## **General Specifications**





#### **GENERAL DESCRIPTION**

- General Purpose Dielectric for Ceramic Capacitors
- · EIA Class II Dielectric
- Temperature variation of capacitance is within ±15% from -55°C to +85°C
- · Well suited for decoupling and filtering applications
- Available in High Capacitance values (up to 100μF)

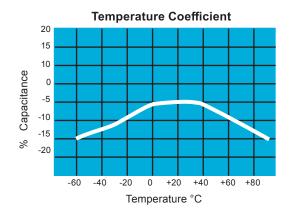
#### PART NUMBER (SEE PAGE 4 FOR COMPLETE PART NUMBER EXPLANATION)

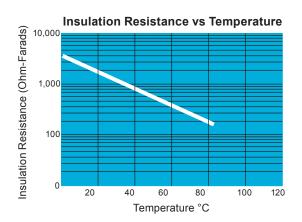
1210	4	D	107	М	Α	Т	2	Α
$\top$	T	T	T	T	T	T	T	T
Size	Voltage	Dielectric	Capacitance	Capacitance	Failure	Terminations	Packaging	Special
(L" x W")	4 = 4V	D = X5R	Code (In pF)	Tolerance	Rate	T = Plated Ni	2 = 7" Reel	Code
0101**	6 = 6.3V		2 Sig. Digits +	$K = \pm 10\%$	A = N/A	and Sn	4 = 13" Reel	A = Std.
0201	Z = 10V		Number of	$M = \pm 20\%$				
0402	Y = 16V		Zeros					
0603	3 = 25V							
0805	D = 35V							<b>A</b> .
1206	5 = 50V							
1210	1 = 100V							The same of the sa
1812								
**EIA 010	005							RoHS COMPLIANT

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**



Parame	ter/Test	X5R Specification Limits	Measuring C	onditions					
	perature Range	-55°C to +85°C	Temperature Cy	cle Chamber					
Capac	itance	Within specified tolerance							
Dissipati	on Factor	≤ 2.5% for ≥ 50V DC rating ≤ 12.5% for 25V, 35V DC rating ≤ 12.5% Max. for 16V DC rating and lower Contact Factory for DF by PN	Freq.: 1.0 kHz ± 10% Voltage: 1.0Vrms ± .2V For Cap > 10 μF, 0.5Vrms @ 120Hz						
Insulation	Resistance	10,000MΩ or 500MΩ - $\mu$ F, whichever is less	Charge device with rate secs @ room te						
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)						
	Appearance	No defects	Deflection	n: 2mm					
Resistance to	Capacitance Variation	≤ ±12%	Test Time: 30						
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)	V						
	Insulation Resistance	≥ Initial Value x 0.3	90 m	m ———					
Solder	rability	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutectic solo ± 0.5 sec						
	Appearance	No defects, <25% leaching of either end terminal							
	Capacitance Variation	≤ ±7.5%							
Resistance to Solder Heat  Dissipation Factor Insulation		Meets Initial Values (As Above)	Dip device in eutectic solder at 260°C for 60seconds. Store at room temperature for 24 2hours before measuring electrical properties						
Coluct Float	Insulation Resistance	Meets Initial Values (As Above)	2hours before measuring	g electrical properties.					
	Dielectric Strength	Meets Initial Values (As Above)							
	Appearance	No visual defects	Step 1: -55°C ± 2°	30 ± 3 minutes					
	Appearance Capacitance Variation	≤ ±7.5%	Step 2: Room Temp	≤ 3 minutes					
Thermal Shock	Dissipation Factor	Meets Initial Values (As Above)	Step 3: +85°C ± 2°	30 ± 3 minutes					
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp ≤ 3 minutes						
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles and hours at room						
	Appearance	No visual defects	Charge device with 1.5X	rated voltage in test					
	Capacitance Variation	≤ ±12.5%	chamber set at 85°C ± (+48,	2°C for 1000 hours					
Load Life	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	Note: Contact factory for						
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	part numbers that are to voltage						
	Dielectric Strength	Meets Initial Values (As Above)	Remove from test chambe temperature for						
	Appearance	No visual defects							
	Capacitance Variation	≤ ±12.5%	Store in a test chamber se 5% relative humidity for 10						
Load Humidity	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	rated voltage	e applied.					
ramary	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from chamber temperature and 24 ± 2 hours before	l humidity for					
	Dielectric Strength	Meets Initial Values (As Above)	24 ± 2 Hours bero	ne measuring.					

