

Double Metallized Polypropylene Film Snubber Capacitors

FSB Series - 850 ~ 2000VDC (Lug Terminal)



Overview

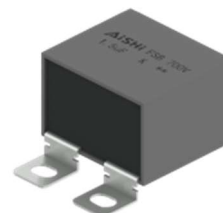
The FSB capacitor is constructed of metallized polypropylene film with double-sided metallized film encapsulated with epoxy resin in a rectangular plastic case, with lug terminals.

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

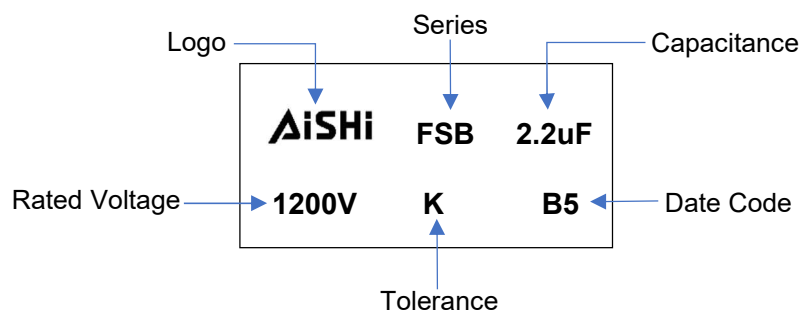


Qualification

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

F	SB	3B	K	225	N19	SN6	G
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

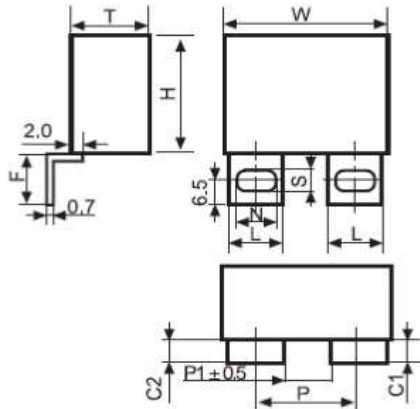
Digit One (Lead/Terminal Type)		Digit Two (Distance of hole for fixing)		Digit Three (Distance of solder slice)	
Style S	S	16~24	A	6	6
Style N	N	17~25	B	7	7
Style W	W	21~29	C	11	A
Style U	U	22~30	D	12	B
		30~38	E	20	C
		31~39	F	21	D
		35~43,	G	25	E
		36~44,	H	26	F
		52~62	J	33	G
		56~66,	K	37	H
		57~67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

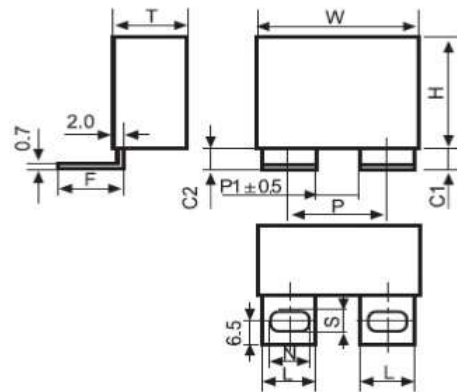
Dimension (mm)

Style S



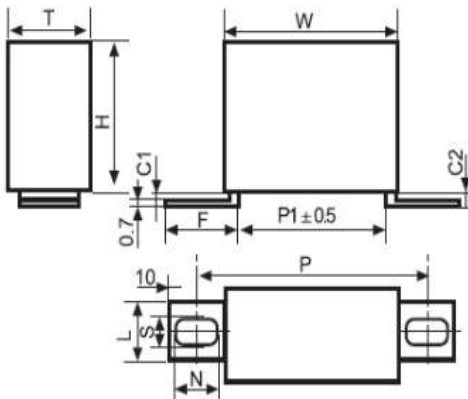
L x F x N x S = 14.0 x 16.0 x 10.2 x 6.2

Style N



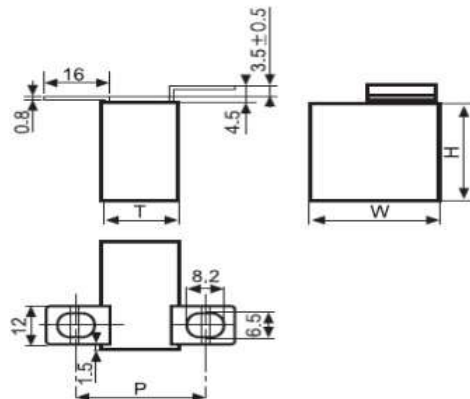
L x F x N x S = 14.0 x 16.0 x 10.2 x 6.2

