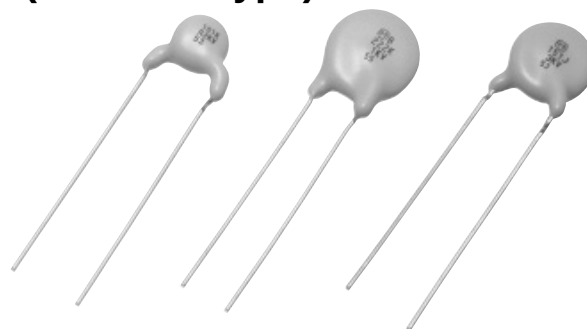


High Voltage Ceramic Disc Capacitors (Low loss type)

Series: **KGE/Char. SL/GP, 1 to 6 kVDC**

Series: **KBP/Char. B/Y5P, 1 to 3 kVDC**

Series: **KRP/Char. R/Y5R, 1 to 3 kVDC**



■ Features

- Wide operating temperature range:
(-25 to 105 °C or -25 to 125 °C)
- Improved Voltage vs. Temperature Rise
- Flame-retardant insulated coating
- Easy mounting through kinked leads and radial taping

■ Recommended Applications

- Snubber circuit for switching power supply
- Horizontal resonance circuitry for TVs and CRT displays
- Inverter type lighting apparatus
- Ballast circuit for LCD backlighting inverter
(For series KGE)
- Other high voltage pulse and DC circuitry

■ Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12	
E	C	K	N	3	A	1	0	2	K	B	P	
Product Code		Lead Style		Rated Voltage		Nominal Capacitance		Cap. Tolerance		Temp. Char.		Suffix
Code	Class	Code	Style	Code	Rated Volt.	Ex.	Cap.	Code	Cap. Tol.	Code	Char.	
ECC	Class 1	A	Kinked Lead Bulk	3A	1 kVDC	470	47 pF	D	±0.5 pF	G	SL/GP	
ECK	Class 2	N	Kinked Lead Taped	3D	2 kVDC	101	100 pF	F	±1.0 pF	B	B/Y5P	
				3F	3 kVDC	102	1000 pF	J	±5 %	R	R/Y5R	
				3J	6 kVDC	222	2200 pF	K	±10 %			
						472	4700 pF					

■ Specifications

Characteristic	Series KGE	Series KBP, KRP												
Operating Temperature Range	−25 to 105 °C	−25 to 125 °C												
Rated Voltage	1 kVDC to 6 kVDC	1 kVDC to 3 kVDC												
Dielectric Withstanding Voltage	Rated Voltage 1 to 3 kVDC: 200 % of Rated Voltage for 1 to 5 seconds Rated Voltage 6 kVDC: 150 % of Rated Voltage for 1 to 5 seconds	Rated Voltage 1 to 3 kVDC: 200 % of Rated Voltage for 1 to 5 seconds												
Capacitance	Within the specified tolerance, when measured at 1 MHz ± 20 %, 1 to 5 Vrms, and 20 °C	Within the specified tolerance, when measured at 1 kHz ± 20 %,1 to 5 Vrms, and 20 °C												
Q or Dissipation Factor (tanδ)	30 pF or under Q > 400+20 C (C:Cap.pF) over 30 pF Q > 1000 at 1 MHz ± 20 %,1 to 5 Vrms. and 20 °C	Series KBP : tanδ > 0.025 Series KRP : tanδ > 0.002 at 1 kHz ± 20 %,1 to 5 Vrms. and 20 °C												
Insulation Resistance	10000 M Ω min. at 500 VDC 1 minute electrification													
Temperature Characteristics	Temperature Coefficient: +350 to −1000 ppm/°C (Temperature Range:20 to 85°C)	<table><tr><th>Series</th><th>Temp.Char</th><th>max.Cap.Change</th><th>Temp. Range</th></tr><tr><td>KBP</td><td>B/Y5P</td><td>±10 %</td><td>−25 to 85 °C</td></tr><tr><td>KRP</td><td>R/Y5R</td><td>±15 %</td><td>−25 to 85 °C</td></tr></table>	Series	Temp.Char	max.Cap.Change	Temp. Range	KBP	B/Y5P	±10 %	−25 to 85 °C	KRP	R/Y5R	±15 %	−25 to 85 °C
Series	Temp.Char	max.Cap.Change	Temp. Range											
KBP	B/Y5P	±10 %	−25 to 85 °C											
KRP	R/Y5R	±15 %	−25 to 85 °C											

■ Rated Voltage and Capacitance Range

Series Name	Temp. Char.	Rated Voltage	Capacitance Range in pF				Typical Applications
			10	100	1000	10000	
Series KGE	SL	1 kVDC			470		Ballast circuit of LCD backlighting inverter
		2 kVDC		220			
		3 kVDC		150			Snubber circuit of switching power supply
		6 kVDC		150			
Series KBP	B	1 kVDC			5600		Snubber circuit of switching power supply
		2 kVDC			5600		Horizontal resonance circuit of TV and CRT display
		3 kVDC			2700		
Series KRP	R	1 kVDC			4700		Snubber circuit of switching power supply
		2 kVDC			4700		
		3 kVDC			2200		

■ Dimensions "D" (Body Diameter)

unit : mm

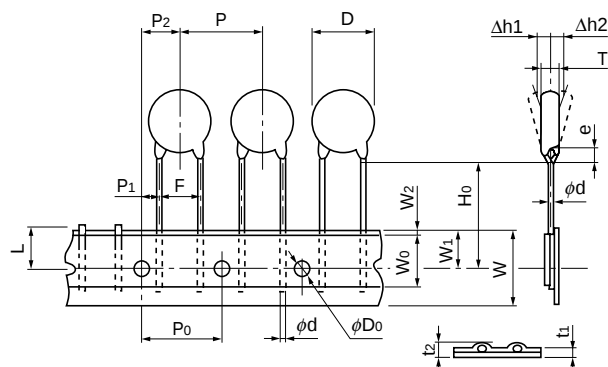
Cap. in pF	KGE				KBP			KRP		
	1 kV	2 kV	3 kV	6 kV	1 kV	2 kV	3 kV	1 kV	2 kV	3 kV
12 to 22	6.0	7.0	7.0	7.0						
22 to 33	6.0	7.0	7.0	8.0						
39	6.0	7.0	7.0	9.0						
47	6.0	7.0	7.0	9.0						
56	6.0	7.0	8.0	10.0						
68	6.0	7.0	8.0	11.0						
82	6.0	7.0	9.0	11.0						
100	7.0	8.0	10.0	13.0	6.0	7.0	7.5	6.0	7.0	7.5
120	7.0	8.0	10.0	13.0	6.0	7.0	7.5	6.0	7.0	7.5
150	8.0	9.0	11.0	15.0	6.0	7.0	7.5	6.0	7.0	7.5
180	8.0	10.0			6.0	7.0	7.5	6.0	7.0	7.5
220	9.0	10.0			6.0	7.0	7.5	6.0	7.0	8.0
270	9.0				6.0	7.0	7.5	6.0	7.0	8.0
330	11.0				6.0	7.0	8.0	6.0	7.5	8.5
390	11.0				6.0	7.0	9.0	7.0	7.5	9.5
470	13.0				6.0	7.5	9.5	7.0	9.0	9.5
560					7.0	8.0	10.0	7.0	9.0	10.5
680					7.0	9.0	11.0	7.5	10.0	10.5
820					7.5	9.0	11.0	7.5	10.0	12.5
1000					9.0	10.0	12.5	9.0	12.0	12.5
1200					9.0	10.5	14.5	9.0	12.0	14.5
1500					9.5	12.0	14.5	10.5	12.0	14.5
1800					12.0	12.5	16.0	10.5	14.0	16.5
2200					12.0	14.0	17.0	11.5	16.0	17.0
2700					13.5	16.0	18.5	13.0	16.0	
3300					13.5	17.0		13.0	19.0	
3900					15.5	18.0		14.0	20.0	
4700					15.5	25.0		16.5	21.0	
5600					17.0	25.0				

■ Dimensions in mm (not to scale)

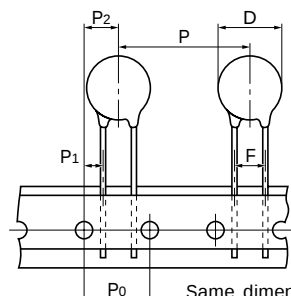
Standard lead styles are available in Kinked Lead and Kinked Lead Taping shown below.

● Kinked Lead Taping

Type N0, N1

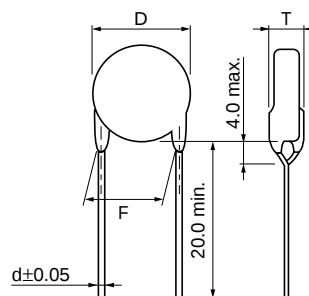


Type N2



Same dimensions as Type N0, N1 except for special dimensions.