## **Capacitance Range**



### **PREFERRED SIZES ARE SHADED**

Case Size	Case Size 0101* 0201								0402						0603							0805							
Soldering		Reflo	w Only		Re	flow 0	nlv			F	Reflow	//Wav	e				Refl	ow/W	feve					Ref	ow/W	/feve			
Packaging		Paper/Er	nbossed		A	II Pape	er er				All P	aper					Α	II Pap	er				Paper/Embossed						
(L) Length	mm (in.)	0.40 : (0.016 ±	± 0.02			50 ± 0. 24 ± 0.			1.00 ± 0.20 (0.040 ± 0.008)						1.60 ± 0.15 (0.063 ± 0.006)					2.01 ± 0.20 (0.079 ± 0.008)									
W) Width	mm	0.20	± 0.02		0.3	30 ± 0.	09				0.50	± 0.20	- /				0.8	31 ± 0	.15					1.:	25 ± 0	.20			
TT) TTIGET	(in.)	(0.008 ±				11 ± 0.						± 0.00						32 ± 0							49 ± 0				
(t) Terminal	mm	0.10				15 ± 0.						± 0.15						35 ± 0				0.50 ± 0.25							
	(in.)	_	0.0016)			06 ± 0.						± 0.00						14 ± 0							20 ± 0				
Voltage:		6.3	10	4	6.3	10	16	25	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	
Cap (pF) 100	101		В					Α																					
150	151		В					Α																					
220	221		В					Α						С															
330	331		В					Α						С															
470	471		В					Α						С															
680	681		В					Α						С															
1000	102		В				Α	Α						С															
1500	152	В	В				Α	Α						С		i –							1						
2200	222	В	В			Α	Α	Α						С														1	
3300	332	В	В			Α	Α	Α						C														T	
4700	472	В	В			Α	Α	Α					С								G		1					1	
6800	682	В	В		1	Α	Α	Α					C								G		t			1		$\dagger$	
Cap (µF) 0.01	103	В	В		1	Α	Α	Α					C						G	G	G							$\vdash$	
0.015	150	В			1								C						G	G	G					1		+-	
0.022	223	В			Α	Α	Α	Α				С	C						G	G	G							N	
0.033	333	В			- / (	/ (	/ (	/\				C	-						G	G	G							N	
0.047	473	В			Α	Α	Α	Α				C	С			<del>                                     </del>			G	G	G		<del>                                     </del>			<del>                                     </del>		N	
0.068	689	В										C				<del>                                     </del>			G		G		<del>                                     </del>			<u> </u>		N	
0.000	104	В			Α	Α	Α	Α			С	C	С	С					G	G	G		1			N	N	N	
0.15	154	В				_ ^	_ ^	_ ^			- 0	U							G	0	G					N	N	IN	
0.13	224	В		Α	A	A				С	С	С	С	С		1	-	G	G				1		-	N	N	N	
0.22	334	В		А	A	A				L C	U	U	U	C		1		G	G				<del>                                     </del>			N	IN	IN	
0.33	474	В		Α	A				С	С	С	С	С	Е		<u> </u>	$\vdash$	G	J	_	$\vdash$	<del>                                     </del>	<u> </u>	-	$\vdash$	N	Р	Р	
0.47	684	Б		A	A				U		U	U				<u> </u>	1	G	J			-		-	1	N		-	
1.0	105	<del>                                     </del>	-	Α	Α	С	С		С	С	С	С	С		G	G	G	G	J	G	G		<u> </u>		N	N	Р	P	
1.5	155		-	A	A		U		U		U	U			G	G	G	G	J	G	G				IN	IN		-	
2.2	225	-		С	С	С	-	-	С	С	С	С	С	-	G	G	J	J	J	K	K	-	-	N	N	P	Р	P	
3.3	335			U	U	U		-	U	U	U	U	U		J	J	J	J	J		I.		N	N	IN	P	Р	+	
4.7	475	-		С	С				Г	Г	г	Е	-	-	_	J	_		V			NI	P		NI	NI	Р	P	
10	106	-		U	U				E	E	E	E			J K	_	J K	G K	K			N P	P	J P	N P	N P	P	P	
		-		-	$\vdash$					E	E	-	-	_		J		I K	K		-	P		P				+	
22 47	226 476		-		$\vdash$			_	Е	G		-	-		K	K	K		_		-	P	P	P	Р	Р		₩	
		-		-	├							-	-	-	K	K	-		-		-	Р	Р	Р	-	-	-	+-	
100	107	6.0	10			10	1.0	0.5			10	1.0	0.5			6.0	10	1.0	0.5	0.5				10	1.0	0.5	0.5		
Voltage:		6.3	10	4	6.3	10	16	25	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	
Case Size		01	01*			0201					04	02						0603							0805				

