

■ Packaging Styles and Standard Packaging Quantities

Quantity : pcs./reel

Packaging Style Code			Size	0402	0603	0805		1206		
	Packaging Styles	Thickness		T=0.5	T=0.8	T=0.85	T=1.25	T=0.85	T=1.15	T=1.6
E	ø180 reel	Paper taping (Pitch : 2 mm)		10,000	—	—	—	—	—	—
V		Paper taping (Pitch : 4 mm)		—	4,000	4,000	—	4,000	—	—
F		Embossed taping (Pitch : 4 mm)		—	—	—	3,000	—	3,000	—
Y				—	—	—	—	—	—	2,000

ø330 reel and Bulk case Type : Please contact us.

■ Temperature Characteristics

● Class 2

Temperature Characteristic Code	Temperature Characteristics	Capacitance Change	Measurement Temperature Range	Reference Temperature
B, X	B	±10 %	−25 to 85 °C	20 °C
	X7R	±15 %	−55 to 125 °C	25 °C
	X5R	±15 %	−55 to 85 °C	25 °C
F	F	+30, −80 %	−25 to 85 °C	20 °C
	Y5V	+22, −82 %	−30 to 85 °C	25 °C

For applicable "Temperature Characteristics", see the lists of standard products on page 6 to 7.

■ Rated Voltage

Code	1H	1E	1C	1A	0J
Rated Voltage	DC 50 V	DC 25 V	DC 16 V	DC 10 V	DC 6.3 V

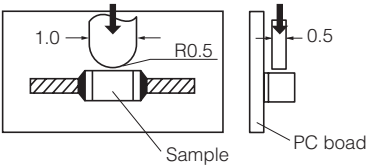
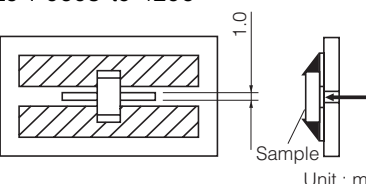
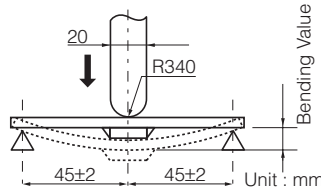
■ Nominal Capacitance

Ex.	105	225	106	226
Nominal Capacitance	1,000,000 pF (1 µF)	2,200,000 pF (2.2 µF)	10,000,000 pF (10 µF)	22,000,000 pF (22 µF)

■ Capacitance Tolerance

Class	Temperature Characteristics	Capacitance Tolerance Code	Capacitance Tolerance
2	B, X7R, X5R	K	±10 %
		M	±20 %
	F, Y5V	Z	+80, −20 %