● Kinked Lead Type



Note: Tolerance of Lead Space

Dim. F (Nominal)	Tolerance of Dim. F
5.0	±1.0
7.5	±1.5
10.0	±1.5

Unit (mm)

Taping Type	N0	N1	N2
Symbol			
P	12.7±1.0	15.0±2.0	30.0±2.0
P ₀	12.7±0.3	15.0±0.3	15.0±0.3
F	5.0±0.8	7.5±1.0	7.5±1.0
P ₁	3.85±0.70	3.75±0.80	3.75±0.80
P ₂	6.35±1.30	7.5±1.5	7.5±1.5
D	To comply with each individual specification		
W	18.0 ^{+1.0} _{-0.5}		
W ₀	10.0 min.		
W ₁	9.0±0.5		
W ₂	3.0 max.		
H ₀	18.0 ^{+2.0} _{-0.5}		
e	4.0 max.		
ϕD ₀	4.0±0.2		
ϕd	0.60±0.05	0.65±0.05	0.65±0.05
t ₁	0.6±0.3		
t ₂	1.5 max.		
T	To comply with each individual specification		
Δh ₁ , Δh ₂	2.0 max.		
L	11.0 max.		

■ Minimum Quantity/Packing Unit

Series / Type			Part Number		Minimum Packing Quantity	Packing Quantity in Carton	Carton L×W×H(mm)
Temp.Char. SL/GP 1 to 3 kVDC Series KGE	Kinked Lead Bulk	1 kVDC	ECCA3A□□□□GE	12 to 120 pF	200	5000	365×197×126
				150 to 470 pF	200	4000	
				12 to 82 pF	200	10000	
	Kinked Lead Bulk	2 kVDC	ECCA3D□□□□GE	100 to 150 pF	200	4000	
				180 to 220 pF	200	3000	
				12 to 82 pF	200	4000	
	Kinked Lead Bulk	3 kVDC	ECCA3F□□□□GE	100 to 150 pF	200	2000	358×232×305
				5 to 82 pF	200	3000	
				100 to 150 pF	200	2000	
	Kinked Lead Taped Type	1 kVDC	ECCN3A□□□□GE	12 to 470 pF	2000	10000	
				12 to 220 pF	1000	5000	
				12 to 150 pF	1000	5000	
Temp.Char. B/Y5P 1 to 3 kVDC Series KBP	Kinked Lead Bulk	1 kVDC	ECKA3A□□□□KBP	100 to 680 pF	200	5000	365×197×126
				820 to 3900 pF	200	4000	
				4700 to 5600 pF	200	2000	
	Kinked Lead Bulk	2 kVDC	ECKA3D□□□□KBP	100 to 560 pF	200	4000	
				680 to 3900 pF	200	2000	
				4700 to 5600 pF	100	1000	
	Kinked Lead Bulk	3 kVDC	ECKA3F□□□□KBP	100 to 390 pF	200	4000	358×232×305
				470 to 2200 pF	200	2000	
				2700 pF	100	1000	
	Kinked Lead Taped Type	1 kVDC	ECKN3A□□□□KBP	100 to 1000 pF	2000	10000	
				1200 to 3300 pF	1000	5000	
				3900 to 4700 pF	500	2500	
Temp.Char. R/Y5R 1 to 3 kVDC Series KRP	Kinked Lead Bulk	1 kVDC	ECKA3A□□□□KRP	100 to 1800 pF	1000	5000	358×232×305
				2200 to 3900 pF	500	2500	
				100 to 1000 pF	1000	5000	
	Kinked Lead Bulk	2 kVDC	ECKA3D□□□□KRP	1200 to 2700 pF	500	2500	
				100 to 560 pF	200	5000	
				680 to 3900 pF	200	4000	
	Kinked Lead Bulk	3 kVDC	ECKA3F□□□□KRP	4700 pF	200	2000	365×197×126
				100 to 390 pF	200	4000	
				470 to 2700 pF	200	2000	
	Kinked Lead Taped Type	1 kVDC	ECKN3A□□□□KRP	3300 to 4700 pF	100	1000	
				100 to 330 pF	200	4000	
				390 to 1500 pF	200	2000	
	Kinked Lead Bulk	1 kVDC	ECKN3A□□□□KRP	1800, 2200 pF	200	1000	358×232×305
				100 to 820 pF	2000	10000	
				1000 to 2200 pF	1000	5000	
	Kinked Lead Taped Type	2 kVDC	ECKN3D□□□□KRP	2700 to 3900 pF	500	2500	
				100 to 1500 pF	1000	5000	
				100 to 820 pF	1000	5000	
	Kinked Lead Bulk	3 kVDC	ECKN3F□□□□KRP	100 to 820 pF	1000	5000	358×232×305
				100 to 820 pF	1000	5000	
				100 to 820 pF	1000	5000	
	Kinked Lead Taped Type	2 kVDC	ECKN3D□□□□KRP	100 to 1500 pF	1000	5000	
				100 to 1500 pF	1000	5000	
				100 to 820 pF	1000	5000	

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Ratings and Characteristics

- Series KGE (Class 1, Temp. Char. SL/GP, 1 kVDC to 6 kVDC)

Rated Volt.	Cap. in pF	Capacitance Tolerance (%)	Dimensions in mm		Kinked Lead Type (Bulk)			Kinked Lead Taping Type			
			D max.	T max.	Part Number	Dimensions in mm		Part Number	Taped Type	Dimensions in mm	
						F	d			F	d
1 kVDC	12	±5, ±10	6.0	5.0	ECCA3A120□GE	5.0	0.60	ECCN3A120□GE	N0	5.0	0.60
	15	±5, ±10	6.0	5.0	ECCA3A150□GE	5.0	0.60	ECCN3A150□GE	N0	5.0	0.60
	18	±5, ±10	6.0	5.0	ECCA3A180□GE	5.0	0.60	ECCN3A180□GE	N0	5.0	0.60
	22	±5, ±10	6.0	5.0	ECCA3A220□GE	5.0	0.60	ECCN3A220□GE	N0	5.0	0.60
	27	±5, ±10	6.0	5.0	ECCA3A270□GE	5.0	0.60	ECCN3A270□GE	N0	5.0	0.60
	33	±5, ±10	6.0	5.0	ECCA3A330□GE	5.0	0.60	ECCN3A330□GE	N0	5.0	0.60
	39	±5, ±10	6.0	5.0	ECCA3A390□GE	5.0	0.60	ECCN3A390□GE	N0	5.0	0.60
	47	±5, ±10	6.0	5.0	ECCA3A470□GE	5.0	0.60	ECCN3A470□GE	N0	5.0	0.60
	56	±5, ±10	6.0	5.0	ECCA3A560□GE	5.0	0.60	ECCN3A560□GE	N0	5.0	0.60
	68	±5, ±10	6.0	5.0	ECCA3A680□GE	5.0	0.60	ECCN3A680□GE	N0	5.0	0.60
	82	±5, ±10	6.0	5.0	ECCA3A820□GE	5.0	0.60	ECCN3A820□GE	N0	5.0	0.60
	100	±5, ±10	7.0	5.0	ECCA3A101□GE	5.0	0.60	ECCN3A101□GE	N0	5.0	0.60
	120	±5, ±10	7.0	5.0	ECCA3A121□GE	5.0	0.60	ECCN3A121□GE	N0	5.0	0.60
	150	±5, ±10	8.0	5.0	ECCA3A151□GE	5.0	0.60	ECCN3A151□GE	N0	5.0	0.60
	180	±5, ±10	8.0	5.0	ECCA3A181□GE	5.0	0.60	ECCN3A181□GE	N0	5.0	0.60
	220	±5, ±10	9.0	5.0	ECCA3A221□GE	5.0	0.60	ECCN3A221□GE	N0	5.0	0.60
	270	±5, ±10	9.0	5.0	ECCA3A271□GE	5.0	0.60	ECCN3A271□GE	N0	5.0	0.60
	330	±5, ±10	11.0	5.0	ECCA3A331□GE	5.0	0.60	ECCN3A331□GE	N0	5.0	0.60
	390	±5, ±10	11.0	5.0	ECCA3A391□GE	5.0	0.60	ECCN3A391□GE	N0	5.0	0.60
	470	±5, ±10	13.0	5.0	ECCA3A471□GE	7.5	0.65	ECCN3A471□GE	N1	7.5	0.65
2 kVDC	12	±5, ±10	7.0	5.5	ECCA3D120□GE	7.5	0.65	ECCN3D120□GE	N1	7.5	0.65
	15	±5, ±10	7.0	5.5	ECCA3D150□GE	7.5	0.65	ECCN3D150□GE	N1	7.5	0.65
	18	±5, ±10	7.0	5.5	ECCA3D180□GE	7.5	0.65	ECCN3D180□GE	N1	7.5	0.65
	22	±5, ±10	7.0	5.5	ECCA3D220□GE	7.5	0.65	ECCN3D220□GE	N1	7.5	0.65
	27	±5, ±10	7.0	5.5	ECCA3D270□GE	7.5	0.65	ECCN3D270□GE	N1	7.5	0.65
	33	±5, ±10	7.0	5.5	ECCA3D330□GE	7.5	0.65	ECCN3D330□GE	N1	7.5	0.65
	39	±5, ±10	7.0	5.5	ECCA3D390□GE	7.5	0.65	ECCN3D390□GE	N1	7.5	0.65
	47	±5, ±10	7.0	5.5	ECCA3D470□GE	7.5	0.65	ECCN3D470□GE	N1	7.5	0.65
	56	±5, ±10	7.0	5.5	ECCA3D560□GE	7.5	0.65	ECCN3D560□GE	N1	7.5	0.65
	68	±5, ±10	7.0	5.5	ECCA3D680□GE	7.5	0.65	ECCN3D680□GE	N1	7.5	0.65
	82	±5, ±10	7.0	5.5	ECCA3D820□GE	7.5	0.65	ECCN3D820□GE	N1	7.5	0.65
	100	±5, ±10	8.0	5.5	ECCA3D101□GE	7.5	0.65	ECCN3D101□GE	N1	7.5	0.65
	120	±5, ±10	8.0	5.5	ECCA3D121□GE	7.5	0.65	ECCN3D121□GE	N1	7.5	0.65
	150	±5, ±10	9.0	5.5	ECCA3D151□GE	7.5	0.65	ECCN3D151□GE	N1	7.5	0.65
	180	±5, ±10	10.0	5.5	ECCA3D181□GE	7.5	0.65	ECCN3D181□GE	N1	7.5	0.65
	220	±5, ±10	10.0	5.5	ECCA3D221□GE	7.5	0.65	ECCN3D221□GE	N1	7.5	0.65
3 kVDC	12	±5, ±10	7.0	6.0	ECCA3F120□GE	7.5	0.65	ECCN3F120□GE	N1	7.5	0.65
	15	±5, ±10	7.0	6.0	ECCA3F150□GE	7.5	0.65	ECCN3F150□GE	N1	7.5	0.65
	18	±5, ±10	7.0	6.0	ECCA3F180□GE	7.5	0.65	ECCN3F180□GE	N1	7.5	0.65
	22	±5, ±10	7.0	6.0	ECCA3F220□GE	7.5	0.65	ECCN3F220□GE	N1	7.5	0.65
	27	±5, ±10	7.0	6.0	ECCA3F270□GE	7.5	0.65	ECCN3F270□GE	N1	7.5	0.65
	33	±5, ±10	7.0	6.0	ECCA3F330□GE	7.5	0.65	ECCN3F330□GE	N1	7.5	0.65
	39	±5, ±10	7.0	6.0	ECCA3F390□GE	7.5	0.65	ECCN3F390□GE	N1	7.5	0.65
	47	±5, ±10	7.0	6.0	ECCA3F470□GE	7.5	0.65	ECCN3F470□GE	N1	7.5	0.65
	56	±5, ±10	8.0	6.0	ECCA3F560□GE	7.5	0.65	ECCN3F560□GE	N1	7.5	0.65
	68	±5, ±10	8.0	6.0	ECCA3F680□GE	7.5	0.65	ECCN3F680□GE	N1	7.5	0.65
	82	±5, ±10	9.0	6.0	ECCA3F820□GE	7.5	0.65	ECCN3F820□GE	N1	7.5	0.65
	100	±5, ±10	10.0	6.0	ECCA3F101□GE	7.5	0.65	ECCN3F101□GE	N1	7.5	0.65
	120	±5, ±10	10.0	6.0	ECCA3F121□GE	7.5	0.65	ECCN3F121□GE	N1	7.5	0.65
	150	±5, ±10	11.0	6.0	ECCA3F151□GE	7.5	0.65	ECCN3F151□GE	N1	7.5	0.65

