

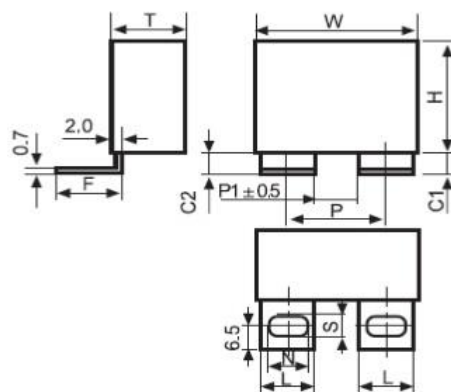
**Dimension (mm)**

**Style S**



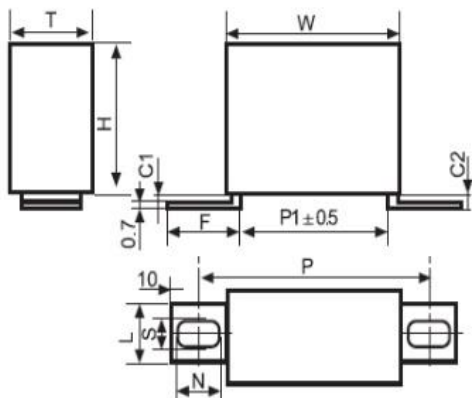
**L x F x N x S = 14.0 x 16.0 x 10.2 x 6.2**

**Style N**



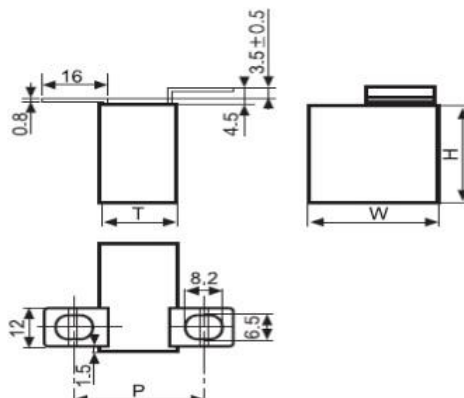
**L x F x N x S = 14.0 x 16.0 x 10.2 x 6.2**

**Style W**



**L x F x N x S = 14.0 x 22.0 x 11.2 x 6.2**

**Style U**



**L x F x N x S = 12.0 x 16.0 x 8.2 x 6.5**

**Size Code Table (mm)**

Size Code	Dimension					
	W	Tolerance	H	Tolerance	T	Tolerance
N11	42.5	0.8	40.0	0.8	20.0	0.8
N13	42.5	0.8	44.0	0.8	24.0	0.8
N15	42.5	0.8	37.0	0.8	28.0	0.8
N18	42.5	0.8	45.0	0.8	30.0	0.8
N21	42.5	0.8	35.5	0.8	33.5	0.8
P13	57.5	1.0	45.0	1.0	30.0	1.0
P17	57.5	1.0	50.0	1.0	35.0	1.0