■ Specifications and Testing Methods

Item	Specification	Test Method																																			
Operating Temperature Range	Temp. Char. B, X7R : -55 to 125 °C Temp. Char. B, X5R : -55 to 85 °C Temp. Char. F, Y5V : -30 to 85 °C	_____																																			
Dielectric Withstanding Voltage	No dielectric breakdown and/or damage	Test voltage : Rated voltage ×250 % Duration:1 to 5 s. Charge / Discharge current: 50 mA max.																																			
Insulation Resistance (I.R.)	500/C (MΩ) min. Note : 100/C(MΩ)min. for DC 10 V max. C : Nominal Cap. in μF	Measuring voltage : Rated voltage Duration : 60±5 s Charge / Discharge current: 50 mA max.																																			
Capacitance	Within the specified tolerance	Measuring temperature: 20±2 °C Preconditioning: The capacitors shall be kept in temperature of 150 +0/-10 °C for 1 hour and subject to standard condition* 48±4 hours before initial measurement.																																			
Dissipation Factor (tan δ)	0.2 max. Please see the technical specifications for details.	<table><tr><td>Nominal capacitance</td><td>C≤10 μF</td><td>C>10 μF</td></tr><tr><td>Measuring frequency</td><td>1 kHz±10 %</td><td>120 Hz±20 %</td></tr><tr><td>Measuring voltage</td><td>1.0±0.2 Vrms</td><td>0.5±0.2 Vrms</td></tr></table>	Nominal capacitance	C≤10 μF	C>10 μF	Measuring frequency	1 kHz±10 %	120 Hz±20 %	Measuring voltage	1.0±0.2 Vrms	0.5±0.2 Vrms																										
Nominal capacitance	C≤10 μF	C>10 μF																																			
Measuring frequency	1 kHz±10 %	120 Hz±20 %																																			
Measuring voltage	1.0±0.2 Vrms	0.5±0.2 Vrms																																			
Temperature Characteristics	Temperature Characteristics B : ±10 % X7R : ±15 % X5R : ±15 % F : +30, -80 % Y5V : +22, -82 %	<table><tr><td colspan="5">Maximum capacitance change at stages 1 to 5</td></tr><tr><td>Temp. Char.</td><td>B, F</td><td>X7R</td><td>X5R</td><td>Y5V</td></tr><tr><td>Stage 1</td><td>20 °C</td><td>25 °C</td><td>25 °C</td><td>25 °C</td></tr><tr><td>Stage 2</td><td>-25 °C</td><td>-55 °C</td><td>-55 °C</td><td>-30 °C</td></tr><tr><td>Stage 3 (Ref. Temp.)</td><td>20 °C</td><td>25 °C</td><td>25 °C</td><td>25 °C</td></tr><tr><td>Stage 4</td><td>85 °C</td><td>125 °C</td><td>85 °C</td><td>85 °C</td></tr><tr><td>Stage 5</td><td>20 °C</td><td>25 °C</td><td>25 °C</td><td>25 °C</td></tr></table> See the technical specifications for details such as measuring voltage.	Maximum capacitance change at stages 1 to 5					Temp. Char.	B, F	X7R	X5R	Y5V	Stage 1	20 °C	25 °C	25 °C	25 °C	Stage 2	-25 °C	-55 °C	-55 °C	-30 °C	Stage 3 (Ref. Temp.)	20 °C	25 °C	25 °C	25 °C	Stage 4	85 °C	125 °C	85 °C	85 °C	Stage 5	20 °C	25 °C	25 °C	25 °C
Maximum capacitance change at stages 1 to 5																																					
Temp. Char.	B, F	X7R	X5R	Y5V																																	
Stage 1	20 °C	25 °C	25 °C	25 °C																																	
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Stage 3 (Ref. Temp.)	20 °C	25 °C	25 °C	25 °C																																	
Stage 4	85 °C	125 °C	85 °C	85 °C																																	
Stage 5	20 °C	25 °C	25 °C	25 °C																																	
Adhesion	Terminal electrodes shall be free from peeling or signs of peeling.	Applied force : 5 N Duration : 10 s Size : 0402  Size : 0603 to 1206  Unit : mm																																			
Bending Strength	Appearance: No mechanical damage Capacitance change: Temp. Char. B, X7R, X5R: within ±12.5 % F, Y5V: within ±30 %	Bending value :1 mm Bending speed : 1 mm/s  Unit : mm																																			
Vibration Proof	Appearance : No mechanical damage. Capacitance : Within the specified tolerance tanδ : Initial standard value	Total amplitude : 1.5 mm Vibration frequency : 10 to 55 to 10 Hz for 1 min 3 perpendicular directions for 2 hours each, a total of 6 hours																																			

*Standard condition : Temperature 15 to 35 °C, Relative humidity 45 to 75 %

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.