Note : □---Capacitance Tolerance Code J (± 5%) or K (± 10%)

■ Ratings and Characteristics

● Series KGE (Class 1, Temp. Char. SL/GP, 1 to 6 kVDC) (Continuation)

Rated Volt.	Cap. in pF	Capacitance Tolerance (%)	Dimensions in mm		Kinked Lead Type (Bulk)			Kinked Lead Taping Type			
			D max.	T max.	Part Number	Dimensions in mm		Part Number	Taped Type	Dimensions in mm	
						F	d			F	d
6 kVDC	5	±0.5pF or ±1pF	7.0	6.0	ECCA3J050□GE	7.5	0.65	ECCN3J050□GE	N1	7.5	0.65
	6	±0.5pF or ±1pF	7.0	6.0	ECCA3J060□GE	7.5	0.65	ECCN3J060□GE	N1	7.5	0.65
	7	±0.5pF or ±1pF	7.0	6.0	ECCA3J070□GE	7.5	0.65	ECCN3J070□GE	N1	7.5	0.65
	8	±0.5pF or ±1pF	7.0	6.0	ECCA3J080□GE	7.5	0.65	ECCN3J080□GE	N1	7.5	0.65
	9	±0.5pF or ±1pF	7.0	6.0	ECCA3J090□GE	7.5	0.65	ECCN3J090□GE	N1	7.5	0.65
	10	±0.5pF or ±1pF	7.0	6.0	ECCA3J100□GE	7.5	0.65	ECCN3J100□GE	N1	7.5	0.65
	12	±5 or ±10	7.0	6.0	ECCA3J120□GE	7.5	0.65	ECCN3J120□GE	N1	7.5	0.65
	15	±5 or ±10	7.0	6.0	ECCA3J150□GE	7.5	0.65	ECCN3J150□GE	N1	7.5	0.65
	18	±5 or ±10	7.0	6.0	ECCA3J180□GE	7.5	0.65	ECCN3J180□GE	N1	7.5	0.65
	22	±5 or ±10	7.0	6.0	ECCA3J220□GE	7.5	0.65	ECCN3J220□GE	N1	7.5	0.65
	27	±5 or ±10	8.0	6.0	ECCA3J270□GE	7.5	0.65	ECCN3J270□GE	N1	7.5	0.65
	33	±5 or ±10	8.0	6.0	ECCA3J330□GE	7.5	0.65	ECCN3J330□GE	N1	7.5	0.65
	39	±5 or ±10	9.0	6.0	ECCA3J390□GE	7.5	0.65	ECCN3J390□GE	N1	7.5	0.65
	47	±5 or ±10	9.0	6.0	ECCA3J470□GE	7.5	0.65	ECCN3J470□GE	N1	7.5	0.65
	56	±5 or ±10	10.0	6.0	ECCA3J560□GE	7.5	0.65	ECCN3J560□GE	N1	7.5	0.65
	68	±5 or ±10	11.0	6.0	ECCA3J680□GE	7.5	0.65	ECCN3J680□GE	N1	7.5	0.65
	82	±5 or ±10	11.0	6.0	ECCA3J820□GE	7.5	0.65	ECCN3J820□GE	N1	7.5	0.65
	100	±5 or ±10	13.0	6.0	ECCA3J101□GE	7.5	0.65	ECCN3J101□GE	N1	7.5	0.65
	120	±5 or ±10	13.0	6.0	ECCA3J121□GE	7.5	0.65	ECCN3J121□GE	N1	7.5	0.65
	150	±5 or ±10	15.0	6.0	ECCA3J151□GE	7.5	0.65	ECCN3J151□GE	N2	7.5	0.65

Note : □---Capacitance Tolerance Code D (± 0.5pF) or F (± 1pF) or J (± 5%) or K (± 10%)

● Series KBP (Class 2, Temp. Char. B/Y5P, 1 to 3 kVDC)

Rated Volt.	Cap. in pF	Capacitance Tolerance (%)	Dimensions in mm		Kinked Lead Type (Bulk)			Kinked Lead Taping Type			
			D max.	T max.	Part Number	Dimensions in mm		Part Number	Taped Type	Dimensions in mm	
						F	d			F	d
1 kVDC	100	±10	6.0	4.5	ECKA3A101KBP	5.0	0.60	ECKN3A101KBP	N0	5.0	0.60
	120	±10	6.0	4.5	ECKA3A121KBP	5.0	0.60	ECKN3A121KBP	N0	5.0	0.60
	150	±10	6.0	4.5	ECKA3A151KBP	5.0	0.60	ECKN3A151KBP	N0	5.0	0.60
	180	±10	6.0	4.5	ECKA3A181KBP	5.0	0.60	ECKN3A181KBP	N0	5.0	0.60
	220	±10	6.0	4.5	ECKA3A221KBP	5.0	0.60	ECKN3A221KBP	N0	5.0	0.60
	270	±10	6.0	4.5	ECKA3A271KBP	5.0	0.60	ECKN3A271KBP	N0	5.0	0.60
	330	±10	6.0	4.5	ECKA3A331KBP	5.0	0.60	ECKN3A331KBP	N0	5.0	0.60
	390	±10	6.0	4.5	ECKA3A391KBP	5.0	0.60	ECKN3A391KBP	N0	5.0	0.60
	470	±10	6.0	4.5	ECKA3A471KBP	5.0	0.60	ECKN3A471KBP	N0	5.0	0.60
	560	±10	7.0	4.5	ECKA3A561KBP	5.0	0.60	ECKN3A561KBP	N0	5.0	0.60
	680	±10	7.0	4.5	ECKA3A681KBP	5.0	0.60	ECKN3A681KBP	N0	5.0	0.60
	820	±10	7.5	4.5	ECKA3A821KBP	5.0	0.60	ECKN3A821KBP	N0	5.0	0.60
	1000	±10	9.0	4.5	ECKA3A102KBP	5.0	0.60	ECKN3A102KBP	N0	5.0	0.60
	1200	±10	9.0	4.5	ECKA3A122KBP	5.0	0.60	ECKN3A122KBP	N0	5.0	0.60
	1500	±10	9.5	4.5	ECKA3A152KBP	5.0	0.60	ECKN3A152KBP	N0	5.0	0.60
	1800	±10	10.0	4.5	ECKA3A182KBP	5.0	0.60	ECKN3A182KBP	N0	5.0	0.60
	2200	±10	12.0	4.5	ECKA3A222KBP	5.0	0.60	ECKN3A222KBP	N0	5.0	0.60
	2700	±10	12.0	4.5	ECKA3A272KBP	5.0	0.60	ECKN3A272KBP	N0	5.0	0.60
	3300	±10	13.5	4.5	ECKA3A332KBP	10.0	0.65	ECKN3A332KBP	N1	7.5	0.65
	3900	±10	13.5	4.5	ECKA3A392KBP	10.0	0.65	ECKN3A392KBP	N1	7.5	0.65
	4700	±10	15.5	4.5	ECKA3A472KBP	10.0	0.65	ECKN3A472KBP	N2	7.5	0.65
	5600	±10	17.0	4.5	ECKA3A562KBP	10.0	0.65	ECKN3A562KBP	N2	7.5	0.65

