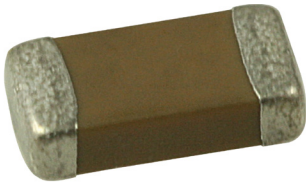


General Purpose Ceramic Capacitors (C Series)



Features:

- RoHS Compliant and Halogen Free
- Capacitance range: 0.1pF to 220uF
- Voltage range: 4V to 100V
- Terminations: 100% matte Tin (Sn), Palladium (Pd-Ag), Gold (Au) and Lead (Pb)
- Very low ESR in X7R/X5R (<10mΩ typical)

Part Number Structure

C Series	0805 Size	COG Temperature Characteristic (Dielectric)	500 Rated Voltage	101 Capacitance (picofarads)	J Tolerance	N Termination	P Packaging	Optional Thickness Identifier
01005	0201	COG	1st two digits are significant followed by number of zeroes.	1st two digits are significant, followed by number of zeroes. e.g. : 101 = 100pF	* B = $\pm 0.1\text{pF}$ * C = $\pm 0.25\text{pF}$ * D = $\pm 0.5\text{pF}$ F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ N = $\pm 30\%$ Z = $\pm 80 - 20\%$ * For values below 10pF only.	N = 100% matte Tin (Sn) over Nickel * P = Palladium Silver * G = Gold over Nickel Pb = 90% Tin (Sn)/10% Lead (Pb) * Pd/Ag & Gold terminations have limited values & sizes available.	D = Paper Tape (10" Reel) E = Embossed Tape (7" Reel) P = Paper Tape (7" Reel) R = Paper Tape (13" Reel) U = Embossed Tape (13" Reel)	Leave blank for standard thickness. Designate "-" for Min. "*" for Max. followed by Thickness Code e.g. :-E (min. thickness of .026") *E (max. thickness of .026")
0402	0603	X7R	4R0 = 4.0 VDCW	6R3 = 6.3 VDCW				
0805	1206	X6S	6R3 = 6.3 VDCW	100 = 10 VDCW				
1210	1812	X5R	160 = 16 VDCW	101 = 100pF				
2221	2220	Z5U	250 = 25 VDCW	R denotes decimal				
			500 = 50 VDCW	6R8 = 6.8pF				
			630 = 63 VDCW					
			101 = 100 VDCW					

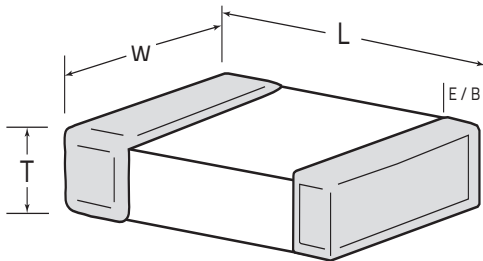
Example P/N: C0805COG500-101JNP

Optional Thickness Identifier Codes:

CODE:	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	6
DIMENSION:	.015	.020	.026	.030	.035	.040	.045	.050	.055	.060	.065	.070	.075	.080	.085	.090	.095	.100	.105	.110	.023

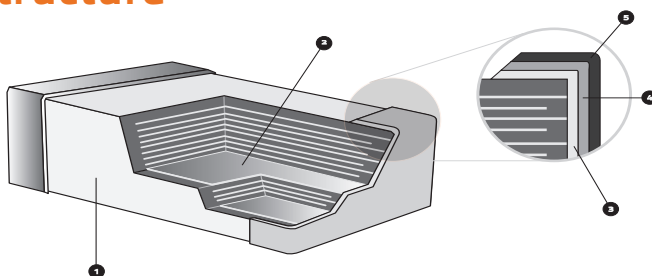
Dimensions

Unit: inches (mm)



Size	L	W	T	E/B
01005	0.016 $\pm$ 0.0008 (0.4 $\pm$ 0.02)	0.008 $\pm$ 0.0008 (0.2 $\pm$ 0.02)	See Specific Value	0.002 (min.) (0.05)
0201	0.024 $\pm$ 0.002 (0.6 $\pm$ 0.05)	0.012 $\pm$ 0.002 (0.3 $\pm$ 0.05)	See Specific Value	0.002 (min.) (0.20)
0402	0.040 $\pm$ 0.002 (1.0 $\pm$ 0.05)	0.020 $\pm$ 0.002 (0.5 $\pm$ 0.05)	See Specific Value	0.004 (min.) (0.10)
0603	0.063 $\pm$ 0.006 (1.6 $\pm$ 0.15)	0.031 $\pm$ 0.0046 (0.8 $\pm$ 0.15)	See Specific Value	0.008 (min.) (0.20)
0805	0.08 $\pm$ 0.008 (2.0 $\pm$ 0.20)	0.050 $\pm$ 0.008 (1.25 $\pm$ 0.20)	See Specific Value	0.020 $\pm$ 0.010 (0.508 $\pm$ 0.254)
1206	0.126 $\pm$ 0.008 (3.2 $\pm$ 0.20)	0.063 $\pm$ 0.008 (1.6 $\pm$ 0.20)	See Specific Value	0.020 $\pm$ 0.010 (0.508 $\pm$ 0.254)
1210	0.126 $\pm$ 0.008 (3.2 $\pm$ 0.20)	0.098 $\pm$ 0.008 (2.50 $\pm$ 0.20)	See Specific Value	0.020 $\pm$ 0.010 (0.508 $\pm$ 0.254)
1812	0.177 $\pm$ 0.012 (4.495 $\pm$ 0.30)	0.126 $\pm$ 0.012 (3.20 $\pm$ 0.30)	See Specific Value	0.024 $\pm$ 0.015 (0.6096 $\pm$ 0.381)
2220	0.225 $\pm$ 0.016 (5.715 $\pm$ 0.41)	0.200 $\pm$ 0.006 (5.08 $\pm$ 0.41)	See Specific Value	0.025 $\pm$ 0.015 (0.635 $\pm$ 0.381)

Structure

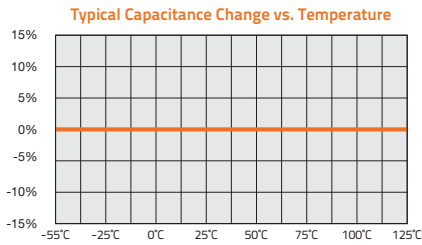


1	Ceramic Body (dielectric)	4	Nickel Plating
2	Inner Electrode	5	Tin Plating
3	Inner Termination		

General Purpose Ceramic Capacitors (C Series)

Electrical Specifications

NPO/COG



Operating Temperature Range:
-55°C to +125°C

Temperature Coefficient:
0 ±30PPM/°C

Temperature Voltage Coefficient:
0 ±30PPM/°C

Insulation Resistance:
>1000 Ω-F or 10 GΩ, for values ≤ 0.047μF (whichever is less at 25°C, VDCV).
For Capacitance values > 0.047μF, the 500 Ω-F rule applies. (The IR at 125°C is 10% of the value at 25°C)

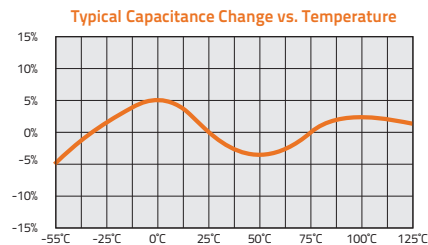
Ageing:
None

Withstanding Voltage:
>2.5 times VDCV

Capacitance Tolerance:
B,C,D,F,G,J,K

Dissipation Factor:
0.1% max

X7R



Operating Temperature Range:
-55°C to +125°C

Temperature Coefficient:
0 ±15%Δ°C MAX.

Temperature Voltage Coefficient:
X7R not applicable

Insulation Resistance:
>100 Ω-F or 10 GΩ, whichever is less at 25°C, VDCV. (The IR at 125°C is 10% of the value at 25°C)

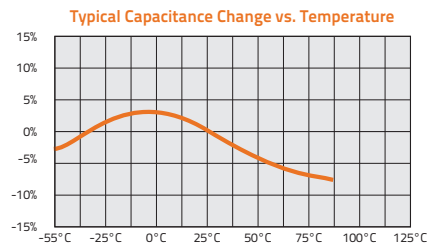
Ageing:
2.5% per decade hour, typical

Withstanding Voltage:
>2.5 times VDCV

Capacitance Tolerance:
J,K,M

Rated Voltage	D.F.	Exception of D.F.	
≥50V	≤2.5%	≤3%	0201 (50V); 0603≥0.047μF 0805≥0.22μF; 1206≥0.47μF
		≤5%	0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF
25V	≤2.5%	≤5%	0201≥0.01μF; 0805≥1μF; 1210≥4.7μF
		≤10%	0402≥0.10μF; 0603≥0.33μF; 0805≥2.2μF 1206≥4.7μF; 1210≥22μF
16V	≤3.5%	≤5%	0201≥0.01μF; 0402≥0.033μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF
		≤10%	0402≥0.47μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF
10V	≤5%	≤10%	0402≥0.33μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF
6.3V	≤10%		

X5R



Operating Temperature Range:
-55°C to +85°C

Temperature Coefficient:
0 ±15%Δ°C MAX.