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 μF	Dimensions			I _{rms} 100KHz 70°C A	Peak Current A	ESR _{Typical} 100KHz mΩ	ESL nH	dv/dt V/us	Style	Part Number
		W mm	H mm	T mm							
850	0.47	42.5	40.0	20.0	14.0	357.0	9.4	40	760	S	FSB2PK474N11SCA6
850	0.68	42.5	40.0	20.0	17.0	517.0	6.6	40	760	S	FSB2PK684N11SCA6
850	1.0	42.5	40.0	20.0	20.0	760.0	4.6	40	760	S	FSB2PK105N11SCA6
850	1.50	42.5	37.0	28.0	27.0	1140.0	3.1	36	760	S	FSB2PK155N15SCA6
850	1.5	42.5	35.5	33.5	28.0	1140.0	3.0	36	760	S	FSB2PK155N21SCA6
850	2.00	42.5	45.0	30.0	34.0	1520.0	2.4	43	760	S	FSB2PK205N18SCA6
850	2.2	42.5	45.0	30.0	35.0	1672.0	2.2	43	760	S	FSB2PK225N18SCA6
850	2.50	57.5	45.0	30.0	37.0	1175.0	2.0	45	470	S	FSB2PK255P13SGE6
850	3.0	57.5	45.0	30.0	30.0	1410.0	3.5	45	470	S	FSB2PK305P13SGE6
850	3.30	57.5	45.0	30.0	31.0	1551.0	3.2	45	470	S	FSB2PK335P13SGE6
850	4.0	57.5	50.0	35.0	34.0	1880.0	2.6	48	470	S	FSB2PK405P17SGE6
850	5.00	57.5	50.0	35.0	40.0	2350.0	2.2	48	470	S	FSB2PK505P17SGE6
1000	0.5	42.5	40.0	20.0	14.0	400.0	8.7	40	850	S	FSB3KK474N11SCA6
1000	0.68	42.5	40.0	20.0	18.0	578.0	6.1	40	850	S	FSB3KK684N11SCA6
1000	1.0	42.5	40.0	20.0	20.0	850.0	4.3	40	850	S	FSB3KK105N11SCA6
1000	1.50	42.5	37.0	28.0	28.0	1275.0	2.9	36	850	S	FSB3KK155N15SCA6
1000	1.5	42.5	35.5	33.5	29.0	1275.0	2.8	36	850	S	FSB3KK155N21SCA6
1000	2.00	42.5	45.0	30.0	35.0	1700.0	2.3	43	850	S	FSB3KK205N18SCA6
1000	2.2	57.5	45.0	30.0	28.0	1166.0	4.4	45	530	S	FSB3KK225P13SGE6
1000	2.50	57.5	45.0	30.0	29.0	1325.0	3.8	45	530	S	FSB3KK255P13SGE6
1000	3.0	57.5	45.0	30.0	31.0	1590.0	3.2	45	530	S	FSB3KK305P13SGE6
1000	3.30	57.5	45.0	30.0	32.0	1749.0	3.0	45	530	S	FSB3KK335P13SGE6
1000	4.0	57.5	50.0	35.0	38.0	2120.0	2.5	48	530	S	FSB3KK405P17SGE6