02 Dec. 2008

Item	Specification	Test Method												
Resistance to Soldering Heat	Appearance : No mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within ±7.5 % F, Y5V : within ±20 % tanδ : Initial standard value IR : Initial standard value Withstand voltage : No dielectric breakdown or damage	Soldering bath method Preconditioning : Heat treatment ^(※1) Solder temperature : 270±5 °C Dipping period : 3.0±0.5 s Preheat condition : <table><tr><th>Order</th><th>Temp. (°C)</th><th>Size 0805 max.</th><th>Size 1206</th></tr><tr><td>1</td><td>80 to 100</td><td>120 to 180s</td><td>300 to 360s</td></tr><tr><td>2</td><td>150 to 200</td><td>120 to 180s</td><td>300 to 360s</td></tr></table> Recovery (Standard condition) : 48±4 h	Order	Temp. (°C)	Size 0805 max.	Size 1206	1	80 to 100	120 to 180s	300 to 360s	2	150 to 200	120 to 180s	300 to 360s
Order	Temp. (°C)	Size 0805 max.	Size 1206											
1	80 to 100	120 to 180s	300 to 360s											
2	150 to 200	120 to 180s	300 to 360s											
Solderability	More than 95 % of the soldered area of both terminal electrodes shall be covered with fresh solder.	Soldering bath method Solder temperature : 230±5 °C Dipping period : 4±1 s Solder : H63A (JIS–Z–3282)												
Temperature Cycle	Appearance : No mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within ±7.5 % F, Y5V : within ±20 % tanδ : Initial standard value IR : Initial standard value Withstand voltage : No dielectric breakdown and/or damage	Preconditioning : Heat treatment ^(※1) Step 1: Minimum operating temp. 30±3 min Step 2: Room temp. 3 min max. Step 3: Maximum operating temp. 30±3 min Step 4: Room temp. 3 min max. Number of cycles : 5 cycles Recovery(Standard condition) : 48±4 h												
Damp Heat (steady state)	Appearance : No mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within ±20 % F, Y5V : within ±30 % tanδ : Temp. Char. B, X7R, X5R : 0.25 max. F, Y5V : 0.3 max. IR : 50/C (MΩ) min. Note : 10/C (MΩ) min. for rated vol. DC 10 V max. C:Nominal cap. in μF Please see the technical specifications for details.	Preconditioning : Heat treatment ^(※1) Temperature : 40±2 °C Relative humidity : 90 to 95 % Test period : 500+24/0 h Recovery(Standard condition) : 48±4 h												
Damp Heat Load	Appearance : No mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within ±20 % F, Y5V : within ±30 % tanδ : Temp. Char. B, X7R, X5R : 0.25 max. F, Y5V : 0.3 max. IR : 25/C (MΩ) min. Note : 5/C (MΩ) min. for rated vol. DC 10 V max. C:Nominal cap. in μF Please see the technical specifications for details.	Preconditioning : Voltage treatment ^(※2) Temperature : 40±2 °C Relative humidity : 90 to 95 % Applied voltage : Rated voltage Charge/discharge current : 50 mA max. Test period : 500+24/0 h Recovery(Standard condition) : 48±4 h												
High Temperature Load	Appearance : no mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within ±20 % F, Y5V : within ±30 % tanδ : Temp. Char. B, X7R, X5R : 0.25 max. F, Y5V : 0.3 max. IR : 50/C (MΩ) min. Note : 10/C (MΩ) min. for rated vol. DC 10 V max. C:Nominal cap. in μF Please see the technical specifications for details.	Preconditioning : Voltage treatment ^(※2) Temperature : Maximum operation temp. ±3 °C Applied voltage : (1)Rated voltage×200 % (2)Rated voltage×150 % (3)Rated voltage×100 % Please see the technical specifications for details. Charge/discharge current : 50 mA max. Test period : 1000+48/0 h Recovery (Standard condition) : 48±4 h												

(*) Heat treatment : 1 h of heat treatment at $150 \pm 0/-10$ °C followed by 48 ± 4 h recovery under standard conditions.

(*) Voltage treatment : 1 h of voltage treatment under the specified temperature and voltage for testing followed by 48 ± 4 h of recovery under standard conditions.

■ Standard Products for EIA Size "0402", Taped Version

● Class 2

◆ Temperature Characteristic Code : B (Temperature Characteristics : X5R)

Rated Voltage		DC 16 V			DC 10 V			DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R
1	±10 %(K) or ±20 %(M)	ECJ0EB1C105M	0.5*	○	ECJ0EB1A105□	0.5	○	ECJ0EB0J105□	0.5	○
2.2								ECJ0EB0J225M	0.5	○
4.7								ECJ0EB0J475M	0.5*	○

□ : Capacitance tolerance code : "□" for "K" or "M"

Dimensional tolerance of L, W, T : ±0.05 mm for no mark, ± 0.15 mm for "*" mark.

Standard packaging quantity of Packaging Style Code "E" (T = 0.5 mm) : 10,000 pcs./reel.

Avoid flow soldering.

◆ Temperature Characteristic Code : F (Temperature Characteristics : F, Y5V)

Rated Voltage		DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. F Y5V
1	+80, -20 % (Z)	ECJ0EF0J105Z	0.5	○ ○

Standard packaging quantity of Packaging Style Code "E" (T = 0.5 mm) : 10,000 pcs./reel.

Recommend soldering method : Reflow soldering.

