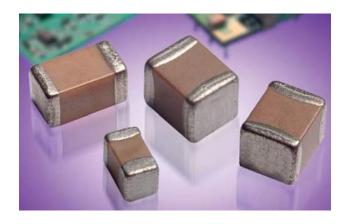
### **General Specifications**



RoHS



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.

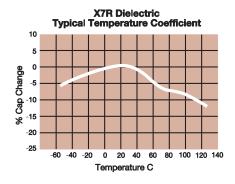
Capacitance for X7R varies under the influence of electrical operating con-ditions such as voltage and frequency.

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

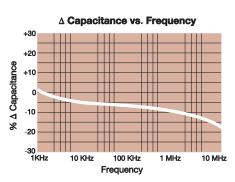
### PART NUMBER (see page 2 for complete part number explanation)

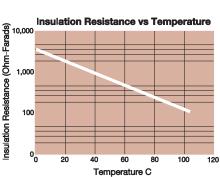
0805	<u>5</u>	<u>C</u>	103	<u>M</u>	<u>A</u>	<u>T</u>	<u>2</u>	A
Size (L" x W")	Voltage 4V = 4 6.3V = 6 10V = Z 16V = Y 25V = 3 50V = 5 100V = 1 200V = 2 500V = 7	<b>Dielectric</b> X7R = C		Capacitance Tolerance J = ± 5%* K = ±10% M = ± 20%  *≤1µF only, contact factory for additional values		Terminations T = Plated Ni and Sn 7 = Gold Plated* Z= FLEXITERM®**  *Optional termination  **See FLEXITERM® X7R section	Packaging 2 = 7" Reel 4 = 13" Reel Contact Factory For Multiples	Special Code A = Std. Product

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

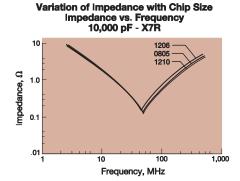


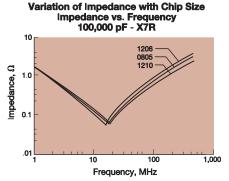
variation of impedance with Cap Value





Impedance vs. Frequency 1,000 pF vs. 10,000 pF - X7R 0805 10.00 pF 10,000 pF 10,000 pF 10,000 pF









Parame	eter/Test	X7R Specification Limits	Measuring	Conditions						
	perature Range	-55°C to +125°C	Temperature C	cycle Chamber						
	on Factor	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  Contact Factory for DF by PN	_	kHz ± 10% DVrms ± .2V 05Vrm @ 120Hz						
Insulation	Resistance	100,000M $\Omega$ or 1000M $\Omega$ - 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	j	Deflection: 2mm						
Resistance to	Capacitance Variation	≤ ±12%		Test Time: 30 seconds						
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)								
	Insulation Resistance	≥ Initial Value x 0.3								
Solde	rability	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutection for 5.0 ± 0.							
	Appearance	No defects, <25% leaching of either end terminal	4							
	Capacitance Variation	≤±7.5%								
Resistance to Solder Heat	Dissipation Factor	Meets Initial Values (As Above)	Dip device in eutectic solder at 260°C for 60seconds. Stor at room temperature for 24 ± 2hours before							
Solder Heat	Insulation Resistance	Meets Initial Values (As Above)	measuring elect	trical properties.						
	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						
CHOOK	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp ≤ 3 minute							
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles 24 ± 2 hours at re							
	Appearance	No visual defects	4							
	Capacitance Variation	≤ ±12.5%	Charge device with 1.5 test chamber set at 125°C:							
	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	c	,						
Load Life	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	If RV > 10V then Life Test there are exceptions (plea	se contact AVX for further						
	Dielectric Strength	Meets Initial Values (As Above)	details on e Remove from test chamb temperature for 24 ± 2 h	per and stabilize at room						
	Appearance	No visual defects								
	Capacitance Variation	≤ ±12.5%	Store in a test chamb							
Load	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	85% ± 5% relative humidity for 1000 hours (+48, -0) with rated voltage applied.  Remove from chamber and stabilize at room temperature and humidity for 24 ± 2 hours before measuring.							
Humidity	Insulation Resistance	≥ Initial Value x 0.3 (See Above)								
	Dielectric Strength	Meets Initial Values (As Above)	24 2 2 Hours service measuring.							



