

Multilayer Ceramic Chip Capacitors (For General Electronic Equipment)

Series: **ECJ**



■ Features

- Small size and wide capacitance range
- Superior humidity characteristics and long life due to the monolithic construction
- Excellent solderability and resistance to soldering heat due to terminals with three layers of silver, nickel and solder
- Low self-inductance and excellent frequency characteristics

■ Recommended Applications

Class 1 (T.C. Type)

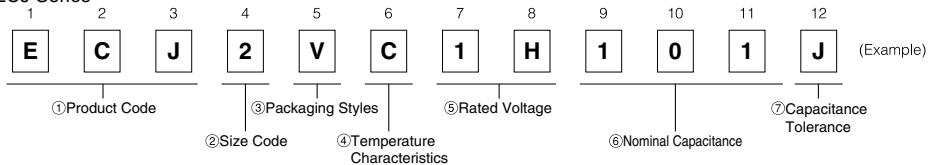
Temperature compensations, tuned circuits and filter circuits, where low loss and high stability of capacitance and high insulation resistance are required

Class 2 (Hi-K Type)

Coupling and By-pass, where low loss and high stability of capacitance are not so important

■ Explanation of Part Numbers

ECJ Series

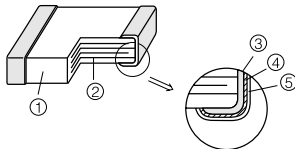


■ Product Code

ECJ : Multilayer Ceramic Chip Capacitors

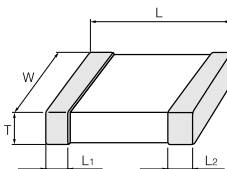
■ Handling Precautions

■ Construction



No	Name
①	Ceramic dielectric
②	Inner electrode
③	Substrate electrode
④	Intermediate electrode
⑤	External electrode

■ Dimensions in mm (not to scale)



Unit : mm

Code	Size Code (EIA)	L	W	T	L1, L2
Z	"06" Type 0201	0.60±0.03	0.30±0.03	0.30±0.03	0.15±0.05
0	"10" Type 0402	1.00±0.05	0.50±0.05	0.50±0.05	0.2±0.1
1	"11" Type 0603	1.6±0.1	0.8±0.1	0.8±0.1	0.3±0.2
2	"12" Type 0805	2.0±0.1	1.25±0.10	0.6±0.1	0.50±0.25
				0.85±0.10	
				1.25±0.10	
3	"13" Type 1206	3.20±0.15	1.60±0.15	0.6±0.1	0.6±0.3
				0.85±0.10	
				1.15±0.10	
4	"23" Type 1210	3.2±0.3	2.5±0.2	1.6±0.2	0.6±0.3
				2.0±0.2	

■ Packaging Styles

Code	Packaging Style	"06" Type (0603)	"10" Type (1005)	"11" Type (1608)	"12" Type (2012)	"13" Type (3216)	"23" Type (3225)
X	Bulk						
E	Paper taping (Pitch:2 mm)			—	—	—	—
V	Paper taping (Pitch:4 mm)	—	—				—
F	Embossed taping (Pitch:4 mm) (3000 pcs./reel)	—	—	—	(T:1.25 mm)	(T:1.15 mm)	—
Y	Embossed taping (Pitch:4 mm) (2000 pcs./reel)	—	—	—	—	(T:1.6 mm)	
W	Large size reel (Pitch:2 mm)	—		—	—	—	—
Z	Large size reel (Pitch:4 mm)	—	—		(T:0.6 mm) (T:0.85 mm)	(T:0.6 mm) (T:0.85 mm)	—
C	Bulk case	—			(T:0.6 mm) (T:1.25 mm)	—	—

■ Temperature Coefficient

● Class 1 Capacitors/T.C. Tolerance (ppm/°C)

Code	Temp. Coeff. Code	T.C. Tolerance (ppm/°C)		
		≤2 pF	3 pF	≥4 pF
C	CΔ	CK(0±250)	CJ(0±120)	CH(0±60)
G	SL	+350 to -1000		

* Measurement of capacitance at 20 °C and 85 °C shall be made to calculate temperature characteristic

* PΔ ~ UΔ: special order

characteristics	Temp. Coeff. (1) (ppm/°C)	Rate of Capacitance change at each Temperature			
		-25 °C		85 °C	
		Max..	Min.	Max..	Min.
CH	0± 60	0.49	-0.27	0.39	-0.39
CJ	0±120	0.82	-0.54	0.78	-0.78
CK	0±250	1.54	-1.13	1.63	-1.63
SL	-350 to -1000	—	—	2.28	-6.50

(1) These temperature coefficients are calculated between 20 °C and 85 °C

● Class 2

Code	Temperature Characteristic	Capacitance Change	Measurement Temperature Range	Reference Temperature
B	X7R (50 VDC, 25 VDC, 16 VDC:C≤2.2 μF)	±15 %	-55 to 125 °C	25 °C
	X5R (10 VDC, 6.3 VDC, 16 VDC:C>2.2 μF)	±15 %	-55 to 85 °C	25 °C
F	Y5V	+22, -82 %	-30 to 85 °C	25 °C

■ Rated Voltage

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

■ Nominal Capacitance

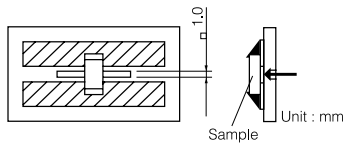
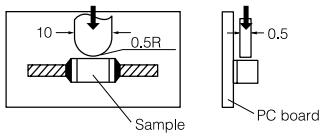
Ex	0R5	010	100	101	104	105
Nominal Capacitance	0.5 pF	1 pF	10 pF	100 pF	100000 pF (0.1μF)	1000000 pF (1μF)

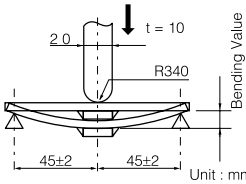
■ Capacitance tolerance

Class	Tol. Code	Capacitance tolerance	
1	C	≤10 pF	±0.25 pF
	D		±0.5 pF
	F		±1.0 pF
	J	>10 pF	±5 %
	K		±10 %
2	K	±10 %	
	M	±20 %	
	Z	+80, 20 %	

Design and specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.
Whenever a doubt about safety arises from this product, please contact us immediately for technical consultation.

