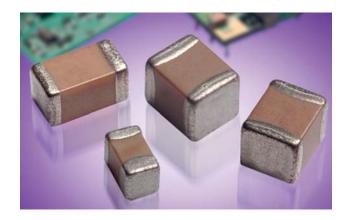
General Specifications



X7R formulations are called "temperature stable" ceramics and fall into EIA Class II materials. X7R is the most popular of these intermediate dielectric constant materials. Its temperature variation of capacitance is within ±15% from -55°C to +125°C. This capacitance change is non-linear.

Capacitance for X7R varies under the influence of electrical operating conditions such as voltage and frequency.

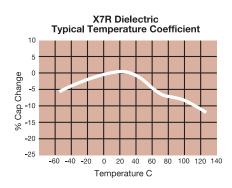
X7R dielectric chip usage covers the broad spectrum of industrial applications where known changes in capacitance due to applied voltages are acceptable.

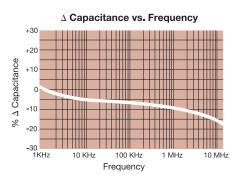


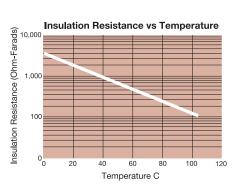
PART NUMBER (see page 2 for complete part number explanation)

0805	<u>5</u>	<u>C</u>	103	<u>M</u>	<u>A</u>	<u>T</u>	2	A
Size (L" x W")	Voltage 4V = 4 6.3V = 6 10V = Z 16V = Y	Dielectric X7R = C	Capacitance Code (In pF) 2 Sig. Digits + Num- ber of Zeros	Capacitance Tolerance J = ± 5%* K = ±10% M = ± 20%	Failure Rate A = Not Applicable	Terminations T = Plated Ni and Sn Z= FLEXITERM®**	Packaging 2 = 7" Reel 4 = 13" Reel	Special Code A = Std. Product
	25V = 3 50V = 5 100V = 1 200V = 2			*≤1µF only, contact factory for addi- tional values		*Optional termination	Contact Factory For Multiples	
NOTE O 1 11	500V = 7					**See FLEXITERM® X7R section		

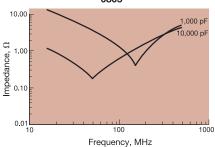
NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers. Contact factory for non-specified capacitance values.

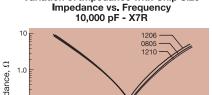






Variation of Impedance with Cap Value Impedance vs. Frequency 1,000 pF vs. 10,000 pF - X7R 0805

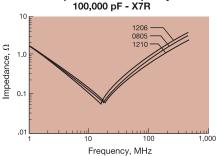




Variation of Impedance with Chip Size

Impedance, Ω 1,000 Frequency, MHz

Variation of Impedance with Chip Size Impedance vs. Frequency



Specifications and Test Methods

Parame	ter/Test	X7R Specification Limits	Measuring Conditions							
Operating Temp		-55°C to +125°C	Temperature Cycle Chamber							
Capac		Within specified tolerance ≤ 10% for ≥ 50V DC rating ≤ 12.5% for 25V DC rating ≤ 12.5% for 25V and 16V DC rating ≤ 12.5% for ≤ 10V DC rating	Freq.: 1.0 kHz ± 10% Voltage: 1.0Vrms ± .2V For Cap > 10µF, 05Vrm @ 120Hz							
Insulation	Resistance	100,000MΩ or 1000MΩ - μF, whichever is less	Charge device with rated voltage for 120 ± 5 secs @ room temp/humidity							
Dielectric	Strength	No breakdown or visual defects	Charge device with 250% of rated voltage for 1-5 seconds, w/charge and discharge current limited to 50 mA (max) Note: Charge device with 150% of rated voltage for 500V devices.							
	Appearance	No defects		ion: 2mm						
	Capacitance	≤ ±12%	Test Time:	30 seconds						
Resistance to	Variation	≤ ±12/0	7	7 1mm/sec						
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)								
	Insulation Resistance	≥ Initial Value x 0.3	90	mm —						
Solder	rability	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutect	ic solder at 230 ± 5°C						
	Appearance	No defects, <25% leaching of either end terminal								
	Capacitance	≤ ±7.5%								
Resistance to Solder Heat	Variation		Dip device in eutectic solder at 260°C for 60							
	Dissipation Factor	Meets Initial Values (As Above)	seconds. Store at roon	n temperature for 24 ± 2 ng electrical properties.						
	Insulation Resistance	Meets Initial Values (As Above)								
	Dielectric Strength	Meets Initial Values (As Above)								
	Appearance	No visual defects	Step 1: -55°C ± 2°	30 ± 3 minutes						
	Capacitance Variation	≤ ±7.5%	Step 2: Room Temp	≤ 3 minutes						
Thermal Shock	Dissipation Factor	Meets Initial Values (As Above)	Step 3: +125°C ± 2°	30 ± 3 minutes						
OHOUR	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	≤ 3 minutes						
	Dielectric	Meets Initial Values (As Above)	Repeat for 5 cycles and i							
	Strength Appearance	No visual defects	24 ± 2 hours at room ten	iperature						
	Capacitance Variation	≤ ±12.5%	Charge device with 1.5 rated voltage (≤ 10V) in test chamber set at 125°C ± 2°C							
Load Life	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	for 1000 hours (+48, -0)							
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from test chamber and stabilize at room temperature for 24 ± 2 hours							
	Dielectric	Meets Initial Values (As Above)	before measuring.							
	Strength									
	Appearance	No visual defects	Store in a test chaml	ber set at 85°C ± 2°C/						
Local	Capacitance Variation	≤±12.5%		umidity for 1000 hours ed voltage applied.						
Load Humidity	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	Remove from chamber and stabilize at room temperature and humidity for 24 ± 2 hours before measuring.							
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)								
	Dielectric Strength	Meets Initial Values (As Above)								

