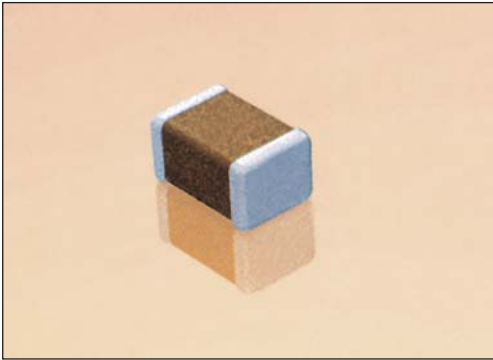




GENERAL DESCRIPTION

- 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

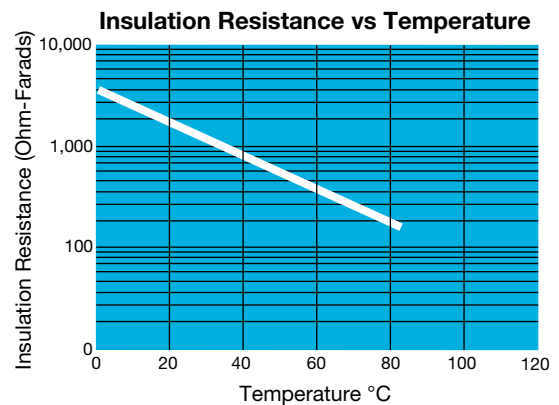
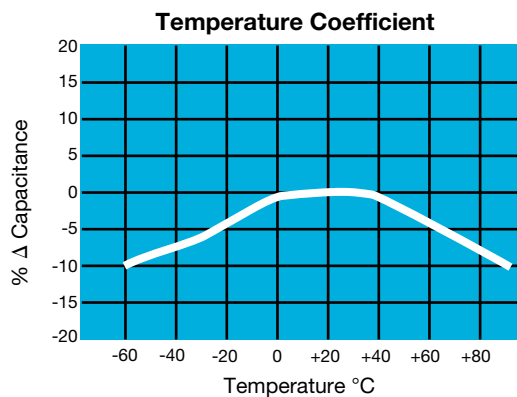
Packaging
2 = 7" Reel
4 = 13" Reel
7 = Bulk Cass.
9 = Bulk

A

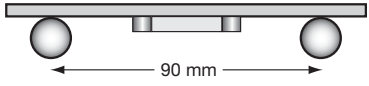
Special Code
A = Std.

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		01005					0201					0402					0603					0805					1206					1210					1812																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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(L) Length	mm	0.40 ± 0.02					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.)	(0.016 ± 0.0008)					(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	0.20 ± 0.02					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.)	(0.008 ± 0.0008)					(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	0.10 ± 0.04					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.)	(0.004 ± 0.016)					(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)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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- = Under Development
- = *Optional Specifications – Contact factory

NOTE: Contact factory for non-specified capacitance values