FEATURES:

- 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/X7S/X6S/X5R (<10mΩ typical)
- Ceramic monolithic structure provides excellent reliability

RoHS Compliant | REACH Compliant | HF Halogen FREE | Conflict Minerals FREE 3TG

PART NUMBER STRUCTURE

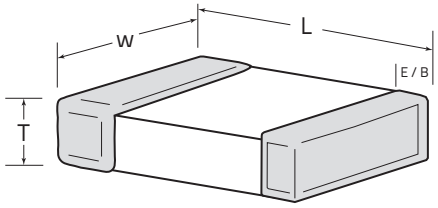
C	0805	C0G	500	-	101	J	N	P	□□
Series	**Size** 01005 0201 0402 0603 0805 1206 1210 1812 2220 2221	**Temperature Characteristic (Dielectric)** C0G X7R X7S X6S X5R Y5V Z5U	**Rated Voltage** 1st two digits are significant followed by number of zeroes. 4R0 = 4.0 VDCW 6R3 = 6.3 VDCW 100 = 10 VDCW 160 = 16 VDCW 250 = 25 VDCW 500 = 50 VDCW 630 = 63 VDCW 101 = 100 VDCW		**Capacitance** (picofarads) 1st two digits are significant, followed by number of zeroes. e.g: 101 = 100pF R denotes decimal 6R8 = 6.8pF	**Tolerance** * B = ± 0.1pF * C = ± 0.25pF * D = ± 0.5pF F = ± 1% G = ± 2% J = ± 5% K = ± 10% M = ± 20% N = ± 30% Z = +80 - 20% * For values below 10pF only.	**Termination** 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.	**Packaging** 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)	**Optional Thickness Identifier** 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")

Example P/N: C0805C0G500-101JNP

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

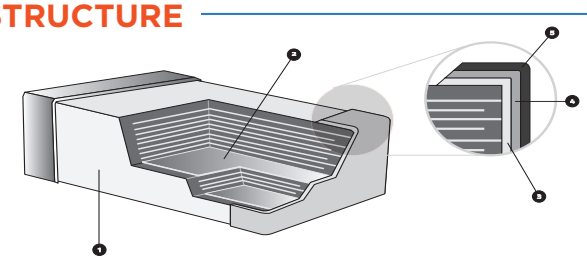


Unit: inches (mm)

SIZE	L	W	T	MIN. E/B
01005	0.016 ± 0.0008 (0.4 ± 0.02)	0.008 ± 0.0008 (0.2 ± 0.02)	See Specific Value	0.002 (0.05)
0201	0.024 ± 0.002 (0.6 ± 0.05)	0.012 ± 0.002 (0.3 ± 0.05)	See Specific Value	0.002 (0.05)
0402*	0.040 ± 0.002 (1.0 ± 0.05)	0.020 ± 0.002 (0.5 ± 0.05)	See Specific Value	0.004 (0.10)
0603	0.063 ± 0.006 (1.6 ± 0.15)	0.031 ± 0.0046 (0.8 ± 0.15)	See Specific Value	0.008 (0.20)
0805	0.08 ± 0.008 (2.0 ± 0.20)	0.050 ± 0.008 (1.25 ± 0.20)	See Specific Value	0.010 (0.25)
1206	0.126 ± 0.008 (3.2 ± 0.20)	0.063 ± 0.008 (1.6 ± 0.20)	See Specific Value	0.010 (0.25)
1210	0.126 ± 0.0157 (3.2 ± 0.40)	0.098 ± 0.0118 (2.50 ± 0.30)	See Specific Value	0.010 (0.25)
1812	0.177 ± 0.012 (4.495 ± 0.30)	0.126 ± 0.012 (3.20 ± 0.30)	See Specific Value	0.010 (0.25)
2220/2221	0.225 ± 0.016 (5.715 ± 0.41)	0.200 ± 0.006 (5.08 ± 0.41)	See Specific Value	0.010 (0.25)

* 0402 size in the X6S/X7S/X5R dielectrics will have a dimensional tolerance of ±0.20mm

STRUCTURE

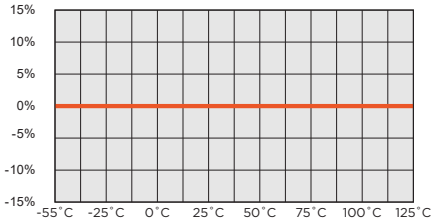


1	Ceramic Body (dielectric)	4	Nickel Plating
2	Inner Electrode	5	Tin Plating
3	Inner Termination		

ELECTRICAL SPECIFICATIONS

NP0/C0G

Typical Capacitance Change vs. Temperature

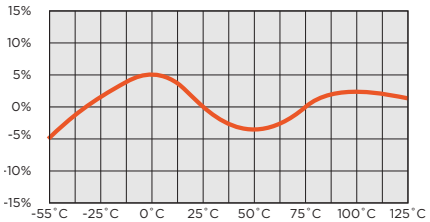


Operating Temperature Range:
-55°C to +125°C
Temperature Coefficient:
0 ±30PPM/°C
Temperature Voltage Coefficient:
0 ±30PPM/°C
Insulation Resistance:
>1000 Ω-F or 10 GΩ, for values ≤ 0.047uF (whichever is less at 25°C, WDCV).
For Capacitance values > 0.047uF, the 500 Ω-F rule applies. (The IR at 125°C is 10% of the value at 25°C)

Ageing:
None
Withstanding Voltage:
>2.5 times VDCW
Capacitance Tolerance:
B,C,D,F,G,J,K
Dissipation Factor:
0.1% max

X7R

Typical Capacitance Change vs. Temperature

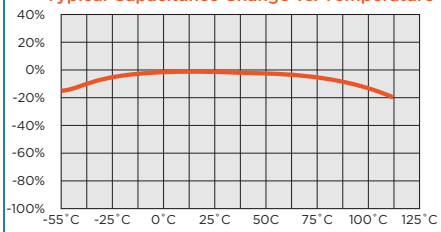


Operating Temperature Range:
-55°C to +125°C
Temperature Coefficient:
0 ±15%Δ°C MAX.
Temperature Voltage Coefficient:
X7R not applicable
Insulation Resistance:
>100 Ω-F or 10 GΩ, whichever is less at 25°C, VDCW. (The IR at 125°C is 10% of the value at 25°C)
Ageing:
2.5% per decade hour, typical
Withstanding Voltage:
>2.5 times VDCW
Capacitance Tolerance:
J,K,M