■ Ratings and Characteristics

● Series KBP (Class 2, Temp. Char. B/Y5P, 1 to 3 kVDC) (Continuation)

Rated Volt.	Cap. in pF	Capacitance Tolerance (%)	Dimensions in mm		Kinked Lead Type (Bulk)			Kinked Lead Taping Type			
			D max.	T max.	Part Number	Dimensions in mm		Part Number	Taped Type	Dimensions in mm	
						F	d			F	d
2 kVDC	100	±10	7.0	5.0	ECKA3D101KBP	7.5	0.65	ECKN3D101KBP	N1	7.5	0.65
	120	±10	7.0	5.0	ECKA3D121KBP	7.5	0.65	ECKN3D121KBP	N1	7.5	0.65
	150	±10	7.0	5.0	ECKA3D151KBP	7.5	0.65	ECKN3D151KBP	N1	7.5	0.65
	180	±10	7.0	5.0	ECKA3D181KBP	7.5	0.65	ECKN3D181KBP	N1	7.5	0.65
	220	±10	7.0	5.0	ECKA3D221KBP	7.5	0.65	ECKN3D221KBP	N1	7.5	0.65
	270	±10	7.0	5.0	ECKA3D271KBP	7.5	0.65	ECKN3D271KBP	N1	7.5	0.65
	330	±10	7.0	5.0	ECKA3D331KBP	7.5	0.65	ECKN3D331KBP	N1	7.5	0.65
	390	±10	7.0	5.0	ECKA3D391KBP	7.5	0.65	ECKN3D391KBP	N1	7.5	0.65
	470	±10	7.5	5.0	ECKA3D471KBP	7.5	0.65	ECKN3D471KBP	N1	7.5	0.65
	560	±10	8.0	5.0	ECKA3D561KBP	7.5	0.65	ECKN3D561KBP	N1	7.5	0.65
	680	±10	9.0	5.0	ECKA3D681KBP	7.5	0.65	ECKN3D681KBP	N1	7.5	0.65
	820	±10	9.0	5.0	ECKA3D821KBP	7.5	0.65	ECKN3D821KBP	N1	7.5	0.65
	1000	±10	10.0	5.0	ECKA3D102KBP	7.5	0.65	ECKN3D102KBP	N1	7.5	0.65
	1200	±10	10.5	5.0	ECKA3D122KBP	7.5	0.65	ECKN3D122KBP	N1	7.5	0.65
	1500	±10	12.0	5.0	ECKA3D152KBP	7.5	0.65	ECKN3D152KBP	N1	7.5	0.65
	1800	±10	12.5	5.0	ECKA3D182KBP	7.5	0.65	ECKN3D182KBP	N1	7.5	0.65
	2200	±10	14.0	5.0	ECKA3D222KBP	10.0	0.65	ECKN3D222KBP	N2	7.5	0.65
	2700	±10	16.0	5.0	ECKA3D272KBP	10.0	0.65	ECKN3D272KBP	N2	7.5	0.65
	3300	±10	17.0	5.0	ECKA3D332KBP	10.0	0.65	ECKN3D332KBP	N2	7.5	0.65
	3900	±10	18.0	5.0	ECKA3D392KBP	10.0	0.65	ECKN3D392KBP	N2	7.5	0.65
	4700	±10	25.0	5.0	ECKA3D472KBP	10.0	0.65	—	—	—	—
	5600	±10	25.0	5.0	ECKA3D562KBP	10.0	0.65	—	—	—	—
3 kVDC	100	±10	7.5	6.0	ECKA3F101KBP	7.5	0.65	ECKN3F101KBP	N1	7.5	0.65
	120	±10	7.5	6.0	ECKA3F121KBP	7.5	0.65	ECKN3F121KBP	N1	7.5	0.65
	150	±10	7.5	6.0	ECKA3F151KBP	7.5	0.65	ECKN3F151KBP	N1	7.5	0.65
	180	±10	7.5	6.0	ECKA3F181KBP	7.5	0.65	ECKN3F181KBP	N1	7.5	0.65
	220	±10	7.5	6.0	ECKA3F221KBP	7.5	0.65	ECKN3F221KBP	N1	7.5	0.65
	270	±10	7.5	6.0	ECKA3F271KBP	7.5	0.65	ECKN3F271KBP	N1	7.5	0.65
	330	±10	8.0	6.0	ECKA3F331KBP	7.5	0.65	ECKN3F331KBP	N1	7.5	0.65
	390	±10	9.0	6.0	ECKA3F391KBP	7.5	0.65	ECKN3F391KBP	N1	7.5	0.65
	470	±10	9.5	6.0	ECKA3F471KBP	7.5	0.65	ECKN3F471KBP	N1	7.5	0.65
	560	±10	10.0	6.0	ECKA3F561KBP	7.5	0.65	ECKN3F561KBP	N1	7.5	0.65
	680	±10	11.0	6.0	ECKA3F681KBP	7.5	0.65	ECKN3F681KBP	N1	7.5	0.65
	820	±10	11.0	6.0	ECKA3F821KBP	7.5	0.65	ECKN3F821KBP	N1	7.5	0.65
	1000	±10	12.5	6.0	ECKA3F102KBP	7.5	0.65	ECKN3F102KBP	N1	7.5	0.65
	1200	±10	14.5	6.0	ECKA3F122KBP	10.0	0.65	ECKN3F122KBP	N1	7.5	0.65
	1500	±10	14.5	6.0	ECKA3F152KBP	10.0	0.65	ECKN3F152KBP	N1	7.5	0.65
	1800	±10	16.0	6.0	ECKA3F182KBP	10.0	0.65	ECKN3F182KBP	N2	7.5	0.65
	2200	±10	17.0	6.0	ECKA3F222KBP	10.0	0.65	ECKN3F222KBP	N2	7.5	0.65
	2700	±10	18.5	6.0	ECKA3F272KBP	10.0	0.65	ECKN3F272KBP	N2	7.5	0.65

■ Ratings and Characteristics

● Series KRP (Class 2, Temp. Char. R/Y5R, 1 to 3 kVDC)

Rated Volt.	Cap. in pF	Capacitance Tolerance (%)	Dimensions in mm		Kinked Lead Type (Bulk)			Kinked Lead Taping Type			
			D max.	T max.	Part Number	Dimensions in mm		Part Number	Taped Type	Dimensions in mm	
						F	d			F	d
1 kVDC	100	±10	6.0	4.5	ECKA3A101KRP	5.0	0.60	ECKN3A101KRP	N0	5.0	0.60
	120	±10	6.0	4.5	ECKA3A121KRP	5.0	0.60	ECKN3A121KRP	N0	5.0	0.60
	150	±10	6.0	4.5	ECKA3A151KRP	5.0	0.60	ECKN3A151KRP	N0	5.0	0.60
	180	±10	6.0	4.5	ECKA3A181KRP	5.0	0.60	ECKN3A181KRP	N0	5.0	0.60
	220	±10	6.0	4.5	ECKA3A221KRP	5.0	0.60	ECKN3A221KRP	N0	5.0	0.60
	270	±10	6.0	4.5	ECKA3A271KRP	5.0	0.60	ECKN3A271KRP	N0	5.0	0.60
	330	±10	6.0	4.5	ECKA3A331KRP	5.0	0.60	ECKN3A331KRP	N0	5.0	0.60
	390	±10	7.0	4.5	ECKA3A391KRP	5.0	0.60	ECKN3A391KRP	N0	5.0	0.60
	470	±10	7.0	4.5	ECKA3A471KRP	5.0	0.60	ECKN3A471KRP	N0	5.0	0.60
	560	±10	7.0	4.5	ECKA3A561KRP	5.0	0.60	ECKN3A561KRP	N0	5.0	0.60
	680	±10	7.5	4.5	ECKA3A681KRP	5.0	0.60	ECKN3A681KRP	N0	5.0	0.60
	820	±10	7.5	4.5	ECKA3A821KRP	5.0	0.60	ECKN3A821KRP	N0	5.0	0.60
	1000	±10	9.0	4.5	ECKA3A102KRP	5.0	0.60	ECKN3A102KRP	N0	5.0	0.60
	1200	±10	9.0	4.5	ECKA3A122KRP	5.0	0.60	ECKN3A122KRP	N0	5.0	0.60
	1500	±10	10.5	4.5	ECKA3A152KRP	5.0	0.60	ECKN3A152KRP	N0	5.0	0.60
	1800	±10	10.5	4.5	ECKA3A182KRP	5.0	0.60	ECKN3A182KRP	N0	5.0	0.60
	2200	±10	11.5	4.5	ECKA3A222KRP	5.0	0.60	ECKN3A222KRP	N0	5.0	0.60
	2700	±10	13.0	4.5	ECKA3A272KRP	7.5	0.65	ECKN3A272KRP	N1	7.5	0.65
	3300	±10	13.0	4.5	ECKA3A332KRP	7.5	0.65	ECKN3A332KRP	N1	7.5	0.65
	3900	±10	14.0	4.5	ECKA3A392KRP	7.5	0.65	ECKN3A392KRP	N1	7.5	0.65
	4700	±10	16.5	4.5	ECKA3A472KRP	7.5	0.65	—	—	—	—
2 kVDC	100	±10	7.0	5.0	ECKA3D101KRP	7.5	0.65	ECKN3D101KRP	N1	7.5	0.65
	120	±10	7.0	5.0	ECKA3D121KRP	7.5	0.65	ECKN3D121KRP	N1	7.5	0.65
	150	±10	7.0	5.0	ECKA3D151KRP	7.5	0.65	ECKN3D151KRP	N1	7.5	0.65
	180	±10	7.0	5.0	ECKA3D181KRP	7.5	0.65	ECKN3D181KRP	N1	7.5	0.65
	220	±10	7.0	5.0	ECKA3D221KRP	7.5	0.65	ECKN3D221KRP	N1	7.5	0.65
	270	±10	7.0	5.0	ECKA3D271KRP	7.5	0.65	ECKN3D271KRP	N1	7.5	0.65
	330	±10	7.5	5.0	ECKA3D331KRP	7.5	0.65	ECKN3D331KRP	N1	7.5	0.65
	390	±10	7.5	5.0	ECKA3D391KRP	7.5	0.65	ECKN3D391KRP	N1	7.5	0.65
	470	±10	9.0	5.0	ECKA3D471KRP	7.5	0.65	ECKN3D471KRP	N1	7.5	0.65
	560	±10	9.0	5.0	ECKA3D561KRP	7.5	0.65	ECKN3D561KRP	N1	7.5	0.65
	680	±10	10.0	5.0	ECKA3D681KRP	7.5	0.65	ECKN3D681KRP	N1	7.5	0.65
	820	±10	10.0	5.0	ECKA3D821KRP	7.5	0.65	ECKN3D821KRP	N1	7.5	0.65
	1000	±10	12.0	5.0	ECKA3D102KRP	7.5	0.65	ECKN3D102KRP	N1	7.5	0.65
	1200	±10	12.0	5.0	ECKA3D122KRP	7.5	0.65	ECKN3D122KRP	N1	7.5	0.65
	1500	±10	12.0	5.0	ECKA3D152KRP	7.5	0.65	ECKN3D152KRP	N1	7.5	0.65
	1800	±10	14.0	5.0	ECKA3D182KRP	10.0	0.65	—	—	—	—
	2200	±10	16.0	5.0	ECKA3D222KRP	10.0	0.65	—	—	—	—
	2700	±10	16.0	5.0	ECKA3D272KRP	10.0	0.65	—	—	—	—
	3300	±10	19.0	5.0	ECKA3D332KRP	10.0	0.65	—	—	—	—
	3900	±10	20.0	5.0	ECKA3D392KRP	10.0	0.65	—	—	—	—
	4700	±10	21.0	5.0	ECKA3D472KRP	10.0	0.65	—	—	—	—