Temperature Voltage Coefficient:
X5R not applicable

Insulation Resistance:
>100 Ω-F or 10 GΩ, whichever is less at 25°C, VDCV. (The IR at 125°C is 10% of the value at 25°C)

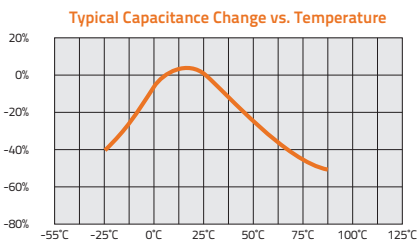
Ageing:
2.5% per decade hour, typical

Withstanding Voltage:
>2.5 times VDCV

Capacitance Tolerance:
K,M

Rated Voltage	D.F.	Exception of D.F.	
≥50V	≤2.5%	≤3%	0201 (50V); 0603≥0.047μF 0805≥0.22μF; 1206≥0.47μF
		≤5%	0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF
25V	≤2.5%	≤5%	0201≥0.01μF; 0805≥1μF; 1210≥4.7μF
		≤10%	0402≥0.10μF; 0603≥0.33μF; 0805≥2.2μF 1206≥4.7μF; 1210≥22μF
16V	≤3.5%	≤5%	0201≥0.01μF; 0402≥0.033μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF
		≤10%	0402≥0.47μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF
10V	≤5%	≤10%	0402≥0.33μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF
6.3V	≤10%		

Z5U



Operating Temperature Range:
+10°C to +85°C

Temperature Coefficient:
+22% - 56%Δ°C MAX.

Insulation Resistance:
>100 Ω-F or 10 GΩ, whichever is less at 25°C, VDCV. (The IR at 125°C is 10% of the value at 25°C)

Ageing:
5% per decade hour, typical

Withstanding Voltage:
>2.5 times VDCV

Capacitance Tolerance:
M,Z

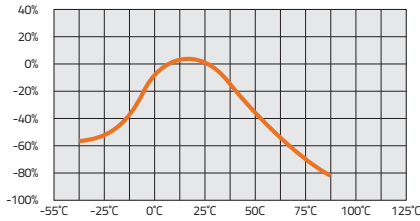
Rated Voltage	D.F.	Exception of D.F.	
≥50V	≤5%	≤9%	0603≥0.1μF; 0805≥0.47μF; 1206≥4.7μF;
25V	≤5%	≤9%	0402≥0.047μF; 0603≥0.1μF; 0805≥0.33μF; 1206≥1μF; 1210≥4.7μF
16V	≤9%	≤12.5%	0603≥2.2μF; 0805≥3.3μF; 1206≥10μF; 1210≥22μF; 1812≥47μF
10V	≤12.5%	≤16%	0603≥2.2μF; 0805≥3.3μF; 1206≥4.7μF; 1210≥10μF; 1812≥47μF
6.3V	≤16%		

General Purpose Ceramic Capacitors (C Series)

Electrical Specifications

Y5V

Typical Capacitance Change vs. Temperature



Operating Temperature Range:

-30°C to +85°C

Temperature Coefficient:

+22% - 82%Δ°C MAX.

Insulation Resistance:

>100 Ω-F or 10 GΩ, whichever is less at 25°C, WDCV. (The IR at 125°C is 10% of the value at 25°C)

Ageing:

7% per decade hour, typical

Withstanding Voltage:

>2.5 times VDCW

Capacitance Tolerance:

M,Z

Rated Voltage	D.F.	Exception of D.F.	
		≤5%	≤9%
≥50V	≤5%	≤9%	0603±0.1uF; 0805±0.47uF; 1206±4.7uF;
25V	≤5%	≤9%	0402±0.047uF; 0603±0.1uF; 0805±0.33uF; 1206±1uF; 1210±4.7uF
16V	≤9%	≤12.5%	0603±2.2uF; 0805±3.3uF; 1206±10uF; 1210±22uF; 1812±47uF
10V	≤12.5%	≤16%	0603±2.2uF; 0805±3.3uF; 1206±4.7uF; 1210±10uF; 1812±47uF
6.3V	≤16%		

Test Parameters

Test parameters for Multilayer Ceramic Capacitors - X7R, X5R, X6S, X7S, Z5U and Y5V: 1KHz ± 100Hz at 1.0 ± 0.2 Vrms < 10uF (10 V min.)

1KHz ± 100Hz at 1.0 ± 0.1 Vrms < 10uF (6.3V max.)

120Hz ± 24Hz at 1.0 ± 0.1 Vrms ≥ 10uF

Test parameters for Multilayer Ceramic Capacitors - NPO/COG:

1MHz ± 100KHz at 1.0 ± 0.2 Vrms ≤ 1000pF, 25°C

1KHz ± 100Hz at 1.0 ± 0.2 Vrms > 1000pF, 25°C

Note: To ensure proper capacitance readings, the voltage level must be held constant. The HP4284 and Agilent E4980 has a "ALC" (Automatic Level Control) function and should be switched to the "ON" position for accurate capacitance readings.

Voltage and Capacitance Range

COG (NPO) Dielectric

Values that are typically available.

(All measurements in inches)

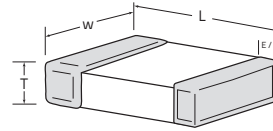
Size		01005 (± 0.0008)		0201 (± 0.002)		0402 (± 0.004)		0504 (± 0.008)		0603 (± 0.006)		0805 (± 0.008)		1206 (± 0.008)		1210 (± 0.008)		1812 (± 0.012)	
T (max)		0.008		0.012		0.025		0.040		0.033		0.055		0.070		0.075		0.085	
Min E/B		0.002		0.002		0.004		0.005		0.008		0.020 ± .010		0.020 ± .010		0.020 ± .010		0.024 ± .015	
VDCW (MAX)		6.3V	16V	25V	50V	25V	50V	25V	50V	100V	50V	100V	50V	100V	25V	50V	100V	50V	100V
CAPACITANCE CODE CAPACITANCE VALUE	OR1	0.1pF																	
	OR2	0.2pF																	
	OR3	0.3pF																	
	OR4	0.4pF																	
	OR5	0.5pF																	
	1R0	1.0pF																	
	1R2	1.2																	
	1R5	1.5																	
	1R8	1.8																	
	2R2	2.2																	
	2R7	2.7																	
	3R3	3.3																	
	3R9	3.9																	
	4R7	4.7																	
	5R0	5.0																	
	5R6	5.6																	
	6R8	6.8																	
	8R2	8.2																	
	100	10pF																	
	120	12																	
	150	15																	
	180	18																	
	220	22																	

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

X7R Dielectric



Values that are typically available.

(All measurements in inches)

Size		01005 (± 0.0008)		0201 (± 0.002)				0402 (± 0.004)				0504 (± 0.008)			0603 (± 0.006)					0805 (± 0.008)		
L		0.016		0.024				0.040				0.053			0.063					0.080		
W		0.008		0.012				0.020				0.040			0.032					0.050		
T (max)		0.008		0.012				0.025				0.040			0.038					0.058		
Min E/B		0.002		0.002				0.004				0.005			0.008					0.020 ± .010		
VDCW (MAX)		6.3V	10V	6.3V	10V	16V	25V	16V	25V	50V	100V	25V	50V	100V	10V	16V	25V	50V	100V	25V	50V	100V
CAPACITANCE CODE ->-																						

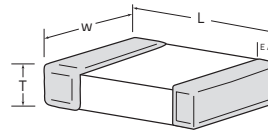
Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

All components manufactured with the X7R dielectric are also available as an X5R dielectric.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

X7R Dielectric



Values that are typically available.

(All measurements in inches)

Size			0201 (± 0.002)			0402 (± 0.004)				0603 (± 0.006)						0805 (± 0.008)							
L			0.024			0.040				0.063						0.080							
W			0.012			0.020				0.032						0.050							
T (max) *			0.012			0.025				0.038						0.058							
Min E/B			0.002			0.004				0.008						0.020 ± .010							
VDCW (MAX)			4V	6.3V	10V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	100V	6.3V	10V	16V	25V	50V	100V	
CAPACITANCE CODE	393	CAPACITANCE VALUE	.039																				
	473		.047																				
	563		.056																				
	683		.068																				
	823		.082																				
	104		.100uF																				
	124		.120																				
	154		.150																				
	184		.180																				
	224		.220																				
	274		.270																				
	334		.330																				
	394		.390																				
	474		.470																				
	564		.560																				
	684		.680																				
	824		.820																				
	105		1.00uF																				
	125		1.20																				
	155		1.50																				
	185		1.80																				
	225		2.20																				
	335		3.30																				
	475		4.70																				
685	6.80																						
106	10.0uF																						
156	15.0uF																						
226	22.0uF																						
476	47.0uF																						
107	100.0uF																						

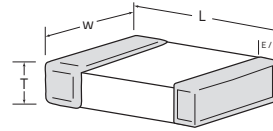
* For values above 1uF, thickness may be greater than specified above.
T(max): 0603 – 0.040"
0805 – 0.060"

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

X7R Dielectric



Values that are typically available.