■ Standard Products for EIA Size "0603", Taped Version

● Class 2

◆ Temperature Characteristic Code : B (Temperature Characteristics : X5R)

Rated Voltage		DC 25 V			DC 16 V			DC 10 V			DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R
1	±10 %(K) or ±20 %(M)	ECJ1VB1E105□	0.8	○	ECJ1VB1C105□	0.8	○	ECJ1VB1A105□	0.8	○	ECJ1VB0J105□	0.8	○
2.2					ECJ1VB1C225□*	0.8	○	ECJ1VB1A225□*	0.8	○	ECJ1VB0J225□	0.8	○
4.7					ECJ1VB1C475□*	0.8**	○	ECJ1VB1A475□*	0.8	○	ECJ1VB0J475□*	0.8	○
10								ECJ1VB1A106M*	0.8**	○	ECJ1VB0J106M*	0.8**	○

□ : Capacitance tolerance code : "□" for "K" or "M"

Standard packaging quantity of Packaging Style Code "V" (T = 0.8 mm) : 4,000 pcs./reel.

* : Avoid flow soldering.

** : "L", "W", "T" Dimension Tolerance ±0.15 mm

◆ Temperature Characteristic Code : F (Temperature Characteristics : F, Y5V)

Rated Voltage		DC 25 V			DC 16 V			DC 10 V			DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. F	Part No.	Dim. T (mm)	Temp. Char. F	Part No.	Dim. T (mm)	Temp. Char. F Y5V	Part No.	Dim. T (mm)	Temp. Char. F Y5V
1	+80,	ECJ1VF1E105Z	0.8	○	ECJ1VF1C105Z	0.8	○	ECJ1VF1A105Z	0.8	○ ○			
2.2	-20 % (Z)							ECJ1VF1A225Z	0.8	○ ○	ECJ1VF0J225Z	0.8	○ ○

Standard packaging quantity of Packaging Style Code "V" (T = 0.8 mm) : 4,000 pcs./reel.

■ Standard Products for EIA Size "0805", Taped Version

● Class 2

◆ Temperature Characteristic Code : B (Temperature Characteristics : B, X5R)

Rated Voltage		DC 25 V			DC 16 V			DC 10 V			DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. B X5R	Part No.	Dim. T (mm)	Temp. Char. X5R
1	±10 %(K) or ±20 %(M)	ECJ2FB1E105□	1.25*	○	ECJ2FB1C105□	1.25*	○	ECJ2FB1A105□	1.25	○ ○			
2.2		ECJ2FB1E225□	1.25*	○	ECJ2FB1C225□	1.25*	○	ECJ2FB1A225□	1.25*	— ○	ECJ2FB0J225□	1.25	○
4.7		ECJ2FB1E475□	1.25*	○	ECJ2FB1C475□	1.25*	○	ECJ2FB1A475□	1.25*	— ○	ECJ2FB0J475□	1.25*	○
10					ECJ2FB1C106□	1.25**	○	ECJ2FB1A106□	1.25**	— ○	ECJ2FB0J106□	1.25**	○
22								ECJ2FB1A226M	1.25**	— ○	ECJ2FB0J226M	1.25**	○

□ : Capacitance tolerance code : "□" for "K" or "M"

Dimensional tolerance of L, W, T : L, W : ±0.15 mm / T : ±0.1 mm for no mark, ±0.15 mm for "*" mark, ±0.2 mm for "**" mark.

Standard packaging quantity of Packaging Style Code "F" (T = 1.25 mm) : 3,000 pcs./reel.

Avoid flow soldering.

◆ Temperature Characteristic Code : F (Temperature Characteristics : F, Y5V)

Rated Voltage		DC 50 V			DC 25 V			DC 16 V			DC 10 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. F	Part No.	Dim. T (mm)	Temp. Char. F	Part No.	Dim. T (mm)	Temp. Char. F Y5V	Part No.	Dim. T (mm)	Temp. Char. F Y5V
1	+80, -20 % (Z)	ECJ2FF1H105Z	1.25*	○	ECJ2FF1E105Z	1.25*	○	ECJ2VF1C105Z	0.85	○ ○			
2.2					ECJ2FF1E225Z	1.25*	○	ECJGVF1C225Z	0.85	○ ○			
4.7								ECJGVF1C475Z	0.85	○ ○	ECJGVF1A475Z	0.85	○ ○
10											ECJ2FF1A106Z	1.25*	○ ○

Dimensional tolerance of L, W, T : L, W : ±0.15 mm / T : ±0.1 mm for no mark, ±0.15 mm for "*" mark.

Standard packaging quantity of Packaging Style Code "V" (T = 0.85 mm) : 4,000 pcs./reel, "F" (T = 1.25 mm) : 3,000 pcs./reel.

Soldering method of dimension T > 1 mm: Avoid flow soldering.

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.