■ Ratings and Characteristics

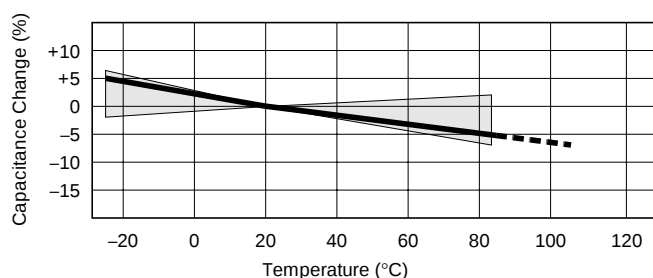
● Series KRP (Class 2, Temp. Char. R/Y5R, 1 to 3 kVDC) (Continuation)

Rated Volt.	Cap. in pF	Capacitance Tolerance (%)	Dimensions in mm		Kinked Lead Type (Bulk)			Kinked Lead Taping Type			
			D max.	T max.	Part Number	Dimensions in mm		Part Number	Taped Type	Dimensions in mm	
						F	d			F	d
3 kVDC	100	±10	7.5	5.5	ECKA3F101KRP	7.5	0.65	ECKN3F101KRP	N1	7.5	0.65
	120	±10	7.5	5.5	ECKA3F121KRP	7.5	0.65	ECKN3F121KRP	N1	7.5	0.65
	150	±10	7.5	5.5	ECKA3F151KRP	7.5	0.65	ECKN3F151KRP	N1	7.5	0.65
	180	±10	7.5	5.5	ECKA3F181KRP	7.5	0.65	ECKN3F181KRP	N1	7.5	0.65
	220	±10	8.0	5.5	ECKA3F221KRP	7.5	0.65	ECKN3F221KRP	N1	7.5	0.65
	270	±10	8.0	5.5	ECKA3F271KRP	7.5	0.65	ECKN3F271KRP	N1	7.5	0.65
	330	±10	8.5	5.5	ECKA3F331KRP	7.5	0.65	ECKN3F331KRP	N1	7.5	0.65
	390	±10	9.5	5.5	ECKA3F391KRP	7.5	0.65	ECKN3F391KRP	N1	7.5	0.65
	470	±10	9.5	5.5	ECKA3F471KRP	7.5	0.65	ECKN3F471KRP	N1	7.5	0.65
	560	±10	10.5	5.5	ECKA3F561KRP	7.5	0.65	ECKN3F561KRP	N1	7.5	0.65
	680	±10	10.5	5.5	ECKA3F681KRP	7.5	0.65	ECKN3F681KRP	N1	7.5	0.65
	820	±10	12.5	5.5	ECKA3F821KRP	7.5	0.65	ECKN3F821KRP	N1	7.5	0.65
	1000	±10	12.5	5.5	ECKA3F102KRP	10.0	0.65	—	—	—	—
	1200	±10	14.5	5.5	ECKA3F122KRP	10.0	0.65	—	—	—	—
	1500	±10	14.5	5.5	ECKA3F152KRP	10.0	0.65	—	—	—	—
	1800	±10	16.5	5.5	ECKA3F182KRP	10.0	0.65	—	—	—	—
	2200	±10	17.0	5.5	ECKA3F222KRP	10.0	0.65	—	—	—	—

■ Typical Temperature Characteristics

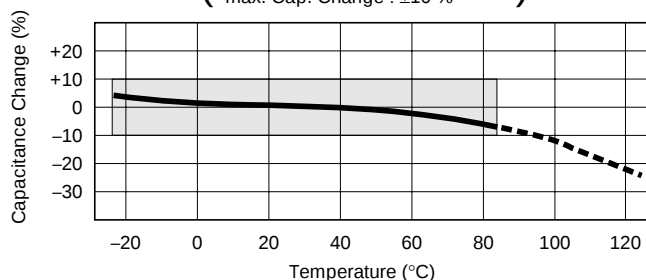
Series KGE (Char. SL/GP)

(Temp. Coeff. : +350 to -1000 ppm/°C)



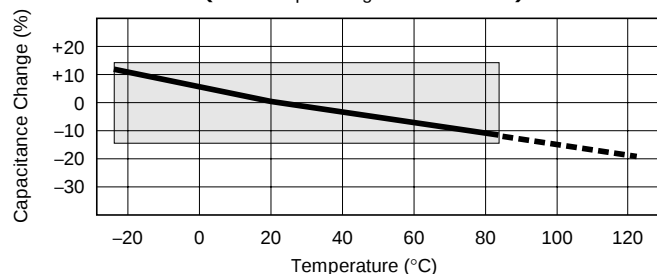
Series KBP (Char. B/Y5P)

(Temp. Range : -25 to 85 °C
max. Cap. Change : ±10 %)

