

Data Sheet

Customer:

Product: Multilayer Ceramic Chip Capacitor

Sizes.: 01005/0201/0402/0603/0805/1206/1210/1808/1812/1825/2220
/2225

Issued Date: 16-Jan-25

Edition: REV.B9



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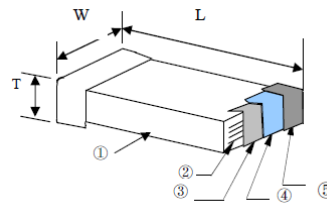
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Multilayer Ceramic Chip Capacitor
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Construction



①	Ceramic Dielectric	④	Nickel Layer:
②	Inner Electrodes	⑤	Tin Layer
③	Substrate Electrodes		

Features for ≤50V

- There is high reliability on monolithic structure of laminated layers
- And its character of excellent soldering ability and soldering resistance ability is suitable for reflow soldering and peak soldering.
- It includes high and stable capacitance
- High Frequency Type: This kind of dielectric material is considered as Class I capacitor. COG capacitors have the most stable electrical performance, which almost does not change with the change of temperature, voltage or time, they are suitable for the low-loss and high stability requirement circuits.
- X7R、X5R、X6S、X6T: X7R、X5R、X6S、X6T material is a kind of material has high dielectric constant.
The capacitor made of this kind material is considered as Class II capacitor whose capacitance is higher than that of class I. These capacitors are classified as having a semi-stable temperature characteristic and used over a wide temperature range, such in these kinds of circuits, DC-blocking, decoupling, bypassing, frequency discriminating etc.
- Executive Standard: GB/T 21041-2007 GB/T 21042-2007

Applications ≤50V

- It is suitable for all kinds of filter, coupled, harmonic vibration, bypassing and high frequency circuits.

Features for ≥100V

- High voltage MLCC is a kind of special design MLCC that bases on the technology of general MLCC. This kind of MLCC has stable high voltage reliability and suitable to SMT. High voltage MLCC is widely applicable for many direct high voltage circuits in which it can improve the performance of the circuit.
- There is high reliability on monolithic structure of laminated layers.
- And its character of excellent soldering ability and soldering resistance ability is suitable for reflow soldering and peak soldering.
- It includes high and stable capacitance
- Executive Standard: GB/T 21041-2007 GB/T 21042-2007

Applications ≥100V

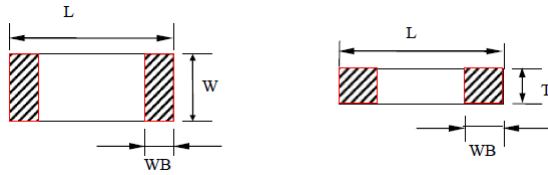
- Analog & Digital Modems
- LAN/WAN Interface
- Lighting Ballast Circuits
- Voltage Multipliers
- DC-DC Converters
- Back-lighting Inverters

Part Numbering

MCF	03	J	T	N	250	3R9
Product Type	Dimensions (LxW)	Capacitance Tolerance	Packaging	Dielectric	Voltage (VDCW)	Capacitance
	E5: 01005 01: 0201 02: 0402 03: 0603 05: 0805 06: 1206 10: 1210 08: 1808 12: 1812 18: 1825 20: 2220 25: 2225	A: ±0.05pF (Cap≤10pF) B: ±0.1pF (Cap≤10pF) C: ±0.25pF (Cap≤10pF) D: ±0.5pF (Cap≤10pF) F: ±1% G: ±2% J: ±5% K: ±10% M: ±20% Z: +80/-20%	T: Taping Reel W: 13" Taping Reel	N: NPO (COG) B: X7R X: X5R S: X6S T: X6T	4V0: 4V 6V3: 6.3V 250: 25V 500: 50V 101: 100V 102: 1000V 202: 2000V 302: 3000V 402: 4000V 502: 5000V	3R9: 3.9pF 150: 15pF 181: 180pF 225: 2.2μF 106: 10μF

Multilayer Ceramic Chip Capacitor

■ Dimensions



Unit: mm

Type	Size (Inch)	L	W	T/Symbol		WB
E5	01005	0.40±0.02	0.20±0.02	0.20±0.02	V	0.10±0.03
01	0201	0.60±0.03	0.30±0.03	0.30±0.03	C	0.15±0.05
		0.60±0.09	0.30±0.09	0.30±0.09	D	
		0.6±0.09	0.3±0.09	0.50±0.05	E	0.15±0.10
02	0402	1.00±0.05	0.50±0.05	0.50±0.05	E	0.25±0.05
		1.00±0.15	0.50±0.15	0.50±0.15	F	
		1.00±0.20	0.50±0.20	0.50±0.20	N	
03	0603	1.60±0.10	0.80±0.10	0.80±0.10	H	0.35±0.20
		1.60±0.20	0.80±0.20	0.80±0.20	B	
05	0805	2.00±0.20	1.25±0.20	0.80±0.20	B	0.50±0.20
				1.25±0.20	J	
06	1206	3.20±0.30	1.60±0.30	0.80±0.20	B	0.60±0.30
				1.00±0.20	I	
				1.25±0.20	J	
				1.60±0.20	M	
				1.60±0.30	L	
10	1210	3.20±0.30	2.50±0.30	1.25±0.20	J	0.60±0.30
				1.40±0.20	K	
				1.60±0.30	L	
				1.80±0.30	P	
				2.00±0.20	R	
				2.00±0.30	S	
08	1808	4.50±0.40	2.00±0.20	1.60±0.30	L	0.60±0.30
				1.80±0.30	P	
				2.00±0.30	S	
12	1812	4.50±0.40	3.20±0.30	1.25±0.20	J	0.60±0.30
				1.60±0.20	M	
				1.60±0.30	L	
				2.00±0.20	R	
				2.00±0.30	S	
18	1825	4.50±0.40	6.3±0.50	1.60±0.30	L	0.60±0.30
				2.00±0.30	S	
				1.80±0.30	P	
				1.60±0.30	L	
20	2220	5.70±0.40	5.00±0.40	1.80±0.30	P	0.60±0.30
				2.00±0.30	S	
				2.00±0.30	S	
				2.50±0.30	O	
25	2225	5.70±0.40	6.30±0.50	1.60±0.30	L	0.60±0.30
				1.80±0.30	P	
				2.00±0.30	S	
				2.50±0.30	O	

■ Temperature Coefficient /Characteristics

Dielectric	Reference Temperature Point	Temperature Coefficient	Operation Temperature Range
NOP(COG)	25°C	0±30ppm/°C	-55~125°C
X7R	25°C	±15%	-55~125°C
X5R	25°C	±15%	-55~85°C
X6S	25°C	±22%	-55°C ~ 105°C
X6T	25°C	-33%~+22%	-55°C ~ 105°C

Note : Nominal temperature coefficient and allowed tolerance of class I are decided by the changing of the capacitance between 20°C and 85°C. Nominal temperature coefficient of class II are decided by the temperature of 20°C.

Multilayer Ceramic Chip Capacitor

Measurement method of dielectric withstanding Voltage for High Voltage MLCC

Rated Voltage Range	Measuring Method
100V≤Vr<500V	Force 200% Rated Voltage for 5 second. Max. Current should not exceed 50mA
500V≤Vr<1000V	Force 150% Rated Voltage for 5 second. Max. Current should not exceed 50mA
1000V<Vr≤2000V	Force 120% Rated Voltage for 5 second. Max. Current should not exceed 50mA
2000V<Vr≤5000V	Force 120% Rated Voltage for 5 second. Max. Current should not exceed 10mA

General Capacitance & Voltage

Capacitance & Voltage (NPO 10V-50V)

Dielectric		NPO																	
EIA	Size	01005				0201		0402		0603		0805		1206		1210		1812	
Code	VDCW	10V	16V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V
0R1	0.1pF	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
0R2	0.2	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
R22	0.22											B	B	B	B				
0R3	0.3	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
R47	0.47											B	B	B	B				
0R4	0.4	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
0R5	0.5	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
0R6	0.6	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
0R7	0.7	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
0R8	0.8	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
0R9	0.9	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R0	1.0	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R1	1.1	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R2	1.2	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R3	1.3	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R4	1.4	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R5	1.5	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R6	1.6	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R7	1.7	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
1R8	1.8	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R0	2.0	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R1	2.1	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R2	2.2	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R3	2.3	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R4	2.4	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R5	2.5	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R6	2.6	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R7	2.7	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
2R8	2.8	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
3R0	3.0	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
3R1	3.1	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
3R2	3.2	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
3R3	3.3	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
3R4	3.4	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
3R6	3.6	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
3R8	3.8	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
3R9	3.9	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
4R0	4.0	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
4R1	4.1	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
4R2	4.2	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
4R3	4.3	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
4R5	4.5	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
4R6	4.6	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
4R7	4.7	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
4R8	4.8	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
5R0	5.0	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
5R1	5.1	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
5R2	5.2	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
5R3	5.3	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
5R6	5.6	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
6R0	6.0	V	V	V	V	C	C	E	E	H	H								
6R2	6.2	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
6R3	6.3	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
6R8	6.8	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
7R0	7.0	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
7R5	7.5	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
8R0	8.0	V	V	V	V	C	C	E	E	H	H	B	B	B	B				

