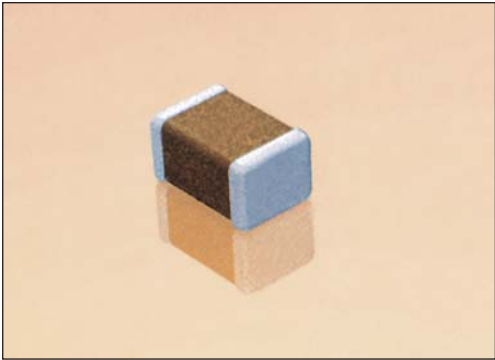


X7S Dielectric

General Specifications



GENERAL DESCRIPTION

X7S formulations are called “temperature stable” ceramics and fall into EIA Class II materials. Its temperature variation of capacitance is within $\pm 22\%$ from -55°C to $+125^{\circ}\text{C}$. This capacitance change is non-linear.

Capacitance for X7S varies under the influence of electrical operating conditions such as voltage and frequency.

X7S dielectric chip usage covers the broad spectrum of industrial applications where known changes in capacitance due to applied voltages are acceptable.

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

1206

Size
(L" x W")

Z

Voltage
4 = 4V
6 = 6.3V
Z = 10V
Y = 16V
3 = 25V
5 = 50V
1 = 100V
2 = 200V

Z

Dielectric
Z = X7S

105

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.

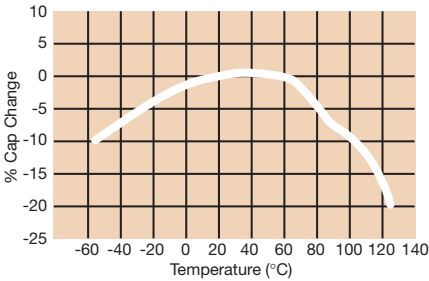
A

Special Code
A = Std. Product

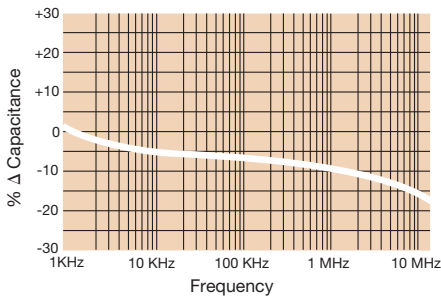
NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.

TYPICAL ELECTRICAL CHARACTERISTICS

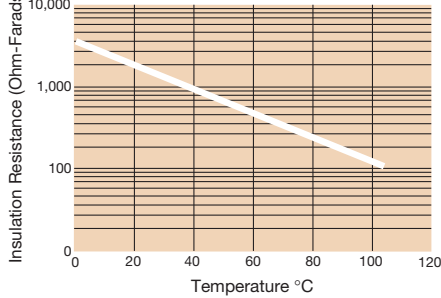
X7S Dielectric Typical Temperature Coefficient



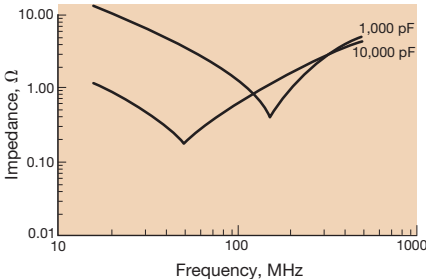
Δ Capacitance vs. Frequency



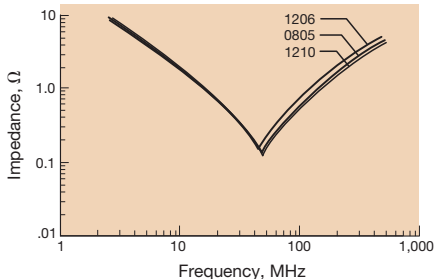
Insulation Resistance vs Temperature



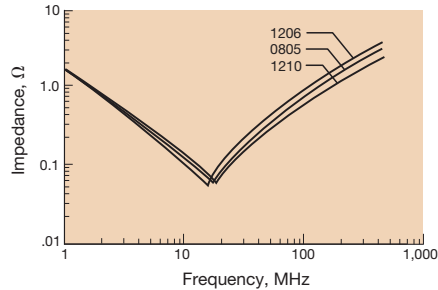
Variation of Impedance with Cap Value Impedance vs. Frequency 1,000 pF vs. 10,000 pF - X7S 0805



Variation of Impedance with Chip Size Impedance vs. Frequency 10,000 pF - X7S



Variation of Impedance with Chip Size Impedance vs. Frequency 100,000 pF - X7S



Specifications and Test Methods

Parameter/Test		X7S Specification Limits	Measuring Conditions	
Operating Temperature Range		-55°C to +125°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 3.5% for 16V DC rating \leq 5.0% for \leq 10V DC rating		
Insulation Resistance		100,000M Ω or 1000M Ω - μ F, whichever is less	Charge device with rated voltage for 120 \pm 5 secs @ room temp/humidity	
Dielectric Strength		No breakdown or visual defects	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 	
	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: +125°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 1.5 rated voltage (\leq 10V) in test chamber set at 125°C \pm 2°C for 1000 hours (+48, -0) 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)		

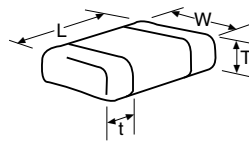
X7S Dielectric

Capacitance Range



PREFERRED SIZES ARE SHADED

SIZE	0402	0603		0805	1206		1210	
Soldering	Reflow/Wave	Reflow/Wave		Reflow/Wave	Reflow/Wave		Reflow Only	
Packaging	All Paper	All Paper		Paper/Embossed	Paper/Embossed		Paper/Embossed	
(L) Length	mm (in.)	1.00 ± 0.10 (0.040 ± 0.004)	1.60 ± 0.15 (0.063 ± 0.006)		2.01 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)		3.20 ± 0.20 (0.126 ± 0.008)
(W) Width	mm (in.)	0.50 ± 0.10 (0.020 ± 0.004)	0.81 ± 0.15 (0.032 ± 0.006)		1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)		2.50 ± 0.20 (0.098 ± 0.008)
(t) Terminal	mm (in.)	0.25 ± 0.15 (0.010 ± 0.006)	0.35 ± 0.15 (0.014 ± 0.006)		0.50 ± 0.25 (0.020 ± 0.010)	0.50 ± 0.25 (0.020 ± 0.010)		0.50 ± 0.25 (0.020 ± 0.010)
WVDC	6.3	6.3	25	4	6.3	10	6.3	
Cap (pF)	100							
	150							
	220							
	330							
	470							
	680							
	1000							
	1500							
	2200							
Cap (μF)	0.010							
	0.015							
	0.022							
	0.033	C						
	0.047	C						
	0.068	C						
	0.10	C						
	0.15							
	0.22		G					
	0.33		G					
	0.47		G					
	0.68		G					
	1.0		G					
	1.5			N	Q			
	2.2			N	Q			
	3.3			N	Q			
	4.7			N	Q	Q		
	10							
	22						Z	
	47							
	100							
WVDC	6.3	6.3	25	4	6.3	10	6.3	
SIZE	0402	0603		0805	1206		1210	



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					EMBOSSSED							