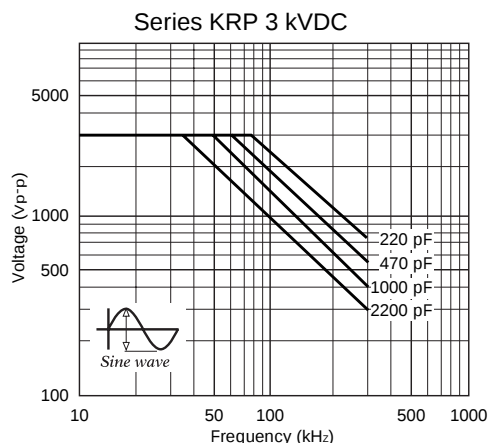
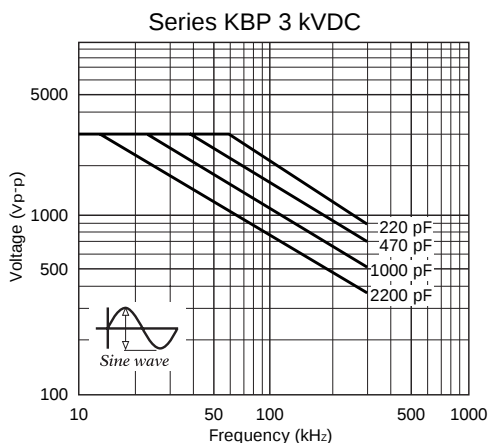
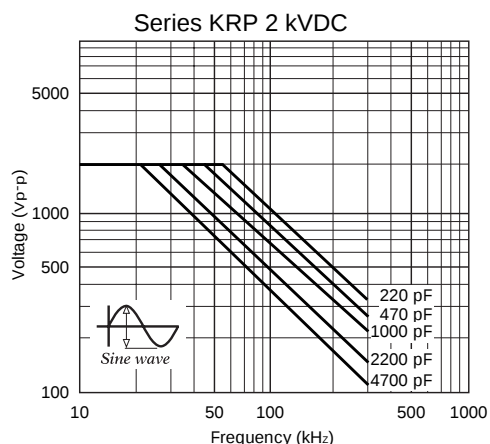
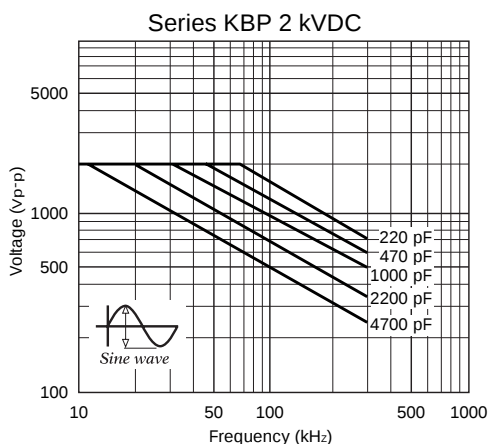
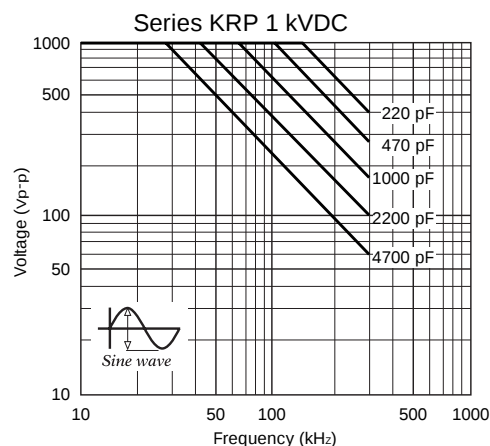
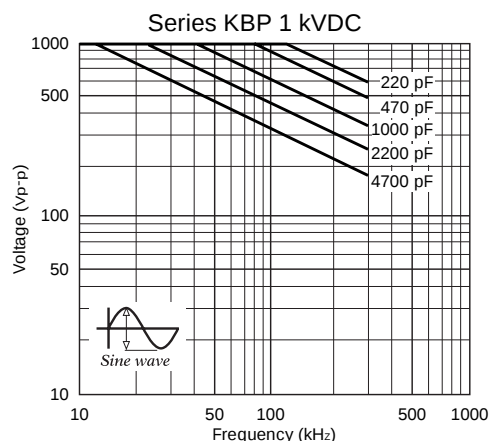


Series KRP (Char. R/Y5R)

(Temp. Range : -25 to 85 °C
max. Cap. Change : ±15 %)

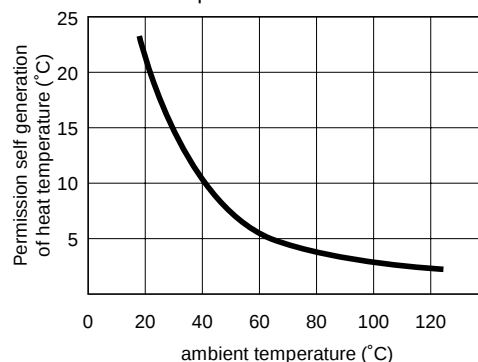


■ Characteristics of Voltage – Frequency



The graphs above show the maximum permissible voltage when using a capacitor with an AC sine wave voltage. When measuring this voltage in room temperature (25 °C), the capacitor self-heat generation will rise a maximum of 20 °C. When using a pulse voltage or an AC voltage other than a sine wave, confirm that the capacitor self-heat generation is less than 20 °C in an ambient room temperature of 25 °C. The self-heat generation temperature is the difference between the surface temperature and the ambient room temperature. As for the situation when the self-heat generation temperature is more than 25 °C, refer to the figure on the right.

Permission self generation of heat temperature vs. ambient temperature



■ Packaging Specifications

● Standard Packing Quantity

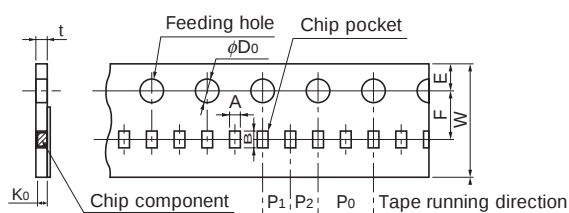
Size	Style	Paper Taping			Embossed Taping			Bulk Case
	Thickness (mm)	Tape Width (mm)	Pitch (mm)	Quantity (pcs./reel)	Tape Width (mm)	Pitch (mm)	Quantity (pcs./reel)	Quantity (pcs./case)
0201	0.3	8	2	15,000	—	—	—	—
0402	0.5	8	2	10,000 (50,000)	—	—	—	50,000
0603	0.8	8	4	4,000 (10,000)	—	—	—	15,000
0805	0.6	8	4	5,000 (20,000)	—	—	—	10,000
	0.85	8	4	4,000 (10,000)	—	—	—	—
	1.25	—	—	—	8	4	3,000	—
1206	0.6	8	4	5,000 (20,000)	—	—	—	—
	0.85	8	4	4,000 (10,000)	—	—	—	—
	1.15	—	—	—	8	4	3,000	—
	1.6	—	—	—	8	4	2,000	—
1210	0.85	—	—	—	8	4	3,000	—
	2.0	—	—	—	8	4	2,000	—
	2.5	—	—	—	8	4	1,000	—
1812	2.5	—	—	—	12	8	500	—
0504	0.6	8	4	4,000	—	—	—	—
	0.8	8	4	4,000	—	—	—	—
0508	0.85	8	4	4,000	—	—	—	—
0612	0.85	8	4	4,000	—	—	—	—

() for $\phi 330$ reel applied

Low Profile Type: Please contact us.

● Paper Taping

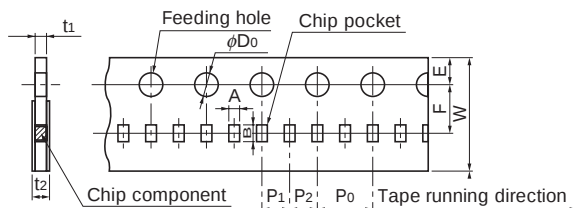
2 mm (Pressed Carrier Taping): Size 0201



Unit:mm

A	B	W	F	E	P ₁	P ₂	P ₀	φD ₀	t	K ₀
0.36 ±0.03	0.66 ±0.03	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.0 ±0.1	1.5+0.1 0	0.55 max.	0.36 ±0.03

2 mm (Punched Carrier Taping): Size 0402

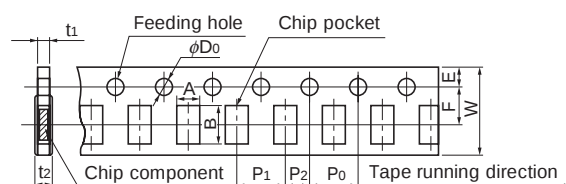


Unit:mm

A	B	W	F	E	P ₁	P ₂	P ₀	φD ₀	t ₁	t ₂
0.62 ±0.05	1.12 ±0.05	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.0 ±0.1	1.5+0.1 0	0.7 max.	1.0 max.

4 mm (Punched Carrier Taping):

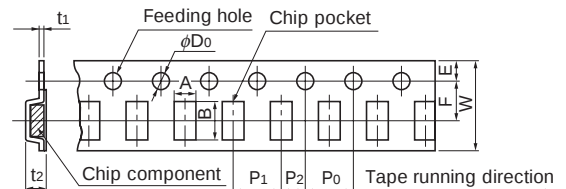
Size 0603, 0805, 1206, 0504, 0508, 0612



Unit:mm

Size	t	A	B	W	F	E	P ₁	P ₂	P ₀	φD ₀	t ₁	t ₂
0603	0.8	1.0 ±0.1	1.8 ±0.1									
0504	0.6 0.8	1.18 ±0.10	1.63 ±0.10									
0805	0.6 0.85	1.65 ±0.20	2.4 ±0.2	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1	2.00 ±0.05	4.0 ±0.1	1.5+0.1 0	1.1 max.	1.4 max.
0508	0.85											
1206	0.6 0.85	2.0 ±0.2	3.6 ±0.2									
0612	0.85											

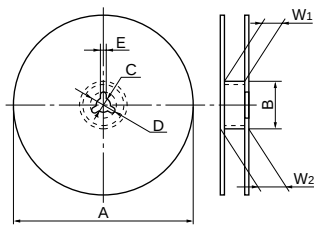
● Embossed Taping



Unit:mm

Size	t	A	B	W	F	E	P ₁	P ₂	P ₀	φD ₀	t ₁	t ₂
0805	1.25	1.55 ±0.20	2.35 ±0.20									
1206	1.15 1.6	1.9 ±0.2	3.5 ±0.2	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1	2.00 ±0.05	4.0 ±0.1	1.5+0.1 0	0.6 max.	2.5 max.
1210	0.85 2.0 2.5	2.8 ±0.2	3.5 ±0.2									3.5 max.
1812	2.5	3.6 ±0.3	4.9 ±0.3	12.0 ±0.3	5.50 ±0.05		8.0 ±0.1					4.0 max.

