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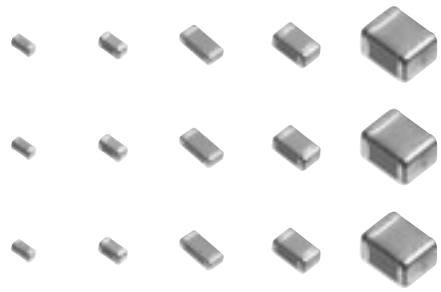
Multilayer Ceramic Capacitors (100V, 200V Series)

Series: **ECJ**



■ Features

- Small size and wide capacitance range
- High humidity resistance and long life
- Low inductance (ESL) and excellent frequency characteristics
- RoHS compliant

■ Recommended Applications

- Noise limiting, coupling, time constant and oscillation circuitry

■ Handling Precautions

See Page 48 to 53

■ Packaging Specifications

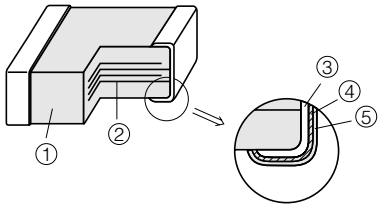
See Page 45, 46, 56

■ Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12	
E	C	J	3	F	B	2	A	4	7	3	K	(Example)

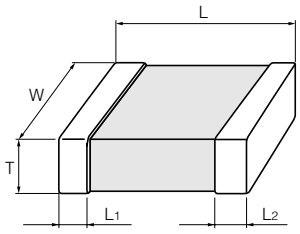
- 1 to 3: Product Code (ECJ:Multilayer Ceramic Chip Capacitors)
- 4: Size Code
- 5: Packaging Style Code
- 6: Temperature Characteristic Code
- 7 to 8: Rated Voltage Code
- 9 to 11: Nominal Capacitance
- 12: Capacitance Tolerance Code

■ Construction



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

■ Dimensions in mm (not to scale)



Size Code	Size (EIA)	L	W	T	L_1, L_2
1	0603	1.6±0.1	0.8±0.1	0.8±0.1	0.3±0.2
2	0805	2.0±0.1	1.25±0.10	0.85±0.10	0.50±0.25
				1.25±0.10	
3	1206	3.20±0.15	1.60±0.15	0.85±0.10	0.6±0.3
				1.15±0.10	
		3.2±0.2	1.6±0.2	1.6±0.2	
4	1210	3.2±0.3	2.5±0.3	2.0±0.2	0.6±0.3
				2.5±0.3	

■ Packaging Styles and Standard Packaging Quantities

Quantity : pcs./reel

Packaging Style Code	Packaging Styles		Size	0603	0805		1206			1210	
			Thickness (mm)	T=0.8	T=0.85	T=1.25	T=0.85	T=1.15	T=1.6	T=2.0	T=2.5
V	φ180 reel	Paper taping (Pitch: 4 mm)		4,000	4,000	—	4,000	—	—	—	—
F		Embossed taping (Pitch: 4 mm)		—	—	3,000	—	3,000	—	—	—
Y				—	—	—	—	—	2,000	2,000	1,000

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■ Temperature Characteristics

● Class 1

Temperature Characteristic Code	Temperature Characteristics	Temp. Coeff. (ppm/°C)	Rate of Capacitance change at each Temp. (%)			
			−25 °C		85 °C	
			max.	min.	max.	min.
C	CH	0 ± 60	0.49	−0.27	0.39	−0.39

Note: Temperature coefficient: calculated between 20 °C to 85 °C

● Class 2

Temperature Characteristic Code	Temperature Characteristics	Capacitance Change	Measurement Temperature Range	Reference Temperature
B	B	±10 %	−25 to 85 °C	20 °C
	X7R	±15 %	−55 to 125 °C	25 °C

For applicable “temperature characteristics”, see the lists of standard products on page 34 to 35.