■ Specification

Characteristics	Specification		Test Method
	Class 1	Class 2	
Operating Temperature Range	C4 -55 to 125 °C -25 to 85 °C (13 Type, 5100 to 10000 pF) SL: -55 to 125 °C	B (X7R): -55 to 125 °C (50 VDC, 25 VDC, 16 VDC:C≤2.2 μF) B (X5R): -55 to 85 °C (10 VDC, 6.3 VDC, 16 VDC:C>2.2 μF) F (Y5V): -25 to 85 °C	
Rated Voltage	C4, SL:50 VDC	B (X7R): 50 VDC, 25 VDC, 16 VDC, B (X5R):10 VDC, 6.3 VDC F (Y5V):50 VDC, 25 VDC, 16 VDC, 10 VDC	
Dielectric Withstanding Voltage	No break down		Test Voltage: Class 1:Rated Voltage ×3 Class 2:Rated Voltage ×2.5 Electrification time:1 to 5s Limit surge current:50 mA max.
Insulation Resistance (I R)	10000 MΩ or 500/C MΩ whichever is less. (C:Nominal Cap. in μF)		Measuring voltage:Rated voltage Measuring voltage time:60±5s Charge/discharge current:within 50 mA
Capacitance	within the specified tolerance		Class 1 Measuring Freq. ≤1000 pF:1 MHz±10 % >1000 pF:1 kHz±10 % Measuring Voltage:0.5 to 5 Vrms Class 2 Preconditioning:Heat Treatment (Class 2) Measuring Freq.:1 kHz±10 % Measuring Voltage:1.0±0.2 Vrms
Q Factor or Dissipation Factor (tan δ)	C<30 pF Q≥400+20C 30 pF≤C≤1000 pF:Q≥1000 C>1000 pF:tan δ≤0.002 (C:Nominal Cap. in pF)	Tan δ B: 0.025max. (50 VDC, 25 VDC, 16 VDC: C≤2.2 μF) 0.05max. (16 VDC:C>2.2 μF, 10 VDC, 6.3 VDC) F: 0.05max.(50 VDC, 25 VDC) 0.07max.(16 VDC) 0.125max.(10 VDC)	
Temperature Characteristics	CK: 0±250 ppm/ °C CJ: 0±120 ppm/ °C CH: 0±60 ppm/ °C SL: +350 to -1000 ppm/ °C	B:±10 %(-25 to 85 °C) F: +30, -80 %(-25 to 85 °C)	Maximum capacitance change at stage 1 to 5 Stage 1: +20 °C Stage 2: -25 °C Stage 3: +20 °C (Reference Temperature) Stage 4: +85 °C Stage 5: +20 °C 6.3V DC and 4.7 μF of Temp. Char. B; 0.2±0.02 Vrms measurement voltage.
Adhesion	The terminal electrode shall be free from peeling or signs of peeling.		Solder the specimen to the testing jig shown in the figure., and apply a 5 N force in the arrow direction for 10 seconds. <u>Test of "11", "12", "13", "23" type</u>  <u>Test of "06", "10" type</u> 

Characteristics	Specification		Test Method									
	Class 1	Class 2										
Bending Strength	Appearance:no mechanical damage Capacitance Change: Within $\pm 5\%$ or $\pm 0.5\text{ pF}$ whichever is larger.	Appearance:no mechanical damage Capacitance Change: B:Within $\pm 12.5\%$ F:Within $\pm 30\%$	Bending value:1 mm Bending speed:1 mm/s Test PC board:JIS C 6429 									
Solderability	More than 95 % of the soldered area of both terminal electrodes shall be covered with fresh solder.		Solder temperature:230±5 °C Dipping period:4±1 s									
Resistance to Solder Heat	Appearance:no mechanical damage Capacitance Change: Within $\pm 2.5\%$ or $\pm 0.25\text{ pF}$ whichever is the larger. Q:initial value IR:initial value With-stand voltage: no dielectric breakdown or damage	Appearance:no mechanical damage Capacitance Change: B:Within $\pm 7.5\%$ F:Within $\pm 20\%$ tanδ initial value (16 V DC,F,C≥1 μF 0.09max.) IR:initial value With-stand voltage: no dielectric breakdown or damage	Preconditioning:Heat Treatment (Class 2) Solder temperature:270±5 °C Dipping period:3.0±0.5 s Preheat Condition:									
			<table><tr><th>Temp.</th><th>06,10,11,12Type</th><th>13,23Type</th></tr><tr><td>80 to 100 °C</td><td>120 to 180s</td><td>300 to 360s</td></tr><tr><td>150 to 200 °C</td><td>120 to 180s</td><td>300 to 360s</td></tr></table>	Temp.	06,10,11,12Type	13,23Type	80 to 100 °C	120 to 180s	300 to 360s	150 to 200 °C	120 to 180s	300 to 360s
			Temp.	06,10,11,12Type	13,23Type							
80 to 100 °C	120 to 180s	300 to 360s										
150 to 200 °C	120 to 180s	300 to 360s										
Recovery: Class 1:24±2 h Class 2:48±4 h												
Temperature cycle	Appearance:no mechanical damage Capacitance Change: Within $\pm 2.5\%$ or $\pm 0.25\text{ pF}$ whichever is the larger. Q:initial value IR:initial value With-stand voltage: no dielectric breakdown or damage	Appearance:no mechanical damage Capacitance Change: B:Within $\pm 7.5\%$ F:Within $\pm 20\%$ tanδ initial value (16 V DC,F,C≥1 μF 0.09max.) IR:initial value With-stand voltage: no dielectric breakdown or damage	Preconditioning:Heat Treatment (Class 2) Condition of one cycle Step 1:Minimum operation temp. 30±3 min. Step 2:Room temp. 3 min. Step 3:Maximum operation temp. 30±3 min. Step 4:Room temp. 3 min. Number of cycles:5 Recovery: Class 1:24±2 h Class 2:48±4 h									
Damp Heat (steady state)	Appearance:no mechanical damage Capacitance Change: Within $\pm 5\%$ or $\pm 0.5\text{ pF}$ whichever is the larger. Q tan δ: C<10 pF:Q≥200+10C 10 pF≤C<30 pF:Q≥275+5C/2 30 pF≤C≤1000 pF:Q≥350 C>1000 pF:tan δ≤0.004 C:Nominal capacitance (pF) IR: 1000 MΩ or 50/C MΩ Whichever is less. (C:Rated capacitance in μF)	Appearance:no mechanical damage Capacitance Change: B:Within $\pm 12.5\%$ F:Within $\pm 30\%$ tanδ B: 0.05 max. (50 VDC, 25 VDC, 16 VDC: C≤2.2 μF) 0.075 max. (16 VDC:C>2.2 μF, 10 VDC, 6.3 VDC) F: 0.075 max.(50 VDC, 25 VDC) 0.10 max.(16 VDC) 0.125 max.(16 VDC C>1 μF) 0.15 max.(10 VDC) IR: 1000 MΩ or 50/C MΩ Whichever is less. (C:Rated capacitance in μF)	Preconditioning:Heat Treatment (Class 2) Temperature:40±2 °C Relative humidity:90 to 95 %RH Test period:500+24/0 h Recovery: Class 1:24±2 h Class 2:48±4 h									