● Reel for Taping

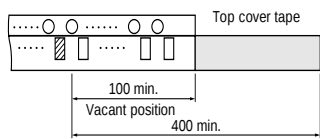


Unit:mm

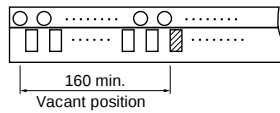
Tape Width	A	B	C	D	E	W ₁	W ₂
8	$\phi 180_{-3}^{0}$	$\phi 60.0 \pm 0.5$	13.0 ± 0.5	21.0 ± 0.8	2.0 ± 0.5	9.0 ± 0.3	11.4 ± 1.0
12						13.0 ± 0.3	15.4 ± 1.0

● Leader Part and Taped End

Leader part

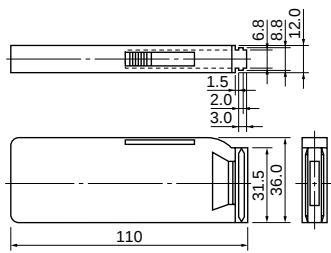


Tape end



unit:mm

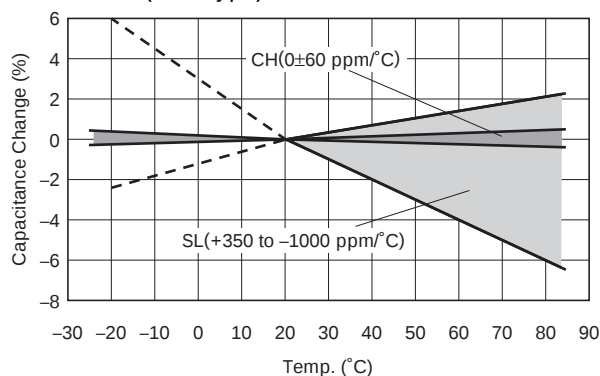
● Bulk Case
(Applicable standards: EIAJ ET-7201A)



unit:mm

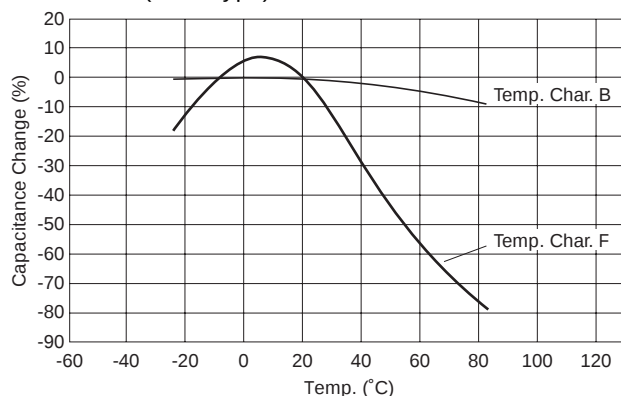
Temperature Characteristics [Ex.]

Class 1 (T.C. Type)

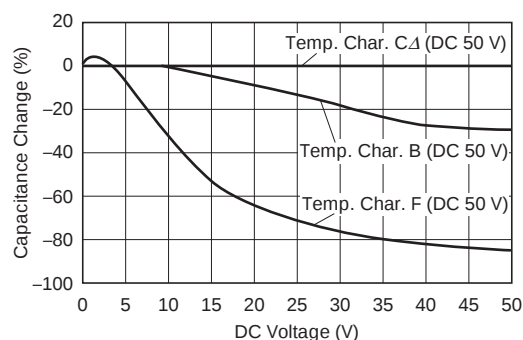


Temperature Characteristics [Ex.]

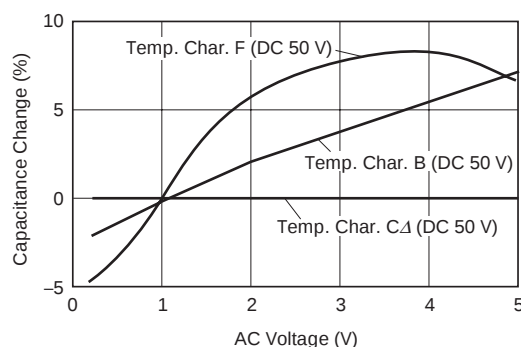
Class 2 (Hi-K Type)



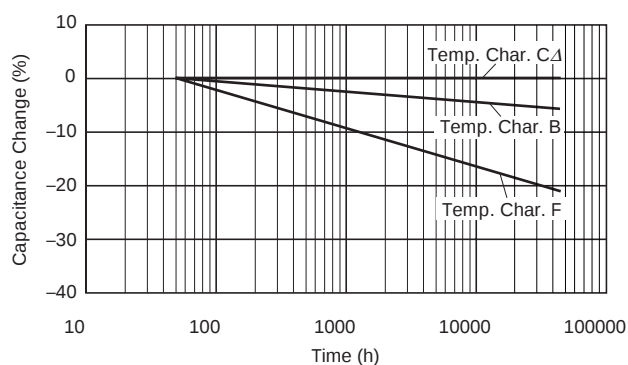
Capacitance - DC bias Voltage [Ex.]



Capacitance - AC Voltage [Ex.]

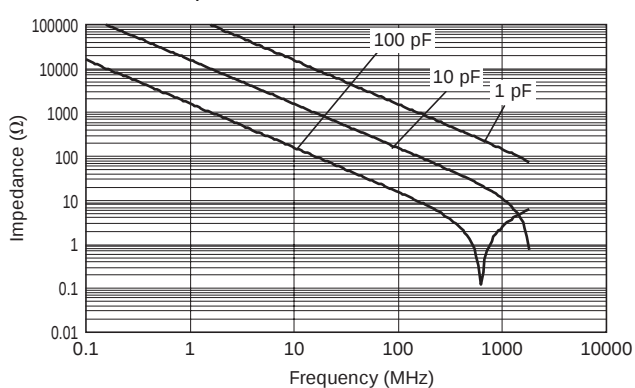


Capacitance aging [Ex.]



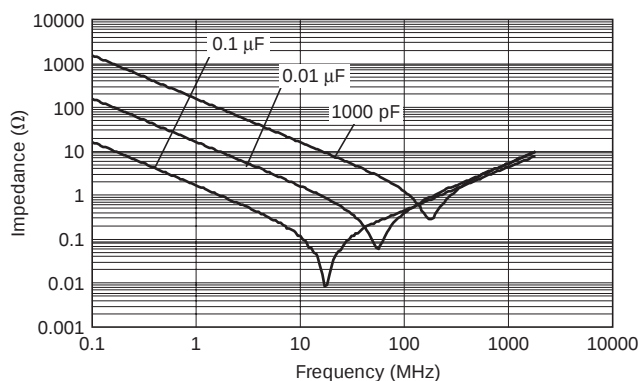
Impedance - Frequency [Ex.]

Class 1, Temp. Char. CH, Size 0402



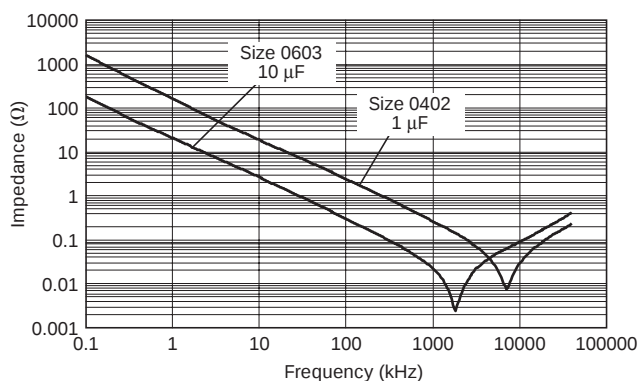
Impedance - Frequency [Ex.]

Class 2, Temp. Char. B, Size 0603



Impedance - Frequency [Ex.]

Class 2, Temp. Char. X5R, Size 0402 and 0603



Packaging Specifications

Product	Series	Style	Size	Dim. T (mm)	Pitch (mm)	Explanation of Part Numbers	Minimum Packing Quantity	Packing Quantity In Carton	Carton LuWuH (mm)
Multilayer Ceramic Capacitors	Series ECJ Series ECY Series ECD	Paper Taping	0201	0.3	2	ECJZE□□□□□□□□	15000	300000	250×190×190
						ECDGZE□□□□□□□□			
			0401	0.5	2	ECJ0E□□□□□□□□	10000	200000	
						ECDG0E□□□□□□□□			
			0504	0.6	4	ECJUV□□□□□□□□	3000	60000	
				0.8		ECJUV□□□□□□□□			
			0603	0.8	4	ECJ1V□□□□□□□□	4000	80000	
						0.6			
			0805	0.85	4	ECJ2V□□□□□□□□	4000	80000	
						ECJGV□□□□□□□□			
						ECJTV□□□□□□□□			
			0508	0.85	4	ECY29R□□□□□□V	4000	80000	
			1206	0.85	4	ECJ3V□□□□□□□□	5000	100000	
						ECJ3V□□□□□□□□			
						ECJDV□□□□□□□□			
						ECJHV□□□□□□□□			
						ECJRV□□□□□□□□			
		0612	0.85	4	ECY39R□□□□□□V	4000	80000		
		Embossed Taping	0805	1.25	4	ECJ2F□□□□□□□□	3000	60000	
			1206	1.15	4	ECJ3F□□□□□□□□	3000	60000	
						ECJMF□□□□□□□□			
				1.6	4	ECJ3Y□□□□□□□□	2000	20000	190×130×190
			1210	0.85	4	ECJ9F□□□□□□□□	3000	60000	250×190×190
				2.0	4	ECJ4Y□□□□□□□□	2000	20000	190×130×190
				2.5	4	ECJ4Y□□□□□□□□	1000	10000	
			1812	2.5	8	ECJ5Y□□□□□□□□	500	2500	190×190× 90

High Voltage Ceramic Capacitors (SMD) (1 to 5 kVDC, Class 1 and 2)

Ceramic Disc Capacitors for Safety Regulations

High Voltage Ceramic Disc Capacitors (1 to 6 kVDC, Class 1 and 2)

Precautions for Handling

⚠ Safety Precautions

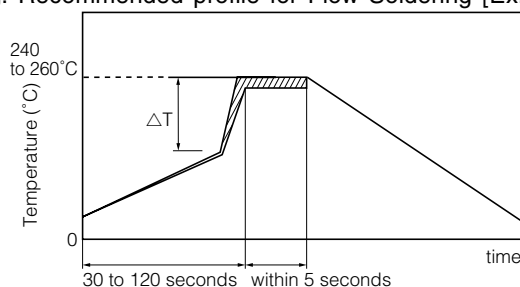
The Ceramic Capacitors (hereafter referred to as "The Capacitors") may fail in a short-circuit mode or in open-circuit mode when subjected to severe conditions of electrical, mechanical and/or environmental stresses beyond their specified "Ratings" and "Operating Conditions" in the Catalog or the Specifications, resulting in burnout, flaming or glowing in the worst case.