(All measurements in inches)

Size		1206 (± 0.008)					1210 (±0.008)					1812 (±0.012)						2220 / 2221 °(±0.016)			
L		0.126					0.126					0.177						0.225 / .225			
W		0.063					0.098					0.126						0.200 / .210			
T (max)*		0.070					0.125					0.085						0.108 / .108			
Min E/B		0.020 ± .010					0.020 ± .010					.024 ± .015						00.025 ± .015			
VDCW (MAX)		10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	6.3V	10V	16V	25V	50V	100V	16V	25V	50V	100V
CAPACITANCE CODE ->-																					

* For values above 1uF, thickness may be greater than specified above.

T(max): 1206 – 0.075" 1812 – 0.130"
1210 – 0.125" 2220 – 0.135"

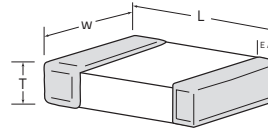
Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

All components manufactured with the X7R dielectric are also available as an X5R dielectric.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

X7R Dielectric



Values that are typically available.

(All measurements in inches)

Size	1206 (± 0.008)						1210 (±0.008)						1812 (±0.012)						2220 / 2221 (±0.016)			
L	0.126						0.126						0.177						0.225 / .225			
W	0.063						0.098						0.126						0.200 / .210			
T (max)*	0.070						0.125						0.095						0.108 / .108			
Min E/B	0.020 ± .010						0.020 ± .010						0.024 ± .015						0.025 ± .015			
VDCW (MAX)	6.3V	10V	16V	25V	50V	100V	6.3V	10V	16V	25V	50V	100V	6.3V	10V	16V	25V	50V	100V	16V	25V	50V	100V
394	.390																					
474	.470																					
564	.560																					
684	.680																					
824	.820																					
105	1.00uF																					
125	1.20																					
155	1.50																					
185	1.80																					
225	2.20																					
335	3.30																					
475	4.70																					
685	6.80																					
106	10.0uF																					
156	15.0uF																		X7S	X7S	X7S	
226	22.0uF																					
476	47.0uF																					
107	100.0uF																					

* For values above 1uF, thickness may be greater than specified above.

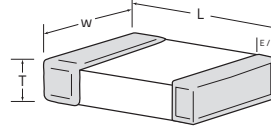
T(max): 1206 – 0.075" 1812 – 0.130"
1210 – 0.125" 2220 – 0.135"

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

X5R Dielectric



Values that are typically available.

(All measurements in inches)

Size		01005 (± 0.0008)		0201 (± 0.002)		0402 (± 0.004)		0603 (± 0.006)		0805 (± 0.008)		1206 (± 0.008)		1210 (±0.016)		1812 (±0.016)															
L		0.016		0.024		0.040		0.063		0.080		0.126		0.126		0.177															
W		0.008		0.012		0.020		0.032		0.050		0.063		0.098		0.126															
T (max)		0.008		0.012		0.025		0.040		0.060		0.072		0.125		0.130															
Min. E/B		0.002		0.002		0.004		0.008		0.020 ± .010		0.020 ± .010		0.020 ± .010		0.024 ± .015															
VDCW (MAX)		6.3V	10V	4V	6.3V	10V	16V	25V	4V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	35V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	16V	25V
CAPACITANCE CODE →																															

For values above 1uF, thickness may be greater than specified above.

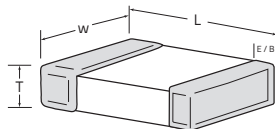
T(max): 1206 – 0.075" 1812 – 0.130"
1210 – 0.125" 2220 – 0.135"

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

X5R Dielectric (0402 - 1206)



Values that are typically available.

(All measurements in inches)

Size			0201 (± 0.002)			0402 (± 0.008)			0603 (± 0.006)					0805 (± 0.008)					1206 (± 0.008)						
L			0.024			0.040			0.063					0.080					0.126						
W			0.012			0.020			0.032					0.050					0.063						
T (max)			0.0216			0.0335			0.040					0.060					0.072						
Min E/B			0.002			0.004			0.008					0.020 ± .010					0.020 ± .010						
VDCW (MAX)			4V	6.3V	10V	4V	6.3V	10V	16V	4V	6.3V	10V	16V	25V	4V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
CAPACITANCE CODE 395 475 685 106 156 226 476 107 157 227	CAPACITANCE VALUE	3.90uF																							
		4.70uF																							
		6.80uF																							
		10.0uF																							
		15.0uF																							
		22.0uF																							
		47.0uF																							
		100.0uF																							
		150.0uF																							
		220.0uF																							

X5R Dielectric (1210 - 2221)

(All measurements in inches)

Size		1210 (±0.016)					1812 (±0.016)				2220 / 2221 (±0.016)			
L		0.126					0.177				0.225 / .225			
W		0.098					0.126				0.200 / .210			
T (max)		0.125					0.130				0.135			
Min E/B		0.020 ± .010					0.024 ± .015				0.025 ± .015			
VDCW (MAX)		6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	6.3V	10V	25V	50V
CAPACITANCE CODE ----->	CAPACITANCE VALUE ----->	395	3.90uF											
		475	4.70uF											
		685	6.80uF											
		106	10.0uF											
		156	15.0uF											
		226	22.0uF											
		476	47.0uF											
		107	100.0uF											
		157	150.0uF											
		227	220.0uF											

For values above 1uF, thickness may be greater than specified above.

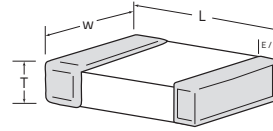
T(max): 1206 – 0.075" 1812 – 0.130"
1210 – 0.125" 2220 – 0.135"

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

Z5U Dielectric



Values that are typically available.

(All measurements in inches)

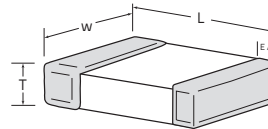
Size	0504 (± 0.008)		0603 (± 0.006)		0805 (± 0.008)		1206 (± 0.008)		1210 (± 0.016)		1812 (± 0.016)		2220 / 2221 (± 0.016)	
L	0.050		0.063		0.080		0.126		0.126		0.177		0.225 / .225	
W	0.040		0.032		0.050		0.063		0.098		0.126		0.200 / .210	
T (max)	0.040		0.038		0.058		0.070		0.075		0.085		0.108 / .108	
Min E/B	0.005		0.008		0.020 ± .010		0.020 ± .010		0.020 ± .010		0.024 ± .015		0.025 ± .015	
VDCW (MAX)	25V 50V		25V 50V		25V 50V		25V 50V		25V 50V		25V 50V		25V 50V	
102	1000pF													
122	1200													
152	1500													
182	1800													
222	2200													
272	2700													
332	3300													
392	3900													
472	4700													
562	5600													
682	6800													
822	8200													
103	.01uF													
123	.012													
153	.015													
183	.018													
223	.022													
273	.027													
333	.033													
393	.039													
473	.047													
563	.056													
683	.068													
823	.082													
104	.100uF													
124	.120													
154	.150													
184	.180													
224	.220													
274	.270													
334	.330													

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

Z5U Dielectric



Values that are typically available.

(All measurements in inches)

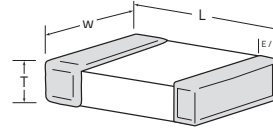
Size	0504 (± 0.008)		0603 (± 0.006)		0805 (± 0.008)		1206 (± 0.008)		1210 (± 0.016)		1812 (± 0.016)		2220 / 2221 (± 0.016)	
L	0.050		0.063		0.080		0.126		0.126		0.177		0.225 / .225	
W	0.040		0.032		0.050		0.063		0.098		0.126		0.200 / .210	
T (max)	0.040		0.038		0.058		0.070		0.075		0.085		0.108 / .108	
Min E/B	0.005		0.008		0.020 ± .010		0.020 ± .010		0.020 ± .010		0.024 ± .015		0.025 ± .015	
VDCW (MAX)	25V 50V		25V 50V		25V 50V		25V 50V		25V 50V		25V 50V		25V 50V	
CAPACITANCE CODE ↑ 394 474 564 684 824 105 125 155 185 225 335 395 475 685 106 156 226 476 107 ↓	CAPACITANCE VALUE ↑ .390 .470 .560 .680 .820 1.00uF 1.20 1.50 1.80 2.20 3.30 3.90 4.70 6.80 10.0uF 15.0uF 22.0uF 47.0uF 100.0uF ↓													

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available. For values above 1uF, thickness may be greater than specified above.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

Y5V Dielectric



Values that are typically available.

(All measurements in inches)

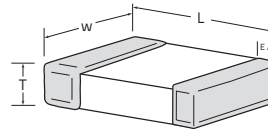
Size		0201 (± 0.002)		0402 (± 0.004)			0603 (± 0.006)					0805 (± 0.008)					1206 (± 0.008)					1210 (±0.016)					1812 (±0.016)			
L		0.024		0.040			0.063					0.080					0.126					0.126					0.177			
W		0.012		0.020			0.032					0.050					0.063					0.098					0.126			
T (max)		0.012		0.025			0.038					0.058					0.070					0.096					0.085			
Min E/B		0.002		0.004			0.008					0.020 ± .010					0.020 ± .010					0.020 ± .010					0.024 ± .015			
VDCW (MAX)		10V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	6.3V	10V	16V	25V	6.3V	10V	25V		
CAPACITANCE CODE →	102	1000pF																												
	122	1200																												
	152	1500																												
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	332	3300																												
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Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.
For values above 1uF, thickness may be greater than specified above.