Characteristics	Specification		Test Method
	Class 1	Class 2	
Loading under Damp Heat	Appearance:no mechanical damage Capacitance Change: Within ± 7.5 % or ± 0.75 pF whichever is the larger. Q tan δ: C<30 pF:Q$\geq$100+10C/3 30 pF$\leq$C$\leq$1000 pF:Q$\geq$200 C>1000 pF:tan $\delta$$\leq$0.004 C:Nominal capacitance (pF) IR: 500 MΩ or 25/C MΩ Which-ever is less. (C:Rated capacitance in μF)	Appearance:no mechanical damage Capacitance Change: B:Within ± 12.5 % F:Within ± 30 % tanδ B: 0.05 max. (50 VDC, 25 VDC, 16 VDC: C$\leq$2.2 μF) 0.075 max. (16 VDC:C>2.2 μF, 10 VDC, 6.3 VDC) F: 0.075 max.(50 VDC, 25 VDC) 0.10 max.(16 VDC) 0.125 max.(16 VDC C>1 μF) 0.15 max.(10 VDC) IR: 500 MΩ or 25/C MΩ Which-ever is less. (C:Rated capacitance in μF)	Preconditioning:Voltage Treatment (Class 2) Temperature:40$\pm$2 °C Relative humidity:90 to 95 %RH Applied voltage:Rated voltage Test period:500+24/0 h Recovery: Class 1:24$\pm$2 h Class 2:48$\pm$4 h
Loading at high temperature	Appearance:no mechanical damage Capacitance Change: Within ± 3 % or ± 0.3 pF whichever is the larger. Q tan δ: C<10 pF:Q$\geq$200+10C 10 pF$\leq$C$\leq$30 pF:Q$\geq$275+5C/2 30 pF$\leq$C$\leq$1000 pF:Q$\geq$350 C>1000 pF:tan $\delta$$\leq$0.004 C:Nominal capacitance (pF) IR: 1000 MΩ or 50/C MΩ Whichever is less. (C:Rated capacitance in μF)	Appearance:no mechanical damage Capacitance Change: B:Within ± 12.5 % F:Within ± 30 % tanδ B: 0.04 max. (50 VDC, 25 VDC, 16 VDC: C$\leq$2.2 μF) 0.075 max. (16 VDC:C>2.2 μF, 10 VDC, 6.3 VDC) F: 0.075 max.(50 VDC, 25 VDC) 0.10 max.(16 VDC) 0.125 max.(16 VDC C>1 μF) 0.15 max.(10 VDC) IR: 1000 MΩ or 50/C MΩ Whichever is less. (C:Rated capacitance in μF)	Preconditioning:VoltageTreatment (Class 2) Temperature:Maximum operation temp. ± 3 °C Applied voltage:Rated voltage $\times 2$ Test period:1000+48/0 h Recovery: Class 1:24$\pm$2 h Class 2:48$\pm$4 h

Note 1) Heat treatment:1 h of heat treatment at 150+0/-10°C followed by 48 $\pm$ 4 h recovery under the standead condition

Note 2) voltage treatment:1 h of voltage treatment under the specified temperature and voltage for testing followed by 48 $\pm$ 4 h of recovery under the standead condition

■ Standard Products for "06" (EIA "0201" Type) , Taped Version

Capacitance (pF)	Capacitance Tolerance	C4				Capacitance (pF)	Cap Tol.	B/X7R								
		25 VDC		16 VDC				25 VDC		16 VDC		10 VDC		6.3 VDC		
		Part No.	Dim T (mm)	Part No.	Dim T (mm)			Part No.	Dim T (mm)	Part No.	Dim T (mm)	Part No.	Dim T (mm)	Part No.	Dim T (mm)	
0.5	±0.25 pF(C)	ECJZEC1E0R5C	0.3			100	±10% (K) or ±20% (M)									
1	±0.25 pF (C) or ±0.5 pF (D)	ECJZEC1E010□	0.3			120										
1.5		ECJZEC1E1R5□	0.3			150		ECJZEB1E151□	0.3							
2		ECJZEC1E020□	0.3			180										
3		ECJZEC1E030□	0.3			220		ECJZEB1E221□	0.3							
4		ECJZEC1E040□	0.3			270										
5		ECJZEC1E050□	0.3			330		ECJZEB1E331□	0.3							
6	±0.5 pF (D)	ECJZEC1E060D	0.3			390										
7		ECJZEC1E070D	0.3			470		ECJZEB1E471□	0.3							
8		ECJZEC1E080D	0.3			560										
9		ECJZEC1E090D	0.3			680		ECJZEB1E681□	0.3							
10		±0.5 pF(D) or ±1 pF(F)	ECJZEC1E100□	0.3				820								
12		ECJZEC1E120□	0.3			1000		ECJZEB1E102□	0.3							
15		ECJZEC1E150□	0.3			1200										
18		ECJZEC1E180□	0.3			1500			ECJZEB1C152□	0.3						
22		ECJZEC1E220□	0.3			1800										
27		ECJZEC1E270□	0.3			2200			ECJZEB1C222□	0.3						
33	±5%(J) or ±10%(K)	ECJZEC1E330□	0.3			2700										
39				ECJZEC1C390□	0.3	3300						ECJZEB1A332□	0.3			
47				ECJZEC1C470□	0.3	3900								ECJZEB0J472□	0.3	
56				ECJZEC1C560□	0.3	4700										
68				ECJZEC1C680□	0.3	5600								ECJZEB0J682□	0.3	
82			ECJZEC1C820□	0.3	6800											
100			ECJZEC1C101□	0.3	8200									ECJZEB0J103□	0.3	
					10000											

* □: Capacitance Tolerance Code.
 ** Packaging Style Code: "E" for Taped Version (Taping pitch: 2 mm)