# Double Metallized Polypropylene Film Snubber Capacitors

## FSB Series - 850 ~ 2000VDC (Lug Terminal)



### Rating and Part Number

Vdc	Cap Value	Dimensions			Irms 100KHz @70°C	Peak Current	Surge Current	ESR 100KHz @70°C	ESL	dv/dt	Terminal Style	Part Number
		W	H	T								
	μF	mm	mm	mm	A	A	A	mΩ	nH	V/us		
850	0.47	42.5	40.0	20.0	14.0	357	1071	9.4	40	760	S	FSB2PK474N11SN6G
850	0.68	42.5	40.0	20.0	17.0	517	1551	6.6	40	760	S	FSB2PK684N11SN6G
850	1.0	42.5	40.0	20.0	20.0	760	2280	4.6	40	760	S	FSB2PK105N11SN6G
850	1.5	42.5	37.0	28.0	27.0	1140	3420	3.1	36	760	S	FSB2PK155N15SN6G
850	1.5	42.5	35.5	33.5	28.0	1140	3420	3.0	36	760	S	FSB2PK155N21SN6G
850	2.0	42.5	45.0	30.0	34.0	1520	4560	2.4	43	760	S	FSB2PK205N18SN6G
850	2.2	42.5	45.0	30.0	35.0	1672	5016	2.2	43	760	S	FSB2PK225N18SN6G
850	2.5	57.5	45.0	30.0	37.0	1175	3525	2.0	45	470	S	FSB2PK255P13SN6L
850	3.0	57.5	45.0	30.0	30.0	1410	4230	3.5	45	470	S	FSB2PK305P13SN6L
850	3.3	57.5	45.0	30.0	31.0	1551	4653	3.2	45	470	S	FSB2PK335P13SN6L
850	4.0	57.5	50.0	35.0	34.0	1880	5640	2.6	48	470	S	FSB2PK405P17SN6L
850	5.0	57.5	50.0	35.0	40.0	2350	7050	2.2	48	470	S	FSB2PK505P17SN6L
1000	0.47	42.5	40.0	20.0	14.0	400	1200	8.7	40	850	S	FSB3KK474N11SN6G
1000	0.68	42.5	40.0	20.0	18.0	578	1734	6.1	40	850	S	FSB3KK684N11SN6G
1000	1.0	42.5	40.0	20.0	20.0	850	2550	4.3	40	850	S	FSB3KK105N11SN6G
1000	1.5	42.5	37.0	28.0	28.0	1275	3825	2.9	36	850	S	FSB3KK155N15SN6G
1000	1.5	42.5	35.5	33.5	29.0	1275	3825	2.8	36	850	S	FSB3KK155N21SN6G
1000	2.0	42.5	45.0	30.0	35.0	1700	5100	2.3	43	850	S	FSB3KK205N18SN6G
1000	2.2	57.5	45.0	30.0	28.0	1166	3498	4.4	45	530	S	FSB3KK225P13SN6L
1000	2.5	57.5	45.0	30.0	29.0	1325	3975	3.8	45	530	S	FSB3KK255P13SN6L
1000	3.0	57.5	45.0	30.0	31.0	1590	4770	3.2	45	530	S	FSB3KK305P13SN6L
1000	3.3	57.5	45.0	30.0	32.0	1749	5247	3.0	45	530	S	FSB3KK335P13SN6L
1000	4.0	57.5	50.0	35.0	38.0	2120	6360	2.5	48	530	S	FSB3KK405P17SN6L
1200	0.33	42.5	40.0	20.0	13.0	330	990	10.9	40	1000	S	FSB3BK334N11SN6G
1200	0.47	42.5	40.0	20.0	16.0	470	1410	7.7	40	1000	S	FSB3BK474N11SN6G
1200	0.68	42.5	40.0	20.0	19.0	680	2040	5.4	40	1000	S	FSB3BK684N11SN6G
1200	1.0	42.5	37.0	28.0	25.0	1000	3000	3.8	36	1000	S	FSB3BK105N15SN6G
1200	1.2	42.5	37.0	28.0	27.0	1200	3600	3.2	36	1000	S	FSB3BK125N15SN6G
1200	1.2	42.5	35.5	33.5	28.0	1200	3600	3.0	36	1000	S	FSB3BK125N21SN6G
1200	1.5	42.5	45.0	30.0	32.0	1500	4500	2.6	43	1000	S	FSB3BK155N18SN6G
1200	2.0	57.5	45.0	30.0	27.0	1200	3600	4.1	45	600	S	FSB3BK205P13SN6L
1200	2.2	57.5	45.0	30.0	28.0	1320	3960	3.8	45	600	S	FSB3BK225P13SN6L
1200	2.5	57.5	45.0	30.0	30.0	1500	4500	3.3	45	600	S	FSB3BK255P13SN6L
1200	3.0	57.5	50.0	35.0	35.0	1800	5400	2.9	48	600	S	FSB3BK305P17SN6L
1200	3.3	57.5	50.0	35.0	38.0	1980	5940	2.6	48	600	S	FSB3BK335P17SN6L
2000	0.1	42.5	40.0	20.0	8.0	140	420	26.8	40	1400	S	FSB3DK104N11SN6G
2000	0.15	42.5	40.0	20.0	10.0	210	630	17.9	40	1400	S	FSB3DK154N11SN6G
2000	0.22	42.5	40.0	20.0	12.0	308	924	12.3	40	1400	S	FSB3DK224N11SN6G
2000	0.33	42.5	40.0	20.0	16.0	462	1386	8.3	40	1400	S	FSB3DK334N11SN6G
2000	0.47	42.5	40.0	20.0	19.0	658	1974	5.9	40	1400	S	FSB3DK474N11SN6G
2000	0.68	42.5	44.0	24.0	24.0	952	2856	4.1	43	1400	S	FSB3DK684N13SN6G
2000	0.68	42.5	35.5	33.5	25.0	952	2856	4.0	43	1400	S	FSB3DK684N21SN6G
2000	0.82	42.5	45.0	30.0	28.0	1148	3444	3.5	43	1400	S	FSB3DK824N18SN6G
2000	1.0	57.5	45.0	30.0	23.0	900	2700	5.9	45	900	S	FSB3DK105P13SN6L
2000	1.2	57.5	45.0	30.0	25.0	1080	3240	4.9	45	900	S	FSB3DK125P13SN6L
2000	1.5	57.5	50.0	35.0	30.0	1350	4050	4.0	48	900	S	FSB3DK155P17SN6L