Multilayer Ceramic Chip Capacitor

Dielectric		NPO																	
EIA	Size	01005				0201		0402		0603		0805		1206		1210		1812	
Code	VDCW	10V	16V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V
8R2	8.2	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
9R0	9.0	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
9R1	9.1	V	V	V	V	C	C	E	E	H	H	B	B	B	B				
100	10pF	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
110	11	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
120	12	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
130	13	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
140	14	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
150	15	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
160	16											B	B	B	B	J	J	L	L
170	17											B	B	B	B	J	J	L	L
180	18	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
200	20	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
220	22	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
240	24											B	B	B	B	J	J	L	L
250	25	V	V	V	V	C	C	E	E	H	H								
260	26	V	V	V	V	C	C	E	E	H	H								
270	27	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
300	30	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
310	31											B	B	B	B	J	J	L	L
330	33	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
360	36											B	B	B	B	J	J	L	L
390	39	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
400	40											B	B	B	B	J	J	L	L
430	43	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
470	47	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
500	50	V	V	V	V	C	C	E	E	H	H								
510	51	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
530	53											B	B	B	B	J	J	L	L
560	56	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
600	60											B	B	B	B	J	J	L	L
620	62	V	V	V	V	C	C	E	E	H	H								
680	68	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
750	75	V	V	V	V	C	C	E	E	H	H								
820	82	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
910	91											B	B	B	B	J	J	L	L
920	92	V	V	V	V	C	C	E	E	H	H								
101	100pF	V	V	V	V	C	C	E	E	H	H	B	B	B	B	J	J	L	L
111	110											B	B	B	B	J	J	L	L
121	120					C	C	E	E	H	H	B	B	B	B	J	J	L	L
131	130											B	B	B	B	J	J	L	L
141	140											B	B	B	B	J	J	L	L
151	150					C	C	E	E	H	H	B	B	B	B	J	J	L	L
161	160											B	B	B	B	J	J	L	L
181	180					C	C	E	E	H	H	B	B	B	B	J	J	L	L
201	200					C	C	E	E	H	H	B	B	B	B	J	J	L	L
221	220					C	C	E	E	H	H	B	B	B	B	J	J	L	L
241	240					C	C	E	E	H	H	B	B	B	B	J	J	L	L
271	270					C	C	E	E	H	H	B	B	B	B	J	J	L	L
301	300					C	C	E	E	H	H	B	B	B	B	J	J	L	L
331	330					C	C	E	E	H	H	B	B	B	B	J	J	L	L
361	360					C	C	E	E	H	H	B	B	B	B	J	J	L	L
391	390					C	C	E	E	H	H	B	B	B	B	J	J	L	L
431	430					C	C	E	E	H	H								
471	470					C	C	E	E	H	H	B	B	B	B	J	J	L	L
501	500											B	B	B	B	J	J	L	L
511	510					C	C	E	E	H	H	B	B	B	B	J	J	L	L
561	560					C	C	E	E	H	H	B	B	B	B	J	J	L	L
681	680					C	C	E	E	H	H	B	B	B	B	J	J	L	L
751	750							E	E	H	H	B	B	B	B	J	J	L	L
821	820							E	E	H	H	B	B	B	B	J	J	L	L
911	910							E	E	H	H	B	B	B	B	J	J	L	L
102	1nF							E	E	H	H	B	B	B	B	J	J	L	L
122	1.2									H	H	B	B	B	B	J	J	L	L
152	1.5									H	H	B	B	B	B	J	J	L	L
182	1.8									H	H	B	B	B	B	J	J	L	L

Multilayer Ceramic Chip Capacitor

Dielectric		NPO																	
EIA	Size	01005				0201		0402		0603		0805		1206		1210		1812	
Code	VDCW	10V	16V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V
222	2.2									H	H	B	B	B	B	J	J	L	L
272	2.7									H	H	B	B	B	B	J	J	L	L
332	3.3									H	H	B	B	B	B	J	J	L	L
392	3.9											B	B	B	B	J	J	L	L
472	4.7									H	H	B	B	B	B	J	J	L	L
562	5.6									H	H								
682	6.8									H	H	B	B	B	B	J	J	L	L
822	8.2											B	B	B	B	J	J	L	L
103	10nF									H	H	B	B	B	B	J	J	L	L
123	12													J	J	J	J		
223	22													J	J	J	J		
333	33															L	J		
473	47															L	J		
563	56															L	J		
683	68															L	J		
823	82															L	J		
104	100nF															L	J		

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X7R 6.3V~50V)

Dielectric		X7R																						
EIA	Size	01005			0201					0402					0603					0805				
Code	VDCW	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
101	100 pF	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
111	110	V	V	V																				
121	120	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H					
131	130				C	C	C	C	C															
151	150	V	V	V	C	C	C	C	C											B	B	B	B	B
181	180	V	V	V	C	C	C	C	C						H	H	H	H	H	B	B	B	B	B
201	200				C	C	C	C	C															
221	220	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
241	240														H	H	H	H	H					
271	270	V	V	V						E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
331	330	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
361	360														H	H	H	H	H					
391	390	V	V	V	C	C	C	C	C						H	H	H	H	H					
471	470	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
561	560	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
621	620														H	H	H	H	H					
681	680	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
821	820	V	V	V	C	C	C	C	C											B	B	B	B	B
911	910				C	C	C	C	C															
102	1nF	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
122	1.2														H	H	H	H	H	B	B	B	B	B
152	1.5														H	H	H	H	H	B	B	B	B	B
182	1.8				C	C	C	C	C						H	H	H	H	H	B	B	B	B	B
222	2.2				C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
272	2.7				C	C	C	C	C						H	H	H	H	H	B	B	B	B	B
332	3.3				C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
392	3.9				C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
472	4.7				C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
562	5.6				C	C	C	C		E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
682	6.8				C	C	C	C		E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
822	8.2				C	C	C	C							H	H	H	H	H	B	B	B	B	B

Multilayer Ceramic Chip Capacitor

Dielectric		X7R																								
EIA	Size	01005			0201					0402					0603					0805						
Code	VDCW	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V		
103	10nF				C	C	C	C		E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
123	12									E	E	E	E	E	H	H	H	H	H							
153	15				C	C	C			E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
183	18				C	C	C			E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
203	20									E	E	E	E	E												
223	22				C	C	C			E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
273	27									E	E	E	E	E	H	H	H	H	H							
303	30														H	H	H	H	H							
333	33					C	C			E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
393	39									E	E	E	E	E	H	H	H	H	H							
473	47									E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
513	51														H	H	H	H	H							
563	56									E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
623	62														H	H	H	H	H							
683	68									E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
823	82														H	H	H	H	H	B	B	B	B	B		
104	100nF									E	E	E	E	E	H	H	H	H	H	B	B	B	B	B		
124	120nF									F	F	F	F													
154	150nF									F	F	F	F		H	H	H	H	H	B	B	B	B	B		
184	180nF														H	H	H	H	H							
224	220									F	F	F	F		H	H	H	H	H	B	B	B	B	B		
274	270														H	H	H	H	H	B	B	B	B	B		
334	330									F	F	F			H	H	H	H	H	B	B	B	B	B		
394	390									F	F	F			H	H	H	H	H	B	B	B	B	B		
474	470									F	F	F			H	H	H	H	H	J	J	J	J	J		
564	560														H	H	H	H	H	J	J	J	J	J		
684	680									F	F				H	H	H	H	H	J	J	J	J	J		
824	820														H	H	H	H	H							
105	1uF									F	F				B	B	B	B	B	J	J	J	J	J		
225	2.2														B	B	B	B		J	J	J	J	J		
335	3.3														B	B				J	J	J	J	J		
475	4.7														B	B				J	J	J	J	J		
685	6.8																			J	J	J	J			
106	10uF																			J	J	J	J			

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X7R 6.3V~50V)

Dielectric		X7R																				
EIA	Size	1206					1210					1808					1812					
Code	VDCW	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	
101	100 pF	B	B	B	B	B																
121	120	B	B	B	B	B																
151	150	B	B	B	B	B																
181	180	B	B	B	B	B																
221	220	B	B	B	B	B																
271	270	B	B	B	B	B																
331	330	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L	L
391	390	B	B	B	B	B																