General Purpose Ceramic Capacitors (C Series)

Voltage and Capacitance Range

Y5V Dielectric



Values that are typically available.

(All measurements in inches)

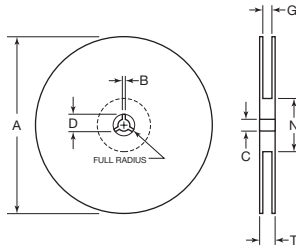
Size		0201 (± 0.002)		0402 (± 0.004)		0603 (± 0.006)				0805 (± 0.008)				1206 (± 0.008)				1210 (±0.016)				1812 (±0.016)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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VDCW (MAX)		10V	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.
For values above 1uF, thickness may be greater than specified above.

General Purpose Ceramic Capacitors (C Series)

Tape and Reel Specifications

All tape and reel specifications must be adhered to per EIA-481-1-A.

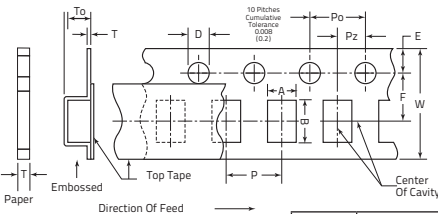


Reel Dimensions

Unit: mm (inch)

Tape	B min	C	A (7")	A (13")	D min	N min	G	T max
4mm	2.0 (0.079)	13 ± 0.05 (0.512 ± 0.02)	178 ± 2.0 (7 ± 0.079)	-	21 ± 0.8 (0.82 ± 0.03)	50 (1.97)	5.0 ± 1.5 (0.196 ± 0.05)	8.0 max (0.315 max)
8mm	2.0 (0.07)	13 ± 0.05 (0.512 ± 0.02)	178 ± 2.0 (7 ± 0.079)	330 ± 2.0 (13 ± 0.08)	20.2 (0.795)	50 (1.97)	10 ± 1.5 (0.394 ± 0.059)	14.9 (0.587)
12mm	2.0 (0.07)	13 ± 0.05 (0.512 ± 0.02)	178 ± 2.0 (7 ± 0.079)	330 ± 2.0 (13 ± 0.08)	20.2 (0.795)	50 (1.97)	10 ± 1.5 (0.394 ± 0.059)	14.9 (0.587)

Taping Specifications



7 in. Reel Quantities **

Size	01005 (E)	01005 (P)	0201	0402	0603	0805	1206	1210	1812	2221
Tape Size	4mm	8mm	8mm	8mm	8mm	8mm	8mm	8mm	12mm	12mm
Min Qty Per Reel	40,000*	20,000*	15,000	5,000	3,000	2,000	2,000	1,000	1,000	1,000
Max Qty Per Reel	40,000*	20,000*	15,000	10,000	4,000	5,000	5,000	5,000	3,000	1,000

Note: ** Quantity dependent on thickness

*Smaller quantities may be available. Please contact us.

Unit: mm (inch)

Paper Tape Carrier Dimensions (8mm)

Size (inches)	A	B	W	F	E	Po	Pz	D	t	P
01005	$\frac{0.25 \pm 0.05}{(0.010 \pm .002)}$	$\frac{0.45 \pm 0.05}{(0.018 \pm .002)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{2.0 \pm 0.05}{(.079 \pm .002)}$
0201	$\frac{0.37 \pm 0.05}{(0.014 \pm .002)}$	$\frac{0.67 \pm 0.05}{(0.026 \pm .002)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{2.0 \pm 0.05}{(.079 \pm .002)}$
0402	$\frac{0.65 \pm 0.1}{(.026 \pm .004)}$	$\frac{1.10 \pm 0.2}{(.043 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{2.0 \pm 0.05}{(.079 \pm .002)}$
0603	$\frac{1.10 \pm 0.2}{(.043 \pm .008)}$	$\frac{1.90 \pm 0.2}{(.075 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$
0805	$\frac{1.16 \pm 0.2}{(.046 \pm .008)}$	$\frac{2.4 \pm 0.2}{(.095 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$
1206	$\frac{2.0 \pm 0.2}{(.079 \pm .008)}$	$\frac{3.6 \pm 0.2}{(.142 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$

Embossed Carrier Dimensions (4mm, 8mm & 12mm)

Size (inches)	A	B	W	F	E	Po	Pz	D	To	T	P
01005	$\frac{0.23}{(0.009)}$	$\frac{0.43}{(0.016)}$	$\frac{4.0 \pm 0.05}{(0.157 \pm 0.002)}$	$\frac{1.8 \pm 0.02}{(0.070 \pm 0.001)}$	$\frac{0.9 \pm 0.05}{(0.035 \pm 0.002)}$	$\frac{2.0 \pm 0.04}{(0.079 \pm 0.001)}$	$\frac{2.00}{(0.079)}$	$\frac{0.8 \pm 0.04}{(0.031 \pm 0.001)}$	$\frac{0.5 \text{ max}}{(0.019 \text{ max})}$	$\frac{0.15 - 0.4}{(0.005 - 0.015)}$	$\frac{1.00}{(0.039)}$
0805	$\frac{1.48 \pm 0.2}{(.058 \pm .008)}$	$\frac{2.3 \pm 0.2}{(.091 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm .0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{(.079 \pm .002)}$	$\frac{1.5 \pm 0.1}{- 0.0}$ $\frac{- 0.0}{(.06 \pm .004)}$ $- .000$	$\frac{2.5 \text{ MAX}}{(.098 \text{ MAX})}$	$\frac{0.6 \text{ MAX}}{(.024 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$
1206	$\frac{2.0 \pm 0.2}{(.079 \pm .008)}$	$\frac{3.6 \pm 0.2}{(.142 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm .0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{(.079 \pm .002)}$	$\frac{1.5 \pm 0.1}{- 0.0}$ $\frac{- 0.0}{(.06 \pm .004)}$ $- .000$	$\frac{2.5 \text{ MAX}}{(.098 \text{ MAX})}$	$\frac{0.6 \text{ MAX}}{(.024 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$
1210	$\frac{2.9 \pm 0.2}{(.114 \pm .008)}$	$\frac{3.6 \pm 0.2}{(.142 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm .0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{(.079 \pm .002)}$	$\frac{1.5 \pm 0.1}{- 0.0}$ $\frac{- 0.0}{(.06 \pm .004)}$ $- .000$	$\frac{2.5 \text{ MAX}}{(.098 \text{ MAX})}$	$\frac{0.6 \text{ MAX}}{(.024 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$
1812	$\frac{3.6 \pm 0.2}{(.142 \pm .008)}$	$\frac{4.9 \pm 0.2}{(.193 \pm .008)}$	$\frac{12.0 \pm 0.3}{(.472 \pm .012)}$	$\frac{5.6 \pm .0.1}{(.221 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{(.079 \pm .002)}$	$\frac{1.5 \pm 0.1}{- 0.0}$ $\frac{- 0.0}{(.06 \pm .004)}$ $- .000$	$\frac{3.8 \text{ MAX}}{(.150 \text{ MAX})}$	$\frac{0.6 \text{ MAX}}{(.024 \text{ MAX})}$	$\frac{8.0 \pm 0.1}{(.315 \pm .004)}$

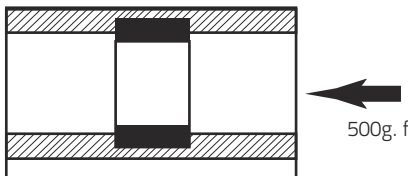
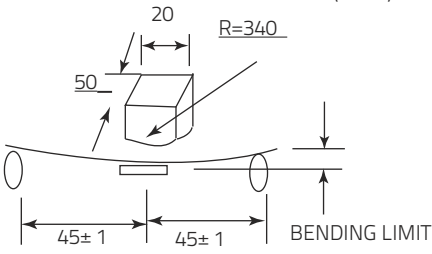
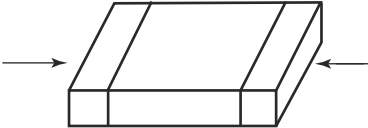
General Purpose Ceramic Capacitors (C Series)