Letter	A	В	С	E	G	J	K	М	N	Р	Q	Х	Υ	Z
Max. Thickness	0.33 (0.013)	0.22 (0.009)	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)
		, ,	PAI	PER	,	,	, ,			EMBC	SSED		, ,	

PAPER and EMBOSSED available for 01005 NOTE: Contact factory for non-specified capacitance values \*EIA 01005

## **Capacitance Range**



### **PREFERRED SIZES ARE SHADED**

Case Size		1206							1210								1812								
Soldering					ow/W				Reflow Only								Reflow Only								
Packaging				Paper,	/Emb	ossec	t				Papeı	r/Emb	ossed					All	Embos	ssed					
(L) Length	mm (in.)				20 ± 0. 26 ± 0.				3.20 ± 0.40 (0.126 ± 0.016)								4.50 ± 0.30 (0.177 ± 0.012)								
W) Width	mm (in.)				0 ± 0. 3 ± 0.				2.50 ± 0.30 (0.098 ± 0.012)								3.20 ± 0.20 (0.126 ± 0.008)								
(t) Terminal	mm (in.)			0.5	50 ± 0. 20 ± 0.	25			0.50 ± 0.25 (0.020 ± 0.010)								0.61 ± 0.36 (0.024 ± 0.014)								
Voltage:		4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	4 6.3 10 16 25 35 50									
Cap (pF) 100	101																								
150	151																								
220	221																								
330	331																								
470	471																								
680	681																								
1000	102																								
1500	152																								
2200	222																								
3300	332																								
4700	472																								
6800	682																								
Cap (µF) 0.01	103																								
0.015	150																								
0.022	223																								
0.033	333																								
0.047	473																								
0.068	689																								
0.1	104																								
0.15	154																								
0.22	224																								
0.33	334																								
0.47	474					Q	Q							Х	Х										
0.68	684																								
1.0	105					Q	Q	Q					Х	Х	Х										
1.5	155																								
2.2	225			Q	Q	Q	Q	Q					Х	Z	Z							$\Box$			
3.3	335		Q	Q																					
4.7	475	Χ	X	X	Х	Χ	Х	Χ			Z	Z	Z	Z	Z										
10	106	Х	Х	Х	Х	Χ	Х	Χ		Х	Х	Z	Z	Z	Z					Z					
22	226	Χ	Х	Х	Х	Χ			Z	Z	Z	Z	Z			Z	Z	Z	Z						
47	476	Χ	Х	Х	Х				Z	Z	Z	Z	Z												
100	107	Χ	Х						Z	Z															
Voltage:		4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50			
Case Size					1206							1210							1812						

Letter	Α	В	С	E	G	J	K	М	N	P	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	1.78	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)
			PA	PER						EMBO	SSED			

PAPER and EMBOSSED available for 01005

NOTE: Contact factory for non-specified capacitance values \*EIA 01005



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CGA2B2C0G1H120J CGA2B2C0G1H680J CGA2B2C0G1H1R5C CGA2B2C0G1H820J CGA2B2C0G1H390J CGA2B2C0G1H391J

CGA2B2C0G1H3R3C CGA2B2C0G1H680J CGA2B2C0G1H6R8D CGA2B2C0G1H820J CGA2B2X8R1H152K