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%		

X7S

Typical Capacitance Change vs. Temperature



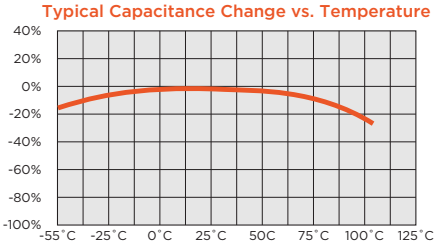
Operating Temperature Range:
-55°C to +125°C
Temperature Coefficient:
0 ±22%Δ°C MAX.
Insulation Resistance:
>1000 Ω-F or 100 GΩ, whichever is less at 25°C, VDCW. (The IR at 125°C is 10% of the value at 25°C)
Ageing:
2.5% per decade hour, typical
Withstanding Voltage:
>2.5 times VDCW
Capacitance Tolerance:
K,M

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%		

ELECTRICAL SPECIFICATIONS

X6S

Typical Capacitance Change vs. Temperature

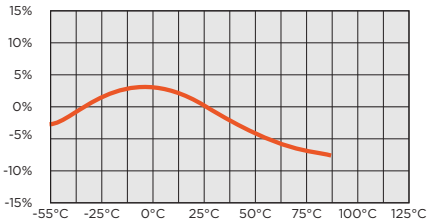


Operating Temperature Range:
-55°C to +105°C
Temperature Coefficient:
0 ±22%Δ°C MAX.
Insulation Resistance:
100,000 MΩ min., or 1000 MΩ (@ +25˚C, RVDC) per uF min. or 100GW, whichever is less
Ageing:
2.5% per decade hour, typical
Withstanding Voltage:
>2.5 times VDCW
Capacitance Tolerance:
K,M

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
4V/6.3V	≤10%	≤15%	0402≥10uF

X5R

Typical Capacitance Change vs. Temperature

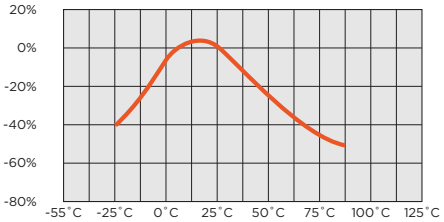


Operating Temperature Range:
-55°C to +85°C
Temperature Coefficient:
0 ±15%Δ°C MAX.
Insulation Resistance:
>100 Ω-F or 10 GΩ, whichever is less at 25°C, VDCW. (The IR at 125°C is 10% of the value at 25°C)
Ageing:
2.5% per decade hour, typical
Withstanding Voltage:
>2.5 times VDCW
Capacitance Tolerance:
K,M

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	≤15%		

Z5U

Typical Capacitance Change vs. Temperature

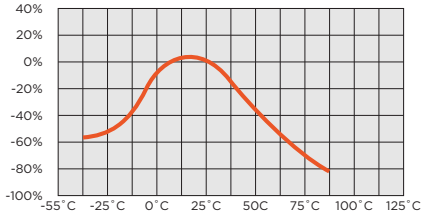


Operating Temperature Range:
+10°C to +85°C
Temperature Coefficient:
+22% - 56%Δ°C MAX.
Insulation Resistance:
>100 Ω-F or 10 GΩ, whichever is less at 25°C, WDCV. (The IR at 125°C is 10% of the value at 25°C)
Ageing:
5% per decade hour, typical
Withstanding Voltage:
>2.5 times VDCW
Capacitance Tolerance:
M,Z

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%		

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, VDCW. (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.	
≥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%		

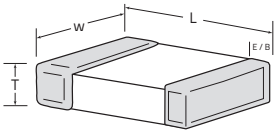
TEST PARAMETERS

Test parameters for Multilayer Ceramic Capacitors - X7R, X7S, X6S, X5R 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 - C0G:	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

C0G (C0G) DIELECTRIC



Values that are typically available.

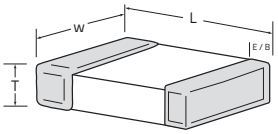
(All measurements in inches)

SIZE		01005				0201		0402			0603		0805			1206		1210		1812	
T (max)		0.008				0.012		0.025			0.033		0.055			0.075		0.103		0.110	
VDCW (MAX)		6.3V	16V	25V	50V	25V	50V	25V	50V	100V	50V	100V	25V	50V	100V	50V	100V	50V	100V	50V	100V
CAPACITANCE CODE	CAPACITANCE VALUE																				
0R1	0.1pF																				
0R2	0.2pF																				
0R3	0.3pF																				
0R4	0.4pF																				
0R5	0.5pF																				
1R0	**1.0pF**																				
1R2	1.2pF																				
1R5	1.5pF																				
1R8	1.8pF																				
2R2	2.2pF																				
2R7	2.7pF																				
3R3	3.3pF																				
3R9	3.9pF																				
4R7	4.7pF																				
5R0	5.0pF																				
5R6	5.6pF																				
6R8	6.8pF																				
8R2	8.2pF																				
100	**10pF**																				
120	12pF																				
150	15pF																				
180	18pF																				
220	22pF																				

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.

VOLTAGE AND CAPACITANCE RANGE

C0G (C0G) DIELECTRIC



Values that are typically available.

(All measurements in inches)

SIZE		01005				0201		0402			0603		0805			1206		1210		1812		2220 / 2221	
T (max)		0.008				0.012		0.025			0.033		0.055			0.075		0.103		0.110		0.134 /0.134	
VDCW (MAX)		6.3V	16V	25V	50V	25V	50V	25V	50V	100V	50V	100V	25V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V
CAPACITANCE CODE	CAPACITANCE VALUE (pF)																						
270	27pF																						
330	33pF																						
390	39pF																						
470	47pF																						
560	56pF																						
680	68pF																						
820	82pF																						
101	**100pF**																						
121	120pF																						
151	150pF																						
181	180pF																						
221	220pF																						
271	270pF																						
331	330pF																						
391	390pF																						
471	470pF																						
561	560pF																						
681	680pF																						
821	820pF																						
102	**1000pF**																						
122	1200pF																						
152	1500pF																						
182	1800pF																						
222	2200pF																						
272	2700pF																						
332	3300pF																						
392	3900pF																						
472	4700pF																						
562	5600pF																						
682	6800pF																						
822	8200pF																						
103	**.01uF**																						
123	.012uF																						
153	.015uF																						
183	.018uF																						
223	.022uF																						
273	.027uF																						
333	.033uF																						
393	.039uF																						
473	.047uF																						
563	.056uF																						
683	.068uF																						
823	.082uF																						
104	**.100uF**																						
124	.120uF															25V / 50V							
154	.150uF																						
184	.180uF																						
224	.220uF																						
274	.270uF																						
334	.330uF																						
394	.390uF																						
474	.470uF																						
564	.560uF																						
684	.680uF																						
824	.820uF																						

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.

VOLTAGE AND CAPACITANCE RANGE

X7R DIELECTRIC

Values that are typically available.