■ Standard Products for “10” Type (EIA “0402” Type) , Taped Version

Capacitance (pF)	Capacitance Tolerance	C4		SL	
		50 VDC		50 VDC	
		Part No.	Dim T (mm)	Part No.	Dim T (mm)
0.5	±0.25 pF(C)	ECJ0EC1H0R5C	0.5	ECJ0EG1H0R5C	0.5
1	±0.25 pF (C) or ±0.5 pF (D)	ECJ0EC1H010□	0.5	ECJ0EG1H010□	0.5
1.5		ECJ0EC1H1R5□	0.5	ECJ0EG1H1R5□	0.5
2		ECJ0EC1H020□	0.5	ECJ0EG1H020□	0.5
3		ECJ0EC1H030□	0.5	ECJ0EG1H030□	0.5
4		ECJ0EC1H040□	0.5	ECJ0EG1H040□	0.5
5		ECJ0EC1H050□	0.5	ECJ0EG1H050□	0.5
6	±0.5 pF (D)	ECJ0EC1H060D	0.5	ECJ0EG1H060D	0.5
7		ECJ0EC1H070D	0.5	ECJ0EG1H070D	0.5
8		ECJ0EC1H080D	0.5	ECJ0EG1H080D	0.5
9		ECJ0EC1H090D	0.5	ECJ0EG1H090D	0.5
10	±0.5 pF(D) or ±1 pF(F)	ECJ0EC1H100□	0.5	ECJ0EG1H100□	0.5
12	±5 % (J) or ±10 % (K)	ECJ0EC1H120□	0.5	ECJ0EG1H120□	0.5
15		ECJ0EC1H150□	0.5	ECJ0EG1H150□	0.5
18		ECJ0EC1H180□	0.5	ECJ0EG1H180□	0.5
22		ECJ0EC1H220□	0.5	ECJ0EG1H220□	0.5
27		ECJ0EC1H270□	0.5	ECJ0EG1H270□	0.5
33		ECJ0EC1H330□	0.5	ECJ0EG1H330□	0.5
39		ECJ0EC1H390□	0.5	ECJ0EG1H390□	0.5
47		ECJ0EC1H470□	0.5	ECJ0EG1H470□	0.5
56		ECJ0EC1H560□	0.5	ECJ0EG1H560□	0.5
68		ECJ0EC1H680□	0.5	ECJ0EG1H680□	0.5
82		ECJ0EC1H820□	0.5	ECJ0EG1H820□	0.5
100		ECJ0EC1H101□	0.5	ECJ0EG1H101□	0.5
120		ECJ0EC1H121□	0.5	ECJ0EG1H121□	0.5
150		ECJ0EC1H151□	0.5	ECJ0EG1H151□	0.5
180		ECJ0EC1H181□	0.5	ECJ0EG1H181□	0.5
220		ECJ0EC1H221□	0.5	ECJ0EG1H221□	0.5

* □: Capacitance Tolerance Code.

** Packaging Style Code: “E” for Taped Version (Taping pitch: 2 mm) and “X” for Bulk Type

■ Standard Products for “10” (EIA “0402” Type) , Taped Version

Capacitance (pF)	B/X7R										Capacitance Tolerance	F/Y5V									
	50 VDC		25 VDC		16 VDC		10 VDC		50 VDC			25 VDC		16 VDC							
	Part No.	Dim T (mm)	Part No.	Dim T (mm)	Part No.	Dim T (mm)	Part No.	Dim T (mm)	Part No.	Dim T (mm)		Part No.	Dim T (mm)	Part No.	Dim T (mm)						
100	±10%(K) or ±20%(M)	ECJ0EB1H101□	0.5	ECJ0EB1E101□	0.5																
120		ECJ0EB1H121K	0.5	ECJ0EB1E121K	0.5																
150		ECJ0EB1H151□	0.5	ECJ0EB1H151□	0.5																
180		ECJ0EB1H181K	0.5	ECJ0EB1E181K	0.5																
220		ECJ0EB1H221□	0.5	ECJ0EB1E221□	0.5																
270		ECJ0EB1H271K	0.5	ECJ0EB1E271K	0.5																
330		ECJ0EB1H331□	0.5	ECJ0EB1E331□	0.5																
390		ECJ0EB1H391K	0.5	ECJ0EB1E391K	0.5																
470		ECJ0EB1H471□	0.5	ECJ0EB1E471□	0.5																
560		ECJ0EB1H561K	0.5	ECJ0EB1E561K	0.5																
680		ECJ0EB1H681□	0.5	ECJ0EB1E681□	0.5																
820		ECJ0EB1H821K	0.5	ECJ0EB1E821K	0.5																
1000		ECJ0EB1H102□	0.5	ECJ0EB1E102□	0.5							ECJ0EF1H102Z	0.5	ECJ0EF1E102Z	0.5						
1200		ECJ0EB1H122K	0.5	ECJ0EB1E122K	0.5																
1500		ECJ0EB1H152□	0.5	ECJ0EB1E152□	0.5							ECJ0EF1H152Z	0.5	ECJ0EF1E152Z	0.5						
1800		ECJ0EB1H182K	0.5	ECJ0EB1E182K	0.5																
2200		ECJ0EB1H222□	0.5	ECJ0EB1E222□	0.5							ECJ0EF1H222Z	0.5	ECJ0EF1E222Z	0.5						
2700		ECJ0EB1H272K	0.5	ECJ0EB1E272K	0.5																
3300		ECJ0EB1H332□	0.5	ECJ0EB1E332□	0.5							ECJ0EF1H332Z	0.5	ECJ0EF1E332Z	0.5						
3900		ECJ0EB1H392K	0.5	ECJ0EB1E392K	0.5																
4700				ECJ0EB1E472□	0.5							ECJ0EF1H472Z	0.5	ECJ0EF1E472Z	0.5						
5600				ECJ0EB1E562K	0.5	ECJ0EB1C562K	0.5														
6800				ECJ0EB1E682□	0.5	ECJ0EB1C682□	0.5					ECJ0EF1H682Z	0.5	ECJ0EF1E682Z	0.5						
8200						ECJ0EB1C822K	0.5														
10000						ECJ0EB1C103□	0.5					ECJ0EF1H103Z	0.5	ECJ0EF1E103Z	0.5						
12000						ECJ0EB1C123K	0.5														
15000						ECJ0EB1C153□	0.5							ECJ0EF1E153Z	0.5	ECJ0EF1C153Z	0.5				
18000						ECJ0EB1C183K	0.5														
22000						ECJ0EB1C223□	0.5							ECJ0EF1E223Z	0.5	ECJ0EF1C223Z	0.5				
27000								ECJ0EB1A273K	0.5												
33000							ECJ0EB1A333□	0.5							ECJ0EF1C333Z	0.5					
39000							ECJ0EB1A393K	0.5													
47000							ECJ0EB1A473□	0.5							ECJ0EF1C473Z	0.5					
56000							ECJ0EB1A563K	0.5													
68000							ECJ0EB1A683□	0.5							ECJ0EF1C683Z	0.5					
82000							ECJ0EB1A823K	0.5													
100000							ECJ0EB1A104□	0.5							ECJ0EF1C104Z	0.5					
220000							Under development	0.5													

* □: Capacitance Tolerance Code.