Multilayer Ceramic Chip Capacitor

Dielectric		X7R																			
EIA	Size	1206					1210					1808					1812				
Code	VDCW	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
471	470	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
561	560	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
681	680	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
821	820	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
102	1nF	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
122	1.2	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
152	1.5	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
182	1.8	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
222	2.2	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
272	2.7	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L					
332	3.3	B	B	B	B	B	J	J	J	J	J										
392	3.9	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
472	4.7	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
562	5.6	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
682	6.8	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
822	8.2	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
103	10nF	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
123	12	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
153	15	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
183	18	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
223	22	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
273	27																L	L	L	L	L
333	33	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
393	39	B	B	B	B	B															
473	47	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
563	56	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
683	68	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
823	82	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
104	100nF	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
124	120											L	L	L	L	L					
154	150	B	B	B	B	B						L	L	L	L	L					
184	180											L	L	L	L	L					
224	220	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
334	330	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
394	390	J	J	J	J	J															
474	470	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
564	560	J	J	J	J	J															
684	680	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
824	820						L	L	L	L	L						L	L	L	L	L
105	1uF	B/L	B/L	B/L	B/L	B/L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
225	2.2	L	L	L	L	L	L	L	L	L	L	S	S	S	S	S	S	S	S	S	S
335	3.3	L	L	L	L	L	L	L	L	L	L	S	S	S	S	S	S	S	S	S	S
475	4.7	L	L	L	L	L	L	L	L	L	L	S	S	S	S	S	S	S	S	S	S
685	6.8	L	L	L	L	L	O	O	O	O	O						S	S	S	S	S
106	10uF	L	L	L	L	L	O	O	O	O	O										

Multilayer Ceramic Chip Capacitor

Dielectric		X7R																			
EIA	Size	1206					1210					1808					1812				
Code	VDCW	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
156	15	L	L				O	O	O	O											
226	22	L	L				O	O	O	O											
476	47						O	O													

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X5R 6.3V~50V)

Dielectric		X5R																						
EIA	Size	01005			0201					0402					0603					0805				
Code	VDCW	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
101	100 pF	V	V	V																				
111	110	V	V	V																				
121	120	V	V	V																				
151	150	V	V	V																				
181	180	V	V	V																				
221	220	V	V	V																				
271	270	V	V	V																				
331	330	V	V	V																				
391	390	V	V	V																				
471	470	V	V	V																				
561	560	V	V	V																				
681	680	V	V	V																				
821	820	V	V	V																				
102	1nF	V	V	V																				
122	1.2	V	V	V																				
152	1.5	V	V	V																				
182	1.8	V	V	V																				
222	2.2	V	V	V																				
272	2.7	V	V	V																				
332	3.3	V	V	V																				
392	3.9	V	V	V																				
472	4.7	V	V	V																				
562	5.6	V	V	V																				
682	6.8	V	V	V																				
822	8.2	V	V	V																				
103	10nF	V	V	V																				
153	15	V	V	V	C	C	C	C																
183	18				C	C	C	C																
223	22	V	V	V	C	C	C	C																
333	33	V			C	C	C	C																
473	47	V			C	C	C	C																E
563	56				C	C	C	C																E
683	68	V			C	C	C	C																E
104	100nF	V			C	C	C	C			E	E	E	E	E									
124	120										F	F	F	F										
154	150										F	F	F	F										

Multilayer Ceramic Chip Capacitor

Dielectric		X5R																								
EIA	Size	01005					0201					0402					0603					0805				
Code	VDCW	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V		
224	220				C	C				F	F	F	F													
334	330				C	C				F	F	F	F													
394	390									F	F	F	F													
474	470				C	C				F	F	F	F		H	H	H	H	H							
564	560														H	H	H	H	H							
684	680									F	F	F	F		H	H	H	H	H							
824	820														H	H	H	H	H							
105	1uF				D	D				F	F	F	F		B	B	B	B	B	J	J	J	J	J		
225	2.2				D	D				N	N	N	N		B	B	B	B	B	J	J	J	J	J		
335	3.3														B	B	B	B		J	J	J	J	J		
475	4.7				E					N	N	N			B	B	B	B		J	J	J	J	J		
685	6.8									N	N				B	B	B	B		J	J	J	J	J		
106	10uF									N	N				B	B	B	B		J	J	J	J	J		
156	15														B	B				J	J	J	J			
226	22									N	N				B	B				J	J	J	J			
476	47														B					J	J					

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X5R 6.3V~50V)

Dielectric		X5R																				
EIA	Size	1206					1210					1808					1812					
Code	VDCW	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	
331	330pF											L	L	L	L	L	L	L	L	L	L	L
471	470											L	L	L	L	L	L	L	L	L	L	L
561	560											L	L	L	L	L	L	L	L	L	L	L
681	680											L	L	L	L	L	L	L	L	L	L	L
820	820											L	L	L	L	L	L	L	L	L	L	L
102	1nF											L	L	L	L	L	L	L	L	L	L	L
122	1.2											L	L	L	L	L	L	L	L	L	L	L
152	1.5											L	L	L	L	L	L	L	L	L	L	L
182	1.8											L	L	L	L	L	L	L	L	L	L	L
222	2.2											L	L	L	L	L	L	L	L	L	L	L
272	2.7											L	L	L	L	L						
392	3.9											L	L	L	L	L	L	L	L	L	L	L
472	4.7											L	L	L	L	L	L	L	L	L	L	L
562	5.6											L	L	L	L	L	L	L	L	L	L	L
682	6.8											L	L	L	L	L	L	L	L	L	L	L
822	8.2											L	L	L	L	L	L	L	L	L	L	L
103	10nF											L	L	L	L	L	L	L	L	L	L	L
123	12											L	L	L	L	L	L	L	L	L	L	L
153	15											L	L	L	L	L	L	L	L	L	L	L
183	18											L	L	L	L	L	L	L	L	L	L	L
223	22											L	L	L	L	L	L	L	L	L	L	L
273	27																L	L	L	L	L	L
333	33											L	L	L	L	L	L	L	L	L	L	L

Multilayer Ceramic Chip Capacitor

Dielectric		X5R																			
EIA	Size	1206					1210					1808					1812				
Code	VDCW	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
473	47											L	L	L	L	L	L	L	L	L	L
563	56											L	L	L	L	L	L	L	L	L	L
683	68											L	L	L	L	L	L	L	L	L	L
823	82											L	L	L	L	L	L	L	L	L	L
104	100nF											L	L	L	L	L	L	L	L	L	L
124	120											L	L	L	L	L					
154	150											L	L	L	L	L					
184	180											L	L	L	L	L					
224	220											L	L	L	L	L	L	L	L	L	L
334	330											L	L	L	L	L	L	L	L	L	L
474	470											L	L	L	L	L	L	L	L	L	L
684	680											L	L	L	L	L	L	L	L	L	L
824	820																L	L	L	L	L
105	1uF	B/L	B/L	B/L	B/L	B/L						L	L	L	L	L	L	L	L	L	L
225	2.2	L	L	L	L	L						L	L	L	L		S	S	S	S	S
335	3.3	L	L	L	L	L						L	L	L	L		S	S	S	S	S
475	4.7	L	L	L	L	L	L	L	L	L	L	L	L	L	L		S	S	S	S	S
685	6.8	L	L	L	L	L	L	O	O	O	O	L	L	L	L		S	S	S	S	S
106	10uF	L	L	L	L	L	L	O	O	O	O						S	S	S	S	S
156	15	L	L	L	L		L	O	O	O	O										
226	22	L	L	L	L		O	O	O	O											
476	47	L	L	L			O	O	O												
107	100uF	L	L				O	O													

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage X6S/X6T 6.3V~50V

Dielectric		X6S/X6T																						
EIA	Size	01005			0201					0402					0603					0805				
Code	VDCW	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
101	100 pF	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
111	110	V	V	V																				
121	120	V	V	V	C	C	C	C	C						H	H	H	H	H					
131	130				C	C	C	C	C															
151	150	V	V	V	C	C	C	C	C											B	B	B	B	B
181	180	V	V	V	C	C	C	C	C											B	B	B	B	B
201	200				C	C	C	C	C															
221	220	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
271	270	V	V	V																B	B	B	B	B
331	330	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
361	360														H	H	H	H	H					
391	390	V	V	V	C	C	C	C	C						H	H	H	H	H					
471	470	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
561	560	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
621	620														H	H	H	H	H					
681	680	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	B	B	B	B	B
821	820	V	V	V	C	C	C	C	C						H	H	H	H	H	B	B	B	B	B