(All measurements in inches)

SIZE		01005		0201				0402				0603					0805		
T (max)		0.008		0.012				0.025				0.038					0.058		
VDCW (MAX)		6.3V	10V	6.3V	10V	16V	25V	16V	25V	50V	100V	10V	16V	25V	50V	100V	25V	50V	100V
101	**100pF**																		
121	120pF																		
151	150pF																		
181	180pF																		
221	220pF																		
271	270pF																		
331	330pF																		
391	390pF																		
471	470pF																		
561	560pF																		
681	680pF																		
821	820pF																		
102	**1000pF**																		
122	1200pF																		
152	1500pF																		
182	1800pF																		
222	2200																		
272	2700pF																		
332	3300pF																		
392	3900pF																		
472	4700pF																		
562	5600pF																		
682	6800pF																		
822	8200pF																		
103	**.01uF**																		
123	.012uF																		
153	.015uF																		
183	.018uF																		
223	.022uF																		
273	.027uF																		
333	.033uF																		

CAPACITANCE CODE ↑ ↓ CAPACITANCE VALUE ↑ ↓

* 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.

VOLTAGE AND CAPACITANCE RANGE

X7R DIELECTRIC

Values that are typically available.

(All measurements in inches)

SIZE			0201			0402					0603						0805					
T (max)*			0.012			0.025					0.038						0.059					
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		CAPACITANCE VALUE																				
393		.039uF																				
473		.047uF																				
563		.056uF																				
683		.068uF																				
823		.082uF																				
104		**0.10uF**	**	**	**																	
124		.120uF																				
154		.150uF																				
184		.180uF																				
224		.220uF																				
274		.270uF																				
334		.330uF																				
394		.390uF																				
474		.470uF																				
564		.560uF																				
684		.680uF																				
824		.820uF																				
105		**1.00uF**																				
125		1.20uF																				
155		1.50uF																				
185		1.80uF																				
225		2.20uF																				
335		3.30uF																				
475		4.70uF																				
685		6.80uF																				
106		**10.0uF**																				
156		15.0uF																			35V	
226		22.0uF																				
476		47.0uF																				
107		100.0uF																				

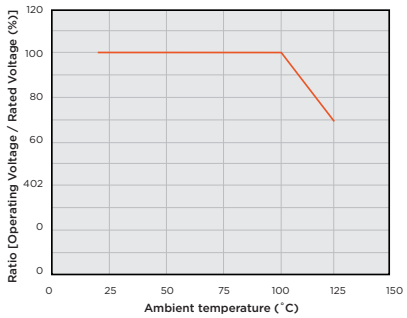
* For values above 1uF, thickness may be greater than specified above.

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.

** RE: 0201, X7R, 0.1uF; When the operating temperature range is between 100˚C and 125˚C, it is recommended to apply the following voltage derating as shown in the diagram below.

DERATING CURVE FOR 0201, 0.1UF, X7R ONLY



VOLTAGE AND CAPACITANCE RANGE

X7R DIELECTRIC

Values that are typically available.

(All measurements in inches)

SIZE		1206					1210					1812						2220 / 2221			
T (max)*		0.070					0.125					0.085						0.108 /0.108			
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	CAPACITANCE VALUE																				
102	**1000pF**																				
122	1200pF																				
152	1500pF																				
182	1800pF																				
222	2200pF																				
272	2700pF																				
332	3300pF																				
392	3900pF																				
472	4700pF																				
562	5600pF																				
682	6800pF																				
822	8200pF																				
103	**.01uF**																				
123	.012uF																				
153	.015uF																				
183	.018uF																				
223	.022uF																				
273	.027uF																				
333	.033uF																				
393	.039uF																				
473	.047uF																				
563	.056uF																				
683	.068uF																				
823	.082uF																				
104	**.100uF**																				
124	.120uF																				
154	.150uF																				
184	.180uF																				
224	.220uF																				
274	.270uF																				
334	.330uF																				

* 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.

VOLTAGE AND CAPACITANCE RANGE

X7R DIELECTRIC

Values that are typically available.

(All measurements in inches)

SIZE			1206						1210						1812						2220 / 2221			
T (max)*			0.070						0.125						0.095						0.108 /0.108			
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
CAPACITANCE CODE		CAPACITANCE VALUE																						
	394	.390uF																						
	474	.470uF																						
	564	.560uF																						
	684	.680uF																						
	824	.820uF																						
	105	**1.00uF**																						
	125	1.20uF																						
	155	1.50uF																						
	185	1.80uF																						
	225	2.20uF																						
	335	3.30uF																						
	475	4.70uF																						
	685	6.80uF																						
	106	**10.0uF**																						
	156	15.0uF																				X7S/X7R	X7S/X7R	X7S/X7R
	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.

VOLTAGE AND CAPACITANCE RANGE

X7S DIELECTRIC (0201-0805)

Values that are typically available.

(All measurements in inches)

SIZE			0201				0402					0603					0805				
T (max)*			0.012				0.025					0.038					0.059				
VDCW (MAX)			4V	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
CAPACITANCE CODE		CAPACITANCE VALUE																			
	104	0.10uF																			
	224	0.22uF																			
	474	0.47uF																			
	105	1.00uF																			
	225	2.2uF																			
	475	4.7uF																			
	106	10.0uF																			
	226	22.0uF																			
	476	47.0uF																			
	107	100.0uF																			

X7S DIELECTRIC (1206-2220/2221)

(All measurements in inches)

SIZE			1206					1210						1812				2220/2221			
T (max)*			0.080					0.125						0.095				0.108			
VDCW (MAX)			6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	100V	16V	25V	50V	100V	16V	25V	50V	100V
CAPACITANCE CODE		CAPACITANCE VALUE																			
	104	0.10uF																			
	224	0.22uF																			
	474	0.47																			
	105	1.00uF																			
	225	2.2uF																			
	335	3.3uF																			
	475	4.7uF																			
	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.

VOLTAGE AND CAPACITANCE RANGE

X6S DIELECTRIC (0201-0805)

Values that are typically available.

(All measurements in inches)

SIZE			0201				0402					0603						0805					
T (max)*			0.012				0.025					0.038						0.059					
VDCW (MAX)			4V	6.3V	10V	16V	6.3V	10V	16V	25V	50V	4V	6.3V	10V	16V	25V	50V	4V	6.3V	10V	16V	25V	50V
CAPACITANCE CODE	104	CAPACITANCE VALUE	0.10uF																				
	224		0.22uF																				
	474		0.47uF																				
	105		1.00uF																				
	225		2.2uF																				
	475		4.7uF																				
	106		10.0uF																				
	226		22.0uF																				
	476		47.0uF																				
	107		100.0uF																				

X6S DIELECTRIC (1206-2220/2221)

(All measurements in inches)

SIZE			1206					1210					1812				2220/2221			
T (max)*			0.080					0.125					0.095				0.108			
VDCW (MAX)			6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	16V	25V	50V	100V	16V	25V	50V	100V
CAPACITANCE CODE	104	CAPACITANCE VALUE	0.10uF																	
	224		0.22uF																	
	474		0.47uF																	
	105		1.00uF																	
	225		2.2uF																	
	335		3.3uF																	
	475		4.7uF																	
	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.