** Packaging Style Code: “E” for Taped Version (Taping pitch: 2 mm) and “X” for Bulk Type

■ Standard Products for “11” Type (EIA “0603” Type) , Taped Version

Capacitance (pF)	Capacitance Tolerance	C4(NPO)		SL	
		50 VDC		50 VDC	
		Part No.	Dim T (mm)	Part No.	Dim T (mm)
0.5	±0.25 pF(C)	ECJ1VC1H0R5C	0.8	ECJ1VG1H0R5C	0.8
1	±0.25 pF (C) or ±0.5 pF (D)	ECJ1VC1H010□	0.8	EGJ1VG1H010□	0.8
1.5		ECJ1VC1H1R5□	0.8	ECJ1VG1H1R5□	0.8
2		ECJ1VC1H020□	0.8	ECJ1VG1H020□	0.8
3		ECJ1VC1H030□	0.8	ECJ1VG1H030□	0.8
4		ECJ1VC1H040□	0.8	ECJ1VG1H040□	0.8
5		ECJ1VC1H050□	0.8	ECJ1VG1H050□	0.8
6	±0.5 pF (D)	ECJ1VC1H060D	0.8	ECJ1VG1H060D	0.8
7		ECJ1VC1H070D	0.8	ECJ1VG1H070D	0.8
8		ECJ1VC1H080D	0.8	ECJ1VG1H080D	0.8
9		ECJ1VC1H090D	0.8	ECJ1VG1H090D	0.8
10	±0.5 pF(D) or ±1 pF(F)	ECJ1VC1H100□	0.8	ECJ1VG1H100□	0.8
12	±5 %(J) or ±10 %(K)	ECJ1VC1H120□	0.8	ECJ1VG1H120□	0.8
15		ECJ1VC1H150□	0.8	ECJ1VG1H150□	0.8
18		ECJ1VC1H180□	0.8	ECJ1VG1H180□	0.8
22		ECJ1VC1H220□	0.8	ECJ1VG1H220□	0.8
27		ECJ1VC1H270□	0.8	ECJ1VG1H270□	0.8
33		ECJ1VC1H330□	0.8	ECJ1VG1H330□	0.8
39		ECJ1VC1H390□	0.8	ECJ1VG1H390□	0.8
47		ECJ1VC1H470□	0.8	ECJ1VG1H470□	0.8
56		ECJ1VC1H560□	0.8	ECJ1VG1H560□	0.8
68		ECJ1VC1H680□	0.8	ECJ1VG1H680□	0.8
82		ECJ1VC1H820□	0.8	ECJ1VG1H820□	0.8
100		ECJ1VC1H101□	0.8	ECJ1VG1H101□	0.8
120		ECJ1VC1H121□	0.8	ECJ1VG1H121□	0.8
150		ECJ1VC1H151□	0.8	ECJ1VG1H151□	0.8
180		ECJ1VC1H181□	0.8	ECJ1VG1H181□	0.8
220		ECJ1VC1H221□	0.8	ECJ1VG1H221□	0.8
270		ECJ1VC1H271□	0.8	ECJ1VG1H271□	0.8
330		ECJ1VC1H331□	0.8	ECJ1VG1H331□	0.8
390		ECJ1VC1H391□	0.8	ECJ1VG1H391□	0.8
470		ECJ1VC1H471□	0.8	ECJ1VG1H471□	0.8
560		ECJ1VC1H561□	0.8	ECJ1VG1H561□	0.8
680		ECJ1VC1H681□	0.8	ECJ1VG1H681□	0.8
820		ECJ1VC1H821□	0.8	ECJ1VG1H821□	0.8
1000		ECJ1VC1H102□	0.8	ECJ1VG1H102□	0.8

* □: Capacitance Tolerance Code.

** Packaging Style Code: “V” for Taped Version (Taping pitch: 4 mm) and “X” for Bulk Type

■ Standard Products for “11” Type (EIA “0603” Type) , Taped Version

Capacitance (pF)	B/X7R										F/Y5V									
	50 VDC		25 VDC		16 VDC		10 VDC		6.3 VDC		50 VDC		25 VDC		16 VDC		10 VDC		Capacitance Tolerance	Dim (mm)
	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)		
1000	ECJ1VB1H102□	0.8									ECJ1VF1H102Z	0.8								
1200	ECJ1VB1H122K	0.8																		
1500	ECJ1VB1H152□	0.8									ECJ1VF1H152Z	0.8								
1800	ECJ1VB1H182K	0.8																		
2200	ECJ1VB1H222K□	0.8									ECJ1VF1H222Z	0.8								
2700	ECJ1VB1H272K	0.8																		
3300	ECJ1VB1H332□	0.8									ECJ1VF1H332Z	0.8								
3900	ECJ1VB1H392K	0.8																		
4700	ECJ1VB1H472□	0.8									ECJ1VF1H472Z	0.8								
5600	ECJ1VB1H562K	0.8																		
6800	ECJ1VB1H682□	0.8									ECJ1VF1H682Z	0.8								
8200	ECJ1VB1H822K	0.8																		
10000	ECJ1VB1H103□	0.8	ECJ1VB1E103□	0.8	ECJ1VB1C103□	0.8					ECJ1VF1H103Z	0.8								
12000	ECJ1VB1H123K	0.8	ECJ1VB1E123K	0.8	ECJ1VB1C123K	0.8														
15000	ECJ1VB1H153□	0.8	ECJ1VB1E153□	0.8	ECJ1VB1C153□	0.8					ECJ1VF1H153Z	0.8								
18000			ECJ1VB1E183K	0.8	ECJ1VB1C183K	0.8														
22000			ECJ1VB1E223□	0.8	ECJ1VB1C223□	0.8					ECJ1VF1H223Z	0.8								
27000			ECJ1VB1E273K	0.8	ECJ1VB1C273K	0.8														
33000			ECJ1VB1E333□	0.8	ECJ1VB1C333□	0.8					ECJ1VF1H333Z	0.8								
39000			ECJ1VB1E393K	0.8	ECJ1VB1C393K	0.8														
47000			ECJ1VB1E473□	0.8	ECJ1VB1C473□	0.8					ECJ1VF1H473Z	0.8								
56000					ECJ1VB1C563K	0.8														
68000					ECJ1VB1C683□	0.8					ECJ1VF1H683Z	0.8	ECJ1VF1E683Z	0.8						
82000					ECJ1VB1C823K	0.8														
100000					ECJ1VB1C104□	0.8					ECJ1VF1H104Z	0.8	ECJ1VF1E104Z	0.8	ECJ1VF1C104Z	0.8				
120000							ECJ1VB1A124K	0.8												
150000							ECJ1VB1A154□	0.8								ECJ1VF1C154Z	0.8			
180000							ECJ1VB1A184K	0.8												
220000							ECJ1VB1A224□	0.8								ECJ1VF1C224Z	0.8			
270000									ECJ1VB0J274K	0.8										
330000									ECJ1VB0J334□	0.8						ECJ1VF1C334Z	0.8			
390000									ECJ1VB0J394K	0.8										
470000								under development	0.8	ECJ1VB0J474□	0.8					ECJ1VF1C474Z	0.8			
560000										ECJ1VB0J564K	0.8									
680000										ECJ1VB0J684□	0.8							ECJ1VF1A684Z	0.8	
820000										ECJ1VB0J824K	0.8									
1000000								under development	0.8	ECJ1VB0J105□	0.8							ECJ1VF1A105Z	0.8	
2200000									under development	0.8										
4700000										under development	0.8									

* □: Capacitance Tolerance Code.