Multilayer Ceramic Chip Capacitor

Dielectric		X6S/X6T																								
EIA	Size	01005			0201					0402					0603					0805						
Code	VDCW	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V		
911	910				C	C	C	C	C																	
102	1nF	V	V	V	C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
122	1.2														H	H	H	H	H	H	B	B	B	B	B	
152	1.5														H	H	H	H	H	H	B	B	B	B	B	
182	1.8				C	C	C	C	C						H	H	H	H	H	H	B	B	B	B	B	
222	2.2				C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
272	2.7				C	C	C	C	C						H	H	H	H	H	H	B	B	B	B	B	
332	3.3				C	C	C	C	C	E	E	E	E	E							B	B	B	B	B	
392	3.9				C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
472	4.7				C	C	C	C	C	E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
562	5.6				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
682	6.8				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
822	8.2				C	C	C	C							H	H	H	H	H	H	B	B	B	B	B	
103	10nF				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
123	12									E	E	E	E	E	H	H	H	H	H							
153	15				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
183	18				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
203	20									E	E	E	E	E												
223	22				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
273	27									E	E	E	E	E	H	H	H	H	H							
303	30														H	H	H	H	H							
333	33				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
393	39									E	E	E	E	E	H	H	H	H	H							
473	47				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
513	51														H	H	H	H	H							
563	56				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
623	62														H	H	H	H	H							
683	68				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
823	82														H	H	H	H	H	H	B	B	B	B	B	
104	100nF				C	C	C	C		E	E	E	E	E	H	H	H	H	H	H	B	B	B	B	B	
124	120									F	F	F	F													
154	150									F	F	F	F		H	H	H	H	H	H	B	B	B	B	B	
184	180														H	H	H	H	H							
224	220									F	F	F			H	H	H	H	H	H	B/J	B/J	B/J	B/J	B/J	
274	270														H	H	H	H	H	H	B	B	B	B	B	
334	330									F	F	F			H	H	H	H	H	H	B	B	B	B	B	
394	390									F	F	F			H	H	H	H	H	H	B	B	B	B	B	
474	470									F	F	F			H	H	H	H	H	H	B/J	B/J	B/J	B/J	B/J	
564	560														H	H	H	H	H	H	B/J	B/J	B/J	B/J	B/J	
684	680									F	F	F			H	H	H	H	H	H	B/J	B/J	B/J	B/J	B/J	
824	820														H	H	H	H	H							
105	1uF									F	F	F			B	B	B	B	B	B	J	J	J	J	J	
225	2.2									N	N	N			B	B	B	B			J	J	J	J	J	
335	3.3														B	B					J	J	J	J	J	
475	4.7									N	N				B	B					J	J	J	J	J	
685	6.8									N					B	B					J	J	J	J		
106	10uF									N					B	B					J	J	J	J		
156	15														B						J	J	J			
226	22														B						J	J	J			
476	47																				J					

Multilayer Ceramic Chip Capacitor

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage X6S/X6T 6.3V~50V)

Dielectric		X6S/X6T																			
EIA	Size	1206					1210					1808					1812				
Code	VDCW	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
101	100 pF	B	B	B	B	B															
121	120	B	B	B	B	B															
151	150	B	B	B	B	B															
181	180	B	B	B	B	B															
221	220	B	B	B	B	B															
271	270	B	B	B	B	B															
331	330	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
391	390	B	B	B	B	B															
471	470	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
561	560	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
681	680	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
821	820	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
102	1nF	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
122	1.2	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
152	1.5	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
182	1.8	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
222	2.2	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
272	2.7	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L					
332	3.3	B	B	B	B	B	J	J	J	J	J										
392	3.9	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
472	4.7	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
562	5.6	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
682	6.8	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
822	8.2	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
103	10nF	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
123	12	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
153	15	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
183	18	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
223	22	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
273	27																L	L	L	L	L
333	33	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
393	39	B	B	B	B	B															
473	47	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
563	56	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
683	68	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
823	82	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
104	100nF	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
124	120											L	L	L	L	L					
154	150	B	B	B	B	B						L	L	L	L	L					
184	180											L	L	L	L	L					
224	220	B	B	B	B	B	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L
334	330	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
394	390	J	J	J	J	J															
474	470	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

Multilayer Ceramic Chip Capacitor

Dielectric		X6S/X6T																			
EIA	Size	1206					1210					1808					1812				
Code	VDCW	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
564	560	J	J	J	J	J															
684	680	J	J	J	J	J	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
824	820						L	L	L	L	L						L	L	L	L	L
105	1uF	B/L	B/L	B/L	B/L	B/L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
225	2.2	L	L	L	L	L	L	L	L	L	L	S	S	S	S	S	S	S			
335	3.3	L	L	L	L	L	L	L	L	L	L	S	S	S	S	S	S	S			
475	4.7	L	L	L	L	L	L	L	L	L	L	S	S	S	S	S	S	S			
685	6.8	L	L	L	L	L	O	O	O	O	O						S	S			
106	10uF	L	L	L	L	L	O	O	O	O	O										
156	15	L	L	L			O	O	O	O											
226	22	L	L	L			O	O	O	O											
476	47	L					O	O													
107	100uF	L					O														

■The letter in cell is expressed the symbol of product thickness

■Middle and High Voltage

Capacitance & Voltage (NPO 100V~3KV)

Dielectric		NPO																
EIA	Size	0402	0603			0805					1206							
Code	VDCW	100V	100V	200V	250V	100V	200V	250V	500V	1000V	100V	200V	250V	500V	630V	1000V	2000V	3000V
0R5	0.5pF													B	J	J		
1R0	1.0													B	J	J		
1R2	1.2													B	J	J		
1R5	1.5													B	J	J		
1R8	1.8													B	J	J		
2R0	2.0													B	J	J	J	
2R2	2.2													B	J	J	J	
2R7	2.7													B	J	J	J	
3R0	3.0													B	J	J	J	
3R3	3.3													B	J	J	J	
3R6	3.6													B	J	J	J	
3R9	3.9													B	J	J	J	
4R7	4.7													B	J	J	J	
5R0	5.0													B	J	J	J	
5R6	5.6													B	J	J	J	
6R8	6.8									B				J	J	J	J	
8R0	8.0									B				J	J	J	J	
8R2	8.2									B				J	J	J	J	
100	10pF					B				J				J	J	J	J	
120	12					B			B	J				J	J	J	J	
150	15					B			B	J				J	J	J	J	
180	18					B			B	J				J	J	J	J	
220	22		H			B			B	J				J	J	J	J	
270	27		H			B			B	J		B		J	J	J	J	
330	33	E	H			B			B	J		B		J	J	J	J	
390	39	E	H			B			B	J		B		J	J	J	J	L
470	47	E	H			B			B	J		B		J	J	J	J	
560	56	E	H			B			B	J		B		J	J	J	J	

Multilayer Ceramic Chip Capacitor

Dielectric		NPO																	
EIA	Size	0402			0603			0805				1206							
680	68	E	H					B			B	J		B	B	J	J	J	L
101	100pF	E	H	H				B	B	B	B	J		B	B	J	J	J	L
121	120	E	H	H				B	B	B	B			B	B	J	J	J	L
151	150	E	H	H				B	B	B	B		B	B	B	J	J	J	L
181	180	E	H	H	H			B	B	B	J		B	B	B	J	J	J	L
221	220	E	H	H	H			B	B	B	J		B	B	B	J	J	J	L
271	270	E	H	H	H			B	B	B	J		B	B	B	J	J	J	
331	330		H	H	H			B	B	B	J		B	B	B	J	J	J	
391	390		H	H				B	B	B	J		B	B	B	J	J	J	
471	470		H	H				B	B	B	J		B	B	B	J	J	J	
561	560		H					B	B	B			B	B	B	J	J	L	
681	680		H					B	B	B			B	B	B	J	J	L	
102	1nF		H					B	B	B			B	J	B	L	L	L	
152	1.5							B					B		B	L	L		
182	1.8							B					B		B				
222	2.2							B					B		B				
272	2.7							B											
332	3.3							B											

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (NPO 100V~5KV)

Dielectric		NPO																	
EIA	Size	1210					1808					1812							
Code	VDCW	100V	200V	500V	1000V	2000V	500V	1000V	2000V	3000V	5000V	100V	200V	500V	630V	1000V	2000V	3000V	5000V
1R0	1.0pF										L								L
1R2	1.2										L								L
1R5	1.5										L								L
1R8	1.8										L								L
2R0	2.0										L								L
2R2	2.2										L								L
2R7	2.7										L								L
3R0	3.0										L	L							L
3R3	3.3										L	L				L		L	L
3R6	3.6										L	L				L		L	L
3R9	3.9										L	L				L		L	L
4R7	4.7										L	L				L		L	L
5R0	5.0										L	L				L		L	L
5R6	5.6										L	L				L		L	L
6R8	6.8										L	L				L		L	L
8R0	8.0										L	L				L		L	L
8R2	8.2										L	L				L		L	L
100	10pF			J							L	L				L		L	L
120	12			J							L	L				L		L	L
150	15			J							L	L				L		L	L
180	18			J							L	L				L		L	L
220	22			J							L	L		J		L	L	L	L
270	27			J							L	L		J		L	L	L	
330	33			J					L		L	L		J		L	L	L	
390	39			J		J			L		L	L		J		L	L	L	
470	47			J		L			L		L	L		J		L	L	L	
560	56			J		L			L		L	L	J	J		L	L	L	
680	68			J	J	L			L		L	L	J	J		L	L	L	
101	100pF	J	J	J	J	L			L	L	L	S	J	J		L	L	L	
121	120	J		J	L	L			L	L	L		J	J		L	L	L	
151	150	J		J	L	L			L	L	L		J	J		L	L	L	