### **Capacitance Range**



#### PREFERRED SIZES ARE SHADED

SIZE	0101*			0201	ı			0402								060	3							0	805								12	206			
Soldering	Reflow Only		Ref	ow (	Only	,		Refl	ow/\	Vav.	Э	Τ			Refl	ow/\	Wa	ve					R	eflo	w/W	ave			П			Re	flov	v/Wa	ave		
Packaging	Paper/Embossed		All	Pap	oer			All Paper							Al	l Pa	per	-					Pap	oer/E	Emb	osse	d		П		F	ape	er/E	mbo	ssec	1	
(1) 1 mm	$0.40 \pm 0.02$	Н	0.6	0 ± 0	0.03	_	Т	1.00 ± 0.10					1.60 ± 0.15							2.01 ± 0.20						3.20 ± 0.20											
(L) Length (in)	(0.016 ± 0.0008)	(0	0.02	4 ± (	0.00	1)	(	0.04	0 ± (	0.00	4)	L		((	0.06	3 ±	0.0	06)					(0.	.079	± 0.	(800.			L			(0.1	26 :	± 0.0	(800		
(W) Width mm	0.20 ± 0.02			0 ± 0					0 ± (			Γ				1 ±									± 0.									± 0.2			
(in)	$(0.008 \pm 0.0008)$	(0	0.01	_	_		(		0 ± (			Ļ		((		2 ±							<u> </u>		_	(800.			╙			<u> </u>			008)		
(t) Terminal mm	0.10± 0.04	,,		5 ± (			١,		5 ± (			ı		,,		5 ±									± 0.									± 0.2			
(in)	(0.004 ± 0.0016)		0.00						0 ± 0			Ļ	0 40			4 ±			200	050	0.0	140				010)	looc	Jose	0.0	Lao				± 0.0		oloc	0 500
WVDC Cap 100 101	16 B	6.3 A	10 A	16 A	25 A	50 A	6.3	10	16 C	25 C	C	Ь.	3 10	1116	)   2:	G (S		G	200 G	250	6.3	10	16	25	50	100	200	250	0.3	10	116	125	150	110	0 20	<u>J 250</u>	1500
(pF) 150 151	В	A	A	A	A	A	_	$\vdash$	C	С	C	Н	+	╫	+	G		G	G	$\vdash$	_	$\vdash$	⊢	⊢	$\vdash$		$\vdash$	╫	⊢	╁	╁	╆	╁	╫	+	+	╫
220 221	В	A	A	A	Α	A	$\vdash$		C	C	C	Н	+	╁	+	G		G	G	$\vdash$	Е	Е	Е	Е	Е	Е	Е		┢	╁	╁	╁	╁	╆	+	+	+
330 331	В	A	A	A	A	A	$\vdash$	$\vdash$	C	C	C	Н	╁	╁	+	G	-	Ğ	G	$\vdash$		J	J	J	J	J	J		╁	十	一	+	╁	╁	+	+	K
470 471	В	Α	Α	A	A	A			C	C	C	Н	╁	╁	$^{+}$	G	_	Ğ	G	$\vdash$	_	J	J	J	J	J	J		╁	$^{+}$	╆	十	⇈	+	+	+	K
680 681	В	Α	Α	Α	Α			t	C	c	C	H	$^{\dagger}$	⇈	$^{+}$	G		Ğ	Ğ	$\vdash$		J	J	J	J	J	J		$\vdash$	t	$\vdash$	$\top$	$\vdash$	$\top$	+	+	K
1000 102	В	Α	Α	Α	Α		m	С	С	C	C	Т	✝	⇈	Ť	G		Ġ	G	G		J	J	J	J	J	J	J		T	一	$\top$	⇈	⇈	$\top$	J	K
1500 152	В	Α	Α	Α	Α		⇈	С	С	С	С	Т	✝	⇈	十	G	1	G	J	G		J	J	J	J	J	J	J	Т	J	J	J	J	J	J	J	М
2200 222	В	Α	Α	Α	Α		İ	С	С	С	С	Г	T	十	十	G		G	J	G		J	J	J	J	J	J	J		J	J	J	J	J	J	J	М
3300 332		Α	Α	Α	Α			С	С	С	С	Г	Τ	Τ	T	G	;	G	J	G		J	J	J	J	J	J	J	Г	J	J	J	J	J	J	J	М
4700 472		Α	Α	Α	Α		П	С	С	С	С	Г	Т	Т	Т	G		G	J	G		J	J	J	J	J	J	J	Г	J	J	J	J	J	J	J	М
6800 682		Α	Α	Α	Α			С	С	С	С	Г	Т	Т	Т	G	T	G	J	G		J	J	J	J	J	J	J	Г	J	J	J	J	J	J	J	Р