VENKEL LTD.

VOLTAGE AND CAPACITANCE RANGE

X5R DIELECTRIC

Values that are typically available.

(All measurements in inches)

SIZE			01005		0201						0402						0603						0805					1206				1210		1812	
T (max)			0.008		0.0216						0.025						0.040						0.060					0.072				0.125		0.130	
VDCW (MAX)			6.3V	10V	4V	6.3V	10V	16V	25V	50V	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	16V	25V
CAPACITANCE CODE		CAPACITANCE VALUE																																		
102		1000pF	■																																	
122		1200pF																																		
152		1500pF	■																																	
182		1800pF																																		
222		2200pF	■	■																																
272		2700pF																																		
332		3300pF	■																																	
392		3900pF																																		
472		4700pF	■																																	
562		5600pF																																		
682		6800pF	■																																	
822		8200pF																																		
103		.01uF	■						■	■																										
153		.015uF				■																														
223		.022uF				■																														
333		.033uF				■																														
393		.039uF				■																														
473		.047uF				■																														
104		0.10uF	■			■	■	■				■	■	■	■	■																				
154		.150uF										■	■																							
224		.220uF	■		■	■	■					■	■		■																					
334		.330uF										■																								
474		.470uF				■	■					■	■	■	■					■																
684		.680uF															■	■																		
105		1.00uF			■	■	■	■				■	■	■	■		■	■	■	■	■	■	■	■	■	■		■	■	■	■				
125		1.20uF																																		
155		1.50uF																																		
185		1.80uF																																		
225		2.20uF			■	■	■				■	■	■	■	■		■	■	■	■			■	■	■	■	■	■	■	■	■				
335		3.30uF									■	■					■	■						■	■	■	■					■	■	■	■

* 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.

VOLTAGE AND CAPACITANCE RANGE

X5R DIELECTRIC (0402-1206)

Values that are typically available.

(All measurements in inches)

SIZE			0201			0402				0603						0805							1206				
T (max)			0.0216			0.0335				0.040						0.060							0.072				
VDCW (MAX)			4V	6.3V	10V	4V	6.3V	10V	16V	4V	6.3V	10V	16V	25V	35V	4V	6.3V	10V	16V	25V	35V	50V	6.3V	10V	16V	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																									

X5R DIELECTRIC (1210-2221)

(All measurements in inches)

SIZE			1210					1812				2220 / 2221				
T (max)			0.125					0.130				0.135				
VDCW (MAX)			6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	6.3V	10V	16V	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.

VOLTAGE AND CAPACITANCE RANGE

Z5U DIELECTRIC

Values that are typically available.

(All measurements in inches)

SIZE		0603		0805		1206		1210		1812		2220 / 2221	
T (max)		0.038		0.058		0.070		0.075		0.085		0.108 /0.108	
VDCW (MAX)		25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V
CAPACITANCE CODE	CAPACITANCE CODE												
102	**1000pF**												
122	1200pF												
152	1500pF												
182	1800pF												
222	2200pF												
272	2700pF												
332	3300pF												
392	3900pF												
472	4700pF												
562	5600pF												
682	6800pF												
822	8200pF												
103	**.01uF**												
123	.012uF												
153	.015uF												
183	.018uF												
223	.022uF												
273	.027uF												
333	.033uF												
393	.039uF												
473	.047uF												
563	.056uF												
683	.068uF												
823	.082uF												
104	**.100uF**												
124	.120uF												
154	.150uF												
184	.180uF												
224	.220uF												
274	.270uF												
334	.330uF												

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.

VOLTAGE AND CAPACITANCE RANGE

Z5U DIELECTRIC

Values that are typically available.

(All measurements in inches)

SIZE			0603		0805		1206		1210		1812		2220 / 2221	
T (max)			0.038		0.058		0.070		0.075		0.085		0.108 /0.108	
VDCW (MAX)			25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V
CAPACITANCE CODE	394	.390uF												
	474	.470uF												
	564	.560uF												
	684	.680uF												
	824	.820uF												
	105	**1.00uF**												
	125	1.20uF												
	155	1.50uF												
	185	1.80uF												
	225	2.20uF												
	335	3.30uF												
	395	3.90uF												
	475	4.70uF												
	685	6.80uF												
	106	**10.0uF**												
	156	15.0uF												
	226	22.0uF												
	476	47.0uF												
	107	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.

VOLTAGE AND CAPACITANCE RANGE

Y5V DIELECTRIC

Values that are typically available.

(All measurements in inches)

SIZE		0201	0402					0603					0805					1206				1210				1812		
T (max)		0.012	0.025					0.038					0.058					0.070				0.096				0.085		
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	CAPACITANCE VALUE																											
102	**1000pF**																											
122	1200pF																											
152	1500pF																											
182	1800pF																											
222	2200pF																											
272	2700pF																											
332	3300pF																											
392	3900pF																											
472	4700pF																											
562	5600pF																											
682	6800pF																											
822	8200pF																											
103	**.01uF**																											
123	.012uF																											
153	.015uF																											
183	.018uF																											
223	.022uF																											
273	.027uF																											
333	.033uF																											
393	.039uF																											
473	.047uF																											
563	.056uF																											
683	.068uF																											
823	.082uF																											
104	**.100uF**																											
124	.120uF																											
154	.150uF																											
184	.180uF																											
224	.220uF																											
274	.270uF																											
334	.330uF																											

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.

VOLTAGE AND CAPACITANCE RANGE

Y5V DIELECTRIC

Values that are typically available.

(All measurements in inches)

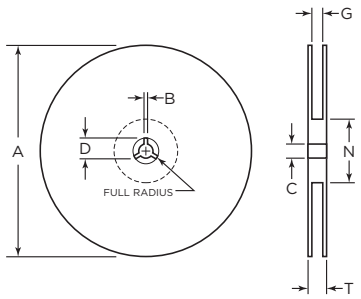
SIZE		0201	0402			0603					0805					1206				1210					1812		
T (max)		0.012	0.025			0.038					0.058					0.070				0.10					0.085		
VDCW (MAX)		10V	6.3V	10V	16V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	25V
CAPACITANCE CODE	CAPACITANCE VALUE																										
394	.390uF																										
474	.470uF																										
564	.560uF																										
684	.680uF																										
824	.820uF																										
105	**1.00uF**																										
125	1.20uF																										
155	1.50uF																										
185	1.80uF																										
225	2.20uF																										
335	3.30uF																										
395	3.90uF																										
475	4.70uF																										
685	6.80uF																										
106	**10.0uF**																										
156	15.0uF																										
226	22.0uF																										
476	47.0uF																										
107	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.