Environmental Test Criteria

NO	ITEM		PERFORMANCE			TEST CONDITION																														
1	APPEARANCE		NO ABNORMAL EXTERIOR APPEARANCE			THROUGH MICROSCOPE (X10)																														
2	INSULATION RESISTANCE		10,000M OR 500M μ F PRODUCT WHICHEVER IS SMALLER (RATED VOLTAGE IS BELOW 16V: 10,000M OR 100M μ F)			RATED VOLTAGE SHALL BE APPLIED. MEASUREMENT TIME IS 60 - 120 RATED VOLTAGE TIME 60 SEC .																														
3	WITHSTANDING VOLTAGE		NO DIELECTRIC BREAKDOWN OR MECHANICAL BREAKDOWN			CLASS I : 300% OF THE RATED VOLTAGE FOR 1-5 SEC, CLASS II: 250% OF THE RATED VOLTAGE FOR 1-5 SEC IS APPLIED WITH LESS THAN 50 mA CURRENT																														
4	CAPACITANCE	CLASS I	WITHIN THE SPECIFIED TOLERANCE			CAPACITANCE	FREQUENCY	VOLTAGE																												
						1,000pF AND BELOW	1MHz $\pm$ 10%	0.5 ~ 5 Vrms																												
						MORE THAN 1,000 pF	1kHz $\pm$ 10%																													
		CLASS II	WITHIN THE SPECIFIED TOLERANCE			CAPACITANCE	FREQUENCY	VOLTAGE																												
						10 μ F AND BELOW	1kHz $\pm$ 10%	1.0 $\pm$ 0.2Vrms																												
				MORE THAN 10 μ F	120Hz $\pm$ 20%	0.5 $\pm$ 0.1Vrms																														
5	Q	CLASS I	OVER 30pF : Q 1,000 LESS THAN 30pF: Q 400 +20C (C: CAPACITANCE)			CAPACITANCE	FREQUENCY	VOLTAGE																												
						1,000pF AND BELOW	1MHz $\pm$ 10%	0.5 ~ 5 Vrms																												
						MORE THAN 1,000 pF	1kHz $\pm$ 10%																													
6	DISSIPATION FACTOR (Tan θ CLASS II)	CLASS II	X7R, X6S, X5R																																	
			<table><tr><th>Rated Voltage</th><th>D.F.</th><th colspan="2">Exception of D.F.</th></tr><tr><td rowspan="2">$\geq$50V</td><td rowspan="2">$\leq$2.5%</td><td>$\leq$3%</td><td>0201 (50V); 0603$\geq$0.047μF 0805$\geq$0.22μF; 1206$\geq$0.47μF</td></tr><tr><td>$\leq$5%</td><td>0603$\geq$1μF; 0805$\geq$1μF; 1206$\geq$4.7μF; 1210$\geq$4.7μF</td></tr><tr><td rowspan="2">25V</td><td rowspan="2">$\leq$2.5%</td><td>$\leq$5%</td><td>0201$\geq$0.01μF; 0805$\geq$1μF; 1210$\geq$4.7μF</td></tr><tr><td>$\leq$10%</td><td>0402$\geq$0.10μF; 0603$\geq$0.33μF; 0805$\geq$2.2μF 1206$\geq$4.7μF; 1210$\geq$22μF</td></tr><tr><td rowspan="2">16V</td><td rowspan="2">$\leq$3.5%</td><td>$\leq$5%</td><td>0201$\geq$0.01μF; 0402$\geq$0.033μF; 0805$\geq$0.68μF; 1206$\geq$2.2μF; 1210$\geq$4.7μF</td></tr><tr><td>$\leq$10%</td><td>0402$\geq$0.47μF; 0603$\geq$0.68μF; 0805$\geq$2.2μF; 1206$\geq$4.7μF; 1210$\geq$22μF</td></tr><tr><td>10V</td><td>$\leq$5%</td><td>$\leq$10%</td><td>0402$\geq$0.33μF; 0603$\geq$0.33μF; 0805$\geq$2.2μF; 1206$\geq$2.2μF; 1210$\geq$22μF</td></tr><tr><td>6.3V</td><td>$\leq$10%</td><td></td><td></td></tr></table>	Rated Voltage	D.F.				Exception of D.F.		$\geq$ 50V	$\leq$ 2.5%	$\leq$ 3%	0201 (50V); 0603 $\geq$ 0.047 μ F 0805 $\geq$ 0.22 μ F; 1206 $\geq$ 0.47 μ F	$\leq$ 5%	0603 $\geq$ 1 μ F; 0805 $\geq$ 1 μ F; 1206 $\geq$ 4.7 μ F; 1210 $\geq$ 4.7 μ F	25V	$\leq$ 2.5%	$\leq$ 5%	0201 $\geq$ 0.01 μ F; 0805 $\geq$ 1 μ F; 1210 $\geq$ 4.7 μ F	$\leq$ 10%	0402 $\geq$ 0.10 μ F; 0603 $\geq$ 0.33 μ F; 0805 $\geq$ 2.2 μ F 1206 $\geq$ 4.7 μ F; 1210 $\geq$ 22 μ F	16V	$\leq$ 3.5%	$\leq$ 5%	0201 $\geq$ 0.01 μ F; 0402 $\geq$ 0.033 μ F; 0805 $\geq$ 0.68 μ F; 1206 $\geq$ 2.2 μ F; 1210 $\geq$ 4.7 μ F	$\leq$ 10%	0402 $\geq$ 0.47 μ F; 0603 $\geq$ 0.68 μ F; 0805 $\geq$ 2.2 μ F; 1206 $\geq$ 4.7 μ F; 1210 $\geq$ 22 μ F	10V	$\leq$ 5%	$\leq$ 10%	0402 $\geq$ 0.33 μ F; 0603 $\geq$ 0.33 μ F; 0805 $\geq$ 2.2 μ F; 1206 $\geq$ 2.2 μ F; 1210 $\geq$ 22 μ F	6.3V	$\leq$ 10%		
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General Purpose Ceramic Capacitors (C Series)

Environmental Test Criteria

NO	ITEM		PERFORMANCE		TEST CONDITION																		
7	CAPACITANCE TEMPERATURE COEFFICIENT	CLASS I	CHARACTERISTIC	TEMP. COEFFICIENT (PPM/°C)	THESE SYMMETRICAL TOLERANCE APPLY TO 2 POINT MEASUREMENT OF TEMPERATURE COEFFICIENT: ONE AT -25°C AND AT 85°C																		
			COG/NPO	0 ± 60 (±30)	STEP	TEMPERATURE (°C)																	
				-150 ± 60	1	25 ± 2																	
				-220 ± 60	2	MIN RATED TEMP ± 2																	
				-330 ± 60	3	25 ± 2																	
				-470 ± 60	4	MAX RATED TEMP ± 2																	
				-750 ± 120	5	25 ± 2																	
+350 ~ -1000																							
8	TEMPERATURE CHARACTERISTICS	CLASS II	CAPACITANCE CHANGE																				
			CHAR. CAP. CHANGE (%)																				
			X	X7R	±15%																		
				X6S	±22%																		
				X5R	±15%																		
			Y	Y5V	-82% ~ +22%																		
				Z5U	-56% ~ +22%																		
				<table><tr><th>STEP</th><th>TEMP. (°C) B</th><th>TEMP. (°C) F</th></tr><tr><td>1</td><td>25 ± 2</td><td>25 ± 2</td></tr><tr><td>2</td><td>-55 ± 2</td><td>-25 ± 2</td></tr><tr><td>3</td><td>25 ± 2</td><td>25 ± 2</td></tr><tr><td>4</td><td>125 ± 2</td><td>85 ± 2</td></tr><tr><td>5</td><td>25 ± 2</td><td>25 ± 2</td></tr></table> $\frac{C2 - C1}{C1} \times 100\%$ C1: CAPACITANCE AT STANDARD TEMPERATURE (25°C) C2: CAPACITANCE AT EACH TEMPERATURE		STEP	TEMP. (°C) B	TEMP. (°C) F	1	25 ± 2	25 ± 2	2	-55 ± 2	-25 ± 2	3	25 ± 2	25 ± 2	4	125 ± 2	85 ± 2	5	25 ± 2	25 ± 2
STEP	TEMP. (°C) B	TEMP. (°C) F																					
1	25 ± 2	25 ± 2																					
2	-55 ± 2	-25 ± 2																					
3	25 ± 2	25 ± 2																					
4	125 ± 2	85 ± 2																					
5	25 ± 2	25 ± 2																					
9	ADHESIVE STRENGTH OF TERMINATION	NO INDICATION OF PEELING SHALL OCCUR ON THE TERMINAL ELECTRODE		A 500g.f PRESSURE SHALL BE APPLIED FOR 10±1 SECOND 																			
10	BENDING STRENGTH	APPEARANCE	NO MECHANICAL DAMAGE SHALL OCCURE		BENDING SHALL BE APPLIED TO THE LIMIT (1mm) WITH 0.3mm/SEC 																		
		CAPACITANCE	CHARACTER	CHANGE OF CAPACITANCE																			
			CLASS I	WITHIN ±5% OR ±0.5pF WHICHEVER IS LARGER																			
			CLASS II	X (X7R, X6S, X5R) WITHIN ±12.5% Y (Y5V,Z5U) WITHIN ±30%																			
11	SOLDERABILITY	MORE THAN 95% OF THE TERMINAL SURFACE IS TO BE SOLDERED NEWLY, SO METAL PART (A) DOES NOT COME OUT OR DISSOLVE		SOLDER TEMPERATURE : 230 ± 5 °C SOLDER: H63A FLUX: ROSIN PRE-HEATING: AT 80 ~ 120 °C FOR 10 ~ 30 SEC. 																			