■ Rated Voltage

Code	2A	2D
Rated Voltage	DC 100 V	DC 200 V

■ Nominal Capacitance

Ex.	100	101	104	105
Nominal Capacitance	10 pF	100 pF	100,000 pF (0.1 µF)	1,000,000 pF (1.0 µF)

■ Capacitance tolerance

Class	Temperature Characteristics			Tolerance Code	Capacitance Tolerance
1	CH	Capacitance range	C=10 pF	D	±0.5 pF
			C>10 pF	J	±5 %
				K	±10 %
2	B, X7R			K	±10 %
				M	±20 %

■ Specifications and Testing Methods

Item	Specifications		Test Method
	Class 1	Class 2	
Operating Temperature Range	−55 to 125 °C		———
Dielectric Withstanding Voltage	No dielectric breakdown and/or damage		Test voltage: Class 1: Rated voltage × 300 % Class 2: Rated voltage × 250 % Duration: 1 to 5 s Charge/discharge current: 50 mA max.
Insulation Resistance (IR)	10000 MΩ or 500/C (MΩ) Whichever is less 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 Class 1
Q Factor or Dissipation Factor (tan δ)	Q: C < 30 pF: Q≧400+20 C 30 pF≦C≦1000 pF: Q≧1000 tan δ: C > 1000 pF: tan δ≦0.002 C: Nominal Cap. in pF	tan δ:0.025 max.	Class 2 Preconditioning: The capacitors shall be kept in temperature of 150 +0/−10 °C for 1 hour and subjected to standard conditions* for 48±4 hours before initial measurement.

Class 1

Nominal capacitance	C ≦ 1000 pF	C > 1000 pF
Measuring frequency	1 MHz±10 %	1 kHz±10 %
Measuring voltage	0.5 to 5 Vrms	0.5 to 5 Vrms

Class 2

Nominal capacitance	C≦1 µF
Measuring frequency	1 kHz±10 %
Measuring voltage	1.0±0.2 Vrms

✻ Standard condition: Temperature 15 to 35 °C, Relative humidity 45 to 75 %.
For further information, see the technical specifications.

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■ Standard Products for EIA Size “0603”, Taped Version

● Class 1

◆ Temp. Char. Code: C (Temp. Char.: CH)

Rated voltage		DC 100 V		
Capacitance (pF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. CH
10	±0.5 pF (D)	ECJ1VC2A100D	0.8	○
15	±5 % (J) or ±10 % (K)	ECJ1VC2A150□	0.8	○
22		ECJ1VC2A220□	0.8	○
33		ECJ1VC2A330□	0.8	○
47		ECJ1VC2A470□	0.8	○
68		ECJ1VC2A680□	0.8	○
100		ECJ1VC2A101□	0.8	○

□: Capacitance tolerance code.
Standard packaging quantity of Packaging Style Code “V” (T = 0.8 mm): 4,000 pcs./reel

● Class 2

◆ Temp. Char. Code: B (Temp. Char.: B, X7R)

Rated voltage		DC 100 V				DC 200 V			
Capacitance (pF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. B	Temp. Char. X7R	Part No.	Dim. T (mm)	Temp. Char. B	Temp. Char. X7R
220	±10 % (K) or ±20 % (M)	ECJ1VB2A221□	0.8	○	○	ECJ1VB2D221□	0.8	○	○
330		ECJ1VB2A331□	0.8	○	○	ECJ1VB2D331□	0.8	○	○
470		ECJ1VB2A471□	0.8	○	○	ECJ1VB2D471□	0.8	○	○
680		ECJ1VB2A681□	0.8	○	○	ECJ1VB2D681□	0.8	○	○
1000		ECJ1VB2A102□	0.8	○	○	ECJ1VB2D102□	0.8	○	○

□: Capacitance tolerance code.
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 1

◆ Temperature Characteristic Code: C (Temperature Characteristics: CH)

Rated voltage		DC 100 V			DC 200 V		
Capacitance (pF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. CH	Part No.	Dim. T (mm)	Temp. Char. CH
10	±0.5 pF (D)	ECJ2VC2A100D	0.85	○	ECJ2VC2D100D	0.85	○
15	±5 % (J) or ±10 % (K)	ECJ2VC2A150□	0.85	○	ECJ2VC2D150□	0.85	○
22		ECJ2VC2A220□	0.85	○	ECJ2VC2D220□	0.85	○
33		ECJ2VC2A330□	0.85	○	ECJ2VC2D330□	0.85	○
47		ECJ2VC2A470□	0.85	○	ECJ2VC2D470□	0.85	○
68		ECJ2VC2A680□	0.85	○	ECJ2FC2D680□	1.25	○
100		ECJ2VC2A101□	0.85	○	ECJ2FC2D101□	1.25	○
150		ECJ2VC2A151□	0.85	○	ECJ2FC2D151□	1.25	○
220		ECJ2VC2A221□	0.85	○	ECJ2FC2D221□	1.25	○
330		ECJ2VC2A331□	0.85	○	ECJ2FC2D331□	1.25	○
470		ECJ2VC2A471□	0.85	○			
680		ECJ2VC2A681□	0.85	○			
1000		ECJ2VC2A102□	0.85	○			

□: Capacitance tolerance code : “□” for “J” or “K”
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.