Multilayer Ceramic Chip Capacitor

Dielectric		NPO																	
EIA	Size	1210					1808					1812							
Code	VDCW	100V	200V	500V	1000V	2000V	500V	1000V	2000V	3000V	5000V	100V	200V	500V	630V	1000V	2000V	3000V	5000V
181	180	J		J	L	L		L	L	L		J		J		L	L	L	
221	220	J		J	L	P		L	L	L		J		J		L	L	L	
271	270	J		J	L	P		L	L	S		J		J		L	L	L	
331	330	J		J	L	S	L	L	L	S		J		J		L	L	S	
391	390	J		J	L		L	L	L			J		J		L	L	S	
471	470	J		J	L		L	L	L			J		J		L	L	S	
561	560	J		J	L		L	L	S			J		J		L	L	S	
681	680	J		J	L		L	L	S			J		J		L	S		
102	1nF	J		L	S		L	L	S			J		J	L	L	S		
152	1.5	J		L	S		P		S			J		L	L	L			
182	1.8	J		L	S		P		S			J		L	L	O			
222	2.2	J		P	O		P					J		L	L	O			
272	2.7	J		S	O		P					J		L	L				
332	3.3	J			O		P					J		L	L				
392	3.9											J	J	L	L				
472	4.7	J			O		P					J	J	L	L				
562	5.6	J			O														
682	6.8	J			O														
103	10nF																		
153	15																		
223	22												O						
333	33												O						

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (NPO 250V~3KV)

Dielectric		NPO														
EIA	Size	1825				2220				2225						
Code	VDCW	200V	630V	1000V	3000V	250V	500V	1000V	2000V	3000V	5000V	1000V	1500V	2000V	2500V	3000V
100	10pF															L
120	12						L									L
150	15						L								L	L
180	18						L								L	L
220	22				L		L								L	L
270	27						L								L	L
330	33						L								L	L
390	39						L								L	L
470	47						L								L	L
560	56						L								L	L
680	68						L								L	L
101	100pF						L				L			L	L	L
121	120						L							L	L	L
151	150						L			L				L	L	L
181	180						L			L				L	L	L
221	220						L			L				L	L	L
271	270						L		L	L				L	L	L
331	330						L		L	L				L		L
391	390						L		L	L			L	S		S
471	470						L		L	L			L	S		S
561	560						L		L	L			L	S		S
681	680					L	L		L	L			L	S		S

Multilayer Ceramic Chip Capacitor

Dielectric		NPO														
EIA	Size	1825				2220						2225				
Code	VDCW	200V	630V	1000V	3000V	250V	500V	1000V	2000V	3000V	5000V	1000V	1500V	2000V	2500V	3000V
102	1nF					L	L	L	L	S		L	L	S		S
152	1.5					L	L	S		O						S
182	1.8					L	L	S		O						O
222	2.2					L	L	S		O						O
272	2.7					L	L	S								O
332	3.3					L	L	S								O
392	3.9					L	L	S								
472	4.7					L	L	S								
562	5.6					L		S								
682	6.8					L		S								
103	10nF			S		L										
153	15		L			L										
223	22															
333	33	L														

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X7R 100V~2.5KV)

Dielectric		X7R																		
EIA	Size	0402	0603			0805						1206								
Code	VDCW	100V	100V	200V	250V	100V	200V	250V	500V	630V	1000V	2000V	100V	200V	250V	500V	630V	1000V	2000V	2500V
101	100pF		H					B	B				B	B		B	J	J	J	
121	120		H					B	B				B	B		B		J	J	
151	150		H					B	B				B	B		B		J	J	
181	180		H					B	B				B	B		B		J	J	
221	220		H			B	B	B	B				B	B		B		J	J	
271	270		H			B	B	B	B				B	B		B		J	J	
331	330		H	H		B	B	B	B				B	B	B	B		J	J	
391	390		H	H		B	B	B	B				B	B	B	B		J	J	
471	470	E	H	H		B	B	B	B				B	B	B	B		J	J	
561	560	E	H	H		B	B	B	B				B	B	B	B		J	J	
681	680	E	H	H		B	B	B	B				B	B	B	B		J	J	
102	1nF	E	H	H		B	B	B	B	B	J	J	B	B	B	B		J	J	J
152	1.5	E	H	H		B	B	B	B	B	J		B	B	B	B		J	J	
182	1.8	E	H	H		B	B	B	B	B	J		B	B	B	B		J	J	
222	2.2	E	H	H		B	B	B	B	B	J		B	B	B	B	B	J	J	
272	2.7	E	H	H		B	B	B	B	B			B	B	B	J	J	J	J	
332	3.3	E	H	H	H	B	B	B	B	B			B	B	B	J	J	J	J	
472	4.7	E	H	H	H	B	B	B	B	B			B	B	B	J	J	J	J	
562	5.6	E	H	H	H	B	B	J	J	B			B	B	B	J	J	J	J	
682	6.8												B	B	B	J	J	J	L	
103	10nF	E	H	H	H	B	B	J	J				B	B	B	J	J	J		
123	12					B														
153	15		H			B	J	J	J				B	B	B	J	J			
183	18		H			B	J	J	J				B	B	B	J	J			
223	22		H			B	J	J	J				B	B	B	J	J			

Multilayer Ceramic Chip Capacitor

Dielectric		X7R																				
EIA	Size	0402			0603				0805						1206							
Code	VDCW	100V	100V	200V	250V	100V	200V	250V	500V	630V	1000V	2000V	100V	200V	250V	500V	630V	1000V	2000V	2500V		
333	33		H			J	J	J	J				B	J	J	J	L					
473	47		H			J			J				B	J	J	J	L					
563	56		H			J			J				B	J	J	L						
683	68		H			J			J				J	J	J	L						
104	100nF		H			J			J				J	J	L	L						
224	220					J							J	L	L							
334	330					J							J									
474	470					J							L									
684	680					J							L									
105	1.0uF					J							L									
225	2.2					J							L									
335	3.3					J																
475	4.7					J																

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X7R 100V~5KV)

Dielectric		X7R														
EIA	Size	1210							1808							
Code	VDCW	100V	200V	250V	500V	630V	1000V	2000V	100V	250V	500V	1000V	2000V	3000V	4000V	5000V
101	100pF													L	L	
121	120													L	L	
151	150													L	L	L
181	180													L	L	L
221	220						J	J					L	L	L	L
271	270						J	J					L	L	L	L
331	330						J	J					L	L	L	L
391	390						J	J					L	L	L	L
471	470						J	J	L				L	L	L	L
561	560						J	J	L				L	L	L	L
681	680					J	J	J	L				L	L	L	L
102	1nF			L		J	J	J	L	L			L	L	L	L
152	1.5			L		J	J	J	L	L			L	L	L	
182	1.8			L		J	J	J	L	L			L	L	L	
222	2.2			L		J	J	J	L	L			L	L	L	
272	2.7			L		J	J	J	L	L			L	L	L	
332	3.3			L	J	J	J	J	L	L			L	L	L	
472	4.7	J		L	J	J	L	L	L	L			L	L	L	
562	5.6	J		L	J	J	L	L	L	L			L	L		
682	6.8	J		L	J	J	L	L	L	L			L	L		
103	10nF	J		L	J	J	L	L	L	L			L	L		
153	15	J		L	J	J	L		L	L			L			
183	18	J		L	J	J	L		L	L			L			
223	22	J		L	J	J	L		L	L			L			
333	33	J		L	L	J			L	L						

Multilayer Ceramic Chip Capacitor

Dielectric		X7R														
EIA	Size	1210							1808							
Code	VDCW	100V	200V	250V	500V	630V	1000V	2000V	100V	250V	500V	1000V	2000V	3000V	4000V	5000V
473	47	J	J	L	L	S			L	L	L					
563	56	J		L	L	L			L	L						
683	68	J		L	L	L			L	L						
104	100nF	J		L	L	L			L	L						
224	220	L		O					L	L						
334	330	L		O					L	L						
474	470	L							L	L						
684	680	L														
105	1.0uF	L														
225	2.2	O														
335	3.3	O														
475	4.7	O														

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Capacitance & Voltage (X7R 100V~5KV)

Dielectric		X7R															
EIA	Size	1812										1825					
Code	VDCW	100V	200V	250V	500V	630V	1000V	2000V	3000V	4000V	5000V	200V	500V	630V	1000V	2000V	3000V
151	150pF								L	L							
181	180								L	L							
221	220							L	L	L							
271	270							L	L	L							
331	330						L	L	L	L							
391	390						L	L	L	L							
471	470						L	L	L	L							
561	560						L	L	L	L							
681	680			L			L	L	L	L							
102	1nF		L	L			L	L	L	L						L	
152	1.5		L	L			L	L	L	L						L	
182	1.8		L	L	L		L	L	L	L						L	
222	2.2		L	L	L		L	L	L	L	S					L	
272	2.7		L	L	L		L	L	L	P						L	
332	3.3		L	L	L		L	L	L	P						L	
392	3.9															L	
472	4.7		L	L	L		L	L	L							L	P
562	5.6		L	L	L		L	L	S							L	S
682	6.8		L	L	L		L	L	S							L	S
103	10nF	J	L	L	L		L	L	O					L	L	S	
153	15	J	L	L	L		L	S						L	L		
183	18	J	L	L	L		L	S						L	L		
223	22	J	L	L	L	L	L							L	L		
333	33	J	L	L	J	L	L					L		L			
473	47	J	L	L	L	L	L					L		L			
563	56	J	L	L	L	L	S					L		L			