Cap 0.01 103		Α	Α	Α	Α			С	С	С	С	Г	Т	Т	G	G		G	J	G		J	J	J	J	J	J	J		J	J	J	J	J	J	J	Р
(µF) 0.015 153								С	С	С	С	Г	Т	П	G	G	T	G	J			J	J	J	J	J	J	N		J	J	J	J	J	М	J	Q
0.022 223								С	С	С	С				G	G	1	G				J	J	J	J	J	N	N		J	J	J	J	J	M	J	Q
0.033 333								С	С	С	С		$\perp$		G			J				J	J	J	J	N	N	N		J	J	J	J	J	M		Q
0.047 473								С	С	С	С		$\perp$	G	G	G		J				J	J	J	J	N	N	N		J	J	J	J	J	M	_	
0.068 683							<u> </u>	С	С	С	C	L		G	_	_	_	J		$oxed{oxed}$		J	J	J	J	N	N		ㄴ	J	J	J	J	J	P		
0.1 104		Щ			_	┖		С	С	С	С	L	G			_	_	J		$oxed{oxed}$		J	J	J	J	N	N	_	╙	J	J	J	J	P	<del>-</del>	_	
0.15 154							<u> </u>				_	G	_	-	_	_	_	_		$oxed{}$	_	J	J	J	N	N	_		┡	J	J	J	J	Q	_		
0.22 224		Щ			L	L	<u> </u>	С	С	С	_	G	G	J	J	-		-				J	J	N	N	N	_	╄	┡	J	J	J	J	Q		Q	
0.33 334		Щ		_	L	┡	_			┡	╄	J	J	J	J	Ť	-	-		Щ		N	N	N	N	N	_	₩	╄	J	J	М	<del>-</del>	Q	_	┿	—
0.47 474		Ш			_	<u> </u>	С	С	_	<u> </u>	╄	J	J	J	J	J	_	$\dashv$		$\vdash$		N	N	N	N	N	_	╄	╙	М	-	М	Р	Q	4	╄	—
0.68 684		Ш			L	$\vdash$			┡	-	╄	J	Į J	J	_	١.	+	-	_	$\vdash$	_	N	N	N			┡	╀	⊢	М	-	$\vdash$	╄	╄	+	+	—
1.0 105		_	_	$\vdash$	$\vdash$	$\vdash$	С	-	$\vdash$	⊢	$\vdash$	J	+-	J	J	J	+	-		$\vdash$	_	N P	P	N P	N P**	-	$\vdash$	$\vdash$	₩	M	-	L	F			+	+
2.2 225		<u> </u>	_	$\vdash$	$\vdash$	$\vdash$	₩	$\vdash$	⊢	⊢	$\vdash$	J	J	J	+	+	+	-		$\vdash$		P	P	P	P	-	$\vdash$	$\vdash$	₩	Q	_	-	Q	ĮQ^	4	+	┿
4.7 475 10 106		$\vdash$	-	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	P	-	╀	+	+	+	-	_	$\vdash$	Р	Р	P	P		-	$\vdash$	$\vdash$	$\vdash$	Q	_		_	$\vdash$	+	+	+-
10 106 22 226		$\vdash$		$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	╀	+	╀	+	╀	+	-		$\vdash$	P	Р	P	$\vdash$	$\vdash$	-	$\vdash$	+	V	Q		-	1	╀	+	+	+-
47 476		$\vdash$	_	$\vdash$	$\vdash$	$\vdash$	⊢	$\vdash$	₩	$\vdash$	$\vdash$	╀	╁	╀	+	╫	+	-		$\vdash$		$\vdash$	$\vdash$	⊢	⊢	$\vdash$	$\vdash$	+	Q	0	_	╀	+	+	+	+	┿
100 107		$\vdash$		$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	╀	+	╀	+	+	+	$\dashv$		$\vdash$	_	$\vdash$	$\vdash$	⊢	$\vdash$	$\vdash$	$\vdash$	$\vdash$	Q	Q	╄	+	$\vdash$	+	+	+	+
WVDC	16	6.3	10	16	25	50	6.3	10	16	25	50	6	3 10	116	3 2	5 50	1	nnl	200	250	6.3	10	16	25	50	100	200	250	6 3	10	16	25	50	10	0 20	0 250	500
SIZE	0101	5.5	_	0201	_	100	0.3	_	040	_	100	10.	0 10	7 10		060	_	50	_00	200	0.0	10	110	_	805	100	1200	1200	0.0	10	110	120	_	206	0 20	51230	71000
SIZE	0101			0∠0°	_				040	۷						UOU	ა							U	005								12	00			