1200	0.33	42.5	40.0	20.0	13.0	330.0	10.9	40	1000	S	FSB3BK334N11SCA6
1200	0.5	42.5	40.0	20.0	16.0	470.0	7.7	40	1000	S	FSB3BK474N11SCA6
1200	0.68	42.5	40.0	20.0	19.0	680.0	5.4	40	1000	S	FSB3BK684N11SCA6
1200	1.0	42.5	37.0	28.0	25.0	1000.0	3.8	36	1000	S	FSB3BK105N15SCA6
1200	1.20	42.5	37.0	28.0	27.0	1200.0	3.2	36	1000	S	FSB3BK125N15SCA6
1200	1.2	42.5	35.5	33.5	28.0	1200.0	3.0	36	1000	S	FSB3BK125N21SCA6
1200	1.50	42.5	45.0	30.0	32.0	1500.0	2.6	43	1000	S	FSB3BK155N18SCA6
1200	2.0	57.5	45.0	30.0	27.0	1200.0	4.1	45	600	S	FSB3BK205P13SGE6
1200	2.20	57.5	45.0	30.0	28.0	1320.0	3.8	45	600	S	FSB3BK225P13SGE6
1200	2.5	57.5	45.0	30.0	30.0	1500.0	3.3	45	600	S	FSB3BK255P13SGE6
1200	3.00	57.5	50.0	35.0	35.0	1800.0	2.9	48	600	S	FSB3BK305P17SGE6
1200	3.3	57.5	50.0	35.0	38.0	1980.0	2.6	48	600	S	FSB3BK335P17SGE6
2000	0.10	42.5	40.0	20.0	8.0	140.0	26.8	40	1400	S	FSB3DK104N11SCA6
2000	0.2	42.5	40.0	20.0	10.0	210.0	17.9	40	1400	S	FSB3DK154N11SCA6
2000	0.22	42.5	40.0	20.0	12.0	308.0	12.3	40	1400	S	FSB3DK224N11SCA6
2000	0.3	42.5	40.0	20.0	16.0	462.0	8.3	40	1400	S	FSB3DK334N11SCA6
2000	0.47	42.5	40.0	20.0	19.0	658.0	5.9	40	1400	S	FSB3DK474N11SCA6
2000	0.7	42.5	44.0	24.0	24.0	952.0	4.1	43	1400	S	FSB3DK684N13SCA6
2000	0.68	42.5	35.5	33.5	25.0	952.0	4.0	43	1400	S	FSB3DK684N21SCA6
2000	0.8	42.5	45.0	30.0	28.0	1148.0	3.5	43	1400	S	FSB3DK824N18SCA6
2000	1.00	57.5	45.0	30.0	23.0	900.0	5.9	45	900	S	FSB3DK105P13SGE6
2000	1.2	57.5	45.0	30.0	25.0	1080.0	4.9	45	900	S	FSB3DK125P13SGE6
2000	1.50	57.5	50.0	35.0	30.0	1350.0	4.0	48	900	S	FSB3DK155P17SGE6
850	0.5	42.5	40.0	20.0	14.0	357.0	9.4	40	760	N	FSB2PK474N11NCA6
850	0.68	42.5	40.0	20.0	17.0	517.0	6.6	40	760	N	FSB2PK684N11NCA6