General Purpose Ceramic Capacitors (C Series)

Environmental Test Criteria

NO	ITEM		PERFORMANCE			TEST CONDITION											
12	RESISTANCE TO SOLDERING HEAT	APPEARANCE	NO MECHANICAL DAMAGE SHALL OCCUR			DIP : SOLDER TEMPERATURE OF 270± 5 °C DIP TIME :10±1 SEC. EACH TERMINATION SHALL BE FULLY IMMERSED AND PREHEATED AS FOLLOWING:											
		CAPACITANCE	CHARACTERISTIC		CAP. CHANGE												
			CLASSS I		WITHIN ±2.5% OR ±0.25 pF WHICHEVER IS LARGER												
			CLASS II	X	WITHIN ±7.5%												
				Y	WITHIN ±20%												
		QCLASS I	30 pF AND OVER: Q 1000 LESS THAN 30 pF: Q 400 + 20xC			<table><tr><th>STEP</th><th>TEMP. (°C)</th><th>TIME (SEC.)</th></tr><tr><td>1</td><td>80~100</td><td>60</td></tr><tr><td>2</td><td>150~180</td><td>60</td></tr></table> MEASURE AT ROOM TEMP. AFTER COOLING FOR CLASS I : 24 ± 2 HOURS CLASS II : 48 ± 4 HOURS			STEP	TEMP. (°C)	TIME (SEC.)	1	80~100	60	2	150~180	60
		STEP	TEMP. (°C)	TIME (SEC.)													
		1	80~100	60													
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Tan CLASS II	TO SATISFY THE SPECIFIED INITIAL VLUE																
INSULATION RESISTANCE	TO SATISFY THE SPECIFIED INITIAL VLUE																
WITHSTANDING VOLTAGE	TO SATISFY THE SPECIFIED INITIAL VLUE																
13	VIBRATION TEST	APPEARANCE	NO MECHANICAL DAMAGE SHALL OCCUR			THE CAPACITOR SHALL BE SUBJECTED TO A HARMONIC MOTION HAVING A TOTAL AMPLITUDE of 1.5mm. THE ENTIRE FREQUENCY RANGE, FROM 10 TO 55Hz AND RETURN TO 10Hz SHALL BE TRAVERSED IN 1 MINUTE. THIS CYCLE SHALL BE PERFORMED 2 HOURS IN EACH THREE MUTUALLY PERPENDICULAR DIRECTION, FOR TOTAL PERIOD of 6 HOURS.											
		CAPACITANCE	CHARACTERISTIC		CAP. CHANGE												
			CLASSS I		WITHIN ±2.5% OR ±0.25 pF WHICHEVER IS LARGER												
			CLASS II	X	WITHIN ±5%												
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		QCLASS I	30 pF AND OVER: Q 1000 LESS THAN 30 pF: Q 400 + 20xC														
		Tan CLASS II	TO SATISFY THE SPECIFIED INITIAL VALUE														
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General Purpose Ceramic Capacitors (C Series)

Environmental Test Criteria

NO	ITEM	PERFORMANCE				TEST CONDITION																																																																						
14	APPEARANCE	NO MECHANICAL DAMAGE SHALL OCCUR				TEMPERATURE : 40±2 °C RELATIVE HUMIDITY: 90~95 %RH TEST TIME : 500 +12/-0 Hr. MEASURE AT ROOM TEMPERATURE AFTER COOLING FOR CLASS I : 24±2 Hr. CLASS II : 48±4 Hr. SEE (FIG.3)																																																																						
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	DISSIPATION FACTOR (Tan Θ CLASS II)	X7R, X6S, X5R <table><tr><th>Rated Voltage</th><th>D.F.</th><th colspan="3">Exception of D.F.</th></tr><tr><td rowspan="2">≥50V</td><td rowspan="2">≤2.5%</td><td>≤3%</td><td colspan="2">0201 (50V); 0603±0.047uF 0805±0.22uF; 1206±0.47uF</td></tr><tr><td>≤5%</td><td colspan="2">0603±1uF; 0805±1uF; 1206±4.7uF; 1210±4.7uF</td></tr><tr><td rowspan="2">25V</td><td rowspan="2">≤2.5%</td><td>≤5%</td><td colspan="2">0201±0.01uF; 0805±1uF; 1210±4.7uF</td></tr><tr><td>≤10%</td><td colspan="2">0402±0.10uF; 0603±0.33uF; 0805±2.2uF 1206±4.7uF; 1210±22uF</td></tr><tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td colspan="2">0201±0.01uF; 0402±0.033uF; 0805±0.68uF; 1206±2.2uF; 1210±4.7uF</td></tr><tr><td>≤10%</td><td colspan="2">0402±0.47uF; 0603±0.68uF; 0805±2.2uF; 1206±4.7uF; 1210±22uF</td></tr><tr><td>10V</td><td>≤5%</td><td>≤10%</td><td colspan="2">0402±0.33uF; 0603±0.33uF; 0805±2.2uF; 1206±2.2uF; 1210±22uF</td></tr><tr><td>6.3V</td><td>≤10%</td><td></td><td colspan="2"></td></tr></table> Y5V, Z5U <table><tr><th>Rated Voltage</th><th>D.F.</th><th colspan="3">Exception of D.F.</th></tr><tr><td>≥50V</td><td>≤5%</td><td>≤9%</td><td colspan="2">0603±0.1uF; 0805±0.47uF; 1206±4.7uF;</td></tr><tr><td>25V</td><td>≤5%</td><td>≤9%</td><td colspan="2">0402±0.047uF; 0603±0.1uF; 0805±0.33uF; 1206±1uF; 1210±4.7uF</td></tr><tr><td>16V</td><td>≤9%</td><td>≤12.5%</td><td colspan="2">0603±2.2uF; 0805±3.3uF; 1206±10uF; 1210±22uF; 1812±47uF</td></tr><tr><td>10V</td><td>≤12.5%</td><td>≤16%</td><td colspan="2">0603±2.2uF; 0805±3.3uF; 1206±4.7uF; 1210±10uF; 1812±47uF</td></tr><tr><td>6.3V</td><td>≤16%</td><td></td><td colspan="2"></td></tr></table>					Rated Voltage	D.F.	Exception of D.F.			≥50V	≤2.5%	≤3%	0201 (50V); 0603±0.047uF 0805±0.22uF; 1206±0.47uF		≤5%	0603±1uF; 0805±1uF; 1206±4.7uF; 1210±4.7uF		25V	≤2.5%	≤5%	0201±0.01uF; 0805±1uF; 1210±4.7uF		≤10%	0402±0.10uF; 0603±0.33uF; 0805±2.2uF 1206±4.7uF; 1210±22uF		16V	≤3.5%	≤5%	0201±0.01uF; 0402±0.033uF; 0805±0.68uF; 1206±2.2uF; 1210±4.7uF		≤10%	0402±0.47uF; 0603±0.68uF; 0805±2.2uF; 1206±4.7uF; 1210±22uF		10V	≤5%	≤10%	0402±0.33uF; 0603±0.33uF; 0805±2.2uF; 1206±2.2uF; 1210±22uF		6.3V	≤10%				Rated Voltage	D.F.	Exception of D.F.			≥50V	≤5%	≤9%	0603±0.1uF; 0805±0.47uF; 1206±4.7uF;		25V	≤5%	≤9%	0402±0.047uF; 0603±0.1uF; 0805±0.33uF; 1206±1uF; 1210±4.7uF		16V	≤9%	≤12.5%	0603±2.2uF; 0805±3.3uF; 1206±10uF; 1210±22uF; 1812±47uF		10V	≤12.5%	≤16%	0603±2.2uF; 0805±3.3uF; 1206±4.7uF; 1210±10uF; 1812±47uF		6.3V	≤16%				
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≥50V	≤5%	≤9%	0603±0.1uF; 0805±0.47uF; 1206±4.7uF;																																																																									
25V	≤5%	≤9%	0402±0.047uF; 0603±0.1uF; 0805±0.33uF; 1206±1uF; 1210±4.7uF																																																																									
16V	≤9%	≤12.5%	0603±2.2uF; 0805±3.3uF; 1206±10uF; 1210±22uF; 1812±47uF																																																																									
10V	≤12.5%	≤16%	0603±2.2uF; 0805±3.3uF; 1206±4.7uF; 1210±10uF; 1812±47uF																																																																									
6.3V	≤16%																																																																											
INSULATION RESISTANCE	MINIMUM INSULATION RESISTANCE: 1,000 M OR 50M .μF PRODUCT WHICHEVER IS SMALLER																																																																											

General Purpose Ceramic Capacitors (C Series)