● Class 2

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

Rated voltage		DC 100 V				DC 200 V			
Capacitance (pF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. B	Temp. Char. X7R	Part No.	Dim. T (mm)	Temp. Char. B	Temp. Char. X7R
220	±10 % (K) or ±20 % (M)	ECJ2VB2A221□	0.85	○	○	ECJ2VB2D221□	0.85	○	○
330		ECJ2VB2A331□	0.85	○	○	ECJ2VB2D331□	0.85	○	○
470		ECJ2VB2A471□	0.85	○	○	ECJ2VB2D471□	0.85	○	○
680		ECJ2VB2A681□	0.85	○	○	ECJ2VB2D681□	0.85	○	○
1000		ECJ2VB2A102□	0.85	○	○	ECJ2VB2D102□	0.85	○	○
1500		ECJ2VB2A152□	0.85	○	○	ECJ2VB2D152□	0.85	○	○
2200		ECJ2VB2A222□	0.85	○	○	ECJ2VB2D222□	0.85	○	○
3300		ECJ2VB2A332□	0.85	○	○	ECJ2VB2D332□	0.85	○	○
4700		ECJ2VB2A472□	0.85	○	○	ECJ2VB2D472□	0.85	○	○
6800		ECJ2VB2A682□	0.85	○	○	ECJ2FB2D682□	1.25	○	○
10000		ECJ2VB2A103□	0.85	○	○	ECJ2FB2D103□	1.25	○	○
15000		ECJ2FB2A153□	1.25	○	○				

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

■ Standard Products for EIA “1206”, Taped Version

● Class 1

◆ Temperature Characteristic Code: C (Temperature Characteristics: CH)

Rated voltage		DC 100 V			DC 200 V		
Capacitance (pF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. CH	Part No.	Dim. T (mm)	Temp. Char. CH
470	±5 % (J) or ±10 % (K)				ECJ3FC2D471□	1.15	○
680					ECJ3FC2D681□	1.15	○
1000					ECJ3FC2D102□	1.15	○
1500		ECJ3VC2A152□	0.85	○			
2200		ECJ3VC2A222□	0.85	○			
3300		ECJ3VC2A332□	0.85	○			

□: Capacitance tolerance code : “□” for “J” or “K”
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
Soldering method of dimension T>1 mm: Avoid flow soldering.

● Class 2

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

Rated voltage		DC 100 V				DC 200 V			
Capacitance (pF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. B	X7R	Part No.	Dim. T (mm)	Temp. Char. B	X7R
15000	±10 % (K) or ±20 % (M)					ECJ3FB2D153□	1.15	○	○
22000		ECJ3FB2A223□	1.15	○	○	ECJ3FB2D223□	1.15	○	○
33000		ECJ3FB2A333□	1.15	○	○				
47000		ECJ3FB2A473□	1.15	○	○				
100000		ECJ3YB2A104□	1.6	○	○				

□: Capacitance tolerance code : “□” for “K” or “M”
Dimensional tolerance of L, W, T: L, W: ± 0.15 mm / T: ± 0.1 mm for T=1.15, ± 0.2 mm for T=1.6
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.

■ Standard Products for EIA “1210”, Taped Version

● Class 2

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

Rated voltage		DC 100 V			
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. B	X7R
0.22	±10 % (K) or ±20 % (M)	ECJ4YB2A224□	2.0	○	○
0.47		ECJ4YB2A474□	2.0	○	○
0.68		ECJ4YB2A684□	2.5	○	○

□: Capacitance tolerance code : “□” for “K” or “M”
Dimensional tolerance of L, W, T: L, W: ± 0.3 mm / T: ± 0.2 mm for T=2.0, ± 0.3 mm for T=2.5
Standard packaging quantity : 2,000 pcs./reel for T = 2.0 mm, 1,000 pcs./reel for T = 2.5 mm
Avoid flow soldering.