Rating and Part Number

Vdc	Cap Value μF	Dimensions			Irms 100KHz 70°C A	Peak Current A	ESR _{Typical} 100KHz mΩ	ESL nH	dv/dt V/us	Style	Part Number
		W mm	H mm	T mm							
850	1.0	42.5	40.0	20.0	20.0	760.0	4.6	40	760	N	FSB2PK105N11NCA6
850	1.5	42.5	37.0	28.0	27.0	1140.0	3.1	36	760	N	FSB2PK155N15NCA6
850	1.5	42.5	35.5	33.5	28.0	1140.0	3.0	36	760	N	FSB2PK155N21NCA6
850	2.0	42.5	45.0	30.0	34.0	1520.0	2.4	43	760	N	FSB2PK205N18NCA6
850	2.2	42.5	45.0	30.0	35.0	1672.0	2.2	43	760	N	FSB2PK225N18NCA6
850	2.5	57.5	45.0	30.0	37.0	1175.0	2.0	45	470	N	FSB2PK255P13NGE6
850	3.0	57.5	45.0	30.0	30.0	1410.0	3.5	45	470	N	FSB2PK305P13NGE6
850	3.3	57.5	45.0	30.0	31.0	1551.0	3.2	45	470	N	FSB2PK335P13NGE6
850	4.0	57.5	50.0	35.0	34.0	1880.0	2.6	48	470	N	FSB2PK405P17NGE6
850	5.0	57.5	50.0	35.0	40.0	2350.0	2.2	48	470	N	FSB2PK505P17NGE6
1000	0.5	42.5	40.0	20.0	14.0	400.0	8.7	40	850	N	FSB3KK474N11NCA6
1000	0.7	42.5	40.0	20.0	18.0	578.0	6.1	40	850	N	FSB3KK684N11NCA6
1000	1.0	42.5	40.0	20.0	20.0	850.0	4.3	40	850	N	FSB3KK105N11NCA6
1000	1.5	42.5	37.0	28.0	28.0	1275.0	2.9	36	850	N	FSB3KK155N15NCA6
1000	1.5	42.5	35.5	33.5	29.0	1275.0	2.8	36	850	N	FSB3KK155N21NCA6
1000	2.0	42.5	45.0	30.0	35.0	1700.0	2.3	43	850	N	FSB3KK205N18NCA6
1000	2.2	57.5	45.0	30.0	28.0	1166.0	4.4	45	530	N	FSB3KK225P13NGE6
1000	2.5	57.5	45.0	30.0	29.0	1325.0	3.8	45	530	N	FSB3KK255P13NGE6
1000	3.0	57.5	45.0	30.0	31.0	1590.0	3.2	45	530	N	FSB3KK305P13NGE6
1000	3.3	57.5	45.0	30.0	32.0	1749.0	3.0	45	530	N	FSB3KK335P13NGE6
1000	4.0	57.5	50.0	35.0	38.0	2120.0	2.5	48	530	N	FSB3KK405P17NGE6
1200	0.3	42.5	40.0	20.0	13.0	330.0	10.9	40	1000	N	FSB3BK334N11NCA6
1200	0.5	42.5	40.0	20.0	16.0	470.0	7.7	40	1000	N	FSB3BK474N11NCA6
1200	0.7	42.5	40.0	20.0	19.0	680.0	5.4	40	1000	N	FSB3BK684N11NCA6
1200	1.0	42.5	37.0	28.0	25.0	1000.0	3.8	36	1000	N	FSB3BK105N15NCA6
1200	1.2	42.5	37.0	28.0	27.0	1200.0	3.2	36	1000	N	FSB3BK125N15NCA6
1200	1.2	42.5	35.5	33.5	28.0	1200.0	3.0	36	1000	N	FSB3BK125N21NCA6
1200	1.5	42.5	45.0	30.0	32.0	1500.0	2.6	43	1000	N	FSB3BK155N18NCA6
1200	2.0	57.5	45.0	30.0	27.0	1200.0	4.1	45	600	N	FSB3BK205P13NGE6
1200	2.2	57.5	45.0	30.0	28.0	1320.0	3.8	45	600	N	FSB3BK225P13NGE6
1200	2.5	57.5	45.0	30.0	30.0	1500.0	3.3	45	600	N	FSB3BK255P13NGE6
1200	3.0	57.5	50.0	35.0	35.0	1800.0	2.9	48	600	N	FSB3BK305P17NGE6
1200	3.3	57.5	50.0	35.0	38.0	1980.0	2.6	48	600	N	FSB3BK335P17NGE6
2000	0.1	42.5	40.0	20.0	8.0	140.0	26.8	40	1400	N	FSB3DK104N11NCA6
2000	0.2	42.5	40.0	20.0	10.0	210.0	17.9	40	1400	N	FSB3DK154N11NCA6
2000	0.2	42.5	40.0	20.0	12.0	308.0	12.3	40	1400	N	FSB3DK224N11NCA6
2000	0.3	42.5	40.0	20.0	16.0	462.0	8.3	40	1400	N	FSB3DK334N11NCA6
2000	0.5	42.5	40.0	20.0	19.0	658.0	5.9	40	1400	N	FSB3DK474N11NCA6
2000	0.7	42.5	44.0	24.0	24.0	952.0	4.1	43	1400	N	FSB3DK684N13NCA6
2000	0.7	42.5	35.5	33.5	25.0	952.0	4.0	43	1400	N	FSB3DK684N21NCA6
2000	0.8	42.5	45.0	30.0	28.0	1148.0	3.5	43	1400	N	FSB3DK824N18NCA6
2000	1.0	57.5	45.0	30.0	23.0	900.0	5.9	45	900	N	FSB3DK105P13NGE6
2000	1.2	57.5	45.0	30.0	25.0	1080.0	4.9	45	900	N	FSB3DK125P13NGE6
2000	1.5	57.5	50.0	35.0	30.0	1350.0	4.0	48	900	N	FSB3DK155P17NGE6