** Packaging Style Code: “V” for Taped Version (Taping pitch: 4 mm) and “X” for Bulk Type

■ Standard Products for “12” Type (EIA “0805” Type) , Taped Version

Capacitance (pF)	CΔ(NPO)			SL	
	Capacitance Tolerance	50 VDC		50 VDC	
		Part No.	Dim T (mm)	Part No.	Dim T (mm)
0.5	±0.25 pF(C)	ECJ2VC1H0R5C	0.6	ECJ2VG1H0R5C	0.6
1	±0.25 pF (C) or ±0.5 pF (D)	ECJ2VC1H010□	0.6	ECJ2VG1H010□	0.6
1.5		ECJ2VC1H1R5□	0.6	ECJ2VG1H1R5□	0.6
2		ECJ2VC1H020□	0.6	ECJ2VG1H020□	0.6
3		ECJ2VC1H030□	0.6	ECJ2VG1H030□	0.6
4		ECJ2VC1H040□	0.6	ECJ2VG1H040□	0.6
5		ECJ2VC1H050□	0.6	ECJ2VG1H050□	0.6
6	±0.5 pF(D)	ECJ2VC1H060D	0.6	ECJ2VG1H060D	0.6
7		ECJ2VC1H070D	0.6	ECJ2VG1H070D	0.6
8		ECJ2VC1H080D	0.6	ECJ2VG1H080D	0.6
9		ECJ2VC1H090D	0.6	ECJ2VG1H090D	0.6
10	±0.5 pF(D) or ±1 pF(F)	ECJ2VC1H100□	0.6	ECJ2VG1H100□	0.6
12	±5 % (J) or ±10 % (K)	ECJ2VC1H120□	0.6	ECJ2VG1H120□	0.6
15		ECJ2VC1H150□	0.6	ECJ2VG1H150□	0.6
18		ECJ2VC1H180□	0.6	ECJ2VG1H180□	0.6
22		ECJ2VC1H220□	0.6	ECJ2VG1H220□	0.6
27		ECJ2VC1H270□	0.6	ECJ2VG1H270□	0.6
33		ECJ2VC1H330□	0.6	ECJ2VG1H330□	0.6
39		ECJ2VC1H390□	0.6	ECJ2VG1H390□	0.6
47		ECJ2VC1H470□	0.6	ECJ2VG1H470□	0.6
56		ECJ2VC1H560□	0.6	ECJ2VG1H560□	0.6
68		ECJ2VC1H680□	0.6	ECJ2VG1H680□	0.6
82		ECJ2VC1H820□	0.6	ECJ2VG1H820□	0.6
100		ECJ2VC1H101□	0.6	ECJ2VG1H101□	0.6
120		ECJ2VC1H121□	0.6	ECJ2VG1H121□	0.6
150		ECJ2VC1H151□	0.6	ECJ2VG1H151□	0.6
180		ECJ2VC1H181□	0.6	ECJ2VG1H181□	0.6
220		ECJ2VC1H221□	0.6	ECJ2VG1H221□	0.6
270		ECJ2VC1H271□	0.6	ECJ2VG1H271□	0.6
330		ECJ2VC1H331□	0.6	ECJ2VG1H331□	0.6
390		ECJ2VC1H391□	0.6	ECJ2VG1H391□	0.6
470		ECJ2VG1H471□	0.6	ECJ2VG1H471□	0.6
560		ECJ2VC1H561□	0.6	ECJ2VG1H561□	0.6
680		ECJ2VC1H681□	0.6	ECJ2VG1H681□	0.6
820		ECJ2VC1H821□	0.6	ECJ2VG1H821□	0.6
1000		ECJ2VC1H102□	0.6	ECJ2VG1H102□	0.6
1200		ECJ2VC1H122□	0.6	ECJ2VG1H122□	0.6
1500		ECJ2VC1H152□	0.6	ECJ2VG1H152□	0.6
1800		ECJ2VC1H182□	0.6	ECJ2VG1H182□	0.6
2200		ECJ2VC1H222□	0.6	ECJ2VG1H222□	0.6
2700		ECJ2VC1H272□	0.85	ECJ2VG1H272□	0.6

* □: Capacitance Tolerance Code.

** Packaging Style Code: “V” for Taped Version (Taping pitch: 4 mm) and “X” for Bulk Type

We will discontinue CΔ and SL Temp. Char. of 0805 type whose range is from 0.5 pF to 820 pF by the end of 2001.