TAPE & REEL SPECIFICATIONS

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

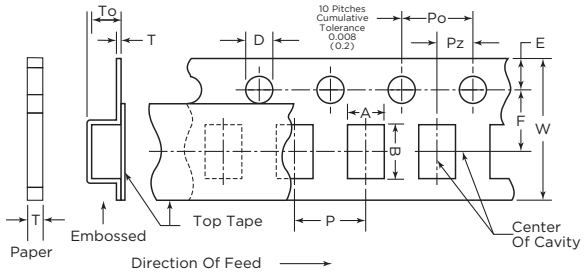
REEL



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)

TAPE



7" Reel Quantities **

SIZE	01005 (E)	01005 (P)	0201	0402	0603	0805	1206	1210	1812	2220/ 2221
Tape Size	4mm	8mm	8mm	8mm	8mm	8mm	8mm	8mm	12mm	12mm
Min Qty Per Reel	40,000*	20000*	15,000	5,000	3,000	2,000	2,000	1,000	1,000	1,000
Max Qty Per Reel	40,000*	20000*	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	0.25 ± 0.05 (0.010 ± 0.002)	0.45 ± 0.05 (0.018 ± 0.002)	8.0 ± 0.2 (0.315 ± 0.008)	3.5 ± 0.1 (0.138 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 - 0.0 (0.039 ± 0.002) - 0.000	1.5 + 0.1 (0.064 + .004)	1.15 max (0.045 max)	2.0 ± 0.05 (0.079 ± 0.002)
0201	0.37 ± 0.05 (0.014 ± 0.002)	0.67 ± 0.05 (0.026 ± 0.002)	8.0 ± 0.2 (0.315 ± 0.008)	3.5 ± 0.1 (0.138 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 - 0.0 (0.039 ± 0.002) - 0.000	1.5 + 0.1 (0.064 + .004)	1.15 max (0.045 max)	2.0 ± 0.05 (0.079 ± 0.002)
0402	0.65 ± 0.1 (0.026 ± 0.004)	1.10 ± 0.2 (0.043 ± 0.008)	8.0 ± 0.2 (0.315 ± 0.008)	3.5 ± 0.1 (0.138 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 - 0.0 (0.039 ± 0.002) - 0.000	1.5 + 0.1 (0.064 + .004)	1.15 max (0.045 max)	2.0 ± 0.05 (0.079 ± 0.002)
0603	1.10 ± 0.2 (0.043 ± 0.008)	1.90 ± 0.2 (0.075 ± 0.008)	8.0 ± 0.2 (0.315 ± 0.008)	3.5 ± 0.1 (0.138 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 - 0.0 (0.039 ± 0.002) - 0.000	1.5 + 0.1 (0.064 + .004)	1.15 max (0.045 max)	4.0 ± 0.1 (0.157 ± 0.004)
0805	1.16 ± 0.2 (0.046 ± 0.008)	2.4 ± 0.2 (0.095 ± 0.008)	8.0 ± 0.2 (0.315 ± 0.008)	3.5 ± 0.1 (0.138 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 - 0.0 (0.039 ± 0.002) - 0.000	1.5 + 0.1 (0.064 + .004)	1.15 max (0.045 max)	4.0 ± 0.1 (0.157 ± 0.004)
1206	2.0 ± 0.2 (0.079 ± 0.008)	3.6 ± 0.2 (0.142 ± 0.008)	8.0 ± 0.2 (0.315 ± 0.008)	3.5 ± 0.1 (0.138 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 - 0.0 (0.039 ± 0.002) - 0.000	1.5 + 0.1 (0.064 + .004)	1.15 max (0.045 max)	4.0 ± 0.1 (0.157 ± 0.004)

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

Size (inches)	A	B	W	F	E	Po	Pz	D	To	T	P
01005	0.23 (0.009)	0.43 (0.016)	4.0 ± 0.05 (0.157 ± 0.002)	1.8 ± 0.02 (0.070 ± 0.001)	0.9 ± 0.05 (0.035 ± 0.002)	2.0 ± 0.04 (0.079 ± 0.001)	2.00 (0.079)	0.8 ± 0.04 (0.031 ± 0.001)	0.5 max (0.019 max)	0.15 -0.4 (0.005 -0.015)	1.00 (0.039)
0603	1.05 ± 0.15 (0.042 ± .006)	1.90 ± 0.15 (0.075 ± 0.006)	8.0 ± 0.3 (0.315 ± 0.012)	3.5 ± .0.1 (0.138 ± .004)	1.75 ± 0.1 (0.069 ± .004)	4.0 ± 0.1 (0.157 ± .004)	2.0 ± 0.05 (0.079 ± .002)	1.5 + 0.1 - 0.0 (0.06 + .004) - 0.000	0.75 max (0.03 max)	0.6 max (0.024 max)	4.0 ± 0.1 (0.157 ± 0.004)
0805	1.48 ± 0.2 (0.058 ± 0.008)	2.3 ± 0.3 (0.091 ± .008)	8.0 ± 0.3 (0.315 ± 0.008)	3.5 ± .0.1 (0.138 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 (0.079 ± 0.002)	1.5 + 0.1 - 0.0 (0.06 + 0.004) - 0.000	2.5 max (0.098 max)	0.6 max (0.024 max)	4.0 ± 0.1 (0.157 ± 0.004)
1206	2.0 ± 0.2 (0.079 ± 0.008)	3.6 ± 0.3 (0.142 ± 0.008)	8.0 ± 0.3 (0.315 ± 0.008)	3.5 ± .0.1 (0.138 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 (0.079 ± 0.002)	1.5 + 0.1 - 0.0 (0.06 + 0.004) - 0.000	2.5 max (0.098 max)	0.6 max (0.024 max)	4.0 ± 0.1 (0.157 ±0.004)
1210	2.9 ± 0.2 (0.114 ± 0.008)	3.6 ± 0.3 (0.142 ± 0.008)	8.0 ± 0.3 (0.315 ± 0.008)	3.5 ± .0.1 (0.138 ±0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 (0.079 ± 0.002)	1.5 + 0.1 - 0.0 (0.06 + 0.004) - 0.000	2.5 max (0.098 max)	0.6 max (0.024 max)	4.0 ± 0.1 (0.157 ± 0.004)
1812	3.6 ± 0.2 (0.142 ± 0.008)	4.9 ± 0.3 (0.193 ± 0.008)	12.0 ± 0.3 (0.472 ± 0.012)	5.6 ± .0.1 (0.221 ± 0.004)	1.75 ± 0.1 (0.069 ± 0.004)	4.0 ± 0.1 (0.157 ± 0.004)	2.0 ± 0.05 (0.079 ± 0.002)	1.5 + 0.1 - 0.0 (0.06 + 0.004) - 0.000	3.8 max (0.150 max)	0.6 max (0.024 max)	8.0 ± 0.1 (0.315 ± 0.004)