# Double Metallized Polypropylene Film Snubber Capacitors

## FSB Series - 850 ~ 2000VDC (Lug Terminal)




### Rating and Part Number

Vdc	Cap Value	Dimensions			I <sub>rms</sub> 100KHz @70°C	Peak Current	Surge Current	ESR 100KHz @70°C	ESL	dv/dt	Terminal Style	Part Number
		W	H	T								
	μF	mm	mm	mm	A	A	A	mΩ	nH	V/us		
850	0.47	42.5	40.0	20.0	14.0	357.0	1071.0	9.4	40	760	N	FSB2PK474N11NN6G
850	0.68	42.5	40.0	20.0	17.0	517.0	1551.0	6.6	40	760	N	FSB2PK684N11NN6G
850	1.0	42.5	40.0	20.0	20.0	760.0	2280.0	4.6	40	760	N	FSB2PK105N11NN6G
850	1.5	42.5	37.0	28.0	27.0	1140.0	3420.0	3.1	36	760	N	FSB2PK155N15NN6G
850	1.5	42.5	35.5	33.5	28.0	1140.0	3420.0	3.0	36	760	N	FSB2PK155N21NN6G
850	2.0	42.5	45.0	30.0	34.0	1520.0	4560.0	2.4	43	760	N	FSB2PK205N18NN6G
850	2.2	42.5	45.0	30.0	35.0	1672.0	5016.0	2.2	43	760	N	FSB2PK225N18NN6G
850	2.5	57.5	45.0	30.0	37.0	1175.0	3525.0	2.0	45	470	N	FSB2PK255P13NN6L
850	3.0	57.5	45.0	30.0	30.0	1410.0	4230.0	3.5	45	470	N	FSB2PK305P13NN6L
850	3.3	57.5	45.0	30.0	31.0	1551.0	4653.0	3.2	45	470	N	FSB2PK335P13NN6L
850	4.0	57.5	50.0	35.0	34.0	1880.0	5640.0	2.6	48	470	N	FSB2PK405P17NN6L
850	5.0	57.5	50.0	35.0	40.0	2350.0	7050.0	2.2	48	470	N	FSB2PK505P17NN6L
1000	0.47	42.5	40.0	20.0	14.0	400.0	1200.0	8.7	40	850	N	FSB3KK474N11NN6G
1000	0.68	42.5	40.0	20.0	18.0	578.0	1734.0	6.1	40	850	N	FSB3KK684N11NN6G
1000	1.0	42.5	40.0	20.0	20.0	850.0	2550.0	4.3	40	850	N	FSB3KK105N11NN6G
1000	1.5	42.5	37.0	28.0	28.0	1275.0	3825.0	2.9	36	850	N	FSB3KK155N15NN6G
1000	1.5	42.5	35.5	33.5	29.0	1275.0	3825.0	2.8	36	850	N	FSB3KK155N21NN6G
1000	2.0	42.5	45.0	30.0	35.0	1700.0	5100.0	2.3	43	850	N	FSB3KK205N18NN6G
1000	2.2	57.5	45.0	30.0	28.0	1166.0	3498.0	4.4	45	530	N	FSB3KK225P13NN6L
1000	2.5	57.5	45.0	30.0	29.0	1325.0	3975.0	3.8	45	530	N	FSB3KK255P13NN6L
1000	3.0	57.5	45.0	30.0	31.0	1590.0	4770.0	3.2	45	530	N	FSB3KK305P13NN6L