Multilayer Ceramic Chip Capacitor

Dielectric		X7R															
EIA	Size	1812										1825					
Code	VDCW	100V	200V	250V	500V	630V	1000V	2000V	3000V	4000V	5000V	200V	500V	630V	1000V	2000V	3000V
683	68	J	L	L	L	L							L		L		
104	100nF	J	L	L	L	S						L	L		S		
124	120												L				
154	150												L	L			
224	220	J	L	S	S	S							L				
334	330	J	S	S		S											
474	470	J	S	O													
684	680	S	S	S													
105	1uF	S	S	S													
225	2.2	O															
335	3.3																
475	4.7																
685	6.8																
106	10uF																

■The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X7R 100V~5KV)

Dielectric		X7R																					
EIA	Size	2220										2225											
Code	VDCW	100V	200V	250V	500V	630V	1KV	2KV	2.5KV	3KV	4KV	5KV	100V	200V	250V	500V	1KV	1.5KV	2KV	3KV	4KV	5KV	
151	150pF																				L		
181	180																				L		
221	220																L				L		
271	270																L				L		
331	330				L												L				L		
391	390				L												L				L		
471	470				L												L				L		
561	560				L												L				L		
681	680				L												L				L		
102	1nF				L			L		L	L				L		L			L			
152	1.5				L			L		L	L				L		L			L			L
182	1.8				L			L		L	L				L		L			L			
222	2.2			L	L			L		L	L	S			L		L		L	L	P		
272	2.7			L	L			L		L	L	S			L		L		L	L			
332	3.3			L	L			L		L	L	S			L	L	L		L	L			
392	3.9			L	L			L		L	L	S			L	L	L		L	L			
472	4.7			L	L		L	L		L	L	S			L	L	L		L	L			
562	5.6			L	L		L	L		L	L				L	L	L		L	L			
682	6.8			L	L		L	L		L	L				L	L	L		L	L			
822	8.2			L	L		L	L		L	L												
103	10nF			L	L		L	L	L	L					L	L	L		L	L			
153	15			L	L		L	L							L	L	L		L	L			

Multilayer Ceramic Chip Capacitor

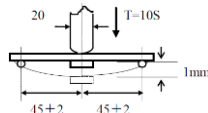
Dielectric		X7R																				
EIA	Size	2220										2225										
Code	VDCW	100V	200V	250V	500V	630V	1KV	2KV	2.5KV	3KV	4KV	5KV	100V	200V	250V	500V	1KV	1.5KV	2KV	3KV	4KV	5KV
183	18			L	L		L	L							L	L	L		L	P		
223	22			L	L		L	L							L	L	L		L	P		
333	33			L	L		L	L							L	L	L		S			
473	47		L	L	L		L	L							L	L	L		P			
563	56		L	L	L		S								L	L	P		S			
683	68		L	L	L		S								L	L	P		S			
104	100nF		L	L	L		S					L		L	L	P	S	S				
124	120		L	L	L		S					L		L	L	S						
154	150		L	L	L	L	S					L		L	L							
224	220		L	L	L	L	S					L		L	L							
334	330		L	L	L	L						L		L	L							
474	470	L	L	L	L	S						L	L	L	L							
684	680	L	L	L										L	S							
105	1uF	L		L										S	O							
225	2.2	P		S										S								
335	3.3	S																				
475	4.7	S																				
685	6.8	S																				
106	10uF	S																				

■The letter in cell is expressed the symbol of product thickness

Environmental Characteristics

Item	Requirement	Test Method																									
Capacitance	Should be within the specified tolerance	NPO: (Class I) Cap≤ 1000pF 1.0±0.2Vrms, 1MHz±10% Cap>1000pF 1.0±0.2Vrms, 1KHz±10% X7R, X5R, X6S, X6T: (Class II) Test Temperature: 25°C±3°C Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms																									
Insulation Resistance	Class I : C≤10 nF, Ri≥50000MΩ C> 10 nF, Ri•Cr≥500S Class II: C≤25 nF, Ri≥10000MΩ C> 25 nF, Ri•Cr> 100S Note: S=Ω•F	Measuring Voltage: Rated Voltage (Max 500V) Duration: 60±5s Test Humidity: ≤75% Test Temperature: 25±3°C Test Current: ≤50mA																									
(DF, tanδ) Dissipation Factor	NPO: Cap≥ 30pF, DF ≤0.1%; Cap<30pF, DF ≤1/ (400+20C) X7R, X5R, X6S, X6T: <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Rated vol.</th> <th>DF(×10-4)</th> <th></th> </tr> </thead> <tbody> <tr> <td rowspan="5">50V</td> <td>≤250</td> <td>0402≤10nF; 0603<100nF; ≥1206≤680nF</td> </tr> <tr> <td>≤350</td> <td>0201≤3.3nF; 0402≤47nF; 0603<470nF; 0805≤1uF; ≥1206≤2.2uF</td> </tr> <tr> <td>≤500</td> <td>0201≤10nF; 0402≤0.1uF</td> </tr> <tr> <td>≤750</td> <td>0805≤2.2uF; ≥1206≤4.7uF</td> </tr> <tr> <td>≤1000</td> <td>0603≤2.2uF; 0805≤10uF; ≥1206≤10uF</td> </tr> <tr> <td rowspan="5">25V</td> <td>≤250</td> <td>0402≤10nF; 0603<100nF; ≥1206≤680nF</td> </tr> <tr> <td>≤350</td> <td>0201≤3.3nF; 0402≤47nF; 0603<470nF; 0805≤1uF</td> </tr> <tr> <td>≤500</td> <td>0201≤10nF; 0402≤0.22uF</td> </tr> <tr> <td>≤750</td> <td>0201>10nF; 0805≤2.2uF; ≥1206≤10uF</td> </tr> <tr> <td>≤1000</td> <td>0201≤100nF; 0402≤2.2uF; 0603≤10uF; 0805≤22uF; ≥1206≤22uF</td> </tr> </tbody> </table>	Rated vol.	DF(×10-4)		50V	≤250	0402≤10nF; 0603<100nF; ≥1206≤680nF	≤350	0201≤3.3nF; 0402≤47nF; 0603<470nF; 0805≤1uF; ≥1206≤2.2uF	≤500	0201≤10nF; 0402≤0.1uF	≤750	0805≤2.2uF; ≥1206≤4.7uF	≤1000	0603≤2.2uF; 0805≤10uF; ≥1206≤10uF	25V	≤250	0402≤10nF; 0603<100nF; ≥1206≤680nF	≤350	0201≤3.3nF; 0402≤47nF; 0603<470nF; 0805≤1uF	≤500	0201≤10nF; 0402≤0.22uF	≤750	0201>10nF; 0805≤2.2uF; ≥1206≤10uF	≤1000	0201≤100nF; 0402≤2.2uF; 0603≤10uF; 0805≤22uF; ≥1206≤22uF	NPO: (Class I) Cap≤ 30pF 1.0±0.2Vrms, 1MHz±10% (C > 1000 pF · 1KHz±10%) Cap> 30pF 1.0±0.2Vrms, 1MHz±10% (C > 1000 pF · 1KHz±10%) X7R, X5R, X6S, X6T: (Class II) C≤10uF Test Frequency:1KHz±10% Test Voltage:1.0±0.2Vrms C > 10 uF Test Frequency:120±24Hz Test Voltage:0.5 ±0.1Vrms
Rated vol.	DF(×10-4)																										
50V	≤250	0402≤10nF; 0603<100nF; ≥1206≤680nF																									
	≤350	0201≤3.3nF; 0402≤47nF; 0603<470nF; 0805≤1uF; ≥1206≤2.2uF																									
	≤500	0201≤10nF; 0402≤0.1uF																									
	≤750	0805≤2.2uF; ≥1206≤4.7uF																									
	≤1000	0603≤2.2uF; 0805≤10uF; ≥1206≤10uF																									
25V	≤250	0402≤10nF; 0603<100nF; ≥1206≤680nF																									
	≤350	0201≤3.3nF; 0402≤47nF; 0603<470nF; 0805≤1uF																									
	≤500	0201≤10nF; 0402≤0.22uF																									
	≤750	0201>10nF; 0805≤2.2uF; ≥1206≤10uF																									
	≤1000	0201≤100nF; 0402≤2.2uF; 0603≤10uF; 0805≤22uF; ≥1206≤22uF																									

