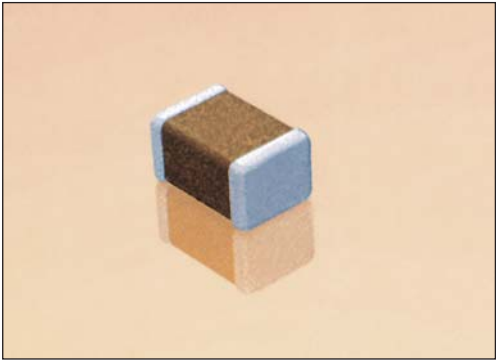


General Specifications



GENERAL DESCRIPTION

- General Purpose Dielectric for Ceramic Capacitors
- EIA Class II Dielectric
- Temperature variation of capacitance is within $\pm 15\%$ from -55°C to $+85^{\circ}\text{C}$
- Well suited for decoupling and filtering applications
- Available in High Capacitance values (up to $100\mu\text{F}$)

PART NUMBER (SEE PAGE 2 FOR COMPLETE PART NUMBER EXPLANATION)

1210

Size
(L" x W")

4

Voltage
4 = 4V
6 = 6.3V
Z = 10V
Y = 16V
3 = 25V
D = 35V
5 = 50V

D

Dielectric
D = X5R

107

Capacitance Code (In pF)
2 Sig. Digits +
Number of
Zeros

M

Capacitance Tolerance
K = $\pm 10\%$
M = $\pm 20\%$

A

Failure Rate
A = N/A

T

Terminations
T = Plated Ni
and Sn

2

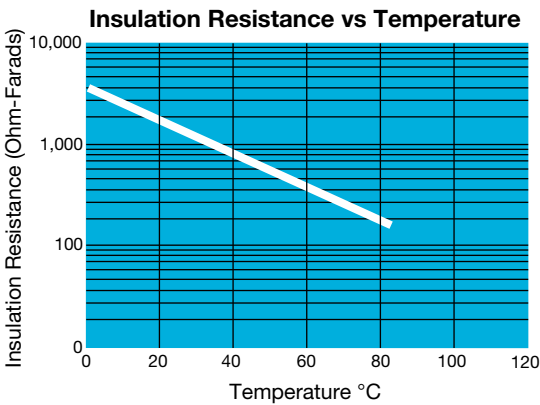
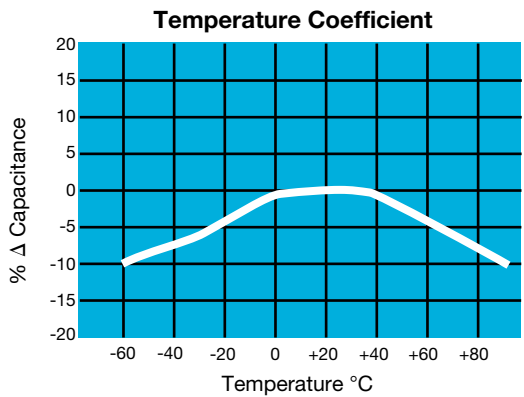
Packaging
2 = 7" Reel
4 = 13" Reel
7 = Bulk Cass.
9 = Bulk

A

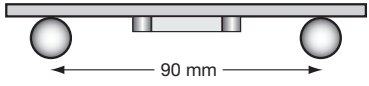
Special Code
A = Std.

NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.
Contact factory for non-specified capacitance values.