Environmental Test Criteria

NO	ITEM		PERFORMANCE			TEST CONDITION		
15	MOISTURE RESISTANCE	APPEARANCE	NO MECHANICAL DAMAGE SHALL OCCUR			APPLIED VOLTAGE: RATED VOLTAGE TEMPERATURE : 40±2 °C RELATIVE HUMIDITY: 90~95%RH TEST TIME : 500 +12/-0 Hr. CURRENT APPLIED: 50mA MAX. MEASURING AT ROOM TEMPERATURE AFTER COOLING FOR CLASS I : 24±2 Hr. CLASS II : 48±4 Hr. SEE (FIG.3)		
		CAPACITANCE	CHARACTERISTIC		CAPACITANCE CHANGE			
			CLASS I		WITHIN ±7.5% OR±0.75pF WHICHEVER IS LARGER			
			CLASS II	X	WITHIN ±12.5%			
				Y	WITHIN ±30%			
		QCLASS I	30pF AND OVER : Q 200 30pF AND BELOW : Q 100 + 10/3xC					
		DISSIPATION FACTOR (Tan Θ CLASS II)	X7R, X6S, X5R					
			Rated Voltage	D.F.	Exception of D.F.			
			≥50V	≤2.5%	≤3%			0201 (50V); 0603≥0.047uF 0805≥0.22uF; 1206≥0.47uF
					≤5%			0603≥1uF; 0805≥1uF; 1206≥4.7uF; 1210≥4.7uF
25V	≤2.5%		≤5%	0201≥0.01uF; 0805≥1uF; 1210≥4.7uF				
			≤10%	0402≥0.10uF; 0603≥0.33uF; 0805≥2.2uF 1206≥4.7uF; 1210≥22uF				
16V	≤3.5%		≤5%	0201≥0.01uF; 0402≥0.033uF; 0805≥0.68uF; 1206≥2.2uF; 1210≥4.7uF				
			≤10%	0402≥0.47uF; 0603≥0.68uF; 0805≥2.2uF; 1206≥4.7uF; 1210≥22uF				
10V	≤5%		≤10%	0402≥0.33uF; 0603≥0.33uF; 0805≥2.2uF; 1206≥2.2uF; 1210≥22uF				
6.3V	≤10%							
Y5V, Z5U								
Rated Voltage	D.F.		Exception of D.F.					
≥50V	≤5%		≤9%	0603≥0.1uF; 0805≥0.47uF; 1206≥4.7uF;				
25V	≤5%		≤9%	0402≥0.047uF; 0603≥0.1uF; 0805≥0.33uF; 1206≥1uF; 1210≥4.7uF				
16V	≤9%	≤12.5%	0603≥2.2uF; 0805≥3.3uF; 1206≥10uF; 1210≥22uF; 1812≥47uF					
10V	≤12.5%	≤16%	0603≥2.2uF; 0805≥3.3uF; 1206≥4.7uF; 1210≥10uF; 1812≥47uF					
6.3V	≤16%							
INSULATION RESISTANCE	MINIMUM INSULATION RESISTANCE: 100 M OR 25M .uF PRODUCT, WHICHEVER IS SMALLER							

General Purpose Ceramic Capacitors (C Series)

Environmental Test Criteria

NO	ITEM	PERFORMANCE				TEST CONDITION			
16	HIGH TEMPERATURE RESISTANCE	APPEARANCE	NO MECHANICAL DAMAGE SHALL OCCUR				APPLIED VOLTAGE: 150% OF RATED VOLTAGE TEST TIME : 1000 +48/-0 Hr. CURRENT APPLIED: 50mA MAX.		
		CAPACITANCE	CHARACTERISTIC		CAP. CHANGE				
			CLASS I		WITHIN ±3% OR ±0.3pF, WHICHEVER IS LARGER				
			CLASS II	X	WITHIN ±12.5%		CHAR.	TEMP.	
				Y	WITHIN ±30%		CLASS I	125 ±3 °C	
		QCLASS I	30pF AND OVER : Q 350 10 - 30 pF : Q 275 + 2.5xC LESS THAN 10pF :Q 200 + 10xC				CLASS II	X	125 ±3 °C
						Y	85 ±3 °C		
		DISSIPATION FACTOR (Tan Θ CLASS II)	X7R, X6S, X5R				(INITIAL VALUE MEASUREMENT) FOR CLASS II CAPACITORS, 150 % OF RATED VOLTAGE SHALL BE APPLIED FOR 1 HOUR AT THE MAXIMUM OPERATING TEMPERATURE, THEN KEEP IT AT ROOM TEMPERATURE. FOR 48 ±4 Hrs. SEE (FIG.3)		
			Rated Voltage	D.F.	Exception of D.F.				
			≥50V	≤2.5%	≤3%	0201 (50V); 0603≥0.047uF 0805≥0.22uF; 1206≥0.47uF			
					≤5%	0603≥1uF; 0805≥1uF; 1206≥4.7uF; 1210≥4.7uF			
			25V	≤2.5%	≤5%	0201≥0.01uF; 0805≥1uF; 1210≥4.7uF			
					≤10%	0402≥0.10uF; 0603≥0.33uF; 0805≥2.2uF 1206≥4.7uF; 1210≥22uF			
			16V	≤3.5%	≤5%	0201≥0.01uF; 0402≥0.033uF; 0805≥0.68uF; 1206≥2.2uF; 1210≥4.7uF			
					≤10%	0402≥0.47uF; 0603≥0.68uF; 0805≥2.2uF; 1206≥4.7uF; 1210≥22uF			
			10V	≤5%	≤10%	0402≥0.33uF; 0603≥0.33uF; 0805≥2.2uF; 1206≥2.2uF; 1210≥22uF			
	6.3V		≤10%						
Y5V, Z5U									
Rated Voltage	D.F.		Exception of D.F.						
≥50V	≤5%		≤9%	0603≥0.1uF; 0805≥0.47uF; 1206≥4.7uF;					
25V	≤5%		≤9%	0402≥0.047uF; 0603≥0.1uF; 0805≥0.33uF; 1206≥1uF; 1210≥4.7uF					
16V	≤9%		≤12.5%	0603≥2.2uF; 0805≥3.3uF; 1206≥10uF; 1210≥22uF; 1812≥47uF					
10V	≤12.5%	≤16%	0603≥2.2uF; 0805≥3.3uF; 1206≥4.7uF; 1210≥10uF; 1812≥47uF						
6.3V	≤16%								
INSULATION RESISTANCE	MINIMUM INSULATION RESISTANCE: 1,000M OR 50M.μF PRODUCT WHICHEVER IS SMALLER								

General Purpose Ceramic Capacitors (C Series)