Multilayer Ceramic Chip Capacitor

Item	Requirement		Test Method	
	16V	≤250	0402≤10nF; 0603<100nF; ≥1206≤680nF	
		≤350	01005≤1nF; 0201≤3.3nF; 0402≤47nF; 0603<470nF; 0805≤1uF	
		≤500	0201≤15nF; 0402≤220nF	
		≤750	01005≤10nF; 0201≤47nF; 0805≤4.7μF; ≥1206≤10μF	
		≤1000	0201≤100nF; 0402≤4.7μF; 0603≤10μF; 0805≤22μF; ≥1206≤47μF	
	10V	≤250	0402≤10nF; 0603<100nF; ≥1206≤680nF	
		≤350	01005≤1nF; 0201≤3.3nF; 0402≤47nF; 0603<470nF; 0805≤1uF	
		≤500	0201≤15nF; 0402≤220nF	
		≤750	01005≤10nF; 0201≤47nF; 0805≤2.2μF; ≥1206≤10μF	
		≤1000	0201≤2.2μF; 0402≤10μF; 0603≤22μF; 0805≤47μF; ≥1206≤47μF	
	≤6.3V	≤250	0402≤10nF; 0603<100nF; ≥1206≤680nF	
		≤350	01005≤1nF; 0201≤3.3nF; 0402 47nF; 0603<470nF; 0805≤1uF	
		≤500	0201≤15nF; 0402≤220nF	
		≤750	01005≤10nF; 0201≤47nF; 0805≤2.2uF; ≥1206≤10μF	
		≤1000	01005≤100nF; 0201≤2.2μF; 0402≤10μF; 0603≤47μF; 0805≤47μF; ≥1206≤100uF	
Dielectric Withstanding Voltage(DWV) (For ≤50V)	No breakdown or damage.		Measuring Voltage: Class I :300% Rated voltage Class II :250% Rated voltage Duration: 1~5s Charge/ Discharge Current: 50mA max. (This method excludes high-voltage MLCC)	
Solderability	At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.		Preheating conditions:80 to 120°C; 10~30s. Lead-free soldering Solder Temperature: 245±5°C Duration: 2±0.5s	
Resistance to Flexure of Substrate (Bending Strength)	Appearance: No visible damage ΔC/C: Class I :≤±5% or ±0.5pF, whichever is larger Class II: ≤±10%		Test Board: PCB Warp: 1mm Speed: 1 mm/sec. Unit: mm The measurement should be made with the board in the bending position. 	
Resistance to Soldering Heat	Item	NPO	X7R, X5R, X6S, X6T	Preheating conditions: 100 to 200°C; 60~120s. Solder Temperature: 265±5°C Duration: 10±1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24±2h Recovery condition: Room temperature
	ΔC/C	≤±2.5% or ±0.25pF whichever is larger	±15%	
	DF	Same to initial value		
	IR	Same to initial value		
	Appearance : No visible damage. At least 95% of the terminal electrode is covered by new solder.			
Termination Adhesion	No visible damage		Applied Force: ≤0402 size: 2N ; ≥0603 size: 5N Duration: 10±1S	

Multilayer Ceramic Chip Capacitor

Item	Requirement	Test Method															
Temperature Cycle	NPO: $\Delta C/C: \leq \pm 1\%$ or $\pm 1\text{pF}$, whichever is larger. X7R, X5R, X6S, X6T: $\Delta C/C: -15\% \sim +15\%$	Preheating conditions: up-category temperature, 1h Recovery time: $24 \pm 1\text{h}$ Initial Measurement Cycling Times: 5 times, 1 cycle, 4 steps: <table border="1" data-bbox="962 327 1406 622"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low- category temp NPO/X7R/X5R : -55</td> <td>30</td> </tr> <tr> <td>2</td> <td>Normal temp. (+25)</td> <td>2-3</td> </tr> <tr> <td>3</td> <td>Up- category temp NPO/X7R/ : +125 X5R: +85 X6S/X6T:+105</td> <td>30</td> </tr> <tr> <td>4</td> <td>Normal temp. (+20)</td> <td>2-3</td> </tr> </tbody> </table> Recovery time after test: $24 \pm 2\text{h}$	Step	Temp.(°C)	Time (min)	1	Low- category temp NPO/X7R/X5R : -55	30	2	Normal temp. (+25)	2-3	3	Up- category temp NPO/X7R/ : +125 X5R: +85 X6S/X6T:+105	30	4	Normal temp. (+20)	2-3
Step	Temp.(°C)	Time (min)															
1	Low- category temp NPO/X7R/X5R : -55	30															
2	Normal temp. (+25)	2-3															
3	Up- category temp NPO/X7R/ : +125 X5R: +85 X6S/X6T:+105	30															
4	Normal temp. (+20)	2-3															
Humidity Load	NPO: $\Delta C/C: \pm 7.5\%$ or $\pm 0.75\text{pF}$, whichever is larger. X7R, X5R, X6S, X6T: $\Delta C/C: \leq \pm 12.5\%$ DF: Not more than twice of initial value. IR: NPO: $R_i \geq 5000\text{M}\Omega$ or $R_i \cdot CR \geq 50\text{S}$ whichever is smaller X7R, X5R, X6S, X6T: $R_i \geq 1000\text{M}\Omega$ or $R_i \cdot CR \geq 10\text{S}$ whichever is smaller. Appearance: No visible damage	Humidity: 90~95%RH Voltage: Rated Voltage Duration: 500h Recovery Time: $24\text{h} \pm 2\text{h}$ Class 2 : $0201 \geq 47\text{nF}$ 、 $0402 \geq 33\text{nF}$ 、 $0603 \geq 1\mu\text{F}$ 、 $0805 \geq 4.7\mu\text{F}$ 、 $1206 \geq 10\mu\text{F}$ product need to keep in 150°C 、1h after the test , and measurement to be made after being kept at room temperature for $24 \pm 2\text{h}$.															
Life Test	NPO: $\Delta C/C: \leq \pm 3\%$ or $\pm 0.3\text{pF}$, whichever is larger. X7R, X5R, X6S, X6T: $\Delta C/C: \pm 20\%$ DF: Not more than twice of initial value. IR: NPO: $R_i \geq 4000\text{M}\Omega$ or $R_i \cdot CR \geq 40\text{S}$ whichever is smaller X7R/X5R: $R_i \geq 2000\text{M}\Omega$ or $R_i \cdot CR \geq 50\text{S}$ whichever is smaller. Visual Appearance: No visible damage	Low-Voltage ($< 100\text{V}$) Applied Voltage: $2 \cdot U_r$, except the table 1 Duration: 1000h Temperature : 125°C (NPO、X7R、X7S) 85°C (X5R) 105°C (X6S、X6T) Charge/ Discharge Current: 50mA max. Recovery Time: $24\text{h} \pm 2\text{h}$ Class 2 : $0201 \geq 47\text{nF}$ 、 $0402 \geq 33\text{nF}$ 、 $0603 \geq 1\mu\text{F}$ 、 $0805 \geq 4.7\mu\text{F}$ 、 $1206 \geq 10\mu\text{F}$ product need to keep in 150°C 、1h after the test , and measurement to be made after being kept at room temperature for $24 \pm 2\text{h}$. <table border="1" data-bbox="962 1261 1525 1364"> <thead> <tr> <th>Capacitance</th> <th>Voltage</th> <th>Capacitance</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>$0201 \geq 10\text{nF}$</td> <td rowspan="3">1.5Ur</td> <td>$0805 \geq 0.47\mu\text{F}$</td> <td rowspan="3">1.5Ur</td> </tr> <tr> <td>$0402 \geq 47\text{nF}$</td> <td>$1206 \geq 1\mu\text{F}$</td> </tr> <tr> <td>$603 \geq 220\text{nF}$</td> <td>$1210 \geq 1\mu\text{F}$</td> </tr> </tbody> </table>	Capacitance	Voltage	Capacitance	Voltage	$0201 \geq 10\text{nF}$	1.5Ur	$0805 \geq 0.47\mu\text{F}$	1.5Ur	$0402 \geq 47\text{nF}$	$1206 \geq 1\mu\text{F}$	$603 \geq 220\text{nF}$	$1210 \geq 1\mu\text{F}$			
Capacitance	Voltage	Capacitance	Voltage														
$0201 \geq 10\text{nF}$	1.5Ur	$0805 \geq 0.47\mu\text{F}$	1.5Ur														
$0402 \geq 47\text{nF}$		$1206 \geq 1\mu\text{F}$															
$603 \geq 220\text{nF}$		$1210 \geq 1\mu\text{F}$															

■ Pretreatment (only for class 2 capacitor) is a method to treat the capacitor before measurement. First, place the capacitor in the up-category temperature or other specified higher temperature environment for 1 hour. Then recovery the capacitor at standard pressure conditions for 24 ± 1 hours.