■ Standard Products for “12” Type (EIA “0805” Type) , Taped Version

B/X7R												F/Y5V											
Capacitance (pF)	Capacitance Tolerance	50 VDC		25 VDC		16 VDC		10 VDC		6.3 VDC		Capacitance Tolerance	50 VDC		25 VDC		16 VDC		10 VDC				
		Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)		Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)	Part No.	Dim (mm)			
1000	±10 % (K) or ±20 % (M)	ECJ2VB1H102□	0.6																				
1200		ECJ2VB1H122K	0.6																				
1500		ECJ2VB1H152□	0.6																				
1800		ECJ2VB1H182K	0.6																				
2200		ECJ2VB1H222□	0.6																				
2700		ECJ2VB1H272K	0.6																				
3300		ECJ2VB1H332□	0.6																				
3900		ECJ2VB1H392K	0.6																				
4700		ECJ2VB1H472□	0.6																				
5600		ECJ2VB1H562K	0.6																				
6800		ECJ2VB1H682□	0.6																				
8200		ECJ2VB1H822K	0.6																				
10000		ECJ2VB1H103□	0.6											ECJ2VF1H103Z	0.6								
12000		ECJ2VB1H123K	0.6																				
15000		ECJ2VB1H153□	0.6											ECJ2VF1H153Z	0.6								
18000		ECJ2VB1H183K	0.6																				
22000		ECJ2VB1H223□	0.6											ECJ2VF1H223Z	0.6								
27000		ECJ2VB1H273K	0.85																				
33000		ECJ2VB1H333□	0.85											ECJ2VF1H333Z	0.6								
39000		ECJ2VB1H393K	0.85	ECJ2VB1E393K	0.85																		
47000		ECJ2FB1H473□	1.25	ECJ2VB1E473□	0.85	ECJ2VB1C473□	0.85							ECJ2VF1H473Z	0.6								
56000		ECJ2FB1H563K	1.25	ECJ2VB1E563K	0.85	ECJ2VB1C563K	0.85																
68000		ECJ2FB1H683□	1.25	ECJ2VB1E683□	0.85	ECJ2VB1C683□	0.85							ECJ2VF1H683Z	0.6	ECJ2VF1E683Z	0.6						
82000		ECJ2FB1H823K	1.25	ECJ2VB1E823K	0.85	ECJ2VB1C823K	0.85																
100000		ECJ2FB1H104□	1.25	ECJ2VB1E104□	0.85	ECJ2VB1C104□	0.85							ECJ2VF1H104Z	0.85	ECJ2VF1E104Z	0.6	ECJ2VF1C104Z	0.6				
120000				ECJ2FB1E124K	1.25	ECJ2VB1C124K	0.85						±80 % ±20 % (Z)										
150000				ECJ2FB1E154□	1.25	ECJ2VB1C154□	0.85							ECJ2VF1H154Z	0.85	ECJ2VF1E154Z	0.6	ECJ2VF1C154Z	0.6				
180000				ECJ2FB1E184K	1.25	ECJ2VB1C184K	0.85																
220000				ECJ2FB1E224□	1.25	ECJ2VB1C224□	0.85							ECJ2VF1H224Z	0.85	ECJ2VF1E224Z	0.85	EGJ2VF1C224Z	0.6				
270000						ECJ2FB1C274K	1.25																
330000					ECJ2FB1C334□	1.25									ECJ2FF1E334Z	1.25	ECJ2VF1C334Z	0.85					
390000					ECJ2FB1C394K	1.25																	
470000					ECJ2FB1C474□	1.25									ECJ2FF1E474Z	1.25	ECJ2VF1C474Z	0.85					
560000							ECJ2FB1A564K	1.25															
680000							ECJ2FB1A684□	1.25									ECJ2VF1C684Z	0.85					
820000							ECJ2FB1A824K	1.25															
1000000							ECJ2FB1A105□	1.25										ECJ2VF1C105Z	0.85				
1500000																							
2200000																	ECJ2FF1C225Z	1.25					
3300000																							
4700000																							
10000000																		ECJ2FF1A475Z	1.25				

* □: Capacitance Tolerance Code.

** Packaging Style Code: "V" or "F" for Taped Version (Taping pitch: 4 mm) and "X" for Bulk Type

Design and specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.
Whenever a doubt about safety arises from this product, please contact us immediately for technical consultation.

■ Standard Products for “13” Type (EIA “1206” Type) , Taped Version

Capacitance (pF)	CΔ		SL	
	Capacitance Tolerance	50 VDC	50 VDC	
		Part No.	Dim T (mm)	Part No.
2700	±5 % (J) or ±10 % (K)	ECJ3VC1H272□	0.6	
3300		ECJ3VC1H332□	0.6	ECJ3VG1H332□ 0.6
3900		ECJ3VC1H392□	0.6	ECJ3VG1H392□ 0.6
4700		ECJ3VC1H472□	0.6	ECJ3VG1H472□ 0.6
5600		ECJ3VC1H562□	0.85	ECJ3VG1H562□ 0.6
6800		ECJ3VC1H682□	0.85	
8200		ECJ3VC1H822□	1.15	
10000		ECJ3VC1H103□	1.15	

B/X7R										F/Y5V									
Capacitance (pF)	Capacitance Tolerance	25 VDC		16 VDC		10 VDC		6.3 VDC		Capacitance Tolerance	25 VDC		16 VDC		10 VDC				
		Part No.	Dim T (mm)	Part No.	Dim T (mm)	Part No.	Dim T (mm)	Part No.	Dim T (mm)		Part No.	Dim T (mm)	Part No.	Dim T (mm)	Part No.	Dim T (mm)			
100000	±10 % (K) or ±20 % (M)	ECJ3VB1E104□	0.85	ECJ3VB1C104□	0.85					80 % -20 % (Z)									
120000		ECJ3VE1E124K	0.85	ECJ3VB1C124K	0.85														
150000		ECJ3VB1E154□	0.85	ECJ3VB1C154□	0.85														
180000		ECJ3VB1E184K	0.85	ECJ3VB1C184K	0.85														
220000		ECJ3VB1E224□	0.85	ECJ3VB1C224□	0.85														
270000		ECJ3VB1E274K	0.85	ECJ3VB1C274K	0.85														
330000		ECJ3VB1E334□	0.85	ECJ3VB1C334□	0.85														
390000		ECJ3FB1E394K	1.15	ECJ3VB1C394K	0.85														
470000		ECJ3FB1E474□	1.15	ECJ3VB1C474□	0.85						ECJ3VF1E474Z	0.85							
560000		ECJ3YB1E564K	1.6	ECJ3VB1C564K	0.85														
680000		ECJ3YB1E684□	1.6	ECJ3VB1C684□	0.85						ECJ3FF1E684Z	1.15	ECJ3VF1C684Z	0.85					
820000		ECJ3YB1E824K	1.6	ECJ3FB1C824K	1.15														
1000000		ECJ3YB1E105□	1.6	ECJ3FB1C105□	1.15						ECJ3FF1E105Z	1.15	ECJ3VF1C105Z	0.85					
1500000				ECJ3YB1C155□	1.6	ECJ3YB1A155□	1.6												
2200000				ECJ3YB1C225□	1.6	ECJ3YB1A225□	1.6				ECJ3FF1E225Z	1.15	ECJ3VF1C225Z	0.85					
3300000						ECJ3YB1A335□	1.6												
4700000						under development	1.6	ECJ3YB0J475□	1.6					ECJ3FF1C475Z	1.15				
6800000								ECJ3YB0J685□	1.6										
10000000				under development	1.6	under development	1.6	ECJ3YB0J106□	1.6							ECJ3YF1A106Z	1.6		
22000000								under development	1.6										

* □: Capacitance Tolerance Code.

** Packaging Style Code: “V”, “F” and “Y” for Taped Version (Taping pitch: 4 mm) and “X” for Bulk Type

■ Standard Products for “23” Type (EIA “3225” Type) , Taped Version

Capacitance (pF)	Capacitance Tolerance	B				F		
		16 VDC		10 VDC		Capacitance Tolerance	25 VDC	
		Part No.	Dim T (mm)	Part No.	Dim T (mm)		Part No.	Dim T (mm)
4700000	±10 % (K) or	ECJ4YB1C475□	2.0			80 %		
10000000	±20 % (M)	ECJ4YB1C106□	2.0	ECJ4YB1A106□	2.0	-20 % (Z)	ECJ4YF1E106Z	2.0

* □: Capacitance Tolerance Code.

** Packaging Style Code: “Y” for Taped Version (Taping pitch: 4 mm) and “X” for Bulk Type

Design and specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.
Whenever a doubt about safety arises from this product, please contact us immediately for technical consultation.