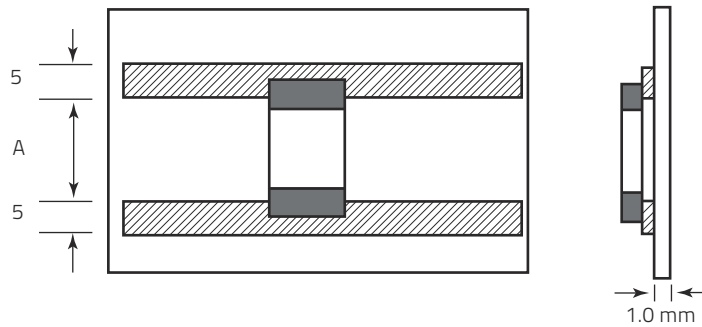
Environmental Test Criteria

NO	ITEM	PERFORMANCE				TEST CONDITION																																																						
17	TEMPERATURE CYCLE	APPEARANCE	NO MECHANICAL DAMAGE SHALL OCCUR				CAPACITORS SHALL BE SUBJECTED TO FIVE CYCLES OF THE TEMPERATURE CYCLE AS FOLLOWING																																																					
		CAPACITANCE	CHARACTERISTIC		CAP. CHANGE																																																							
			CLASS I		WITHIN ±2.5% OR ±0.25pF WHICHEVER IS LARGER																																																							
			CLASS II	X	WITHIN ±7.5%																																																							
				Y	WITHIN ±20%																																																							
		QCLASS I	30 pF AND OVER : Q 1000 LESS THAN 30pF:Q 400 +20xC				2	25	2 ~ 3																																																			
		TAN CLASS II	X7R, X6S, X5R <table><tr><th>Rated Voltage</th><th>D.F.</th><th colspan="2">Exception of D.F.</th></tr><tr><td rowspan="2">≥50V</td><td rowspan="2">≤2.5%</td><td>≤3%</td><td>0201 (50V); 0603±0.047uF 0805±0.22uF; 1206±0.47uF</td></tr><tr><td>≤5%</td><td>0603≥1uF; 0805≥1uF; 1206≥4.7uF; 1210≥4.7uF</td></tr><tr><td rowspan="2">25V</td><td rowspan="2">≤2.5%</td><td>≤5%</td><td>0201≥0.01uF; 0805≥1uF; 1210≥4.7uF</td></tr><tr><td>≤10%</td><td>0402≥0.10uF; 0603≥0.33uF; 0805≥2.2uF 1206≥4.7uF; 1210≥22uF</td></tr><tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥0.01uF; 0402≥0.033uF; 0805≥0.68uF; 1206≥2.2uF; 1210≥4.7uF</td></tr><tr><td>≤10%</td><td>0402≥0.47uF; 0603≥0.68uF; 0805≥2.2uF; 1206≥4.7uF; 1210≥22uF</td></tr><tr><td>10V</td><td>≤5%</td><td>≤10%</td><td>0402≥0.33uF; 0603≥0.33uF; 0805≥2.2uF; 1206≥2.2uF; 1210≥22uF</td></tr><tr><td>6.3V</td><td>≤10%</td><td></td><td></td></tr></table> Y5V, Z5U <table><tr><th>Rated Voltage</th><th>D.F.</th><th colspan="2">Exception of D.F.</th></tr><tr><td>≥50V</td><td>≤5%</td><td>≤9%</td><td>0603≥0.1uF; 0805≥0.47uF; 1206≥4.7uF;</td></tr><tr><td>25V</td><td>≤5%</td><td>≤9%</td><td>0402≥0.047uF; 0603≥0.1uF; 0805≥0.33uF; 1206≥1uF; 1210≥4.7uF</td></tr><tr><td>16V</td><td>≤9%</td><td>≤12.5%</td><td>0603≥2.2uF; 0805≥3.3uF; 1206≥10uF; 1210≥22uF; 1812≥47uF</td></tr><tr><td>10V</td><td>≤12.5%</td><td>≤16%</td><td>0603≥2.2uF; 0805≥3.3uF; 1206≥4.7uF; 1210≥10uF; 1812≥47uF</td></tr><tr><td>6.3V</td><td>≤16%</td><td></td><td></td></tr></table>				Rated Voltage	D.F.	Exception of D.F.		≥50V	≤2.5%	≤3%	0201 (50V); 0603±0.047uF 0805±0.22uF; 1206±0.47uF	≤5%	0603≥1uF; 0805≥1uF; 1206≥4.7uF; 1210≥4.7uF	25V	≤2.5%	≤5%	0201≥0.01uF; 0805≥1uF; 1210≥4.7uF	≤10%	0402≥0.10uF; 0603≥0.33uF; 0805≥2.2uF 1206≥4.7uF; 1210≥22uF	16V	≤3.5%	≤5%	0201≥0.01uF; 0402≥0.033uF; 0805≥0.68uF; 1206≥2.2uF; 1210≥4.7uF	≤10%	0402≥0.47uF; 0603≥0.68uF; 0805≥2.2uF; 1206≥4.7uF; 1210≥22uF	10V	≤5%	≤10%	0402≥0.33uF; 0603≥0.33uF; 0805≥2.2uF; 1206≥2.2uF; 1210≥22uF	6.3V	≤10%			Rated Voltage	D.F.	Exception of D.F.		≥50V	≤5%	≤9%	0603≥0.1uF; 0805≥0.47uF; 1206≥4.7uF;	25V	≤5%	≤9%	0402≥0.047uF; 0603≥0.1uF; 0805≥0.33uF; 1206≥1uF; 1210≥4.7uF	16V	≤9%	≤12.5%	0603≥2.2uF; 0805≥3.3uF; 1206≥10uF; 1210≥22uF; 1812≥47uF	10V	≤12.5%	≤16%	0603≥2.2uF; 0805≥3.3uF; 1206≥4.7uF; 1210≥10uF; 1812≥47uF	6.3V	≤16%		
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6.3V	≤16%																																																											
INSULATION RESISTANCE	TO SATISFY THE SPECIFIED INITIAL VALUE				MEASURE AT ROOM TEMPERATURE AFTER COOLING FOR CLASS I : 24±2 Hr. CLASS II : 48±4 Hr. SEE(FIG.3)																																																							

MEASURE AT ROOM TEMPERATURE
AFTER COOLING FOR
CLASS I : 24 $\pm$ 2 Hr.
CLASS II : 48 $\pm$ 4 Hr.
SEE(FIG.3)

General Purpose Ceramic Capacitors (C Series)

Adhesive Strength of Termination

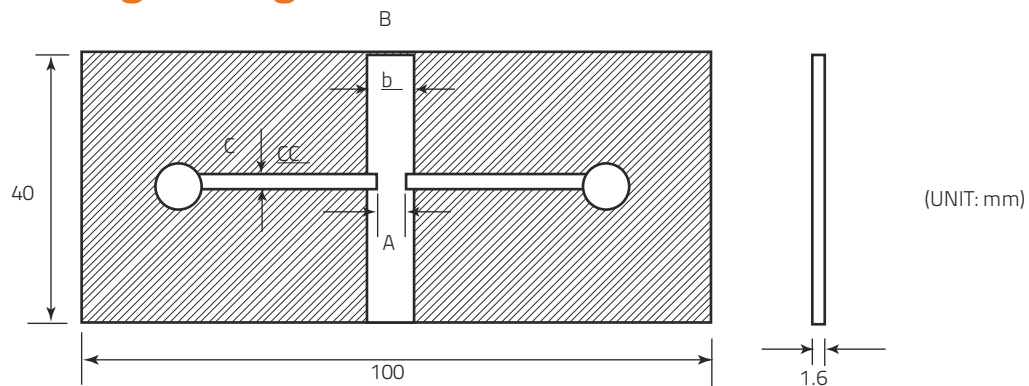


CODE	DIMENSION (mm)	A (mm)	CODE	DIMENSION (mm)	A (mm)
01005 (0402)	0.40 x 0.20	0.12	1206 (3216)	3.2 x 1.6	2.2
0201 (0603)	0.61 x 0.31	0.2	1210 (3225)	3.2 x 2.5	2.2
0402 (1005)	1.0 x 0.5	0.4	1812 (4532)	4.5 x 3.2	3.5
0603 (1608)	1.6 x 0.8	1.0	2220 (5750)	5.7 x 5.08	4.7
0805 (2012)	2.0 x 1.25	1.2			

 MATERIAL: ALUMINA SUBSTRATE (Al₂O₃ 95% min) OR GLASS EPOXY SUBSTRATE

 COPPER FOIL (t = 0.035mm)

Substrate Bending Strength



CODE	DIMENSION (mm)	A (mm)	B (mm)	C (mm)
01005 (0402)	0.40 x 0.20	0.12	0.7	0.20
0201 (0603)	0.61 x 0.31	0.2	1.0	0.4
0402 (1005)	1.0 x 0.5	0.4	1.4	0.5
0603 (1608)	1.6 x 0.8	1.0	3.0	1.0
0805 (2012)	2.0 x 1.25	1.2	4.0	1.65
1206 (3216)	3.2 x 1.6	2.2	5.0	2.0
1210 (3225)	3.2 x 2.5	2.2	5.0	3.2
1812 (4532)	4.5 x 3.2	3.5	7.0	4.0
2220 (5750)	5.7 x 5.08	4.7	8.5	5.0

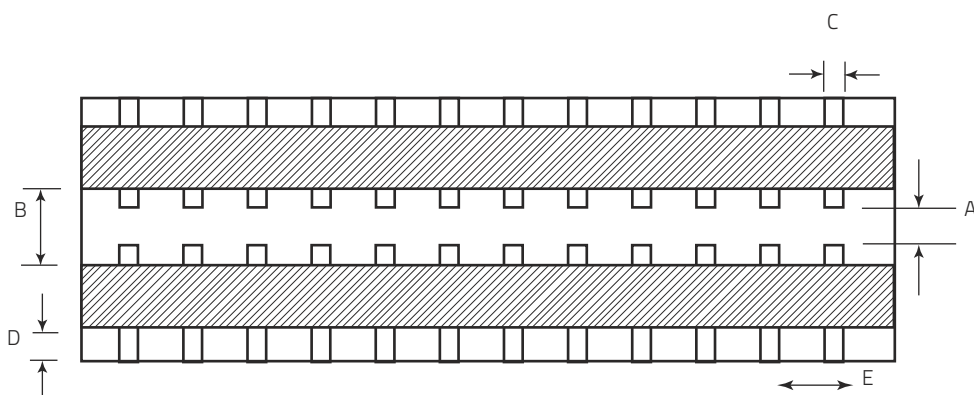
MATERIAL: GLASS EPOXY SUBSTRATE

 COPPER FOIL (t = 0.035mm)

 SOLDER RESIST

General Purpose Ceramic Capacitors (C Series)

Test Substrate



(UNIT: mm)

CODE	DIEMNSION (mm)	A	B	C	D	E
0201 (0603)	0.61 x 0.31	0.2	1.0	0.4	7.5	3.6
0402 (1005)	1.0 x 0.5	0.4	1.4	0.5	7.5	3.8
0603 (1608)	1.6 x 0.8	1.0	3.0	0.7	7.5	4.0
0805 (2012)	2.0 x 1.25	1.2	4.0	1.0	7.5	4.2
1206 (3216)	3.2 x 1.6	2.2	5.0	1.3	7.5	4.6
1210 (3225)	3.2 x 2.5	2.2	5.0	2.0	7.5	5.5
1812 (4532)	4.5 x 3.2	3.5	7.0	2.7	7.5	6.2
2220 (5750)	5.7 x 5.08	4.7	8.5	3.4	7.5	7.0

MATERIAL: GLASS EPOXY SUBSTRATE

 COPPER FOIL (t = 0.035mm)

 SOLDER RESIST