ENVIRONMENTAL CHARACTERISTICS

NO	ITEM		PERFORMANCE	TEST CONDITION		
1	APPEARANCE		NO ABNORMAL EXTERIOR APPEARANCE	THROUGH MICROSCOPE (X10)		
2	INSULATION RESISTANCE		10,000M OR 50OM μF PRODUCT WHICHEVER IS SMALLER (RATED VOLTAGE IS BELOW 16V: 10,000M OR 100M μF)	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 50mA CURRENT		
4	CAPACITANCE	CLASS I	WITHIN THE SPECIFIED TOLERANCE	CAPACITANCE	FREQUENCY	VOLTAGE
				1,000pF AND BELOW	1MHz ±10%	0.5 ~ 5 Vrms
				MORE THAN 1,000 pF	1kHz ± 10%	
		CLASS II	WITHIN THE SPECIFIED TOLERANCE	CAPACITANCE	FREQUENCY	VOLTAGE
				4.7μF AND BELOW	1kHz ± 10%	1.0 ± 0.2Vrms
				MORE THAN 4.7μF	120Hz ± 20%	1.0 ± 0.2Vrms
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 ±10%	0.5 ~ 5 Vrms
				MORE THAN 1,000 pF	1kHz ± 10%	
6	DISSIPATION FACTOR (TanΘ CLASS II)	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	≤15%		

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%		

ENVIRONMENTAL CHARACTERISTICS

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/C0G	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		

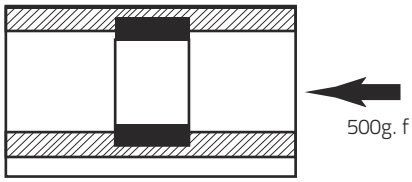
NO	ITEM		PERFORMANCE			TEST CONDITION
8	TEMPERATURE CHARACTERISTICS	CLASS II	CAPACITANCE CHANGE			
			CHAR.		CAP. CHANGE (%)	
			X	X7R	±15%	
				X6S	±22%	
				X5R	±15%	
			Y	Y5V	-82% ~ +22%	
				Z5U	-56% ~ +22%	

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

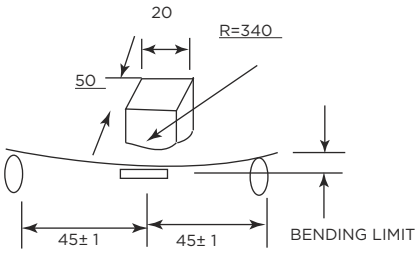
$\frac{C2 - C1}{C1} \times 100\%$

C1: CAPACITANCE AT STANDARD TEMPERATURE (25°C)
C2: CAPACITANCE AT EACH TEMPERATURE

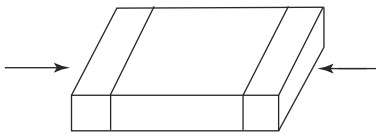
NO	ITEM		PERFORMANCE	TEST CONDITION
9	ADHESIVE STRENGTH OF TERMINATION		NO INDICATION OF PEELING SHALL OCCUR ON THE TERMINAL ELECTRODE	A 500g.f PRESSURE SHALL BE APPLIED FOR 10±1 SECOND



NO	ITEM		PERFORMANCE			TEST CONDITION
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%	



NO	ITEM	PERFORMANCE	TEST CONDITION
11	SOLDERABILITY	MORE THAN 75% OF THE TERMINAL SURFACE IS TO BE SOLDERED NEWLY, SO METAL PART (A) DOES NOT COME OUT OR DISSOLVE	SOLDER TEMPERATURE: 245 ± 5 ˚C SOLDER: Sn_Ag3_0.5Cu FLUX: RMA Type PRE-HEATING: AT 80 ~ 120 ˚C FOR 10 ~ 30 SEC.



ENVIRONMENTAL CHARACTERISTICS

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: STEP / TEMP. (˚C) / TIME (SEC.) 1 / 80-100 / 60 2 / 150-180 / 60 MEASURE AT ROOM TEMP. AFTER COOLING FOR CLASS I : 24 ± 2 HOURS CLASS II : 48 ± 4 HOURS
		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			
		Tan CLASS II	TO SATISFY THE SPECIFIED INITIAL VALUE			
		INSULATION RESISTANCE	TO SATISFY THE SPECIFIED INITIAL VALUE			
		WITHSTANDING VOLTAGE	TO SATISFY THE SPECIFIED INITIAL VALUE			
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 DIREC-TION, 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%	
				Y	WITHIN ±20%	
		QCLASS I	30 pF AND OVER: Q 1000 LESS THAN 30 pF: Q 400 + 20xC			
		Tan CLASS II	TO SATISFY THE SPECIFIED INITIAL VALUE			
		INSULATION RESISTANCE	TO SATISFY THE SPECIFIED INITIAL VALUE			

ENVIRONMENTAL CHARACTERISTICS

NO	ITEM		PERFORMANCE	TEST CONDITION
14	HUMIDITY (STEADY STATE)	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)

CAPACITANCE

CHARACTERISTIC		CAPACITANCE CHANGE
CLASS I		WITHIN ±5% OR±0.5pF WHICHEVER IS LARGER
CLASS II	X	WITHIN ±12.5%
	Y	WITHIN ±30%

QCLASS I

30pF AND OVER : Q 350
10 - 30pF : Q 275 + 2.5xC
LESS THAN 10pF : Q 200 + 10xC

DISSIPATION FACTOR (TanΘ 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	≤15%		

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

ENVIRONMENTAL CHARACTERISTICS

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 (TanΘ 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	≤15%			
			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 μF PRODUCT, WHICHEVER IS SMALLER				

ENVIRONMENTAL CHARACTERISTICS

NO	ITEM		PERFORMANCE			TEST CONDITION		
16	HIGH TEMERATURE RESISTANCE	APPEARANCE	NO MECHANICAL DAMAGE SHALL OCCUR			APPLIED VOLTAGE: 200% OF RATED VOLTAGE TEST TIME : 1000 +48/-0 Hr. CURRENT APPLIED: 5OmA 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 + I0xC			CLASS II	X	125 ±3 ˚C
							Y	85 ±3 ˚C
		DISSIPATION FACTOR (TanΘ CLASS II)	**X7R, X6S, X5R**			(INITIAL VALUE MEASUREMENT) FOR CLASS II CAPACITORS, 200 % 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	≤15%				
			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					

ENVIRONMENTAL CHARACTERISTICS

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 3OpF:Q 400 +20xC				
		TAN 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	≤15%			
			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	TO SATISFY THE SPECIFIED INITIAL VALUE				