■ Packaging Specifications

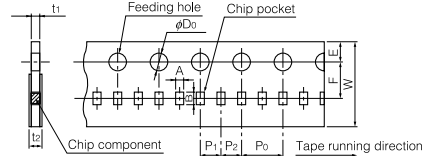
● Standard Packing Quantity

Size (EIA)	Style	Thickness (mm)	Paper taping		Enbossed taping		Bulk	Bulk case
			pitch (mm)	Quantity (pcs./reel)	pitch (mm)	Quantity (pcs./reel)	Quantity (pcs./bag)	Quantity (pcs./case)
06(0201)		0.3	2	15,000	—	—	1,000	—
10(0402)		0.5	2	10,000 (20,000)	—	—	1,000	50,000
11(0603)		0.42	4	5,000	—	—	1,000	—
		0.8	4	4,000 (10,000)	—	—	1,000	15,000
12(0805)		0.6	4	5,000 (20,000)	—	—	1,000	10,000
		0.85	4	4,000 (10,000)	—	—	1,000	—
		1.25	—	—	4	3,000	1,000	—
13(1206)		0.6	4	5,000 (20,000)	—	—	1,000	—
		0.85	4	4,000 (10,000)	—	—	1,000	—
		1.15	—	—	4	3,000	1,000	—
		1.6	—	—	4	2,000	1,000	—
23(1210)		2.0	—	—	4	2,000	1,000	—

() for large size reel applied

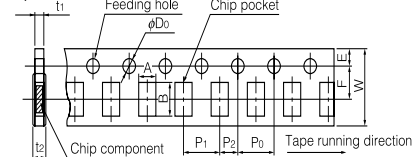
● Paper Taping

P₁: 2mm



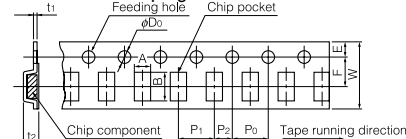
Symbol	A	B	W	F	E	P ₁	P ₂	P ₀	phi D ₀	T ₁	T ₂
06 (0201)	0.37 ±0.03	0.67 ±0.03								0.5 max.	0.8 max.
10 (0402)	0.65 ±0.05	1.15 ±0.05	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.0 ±0.1	1.5 ±0.1	0.7 max.	1.0 max.
11 (0603)	1.10 ±0.10	1.90 ±0.10								1.1 max.	1.4 max.
12 (0805)	1.65 ±0.20	2.4 ±0.2									

P₁: 4mm



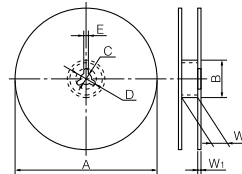
Symbol	A	B	W	F	E	P ₁	P ₂	P ₀	phi D ₀	T ₁	T ₂
11 (0603)	1.10 ±0.10	1.90 ±0.10									
12 (0805)	1.65 ±0.20	2.4 ±0.2	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1	2.00 ±0.05	4.0 ±0.1	1.5 ±0.1	1.1 max.	1.4 max.
13 (1206)	2.0 ±0.2	3.6 ±0.2									

● Embossed Taping



Symbol	A	B	W	F	E	P ₁	P ₂	P ₀	phi D ₀	T ₁	T ₂
12 (0805)	1.55 ±0.20	2.35 ±0.20									
13 (1206)	1.95 ±0.20	3.6 ±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	0.6 max.	2.1 max.
23 (1210)	2.9 ±0.2	3.6 ±0.2									2.5 max.

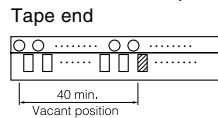
● Reel for Taping



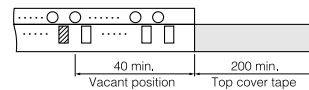
A	B	C	D	E	W	W ₁
phi 180 ⁺³ ₋₅ (330±5)	phi 60.0±0.5 (50 min.)	13.0±0.5	21.0±0.5 (20 min.)	2.0±0.5	9.0±0.3 (9.5±1.0)	1.3±0.2 (2.0±0.5)

(): Large size reel

● Leader Part and Taped End

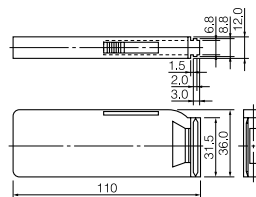


● Leader part



Unit : mm

● Bulk Case

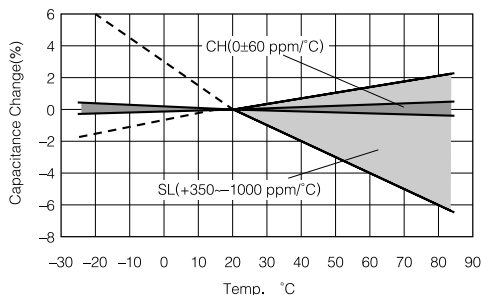


Unit : mm

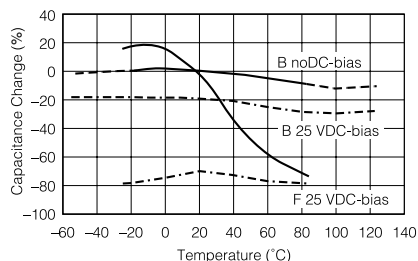
■ Typical Characteristics

● Temperature characteristics

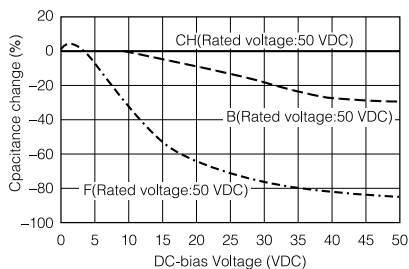
Class 1 (T.C. Type)



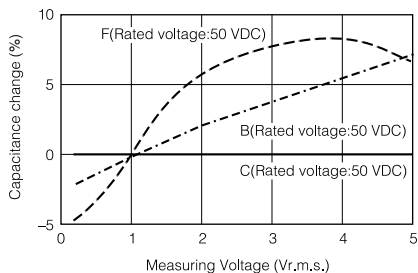
Class 2 (Hi-K Type)



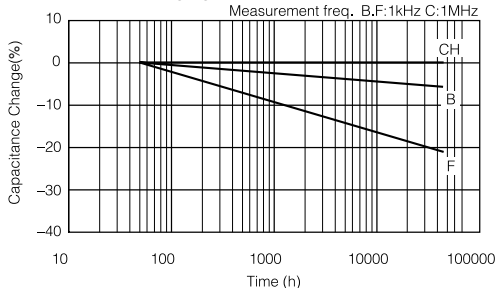
● Capacitance -DCbias Voltage



● Capacitance -ACbias Voltage



● Capacitance aging



● Impedance-Frequency

