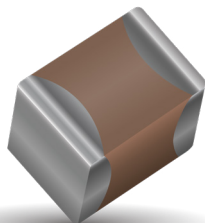


# X7S Dielectric

## 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  $-55^{\circ}\text{C}$  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.

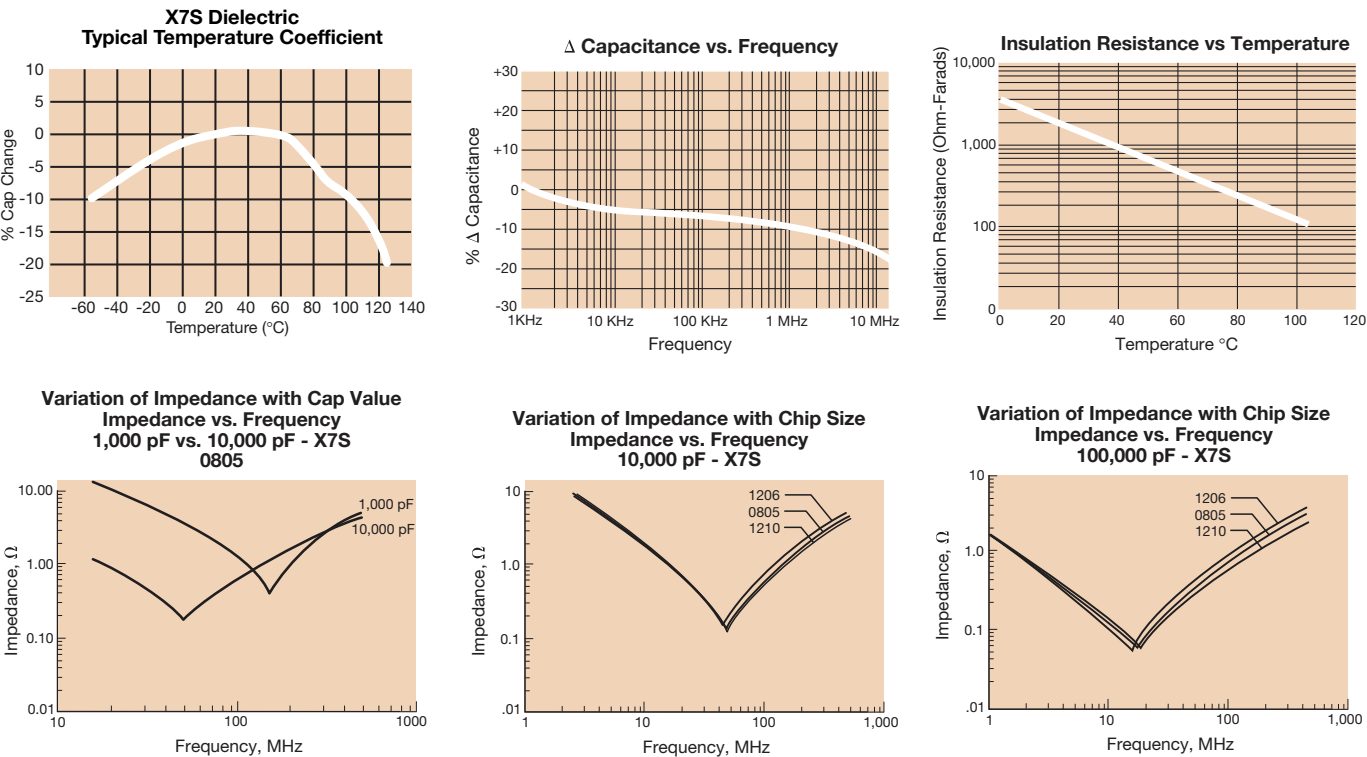
### PART NUMBER (SEE PAGE 4 FOR COMPLETE PART NUMBER EXPLANATION)

<b>1206</b>	<b>Z</b>	<b>Z</b>	<b>105</b>	<b>M</b>	<b>A</b>	<b>T</b>	<b>2</b>	<b>A</b>
Size (L" x W")	Voltage 4 = 4V 6 = 6.3V Z = 10V Y = 16V 3 = 25V 5 = 50V 1 = 100V 2 = 200V	Dielectric Z = X7S	Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	Capacitance Tolerance K = $\pm 10\%$ M = $\pm 20\%$	Failure Rate A = N/A	Terminations T = Plated Ni and Sn	Packaging 2 = 7" Reel 4 = 13" Reel	Special Code A = Std. Product



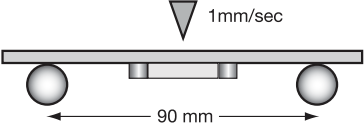
NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.

### TYPICAL ELECTRICAL CHARACTERISTICS



# X7S Dielectric

## Specifications and Test Methods

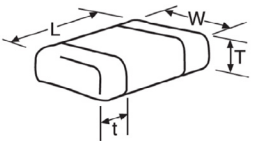
Parameter/Test		X7S Specification Limits	Measuring Conditions	
Operating Temperature Range		-55°C to +125°C	Temperature Cycle Chamber	
Capacitance		Within specified tolerance	Freq.: 1.0 kHz $\pm$ 10% Voltage: 1.0Vrms $\pm$ .2V For Cap > 10 $\mu$ F, 0.5Vrms @ 120Hz	
Dissipation Factor		$\leq$ 5.0% for $\geq$ 100V DC rating $\leq$ 5.0% for $\geq$ 25V DC rating $\leq$ 10.0% for $\geq$ 10V DC rating $\leq$ 10.0% for $\leq$ 10V DC rating		
Insulation Resistance		100,000M $\Omega$ or 1000M $\Omega$ - $\mu$ F, whichever is less		
Dielectric Strength		No breakdown or visual defects		
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	1.00 ± 0.10	1.60 ± 0.15	2.01 ± 0.20	3.20 ± 0.20			3.20 ± 0.20
	(in.)	(0.040 ± 0.004)	(0.063 ± 0.006)	(0.079 ± 0.008)	(0.126 ± 0.008)			(0.126 ± 0.008)
W) Width	mm	0.50 ± 0.10	0.81 ± 0.15	1.25 ± 0.20	1.60 ± 0.20			2.50 ± 0.20
	(in.)	(0.020 ± 0.004)	(0.032 ± 0.006)	(0.049 ± 0.008)	(0.063 ± 0.008)			(0.098 ± 0.008)
(t) Terminal	mm	0.25 ± 0.15	0.35 ± 0.15	0.50 ± 0.25	0.50 ± 0.25			0.50 ± 0.25
	(in.)	(0.010 ± 0.006)	(0.014 ± 0.006)	(0.020 ± 0.010)	(0.020 ± 0.010)			(0.020 ± 0.010)
WVDC		6.3	6.3	4	10	50	100	6.3
Cap (pF)		100						
		150						
		220						
		330						
		470						
		680						
		1000						
		1500						
		2200						
		3300						
		4700						
		6800						
Cap (µF)		0.010						
		0.015						
		0.022						
		0.033	C					
		0.047	C					
		0.068	C					
		0.10	C					
		0.15						
		0.22						
		0.33		G				
		0.47		G				
		0.68		G				
		1.0		G				
		1.5			N			
		2.2			N			
		3.3			N			
		4.7			N	Q	Q*	
		10						
		22						Z
		47						
		100						
WVDC		6.3	6.3	4	10	50	100	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)	1.90 (0.075)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
PAPER						EMBOSSED							

\*Contact Factory for Specifications