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

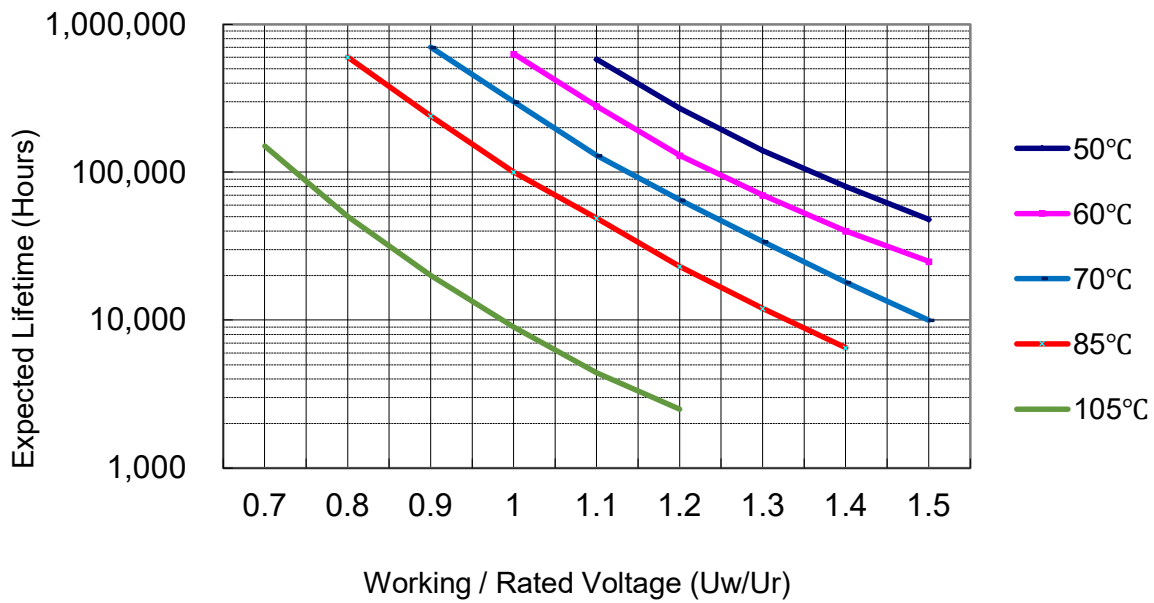
Construction

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 

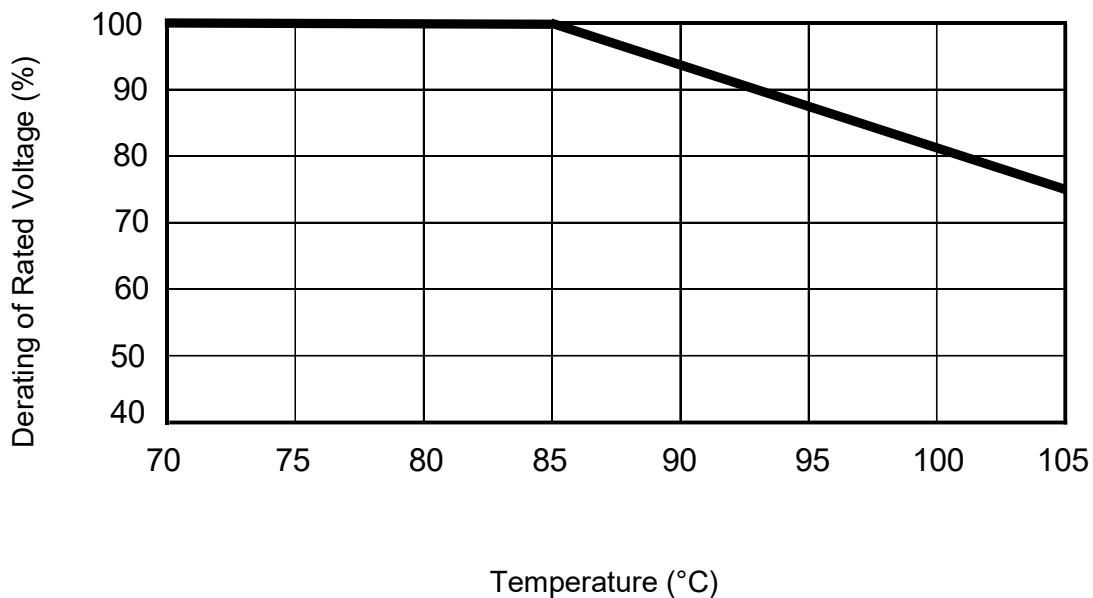
Electrical Characteristics

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	Ambient temperature 15°C to 35°C (If there is any doubt on the results, the measurements shall be made at +20 +/- 5°C) Relative humidity 45% to 75% (If there is any doubt on the results, the measurements shall be made at 60% to 70 %.) Air pressure 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 Tgδ 0	≤2×10 ⁻⁴
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 , Θ _{hotspot} =85°C)
Failure Rate	100 Fit
Max. Altitude	2000 m
Overvoltage	Maximum duration within one day
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