Capacitance Range

PREFERRED SIZES ARE SHADED

0101* SIZE 0201 0402 0603 0805 1206 Soldering Reflow Only Reflow Only Reflow/Wave Reflow/Wave Reflow/Wave Reflow/Wave Paper/Embossed 2.01 ± 0.20 (0.079 ± 0.008) 1.25 ± 0.20 (0.049 ± 0.008) 0.50 ± 0.25 (0.020 ± 0.020) Paper/Embossed 3.20 ± 0.20 (0.126 ± 0.008) 1.60 ± 0.20 (0.063 ± 0.008) 0.50 ± 0.25 All Paper 1.60 ± 0.15 Paper/Embosse Packaging All Paper 0.60 ± 0.03 All Paper 1.00 ± 0.10 (L) Length 0.40 ± 0.02 (0.016 ± 0.0008) 0.20 ± 0.02 (0.008 ± 0.0008) 0.10 ± 0.04 (0.063 ± 0.006) 0.81 ± 0.15 (0.032 ± 0.006) 0.35 ± 0.15 (in. (0.024 ± 0.001) 0.30 ± 0.03 $\frac{(0.040 \pm 0.004)}{0.50 \pm 0.10}$ (W) Width (0.011 ± 0.001) 0.15 ± 0.05 $\frac{(0.020 \pm 0.004)}{0.25 \pm 0.15}$ (t) Terminal (0.004 ± 0.0016) (0.006 ± 0.002) 6.3 | 10 | 16 | 25 (0.014 ± 0.006) 16 | 25 | 50 | 100 | 200 (0.020 ± 0.010) 16 | 25 | 50 | 100 | 200 (0.020 ± 0.010) 6 | 25 | 50 | 100 | 200 | 500 (0.010 ± 0.006) 10 | 16 | 25 | 50 (in. WVDC 101 151 221 331 471 681 102 152 222 332 472 682 103 153 223 333 473 680 1000 1500 2200 3300 4700 6800 683 104 154 224 334 474 684 105 225 475 106 226 476 107 50 100 200 25 50 100 200 6.3 10 16 25 50 100 200 500 50 6.3 10 16 25 50 6.3 10 6.3 10 WVDC 10 25 0101 0402 0603 0805 SIZE 0201 1206

Letter	Α	В	С	E	G	J	K	M	N	Р	Q	X	Υ	Z		
Max.	0.33	0.22	0.56	0.71	0.90	0.94	1.02	1.27	1.40	1.52	1.80	2.29	2.54	2.79		
Thickness	(0.013)	(0.009)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.071)	(0.090)	(0.100)	(0.110)		
			PAF	PER			EMBOSSED									