STEP	TEMP.(˚C)	TIME (MIN)
1	MIN. RATED TEMP. +0/-3	30
2	25	2 - 3
3	MAX. RATED TEMP. +3/-0	30
4	25	2 - 3

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

ENVIRONMENTAL CHARACTERISTICS

NO	ITEM	TEST CONDITION	REQUIREMENTS
18	HIGH TEMPERATURE Load-Endurance (Life Testing)		

*Test Temperature:
C0G, X7R/X7S: 125±3˚C
X5R, Y5V: 85±3˚C
Test time: 1000+24/-0 hrs.
Endurance or Life Test Voltage (RVLL)
* All components are tested at 100% of rated voltage (Vr) for the below range:

SIZE	DIELECTRIC	RATED VOLTAGE	CAPACITANCE
0201	X5R/X7R/X6S	≤10V	C≥0.1μF
		≥16V	C>0.1μF
0402	X5R	≤16V	C>0.1μF
		25V, 50V	C≥0.1μF
	X6S	6,3V, 10V	C>0.1μF
		16V, 25V	C≥0.1μF
	X7R/X7S/Y5V	25V	C≥0.1μF
		35V	C≥0.1μF
0603	X5R/X7R/ X6S/X7S	4V	C≥22μF
		6.3V, 10V	C≥4.7μF
	X5R/X7R/X6S	25V	C≥0.1μF
	X7R	35V	C≥0.1μF
0805	X5R/X7R/ X6S/X7S	4V	C≥47μF
		6.3V	C≥22μF
		10V, 50V	C≥10μF
	X7R/X6S	16V, 25V	C≥10μF
	X5R		C≥22μF
1206	X5R/X7R/X6S	≤6.3V	C≥47μF
1210	X5R/X7R/X6S	16V	C≥47μF
	X7R	100V	C≥43.3μF

*Any items outside this range or with a different dielectric will hold the following test conditions:
(1) ≤ 6.3V or C ≥ 10μF : 150% of rated voltage.
(2) 10V ≤ Vr ≤ 100V: 200% of rated voltage.

• No remarkable damage.
CAP CHANGE:
C0G: ±3.0% or ±0.3pF whichever Is larger
X7R, X5R, X6S, X7S: ≥10V**, within ±12.5%; ≤6.3V within ±25%;
**10V: 0603≥4.7μF; 0402≥1.0μF; 0201≥0.1μF, within ±25%
Y5V≥10V, within ±30%; ≤6.3V, within +30/-40%
Q/D.F. VALUE:
C0G: More than 30pF, Q≥350
10pF≤30pF, Q≥275+2.5C
Less than 10pF, Q≥200+10C

X7R, X5R, X6S, X7S:

RATED VOLTAGE	D.F.	EXCEPTIONS OF D.F. ≤	
≥100V	≤3%	≤6%	1206≥0.47μF
		≤7.5%	0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF
		≤20%	0805>2.2μF; 1210≤3.3μF
50V	≤3%	≤6%	0201(50V); 0603>0.047μF; 0805≥0.18μF; 1206≥0.47μF
		≤10%	0201≥0.01μF; 1210≥3.3μF
		≤20%	0402≥0.012μF; 0603>0.1μF; 0805≥1.0μF (0805/X7R>0.47μF); 1206≥2.2μF; 1210≥10μF
35V	≤5%	≤20%	0603≥1.0μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF
25V	≤5%	≤10%	0201=0.01μF; 0805≥1.0μF; 1210≥10μF
		≤14%	0603≥0.33μF
		≤15%	0201>0.01μF; 0402>0.10μF (0402/X7R≥0.056μF); 0603≥0.47μF; 0805≥2.2μF; 1206≥0.47μF; 1210≥22μF (1210/X5R≥10μF)
		≤20%	0402≥0.47μF
16V	≤5%	≤10%	0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF
		≤15%	0201≥0.01μF (0201/X7R≥0.022μF); 0402≥0.033μF 0603>0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF
10V	≤7.5%	≤15%	0201≥0.012μF; 0402≥0.22μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF
		≤20%	0201≥0.01μF; 0402≥1.0μF; 0603/X5R≥10μF; 01R5/x5R
6.3V	≤15%	≤30%	0201≥0.01μF; 0402≥1.0μF (0402/X6S≥0.47μF); 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF
4V	≤20%	-	-

ENVIRONMENTAL CHARACTERISTICS

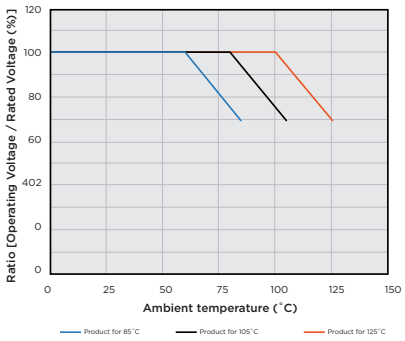
NO	ITEM	TEST CONDITION	REQUIREMENTS
18	HIGH TEMPERATURE Load-Endurance (Life Testing)		

(3) 150% of rated voltage for below range.

SIZE	DIELECTRIC	RATED VOLTAGE	CAPACITANCE
0201	X5R/X6S	16V, 25V	C=0.1μF
	X7R	16V	C≥0.022μF
0402	X7R/X5R/X6S	50V	C≥0.01μF
		10-25V	C≥0.22μF
	Y5V	16V	C≥0.47μF
0603	X7S	50-100V	C>0.22μF
		50V	C>0.1μF
	X7R	25V	C=1.0μF
	X5R	50V	C≥1.0μF
	X5R/X7R/ X6S/X7S	10V, 16V	C≥1.0μF
	Y5V	16V	C≥2.2μF
0805	X5R/X7R/ X6S/X7S	100V	C≥0.47μF
		50V	C≥0.68μF
		35V	C≥2.2μF
		10-25V	C≥4.7μF
	Y5V	16V	C≥4.7μF
1206	X7R	100V	C≥1.0μF
		50V	C=4.7μF
	X5R/X6S/X7S	100V	C>1.0μF
		50V	C=4.7μF
1210	X5R/X7R/ X6S/X7S	50~100V	C≥2.2μF
1825 2220 2225	X7R	100-250V	C≥1.0μF

* Before initial measurement (Class II only):
To apply de-aging at 150˚C for 1 hr then set for 24±2 hrs at room temp
* Cap./DF(Q)/I.R. Measurement to be made after de-aging at 150˚C for 1hr then set for 24±2hrs at room temp.
** De-rating conditions:

DERATING CURVE



• No remarkable damage.
CAP CHANGE:
C0G: ±3.0% or ±0.3pF whichever Is larger
X7R, X5R, X6S, X7S: ≥10V**, within ±12.5%; ≤6.3V within ±25%;
**10V: 0603≥4.7μF; 0402≥1.0μF; 0201≥0.1μF, within ±25%
Y5V≥10V, within ±30%; ≤6.3V, within +30/-40%
Q/D.F. VALUE:
C0G: More than 30pF, Q≥350
10pF≤30pF, Q≥275+2.5C
Less than 10pF, Q≥200+10C