1000	3.3	57.5	45.0	30.0	32.0	1749.0	5247.0	3.0	45	530	N	FSB3KK335P13NN6L
1000	4.0	57.5	50.0	35.0	38.0	2120.0	6360.0	2.5	48	530	N	FSB3KK405P17NN6L
1200	0.33	42.5	40.0	20.0	13.0	330.0	990.0	10.9	40	1000	N	FSB3BK334N11NN6G
1200	0.47	42.5	40.0	20.0	16.0	470.0	1410.0	7.7	40	1000	N	FSB3BK474N11NN6G
1200	0.68	42.5	40.0	20.0	19.0	680.0	2040.0	5.4	40	1000	N	FSB3BK684N11NN6G
1200	1.0	42.5	37.0	28.0	25.0	1000.0	3000.0	3.8	36	1000	N	FSB3BK105N15NN6G
1200	1.2	42.5	37.0	28.0	27.0	1200.0	3600.0	3.2	36	1000	N	FSB3BK125N15NN6G
1200	1.2	42.5	35.5	33.5	28.0	1200.0	3600.0	3.0	36	1000	N	FSB3BK125N21NN6G
1200	1.5	42.5	45.0	30.0	32.0	1500.0	4500.0	2.6	43	1000	N	FSB3BK155N18NN6G
1200	2.0	57.5	45.0	30.0	27.0	1200.0	3600.0	4.1	45	600	N	FSB3BK205P13NN6L
1200	2.2	57.5	45.0	30.0	28.0	1320.0	3960.0	3.8	45	600	N	FSB3BK225P13NN6L
1200	2.5	57.5	45.0	30.0	30.0	1500.0	4500.0	3.3	45	600	N	FSB3BK255P13NN6L
1200	3.0	57.5	50.0	35.0	35.0	1800.0	5400.0	2.9	48	600	N	FSB3BK305P17NN6L
1200	3.3	57.5	50.0	35.0	38.0	1980.0	5940.0	2.6	48	600	N	FSB3BK335P17NN6L
2000	0.1	42.5	40.0	20.0	8.0	140.0	420.0	26.8	40	1400	N	FSB3DK104N11NN6G
2000	0.15	42.5	40.0	20.0	10.0	210.0	630.0	17.9	40	1400	N	FSB3DK154N11NN6G
2000	0.22	42.5	40.0	20.0	12.0	308.0	924.0	12.3	40	1400	N	FSB3DK224N11NN6G
2000	0.33	42.5	40.0	20.0	16.0	462.0	1386.0	8.3	40	1400	N	FSB3DK334N11NN6G
2000	0.47	42.5	40.0	20.0	19.0	658.0	1974.0	5.9	40	1400	N	FSB3DK474N11NN6G
2000	0.68	42.5	44.0	24.0	24.0	952.0	2856.0	4.1	43	1400	N	FSB3DK684N13NN6G
2000	0.68	42.5	35.5	33.5	25.0	952.0	2856.0	4.0	43	1400	N	FSB3DK684N21NN6G
2000	0.82	42.5	45.0	30.0	28.0	1148.0	3444.0	3.5	43	1400	N	FSB3DK824N18NN6G
2000	1.0	57.5	45.0	30.0	23.0	900.0	2700.0	5.9	45	900	N	FSB3DK105P13NN6L
2000	1.2	57.5	45.0	30.0	25.0	1080.0	3240.0	4.9	45	900	N	FSB3DK125P13NN6L
2000	1.5	57.5	50.0	35.0	30.0	1350.0	4050.0	4.0	48	900	N	FSB3DK155P17NN6L