PAPER and EMBOSSED available for 01005

NOTE: Contact factory for non-specified capacitance values

*EIA 01005

**Contact Factory for Specifications

Capacitance Range

PREFERRED SIZES ARE SHADED

SIZI	E				1210				1812						1825			2220					2225		
Solder	rina	Reflow Only					Reflow Only						R	eflow C)nlv	Reflow Only					Reflow Only				
Packag		Paper/Embossed					All Embossed					All Embossed				All Embossed				All Embossed					
(L) Length	mm				3.30 ± 0.	4			4.50 ± 0.30					4.50 ± 0.30				5.70 ± 0.40				5.72 ± 0.25			
(L) Length	(in.)	(0.130± 0.016)								± 0.012)				0.177 ± 0.0		(0.225 ± 0.016) 5.00 ± 0.40						$.225 \pm 0.0$			
(W) Width	mm (in.)	2.50 ± 0.20 (0.098 ± 0.008)					3.20 ± 0.20 (0.126 ± 0.008)					6.40 ± 0.40 (0.252 ± 0.016)				5.00 ± 0.40 (0.197 ± 0.016)				6.35 ± 0.25 (0.250 ± 0.010)					
(t) Terminal	mm	0.50 ± 0.25				0.61 ± 0.36						0.61 ± 0.36			0.64 ± 0.39				0.64 ± 0.39						
(t) Terrifical	(in.)				020 ± 0.0							± 0.014)				0.024 ± 0.0			(0.025 ± 0.015)				(0.025 ± 0.015)		
Cap 100	WVDC 101	10	16	25	50	100	200	500	16	25	50	100	200	500	50	100	200	25	50	100	200	500	50	100	200
Cap 100 (pF) 150	151																				٠ . ڪ	·	_	-W	_
220	221																			~			$\overline{}$	$\supset \stackrel{\sim}{\sim}$	_
330	331																				$\langle \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	$\overline{}$		レル	Т
470	471																				<u></u>)].		_	_
680	681																								
1000	102																					t			
1500 2200	152 222	J	J	J	J	J	J J	M														. "			
3300	332	J	J	J	J	J	J	M										-						\vdash	_
4700	472	J	J	J	J	J	J	M										 						\vdash	
6800	682	J	J	J	J	J	J	M																	
Cap 0.01	103	J	J	J	J	J	J	M		K	K	K	K	K	М	M	M		Х	Χ	Х	Χ	M	Р	Р
(μF) 0.015	153	J	J	J	J	J	J	Р		K	K	K	K	Р	М	M	M		Χ	Χ	Х	Χ	M	Р	Р
0.022	223	J	J	J	J	J	J	Q		K	K	K	K	Р	M	M	M		Х	Χ	Х	Χ	M	Р	Р
0.033	333	J	J	J	J	J	J	Q		K	K	K	K	X	М	M	М		Х	Х	Х	Х	М	Р	Р
0.047	473 683	J	J	J	J	J	J M	Q Q		K	K K	K	K	Z Z	M M	M	M		X	X	X	X	M M	P P	P P
0.000	104	J	J	J	J	J	M	X		K K	K	K	K	Z	M	M	M	_	X	X	X	X	M	P	P
0.15	154	J	J	J	J	M	Z	Z		K	K	K	P	Z	M	M	M		X	X	X	X	M	P	X
0.22	224	J	J	J	J	P	Z	_		K	K	K	P	Z	M	M	M		X	X	X	X	M	P	X
0.33	334	J	J	J	J	Q				K	K	М	Х	Z	M	M			Х	Х	Х	Х	M	Р	Х
0.47	474	M	М	M	M	Q				K	K	Р	X	Z	M	M			Х	Х	Х	Χ	M	Р	Х
0.68	684	M	М	Р	Х	Х	Z			М	М	Q			M	Р			Х	Х			М	Р	Х
1.0	105	N	N	P	X	Z				M	M	X	Z		M	P			X	X	Х	Z	M	Р	X
1.5	155 225	N X	N X	Z	Z	Z				Z Z	Z	Z			Q X	X	Z		X	X			M M	X	Z
3.3	335	X	X	Z	Z	Z				Z	Z	Z			^	٨	L		X	Z			7	X	Z
4.7	475	Z	Z	Z	Z	Z				Z	Z	Z							X	Z					
10	106	Z	Z	Z	Z				Z						Z	Z			Z	Z			Z	Z	
22	226	Z	Z	Z														Z					Z		
47	476	Z																						igsquare	<u> </u>
100	107	- 40	40	0.5		400	000	500	40	0.5		400	000	500		400	000	0.5		400	000	500		100	
		200	500	16	25	50	100	200	500	50	100	200	25	50	100	200	500	50	100	200					
5126					1210						18	12				1825				2220				2225	
Letter	А		В	T C		Е		G		J	K		М		N I	Р		Q		X	Υ		Z		
Max.	0.33		0.22	0.5		0.71		0.90		94	1.02		1.27			1.52)	1.80		.29	2.54	1	2.79	-	
Thickness	(0.013)		0.22	(0.0)		(0.028		0.90		037)							0.071)		090)	(0.10		2.79 (0.110)			
HICKHESS	(0.013)	(0	,.000)	(0.0	,		, (3.000)	(0.0	501)	(0.040	, ((0.000)	(0.0	300)		- / \	,	(0.	030)	(0.10	·)	(0.110)	-	
l	PAPER EMBOSSED																								

NOTE: Contact factory for non-specified capacitance values