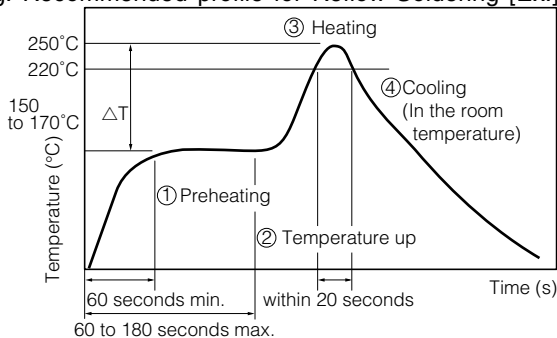
Following "⚠ Safety Precautions" and "Application Notes" shall be noted in applications of the Capacitors. If you have a question about the "Precautions for Handling," please contact our engineering section or factory.

Notes; "A" means "⚠ Safety Precautions" to be observed without fail. "B" means "General Application Notes"	High Voltage Disc Type	Safety Regulations Recognized	Surface Mount Type (High Voltage Ratings)
1. Operating Conditions and Circuit Designs			
1.1 Operating Conditions (General) Operating conditions of the Capacitors shall conform to the individual Specifications of the devices. The Capacitors shall not be operated beyond their specified "Ratings", "Allowable/ Maximum Operating Ranges" in their performance characteristics.	A	A	A
1.2 Operating Temperature Range The specified "Operating Temperature Range" in the catalog is absolute maximum and minimum temperature rating. So in any case, each Capacitor shall not be operated beyond the specified "Operating Temperature Range".	A	A	A
1.3 Self-generated heat If a capacitor for DC rated voltage is used in an High frequency AC voltage circuit or pulse circuit and self-generated heat (the difference between the surface temperature and the ambient temperature of capacitor) by the current, the temperature of the capacitor shall not rise by more than +20 °C, when measured at room temperature (at 25 °C). Check the self-generated heat temperature by using the capacitor in the actual equipment. The Self-generated heat temperature changes according to ambient temperature. As for the permissible self-generated heat temperature when the ambient temperature is more than 25 °C, refer to the figure of the page 48 of this catalog.	A	B	A
1.4 Designs of Voltage Applications ● The Capacitors shall not be operated exceeding the specified "Rated Voltage" in the catalog. If voltage ratings are exceeded, the Capacitors could result in failure or damage. In case of application of DC and AC voltages to the capacitors, the designed peak voltage shall be within the specified "Rated Voltage". ● In case of AC or pulse voltage, the peak voltage (peak to peak) shall be within the specified "Rated Voltage". If high frequency voltage or fast rising pulse voltage is applied continuously even within the "Rated Voltage", contact our engineering section before use. Note: *The AC rated Capacitors in the Catalog can be operated beyond the "Nominal Voltage Ratings" within the limits of voltage fluctuations on the AC primary lines.	A A	— A*	A A

Notes; "A" means "△Safety Precautions" to be observed without fail. "B" means "General Application Notes"	High Voltage Disc Type	Safety Regulations Recognized	Surface Mount Type (High Voltage Ratings)
1.5 Operating Current ● If AC voltage or pulse voltage is applied continuously and the charging/discharging current is large, contact our engineering section or factory before use.	A	A	A
1.6 Environmental Conditions The Capacitors shall not be operated and/or stored under following environmental conditions; a) To be exposed directly to water or salt water. b) Under conditions of dew formation. c) Under conditions of corrosive atmosphere such as hydrogen sulfide, sulfurous acid, chlorine and ammonia. d) Under the severe conditions of vibrations beyond the Specified values.	A	A	A
2. Assembly and Soldering Conditions			
2.1 Automated Assembly ● Dimensions and tolerances of the piercing holes and spacings on printed circuit boards shall conform to the dimensions of the each Capacitor in individual Specification. ● In an automated assembly of the Capacitors, abnormal mechanical stresses such as pushing/bending/crushing forces and excessive shocks to the Capacitors shall be kept minimum to prevent mechanical/electrical failures of the devices.	B	B	—
2.2 Soldering Fluxes ● Rosin-based and non-activated soldering flux is recommended. ● The content of halogen in the flux shall be 0.1 wt. % or less, not to corrode copper wires of the devices and not to deteriorate the insulation resistance of circuit board.	B	B	B
2.3 Flow Soldering (For leaded type) ● Soldering · Do not immerse the capacitor body into the solder. Apply only the lead wires to solder. · When soldering this product to the PWB, do not exceed the solder heat specification of the capacitor. · Subjecting this product to excessive heating could melt the internal junction solder and/or crack the ceramic element. ● Recommended profile for flow soldering [Ex.] Preheating : Temperature difference between melted solder and capacitor surface : $\Delta T \leq 150^\circ\text{C}$ Preheating temperature. $\Delta T \leq 120^\circ\text{C}$ Soldering : Lead wires shall be immersed into a soldering bath of 240°C to 260°C within 5 seconds. Cooling : The capacitor shall be cooled gradually to room temperature for preventing mechanical damages such as cracking.	A B B B B B	A B B B B B	— — — — — —
● Soldering limits Soldering limits are temperature : 260°C maximum, time : within 10 seconds. However, these conditions are subject to change according to the preheating conditions and soldering machines. Make sure the performance of the capacitor before use.	B	B	—
2.4 Reflow Soldering (For surface mounting molded type) Sudden heating of the capacitor results in distortion due to high internal temperature difference, causing cracked the capacitor. Do not immerse the capacitor body into melted solder.	—	—	A

Fig. Recommended profile for Flow Soldering [Ex.]



Notes; "A" means "△Safety Precautions" to be observed without fail. "B" means "General Application Notes"	High Voltage Disc Type	Safety Regulations Recognized	Surface Mount Type (High Voltage Ratings)
Recommended profile for reflow soldering [Ex.] Preheating zone : 150 to 170 °C Temperature up zone : 2 to 5 seconds Heating zone : 220 °C, within 20 seconds Peak temperature : 250 °C, within 5 seconds Cooling : Gradual cooling in the room temperature Fig. Recommended profile for Reflow Soldering [Ex.]  There is no problem with twice reflow soldering under the recommended profile for reflow soldering [Ex.]. However, make sure the performance of capacitor to avoid the mechanical damages such as cracking.	— — — — —	— — — — —	B B B B B
Soldering Limits Soldering limits are temperature : 250 °C maximum, time : within 5 seconds, twice reflow soldering. However, these conditions are subject to change according to the preheating conditions and soldering machines. Make sure the performance of the capacitor before use.	—	—	B
2.5 Post Soldering Cleaning			
When using water-soluble soldering fluxes, allow sufficient cleaning with water and then drying in the final step of the cleaning to remove corrosive remains of the soldering flux on printed circuit board.	B	B	B
If the capacitors are cleaned with the printed circuit board, check the influence on quality by the cleaning under actual conditions.	B	B	B
2.6 Plastic Molding			
If another plastic molding is applied to the Capacitors on your option, investigate a influence on reliability of the devices in your equipment. Some plastic molding may damage the Capacitors with the mechanical stresses by thermal expansion or shrinkage, or deteriorate the performance characteristics of the Capacitors with cracked gas or reaction gas from the resin, or deteriorate the humidity resistance.	A	A	A
3. Testing			
3.1 AC Dielectric Withstanding Test			
Perform AC dielectric withstanding test for the noise suppression capacitors in AC primary circuit, under the sine wave voltage and specified conditions (voltage, time). Some test equipment may deform the wave form of applied voltage and apply a voltage of peak value more than $\sqrt{2}$ times of rms value, resulting in dielectric breakdown of the Capacitors.	A	A	A
The AC test voltage shall be applied gradually from 0 volt to the specified test voltage after the Capacitor's terminals are connected securely to the test equipment. When the specified voltage is applied directly for some reasons, apply it in the zero cross start method. If the voltage is applied directly from equipment which does not use the zero cross start method, an abnormal voltage higher than the specified voltage may be generated, resulting in dielectric breakdown of the Capacitors.	A	A	A
4. Long Term Storage			
The Capacitors shall not be stored under severe conditions of high temperatures and high humidities. Store them indoors under 40 °C max. and 75 % RH max.. Use them within one year and check the solderability before use.	B	B	B
The Capacitors shall not be exposed to direct sunlight and dew formation.	B	B	B