TYPICAL ELECTRICAL CHARACTERISTICS



Specifications and Test Methods

Parameter/Test		X5R Specification Limits	Measuring Conditions	
Operating Temperature Range		-55°C to +85°C	Temperature Cycle Chamber	
Capacitance		Within specified tolerance	Freq.: 1.0 kHz \pm 10% Voltage: 1.0Vrms \pm .2V For Cap > 10 μ F, 0.5Vrms @ 120Hz	
Dissipation Factor		\leq 2.5% for \geq 50V DC rating \leq 3.0% for 25V DC rating \leq 12.5% Max. for 16V DC rating and lower Contact Factory for DF by PN		
Insulation Resistance		10,000M Ω or 500M Ω - μ F, whichever is less		
Dielectric Strength		No breakdown or visual defects	Charge device with rated voltage for 120 \pm 5 secs @ room temp/humidity Charge device with 300% of rated voltage for 1-5 seconds, w/charge and discharge current limited to 50 mA (max)	
Resistance to Flexure Stresses	Appearance	No defects	Deflection: 2mm Test Time: 30 seconds  1mm/sec 90 mm	
	Capacitance Variation	$\leq \pm 12\%$		
	Dissipation Factor	Meets Initial Values (As Above)		
	Insulation Resistance	\geq Initial Value x 0.3		
Solderability		\geq 95% of each terminal should be covered with fresh solder	Dip device in eutectic solder at 230 \pm 5°C for 5.0 \pm 0.5 seconds	
Resistance to Solder Heat	Appearance	No defects, <25% leaching of either end terminal	Dip device in eutectic solder at 260°C for 60 seconds. Store at room temperature for 24 \pm 2 hours before measuring electrical properties.	
	Capacitance Variation	$\leq \pm 7.5\%$		
	Dissipation Factor	Meets Initial Values (As Above)		
	Insulation Resistance	Meets Initial Values (As Above)		
	Dielectric Strength	Meets Initial Values (As Above)		
Thermal Shock	Appearance	No visual defects	Step 1: -55°C \pm 2°	30 \pm 3 minutes
	Capacitance Variation	$\leq \pm 7.5\%$	Step 2: Room Temp	\leq 3 minutes
	Dissipation Factor	Meets Initial Values (As Above)	Step 3: +85°C \pm 2°	30 \pm 3 minutes
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	\leq 3 minutes
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles and measure after 24 \pm 2 hours at room temperature	
Load Life	Appearance	No visual defects	Charge device with 1.5X rated voltage in test chamber set at 85°C \pm 2°C for 1000 hours (+48, -0). Note: Contact factory for *optional specification part numbers that are tested at < 1.5X rated voltage. Remove from test chamber and stabilize at room temperature for 24 \pm 2 hours before measuring.	
	Capacitance Variation	$\leq \pm 12.5\%$		
	Dissipation Factor	\leq Initial Value x 2.0 (See Above)		
	Insulation Resistance	\geq Initial Value x 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)		
Load Humidity	Appearance	No visual defects	Store in a test chamber set at 85°C \pm 2°C/ 85% \pm 5% relative humidity for 1000 hours (+48, -0) with rated voltage applied. Remove from chamber and stabilize at room temperature and humidity for 24 \pm 2 hours before measuring.	
	Capacitance Variation	$\leq \pm 12.5\%$		
	Dissipation Factor	\leq Initial Value x 2.0 (See Above)		
	Insulation Resistance	\geq Initial Value x 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)		

X5R Dielectric

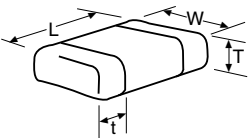
Capacitance Range



PREFERRED SIZES ARE SHADED

SIZE		0201					0402					0603					0805					1206					1210					1812										
Soldering		Reflow Only					Reflow/Wave					Reflow/Wave					Reflow/Wave					Reflow/Wave					Reflow Only					Reflow Only										
Packaging		All Paper					All Paper					All Paper					Paper/Embossed					Paper/Embossed					Paper/Embossed					All Embossed										
(L) Length	mm	0.60 ± 0.03					1.00 ± 0.10					1.60 ± 0.15					2.01 ± 0.20					3.20 ± 0.20					3.20 ± 0.20					4.50 ± 0.30										
	(in.)	(0.024 ± 0.001)					(0.040 ± 0.004)					(0.063 ± 0.006)					(0.079 ± 0.008)					(0.126 ± 0.008)					(0.126 ± 0.008)					(0.177 ± 0.012)										
(W) Width	mm	0.30 ± 0.03					0.50 ± 0.10					0.81 ± 0.15					1.25 ± 0.20					1.60 ± 0.20					2.50 ± 0.20					3.20 ± 0.20										
	(in.)	(0.011 ± 0.001)					(0.020 ± 0.004)					(0.032 ± 0.006)					(0.049 ± 0.008)					(0.063 ± 0.008)					(0.098 ± 0.008)					(0.126 ± 0.008)										
(t) Terminal	mm	0.15 ± 0.05					0.25 ± 0.15					0.35 ± 0.15					0.50 ± 0.25					0.50 ± 0.25					0.50 ± 0.25					0.61 ± 0.36										
	(in.)	(0.006 ± 0.002)					(0.010 ± 0.006)					(0.014 ± 0.006)					(0.020 ± 0.010)					(0.020 ± 0.010)					(0.020 ± 0.010)					(0.024 ± 0.014)										
WVDC		4	6.3	10	16	25	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	6.3	10	16	25	35	50	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	6.3	10	25	50
Cap (pF)	100					A																																				
	150					A																																				
	220					A						C																														
	330					A						C																														
	470					A						C																														
680					A						C																															
1000					A	A					C																															
1500					A	A					C																															
2200				A	A						C																															
3300				A	A						C																															
4700				A	A						C																															
6800				A	A						C																															
Cap (μF)	0.010			A							C																															
	0.015										C																															
	0.022			A*							C																															
	0.033										C																															
	0.047			A*							C																															
0.068											C																															
0.10			A*							C																																
0.15											C																															
0.22		A*	A*								C*																															
0.33																																										
0.47											C*	C*																														
0.68																																										
1.0											C*	C*	C*																													
1.5																																										
2.2											C*	C*																														
3.3																																										
4.7																																										
10																																										
22																																										
47																																										
100																																										
WVDC		4	6.3	10	16	25	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	6.3	10	16	25	35	50	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	6.3	10	25	50

SIZE	0201					0402					0603					0805					1206					1210					1812										



Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
PAPER						EMBOSSED							

= Under Development

= *Optional Specifications – Contact factory

NOTE: Contact factory for non-specified capacitance values