Letter	А	В	С	Е	G	J	K	М	N	Р	Q	Х	Υ	Z	
Max.	0.33	0.22	0.56	0.71	0.90	0.94	1.02	1.27	1.40	1.52	1.78	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)	(0.070)	(0.090)	(0.100)	(0.110)	
	PAPER							EMBOSSED							

NOTE: Contact factory for non-specified capacitance values



<sup>\*</sup>EIA 01005

<sup>\*\*</sup>Contact Factory for Specifications

### **Capacitance Range**



#### PREFERRED SIZES ARE SHADED

SIZE		1210									18	12				1825				2220				5.72 ± 0.25 0.225 ± 0.010) 6.35 ± 0.25 0.250 ± 0.010) 0.64 ± 0.39 0.025 ± 0.015) 50 100 200 100 200 100 200 101 200 102 200 103 200 104 200 105 200 107 200 108 200 109 200 100		
Soldering	3			Ref	flow C	Only				F	Reflov	v Onl	y		Ref	low C	nly		Ref	low (	Only		Ref	Reflow Or I Emboss 5.72 ± 0.25 0.225 ± 0.01 0.35 ± 0.25 0.255 ± 0.01 0.64 ± 0.39 0.025 ± 0.01 50 100 200 WW W W W W W W W W W W W W W W W		
Packaging	g		F	aper	/Emb	osse	d			Α	II Em	oosse	ed		All E	mbo	ssed		All E	mbo	ssed		All E	mbos	ssed	
(L) Length	mm (in.)				.30 ± 0.0					(	4.50 : 0.177 :		)			50 ± 0. 77 ± 0.		5.70 ± 0.40 (0.225 ± 0.016)						5.72 ± 0.25 (0.225 ± 0.010)		
(W) Width	mm (in.)				50 ± 0.0						3.20 : 0.126 :		)			40 ± 0. 52 ± 0.				00 ± 0. 97 ± 0.				Reflow Or All Emboss 5.72 ± 0.25 (0.225 ± 0.01 0.64 ± 0.38 (0.025 ± 0.01 50 100 20 W W M P M P M P M P M P M P M P M P M P M P		
(t) Terminal	mm	0.50 ± 0.25									0.61 :	± 0.36			0.	61 ± 0.	 36		0.	64 ± 0.	39		0.	Reflow Onl II Embosse 5.72 ± 0.25 (0.225 ± 0.010 6.35 ± 0.25 (0.250 ± 0.010 0.64 ± 0.39 (0.025 ± 0.015 50 100 200  W  M  P  M  P  M  P  M  P  M  P  M  P  M  P  M  P  M  P  M  P  M  P  M  P  M  P  M  M		
	(in.)	(0.020 ± 0.010)							10		0.024 :	_		l 500	<u> </u>	24 ± 0.	<u> </u>	05	<u> </u>	25 ± 0.	<del></del>	l 500	<u> </u>			
Cap 100	/VDC 101	10	16	25	50	100	200	500	16	25	50	100	200	500	50	100	200	25	50	100	200	500	50	100 2	:00	
(pF) 150	151																							-W-		
220	221																		_	~				$\mathcal{I}_{\leq}$	1 T	