**General Technical Data**

Applications	High voltage, high frequency and pulse circuit / IGBT module protection
Dielectric	Double Metallized Polypropylene Film
Reference Standard	IEC 61071
Climatic Category	40/85/56 IEC 60068-1
Operating Temperature Range	-40°C ~ +105°C (85°C ~105°C, decreasing factor 1.25% per °C for Urms)
Protection	Solvent resistant plastic case UL94 V-0 Thermosetting resin sealing UL 94 V-0 compliant
Installation	Any position
Packaging	Packed in cardboard boxes with protection for the terminals
Storage Conditions	Storage time: ≤24months from the date marked on the label package Average relative humidity per year ≤70% RH≤85% for 30 days randomly distributed throughout the year Dew is absent Temperature: -40°C ~ +85°C
Storage Life	Product that passed less than 2 years from production, No need reconfirmation
RoHS Compliance	Compliant with the restricted substance requirement of Directive 2011/65/EU
Application note and limiting conditions	These capacitors are designed only for DC voltage so should not be used for AC line. The continuous peak voltage shall not exceed the rated DC voltage rating

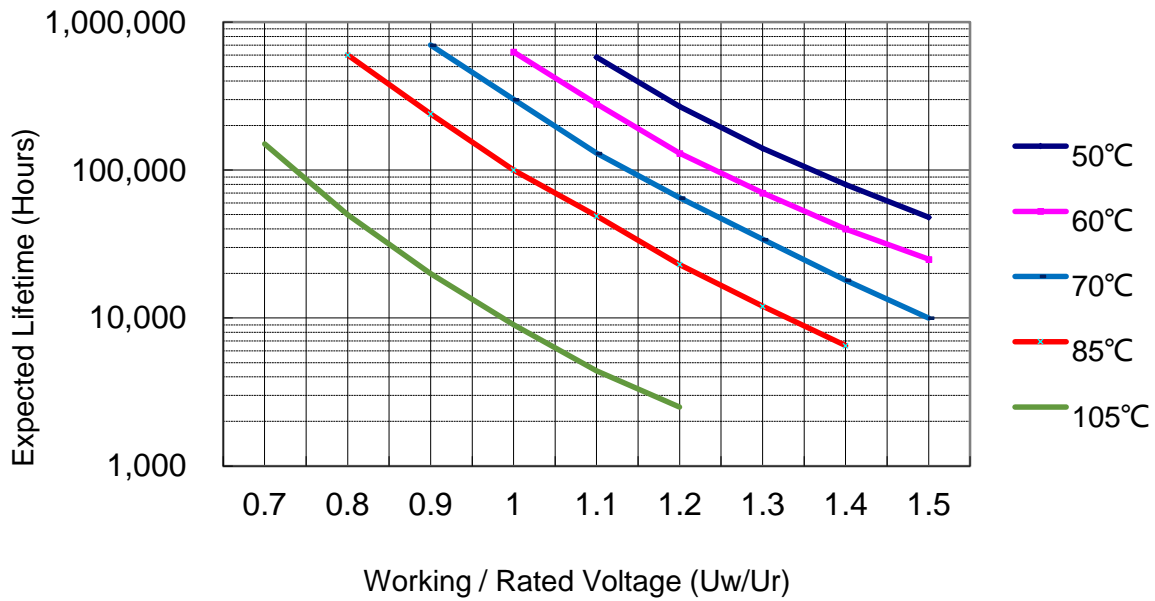
**Construction**

Metallized Film	OPP & Al (Single Side Metallized and Double Sided Metallized)
Metal Sprayed	Sn/Zn Alloy
Connection Electrode	Tin-plated Copper Lug Terminal
Case	Plastic Case (UL94V-0)
Filling	Epoxy Resin (UL94V-0)
Film Construction	Inner Series Connection 