■ Standard Products for EIA Size “1206”, Taped Version

● Class 2

◆ Temperature Characteristic Code : B (Temperature Characteristics : B, X7R, X5R)

Rated Voltage		DC 25 V				DC 16 V				DC 10 V				DC 6.3 V			
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.	
				B	X7R/X5R			B	X7R/X5R			B	X7R/X5R			X5R	
1	±10 % (K) or ±20 % (M)	ECJ3YB1E105□	1.6	○	○	ECJ3FB1C105□	1.15*	○	○								
2.2		ECJ3YB1E225□	1.6	—	○	ECJ3YB1C225□	1.6	○	○	ECJ3YB1A225□	1.6	○	○				
4.7		ECJ3YB1E475□	1.6	—	○	ECJ3YB1C475□	1.6	—	○	ECJ3YB1A475□	1.6	—	○	ECJ3YB0J475□	1.6	○	
10		ECJ3YB1E106□	1.6	—	○	ECJ3YB1C106□	1.6	—	○	ECJ3YB1A106□	1.6	—	○	ECJDV50J106M	0.85**	○	
22						ECJ3YB1C226M	1.6	—	○	ECJ3YB1A226M	1.6	—	○	ECJDV50J226M	0.85**	○	

□ : Capacitance tolerance code : “□” for “K” or “M”

Dimensional tolerance of L, W, T: ±0.2 mm for no mark, L, W: ±0.15 mm / T: ±0.1 mm for “*” mark, L, W: ±0.2 mm / T: ±0.1 mm for “**” mark.

Standard packaging quantity of Packaging Style Code “V” (T = 0.85 mm) : 4,000 pcs./reel, “F” (T = 1.15 mm) : 3,000 pcs./reel, “Y” (T = 1.6 mm) : 2,000 pcs./reel

Avoid flow soldering.

◆ High Temperature Series : Temperature Characteristic Code : B, X (Temperature Characteristics : B, Y7R)

Rated Voltage		DC 50 V				DC 25 V				DC 16 V				DC 10 V			
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.	
				B	Y7R			B	Y7R			B	Y7R			B	Y7R
1	±10 % (K) or ±20 % (M)	ECJ3YX1H105□	1.6	○	○	ECJ3YB1E105□	1.6	○	○	ECJ3FB1C105□	1.15*	○	○				
2.2										ECJ3YB1C225□	1.6	○	○	ECJ3YB1A225□	1.6	○	○
4.7										ECJ3YX1C475□	1.6	○	○				
10										ECJ3YX1C106□	1.6	○	○				

□ : Capacitance tolerance code : “□” for “K” or “M”

Dimensional tolerance of L, W, T: ±0.2 mm for no mark, L, W: ±0.15 mm / T: ±0.1 mm for “*” mark.

Standard packaging quantity of Packaging Style Code “F” (T = 1.15 mm) : 3,000 pcs./reel, “Y” (T = 1.6 mm) : 2,000 pcs./reel

Avoid flow soldering.

◆ Temperature Characteristic Code : F (Temperature Characteristics : F, Y5V)

Rated Voltage		DC 50 V				DC 25 V				DC 16 V				DC 10 V			
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.		Part No.	Dim. T (mm)	Temp. Char.	
				F				F	Y5V			F	Y5V			F	Y5V
1	+80, -20 % (Z)	ECJ3FF1H105Z	1.15*	○		ECJ3FF1E105Z	1.15*	○	○	ECJ3VF1C105Z	0.85*	○	○				
2.2						ECJ3FF1E225Z	1.15*	○	○	ECJ3VF1C225Z	0.85*	○	○				
4.7						ECJ3FF1E475Z	1.15*	○	—	ECJ3FF1C475Z	1.15*	○	○				
10						ECJ3YF1E106Z	1.6	○	—	ECJMF1C106Z	1.15**	○	○	ECJMF1A106Z	1.15**	○	○
22														ECJMF1A226Z	1.15**	○	○

Dimensional tolerance of L, W, T: ±0.2 mm for no mark, L, W: ±0.15 mm / T: ±0.1 mm for “*” mark, L, W: ±0.2 mm / T: ±0.1 mm for “**”.

Standard packaging quantity of Packaging Style Code “V” (T = 0.85 mm) : 4,000 pcs./reel, “F” (T = 1.15 mm) : 3,000 pcs./reel, “Y” (T = 1.6 mm) : 2,000 pcs./reel

Avoid flow soldering.