330	331																			(	_	$\int$		<b>ル</b> -	<b>↓</b> ' ]	
470	471																			`		┵			_	
680	681																					4			4	
1000	102					,													_			' ' 	ı		. 4	
1500 2200	152 222	J	J	J	J	J	J	M																		
3300	332	J	J	J	J	J	J	M																		
4700	472	J	J	J	J	J	J	M																		
6800	682	J	J	J	J	J	J	М																		
Cap 0.01	103	J	J	J	J	J	J	М		K	K	K	K	K	М	М	М		Χ	Х	Х	Х	М	Р	Р	
(μF) 0.015	153	J	J	J	J	J	J	Р		K	K	K	K	Р	М	М	М		Х	Х	Х	Х	М	Р	Р	
0.022	223	J	J	J	J	J	J	Q		K	K	K	K	Р	М	М	М		Х	Х	Х	Х	М	Р	Р	
0.033	333	J	J	J	J	J	J	Q		K	K	K	K	Х	M	М	М		Х	Х	Х	Х	_			
0.047	473	J	J	J	J	J	J	Q		K	K	K	K	Z	М	М	М		Х	Х	Х	Х	_	_	Р	
0.058	683	J	J	J	J	J	M	Q		K	K	K	K	Z	M	M	M		X	X	X	X		1	- 1	
0.1	104 154	J	J	J	J	J M	M Z	Х		K K	K K	K K	K P	Z Z	M M	M M	M M		X	X	X	X	_		- 1	
0.13	224	J	J	J	J	P	Z			K	K	K	Р	Z	M	M	M		X	X	X	X	_			
0.33	334	J	J	J	J	Q				K	K	M	X		M	M	IVI		X	X	X	X	_			
0.47	474	М	M	M	М	Q				K	K	P	Х		M	M			X	X	X	X	_	_	X	
0.68	684	М	М	Р	Х	Х				М	М	Q			М	Р			Х	Х			М	Р	Х	
1.0	105	N	N	Р	Х	Z				М	М	Х	Z		М	Р			Х	Х			М	Р	Х	
1.5	155	N	N	Z	Z	Z				Z	Z	Z			Q				Х	Х					Z	
2.2	225	Χ	Х	Z	Z	Z				Z	Z	Z							Х	Х			М	Х	Z	
3.3	335	X	X	Z	Z	Z	<u> </u>	<u> </u>		Z	Z	Z			<u> </u>			<u> </u>	Х	Z			_	$\vdash$		
4.7	475	Z	Z	Z	Z	Z	<u> </u>		7	Z	Z				<del>                                     </del>				X Z	Z	<u> </u>		<u> </u>			
10	106 226	Z Z	Z Z	Z Z	Z		_		Z						$\vdash$			Z	Z	Z			-			
47	476	Z					$\vdash$							$\vdash$	$\vdash$	$\vdash$				$\vdash$	$\vdash$	$\vdash$	$\vdash$			
100	107					_	$\vdash$								$\vdash$						$\vdash$		$\vdash$			
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	
SIZE		1210								1812					1825		2220						2225			

		EMBOSSED												
Thickness	(0.013)	(0.009)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)
Max.	0.33	0.22	0.56	0.71	0.90	0.94	1.02	1.27	1.40	1.52	1.78	2.29	2.54	2.79
Letter	А	В	С	Е	G	J	K	М	N	Р	Q	Х	Υ	Z

NOTE: Contact factory for non-specified capacitance values