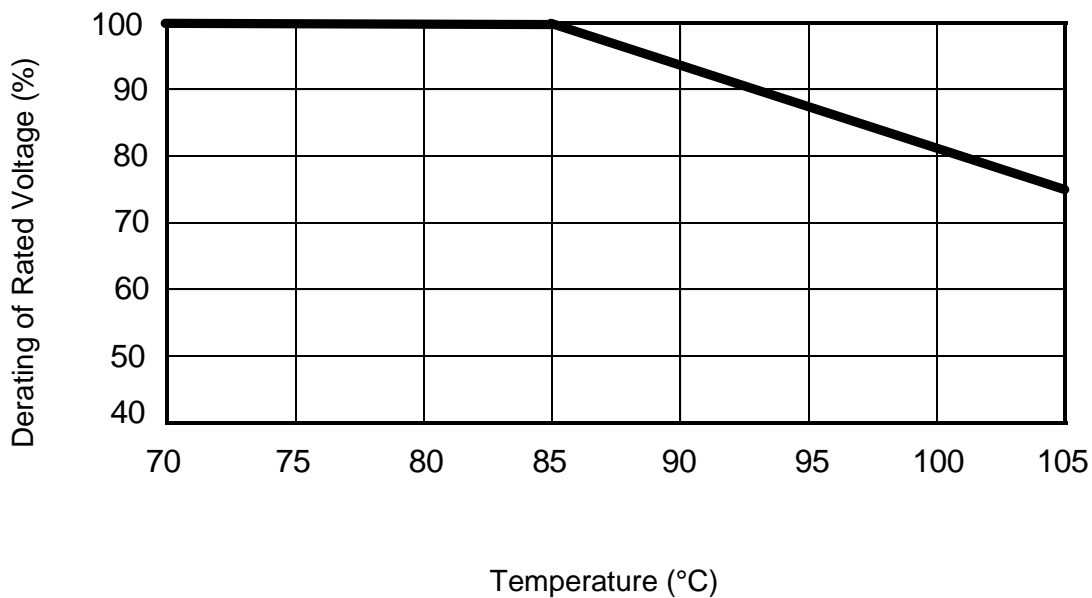
### Electrical Characteristics

Voltage Range	850Vdc ~ 2000Vdc
Capacitance Range	0.1uF ~ 4.0uF
Capacitance Tolerance	±5% or ±10% at +25°C
Capacitance	Measuring Frequency at 1kHz Measuring Voltage: 1±0.2V
Standard Atmospheric Conditions for Static Test	<b>Ambient temperature</b> 15°C to 35°C (If there is any doubt on the results, the measurements shall be made at +20 +/- 5°C) <b>Relative humidity</b> 45% to 75% (If there is any doubt on the results, the measurements shall be made at 60% to 70 %.) <b>Air pressure</b> 86 kPa to 106 kPa.
Voltage Between Terminals $U_{TT}$	1.5 x $V_R$ VDC for 10 seconds (between terminations) @ +25°C ±5°C
Voltage Between Terminals and Case $U_{TC}$	3000VAC, 60s (at+20+/-2°C)
Dielectric Dissipation Factor $Tg\delta 0$	≤2×10 <sup>-4</sup>
Dissipation factor	0.0010 (0.1%) at 25°C, 1kHz
Insulation Resistance	R between leads, for C ≤ 0.33 μF at 100 V; 1 min > 100 000 MΩ RC between leads, for C > 0.33 μF at 100 V; 1 min > 30 000 s
Self-Inductance	<1nH per mm of lead spacing
Hot-Spot	≤85°C
Life Expectancy	100,000 hours ( $U_R$ , $\Theta_{hotspot}=85^\circ\text{C}$ )
Failure Rate	100 Fit
Max. Altitude	2000 m
<b>Overvoltage</b>	<b>Maximum duration within one day</b>
Apply 110% of rated voltage	30% of on-load duration
Apply 115% of rated voltage	30 mins
Apply 120% of rated voltage	5 mins
Apply 130% of rated voltage	1 min