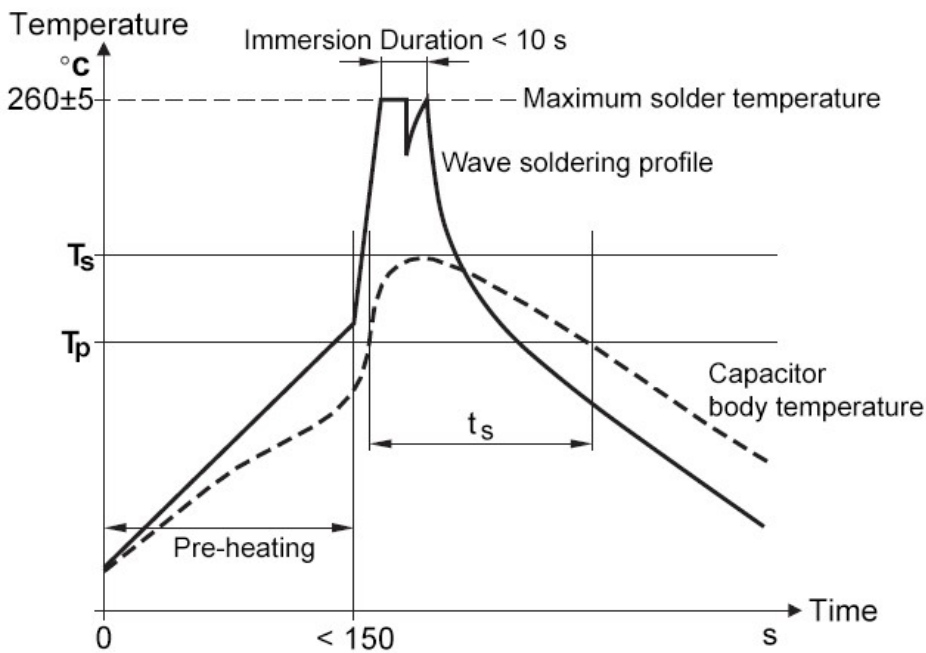
Expected Life Curve



Derating of Rated Voltage Vs Temperature



Wave Soldering Recommendations

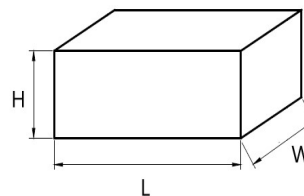


T_s : Capacitor body maximum temperature at wave soldering
 T_p : Capacitor body maximum temperature at pre-heating

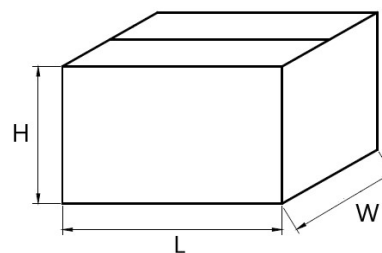
Polypropylene Capacitors	Polyester Capacitors
During pre-heating: $T_p \leq 110^\circ\text{C}$ During soldering: $T_s \leq 120^\circ\text{C}$, $t_s \leq 60$	During pre-heating: $T_p \leq 130^\circ\text{C}$ During soldering: $T_s \leq 160^\circ\text{C}$, $t_s \leq 60\text{s}$

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 pitch 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.

Disclaimer

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