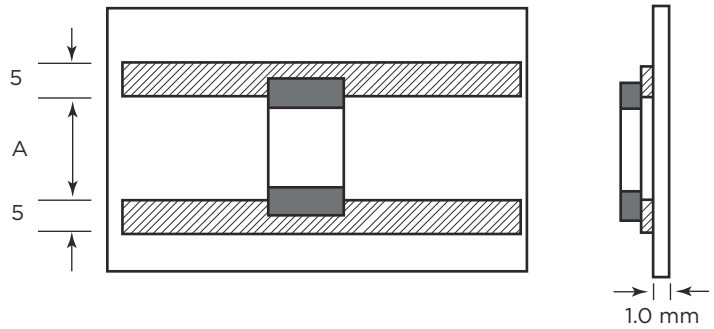
Y5V:

RATED VOLTAGE	D.F.	EXCEPTIONS OF D.F. ≤	
≥0V	≤7.5%	≤10%	0603≥0.1μF; 0805≥0.47μF; 1206≥4.7μF
		≤20%	1210≥6.8μF
35V	≤10%	-	-
25V	≤7.5%	≤10%	0402≥0.047μF; 0603≥0.1μF; 0805≥0.33μF; 1206≥1.0μF; 1210≥4.7μF
		≤15%	0402≥0.068μF; 0603≥0.47μF; 1206≥4.7μF; 1210≥22μF
16V (C<1.0μF)	≤10%	≤12.5%	0402≥0.068μF; 0603≥0.68μF
		≤20%	0402≥0.22μF
16V (C≥1.0μF)	≤12.5%	≤20%	0603≥2.2μF; 0805≥3.3μF; 1206≥10μF; 1210≥22μF; 1812≥47μF
10V	≤20%	≤30%	0402≥0.47μF
6.3V	≤30%	-	-

*I.R.: ≥10V, 1GΩ or 50Ω-F whichever Is smaller.
Class II (X7R, X5R, X6S, X7S, Y5V)

RATED VOLTAGE	INSULATION RESISTANCE
100V: All X7R; 1210≥3.3μF	1GΩ or apply ≥10Ω-F rule, whichever is smaller.
50V: 0402>0.01μF; 0603≥1.0μF; 0805≥1.0μF; 1206≥4.7μF; 1210≥4.7μF	
35V: 0603≥1.0μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF	
25V: 0201≥0.1μF; 0402≥0.22μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF	
16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1.0μF; 0805≥2.2μF; 1206≥10μF; 1210≥47μF	
10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥47μF	
6.3V; 4V : All X6S/X7S items, Size≥1812	

ADHESIVE STRENGTH OF TERMINATION

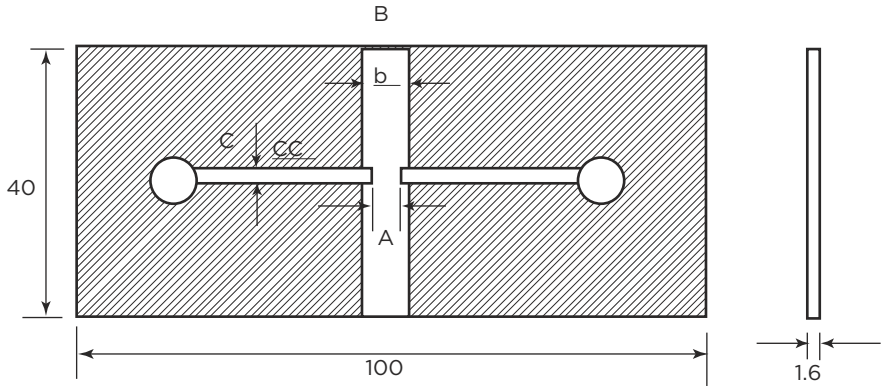


CODE	DIMENSION (mm)	A (mm)	CODE	DIMENSION (mm)	A (mm)
01005 (0402)	0.40 x 0.20	0.12	1206 (3216)	3.2 x 1.6	2.2
0201 (0603)	0.61 x 0.31	0.2	1210 (3225)	3.2 x 2.5	2.2
0402 (1005)	1.0 x 0.5	0.4	1812 (4532)	4.5 x 3.2	3.5
0603 (1608)	1.6 x 0.8	1.0	2220 (5750)	5.7 x 5.08	4.7
0805 (2012)	2.0 x 1.25	1.2			

Material: Alumina Substrate (Al203 95% Min) or Glass Epoxy Substrate

Copper Foil (T = 0.035mm)

SUBSTRATE BENDING STRENGTH



(UNIT: mm)

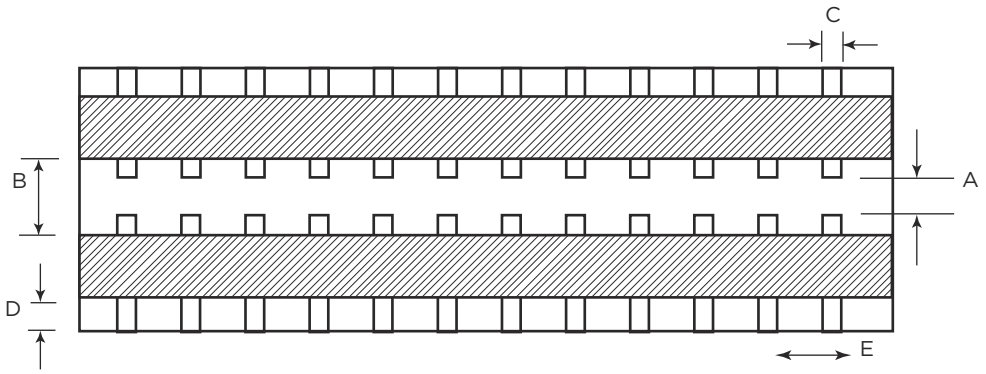
CODE	DIMENSION (mm)	A (mm)	B (mm)	C (mm)
01005 (0402)	0.40 x 0.20	0.12	0.7	0.20
0201 (0603)	0.61 x 0.31	0.2	1.0	0.4
0402 (1005)	1.0 x 0.5	0.4	1.4	0.5
0603 (1608)	1.6 x 0.8	1.0	3.0	1.0
0805 (2012)	2.0 x 1.25	1.2	4.0	1.65
1206 (3216)	3.2 x 1.6	2.2	5.0	2.0
1210 (3225)	3.2 x 2.5	2.2	5.0	3.2
1812 (4532)	4.5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

TEST SUBSTRATE



(UNIT: mm)

CODE	DIMENSION (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