■ Storage Temperature: $5 \sim 40^\circ\text{C}$; Relative Humidity 20 ~70 %RH

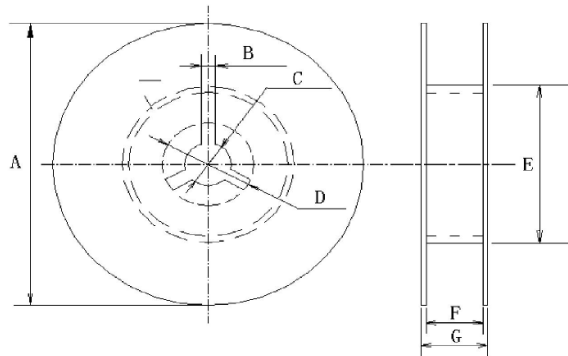
Multilayer Ceramic Chip Capacitor

■Packaging

Packaging Quantity

Type	Packaging (7" Reel)		Packaging (13" Reel)	
	Paper tape	Plastic tape	Paper tape	Plastic tape
01005	20K	-	-	-
0201	15K	-	70K	-
0402	10K	-	50K	-
0603	4K	-	15K	-
0805	4K	T≤1.35mm 3K T>1.35mm 2K	15K	K0 : 1.35 10K
1206	4K	T≤1.35mm 3K	15K	K0 : 1.35 10K K0 : 1.80 8K
		T>1.35mm 2K		
1210	-	T≤1.80mm 2K	-	K0 : 1.80 8K
		T>1.80mm 1K		
1808	-	2K	-	8K
1812	-	T≤1.85mm 1K	-	3K
		T>1.85mm 0.5K		
2220	-	0.5K	-	-
2225	-	0.5K	-	-

Tape and Reel

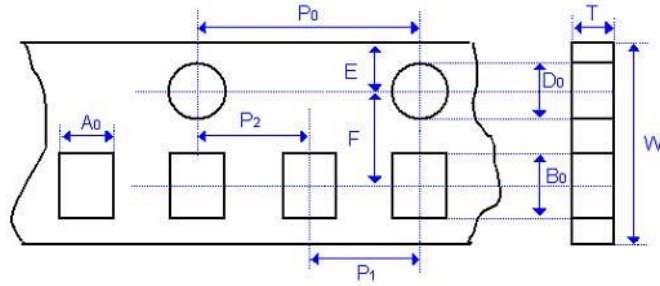


Unit: mm

Reel Diameter	A	B	C	D	E	F	G
7"	178±2.0	3.0	13.0±0.5	21.0±0.8	50 or more	10.0±1.5	12 max
13"	330±2.0	3.0	13.0±0.5	21.0±0.8	92~100	10.0±1.5	12 max

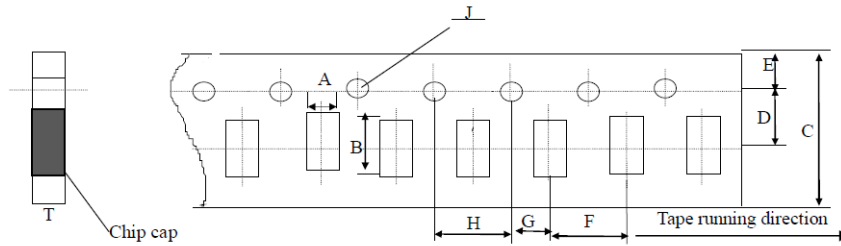
Multilayer Ceramic Chip Capacitor

Paper Tape Size Specification



Unit: mm

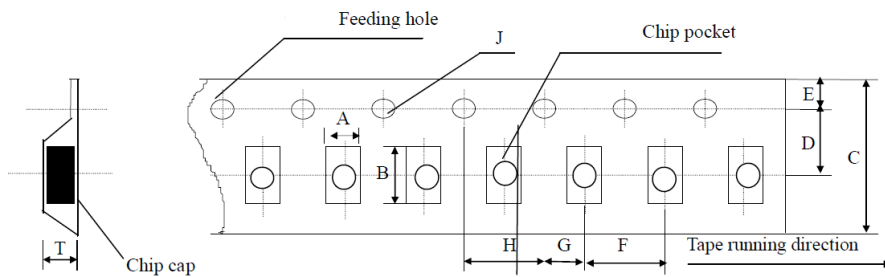
Type	A0	B0	T	W	P0	P1	P2	D0	E	F
01005	0.24±0.20	0.45±0.02	0.30 Below	8.00±0.10	4.00±0.10	2.00±0.05	2.00±0.05	1.5-0/+0.10	1.75±0.10	3.50±0.05
0201	0.37±0.10	0.67±0.10	0.80 Below	8.00±0.10	4.00±0.10	2.00±0.05	2.00±0.05	1.5-0/+0.10	1.75±0.10	3.50±0.05
0402	0.65±0.10	1.15±0.10	0.80 Below	8.00±0.10	4.00±0.10	2.00±0.05	2.00±0.05	1.5-0/+0.10	1.75±0.10	3.50±0.05



Unit: mm

Type	A	B	C	D	E	F	G	H	J	T
0603	1.10±0.10	1.90±0.10	8.00±0.10	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.5-0/+0.10	1.10 Max
0805	1.45±0.15	2.30±0.15	8.00±0.15	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.5-0/+0.10	1.10 Max
1206	1.80±0.20	3.40±0.20	8.00±0.20	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.5-0/+0.10	1.10 Max

Plastic Tape Size Specification



Unit: mm

Type	A	B	C	D	E	F	G	H	J	T
0805	1.55±0.20	2.35±0.20	8.00±0.20	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.50-0/+0.10	1.50 Max
1206	1.95±0.20	3.60±0.20	8.00±0.20	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.50-0/+0.10	1.85 Max
1210	2.70±0.10	3.42±0.10	8.00±0.10	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.55-0/+0.10	3.20 Max
1808	2.20±0.10	4.95±0.10	12.00±0.10	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50-0/+0.10	3.00 Max
1812	3.66±0.10	4.95±0.10	12.00±0.10	5.50±0.05	1.75±0.10	8.00±0.10	2.00±0.05	4.00±0.10	1.55-0/+0.10	4.00 Max
2220	6.20±0.10	6.70±0.10	12.00±0.10	5.50±0.05	1.75±0.10	8.00±0.10	2.00±0.05	4.00±0.10	1.55-0/+0.10	2.40±0.10
2225	6.20±0.10	6.70±0.10	12.00±0.10	5.50±0.05	1.75±0.10	8.00±0.10	2.00±0.05	4.00±0.10	1.55-0/+0.10	2.40±0.10

Multilayer Ceramic Chip Capacitor

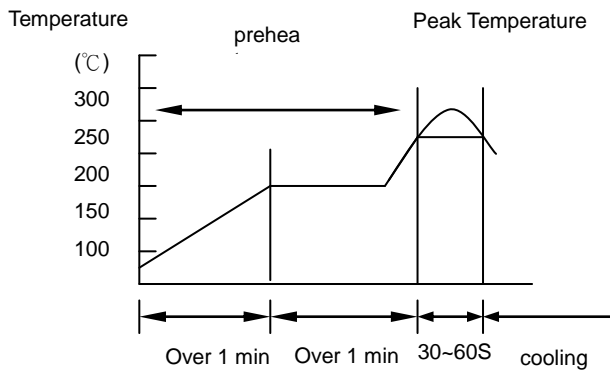
Recommended Soldering Method

Type	Dielectric	Capacitance	Soldering Method
01005	NPO/ X7R/X5R	/	R
0201	NPO	/	R
	X7R/X5R	/	R
0402	NPO	/	R
	X7R/X5R/X6S	/	R
0603	NPO	/	R/W
	X7R/X5R/X6S	C≥1uF	R
		C<1uF	R/W
0805	NPO	/	R/W
	X7R/X5R/X6S	C≥4.7uF	R
		C<4.7uF	R/W
1206	NPO	/	R/W
	X7R/X5R/X6S	C≥10uF	R
		C<10uF	R/W
≥1210	NPO	/	R
	X7R/X5R/X6S	/	R

Soldering method : R - Reflow Soldering
W - Wave Soldering

The temperature profile for soldering

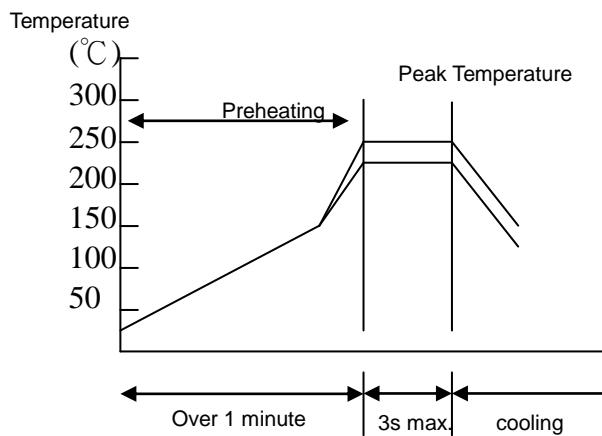
Re-flow soldering



	Pb-Sn soldering	Lead-free soldering
Peak temperature	230°C ~250°C	240°C ~260°C

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as: $T \leq 150^{\circ}\text{C}$.

Wave soldering



	Pb-Sn soldering	Lead-free soldering
Peak temperature	230°C ~260°C	240°C ~270°C

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as: $T \leq 150^{\circ}\text{C}$.