**Expected Life Curve**

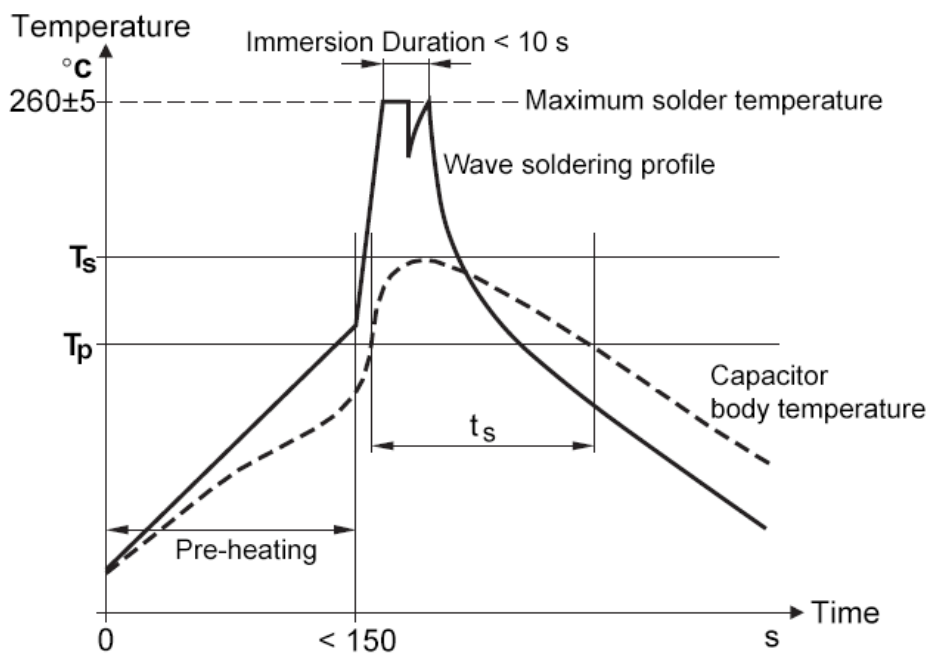


**Derating of Rated Voltage Vs Temperature**





**Wave Soldering Recommendations**

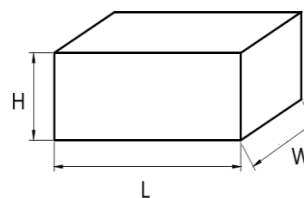


Ts: Capacitor body maximum temperature at wave soldering  
 Tp: Capacitor body maximum temperature at pre-heating

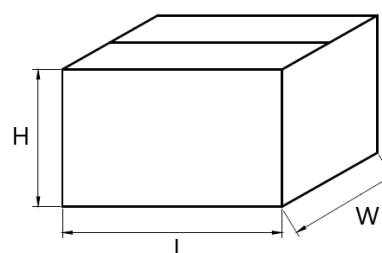
Polypropylene Capacitors	Polyester Capacitors
During pre-heating: $T_p \leq 110^\circ\text{C}$ During soldering: $T_s \leq 120^\circ\text{C}$ , $t_s \leq 60$	During pre-heating: $T_p \leq 130^\circ\text{C}$ During soldering: $T_s \leq 160^\circ\text{C}$ , $t_s \leq 60\text{s}$

**Packaging Information**

Inner Box Specifications (Dimensions)			
Box #	L ±3mm	W±3mm	H ±3mm
# 1	331	331	25
# 2	331	331	35
# 3	331	331	50
# 4	331	331	80
# 5	350	170	35
# 6	350	170	50
# 7	350	170	80



Outer Box Specifications (Dimensions)			
Box #	L ±5mm	W±5mm	H ±5mm
# 1	350	340	265
# 2	370	360	350



**Packaging Quantity**

Code	W	H	T	N / S Style
N11	42.5	40.0	20.0	98
N13	42.5	44.0	24.0	77
N15	42.5	37.0	28.0	70
N18	42.5	45.0	30.0	63
N21	42.5	35.5	33.5	56
P13	57.5	45.0	30.0	45
P17	57.5	50.0	35.0	35

### Cautions and Warnings

- Don't exceed the upper category temperature.
- For longtime storage, maximum relative humidity 80%, no dew allowed on the capacitor.
- Do not use or store capacitor in corrosive atmosphere, in the dusty environment's regular maintenance and cleaning especially of the terminals is required to avoid conductive path between terminal / or terminal and ground.
- Don't apply any mechanical stress to the capacitor terminals, and avoid any compressive, tensile or flexural stress.
- Don't move the capacitor after fixed to the PC board, and don't pick up the PC board by the fixed capacitor.
- Don't place the capacitor on a PC board whose holes space differs from the specified space.
- Avoid overload of the capacitors
- Do not have unlimited service life expectancy, the max service life expectancy may vary depending on the application the capacitor is used in.

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