## MLCC Tin/Lead Termination "B" (LD Series)







AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

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

#### **Not RoHS Compliant**

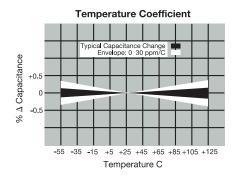
LD05	5	A	101	<u>J</u>	<u>A</u>	В	2	Α
<b>Size</b> LD02 - 0402	<b>Voltage</b> 6.3V = 6	<b>Dielectric</b> COG (NP0) = A	Capacitance Code (In pF)	Capacitance Tolerance	Failure Rate	<b>Terminations</b> B = 5% min lead	<b>Packaging</b> 2 = 7" Reel	Special Code
LD03 - 0603	10V = Z	XŻR = Ć	2 Sig. Digits +	B = ±.10 pF (<10pF)	A = Not	X = FLEXITERM®	4 = 13" Reel	A = Std.
LD04 - 0504* LD05 - 0805	16V = Y 25V = 3	X5R = D X8R = F	Number of Zeros	$C = \pm .25  pF  (<10 pF)$	Applicable 4 = Automotive	with 5% min lead**	<b>Contact Factory</b>	Product
LD06 - 1206 LD10 - 1210	35V = D	X0IX = 1	Zeios	D = $\pm .50 \text{ pF } (<10 \text{pF})$ F = $\pm 1\% (\ge 10 \text{ pF})$	4 - Automotive	leau	For Multiples*	
LD12 - 1812	50V = 5			G = ±2% (≥ 10 pF)		**X7R only	Multiples*	
LD13 - 1825 LD14 - 2225	100V = 1 200V = 2			J = ±5% K = ±10%				
LD20 - 2220	500V = 7			$M = \pm 20\%$				

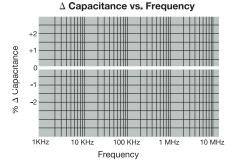
\*LD04 has the same CV ranges as LD03.

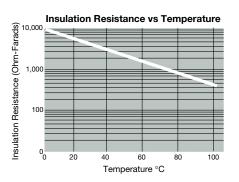
See FLEXITERM $^{\mbox{\tiny 8}}$  section for CV options

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

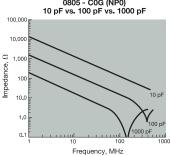
Contact factory for non-specified capacitance values.



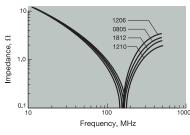




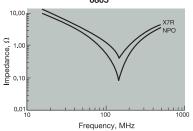
Variation of Impedance with Cap Value Impedance vs. Frequency 0805 - COG (NP0) 10 pF vs. 100 pF vs. 1000 pF







Variation of Impedance with Ceramic Formulation Impedance vs. Frequency 1000 pF - COG (NPO) vs X7R







Parame	ter/Test	NP0 Specification Limits	Measuring	Conditions			
Operating Tem	perature Range	-55°C to +125°C	Temperature C	ycle Chamber			
Сарас	itance	Within specified tolerance	Freq.: 1.0 MHz ± 109	% for cap ≤ 1000 pF			
C	3	<30 pF: Q≥ 400+20 x Cap Value ≥30 pF: Q≥ 1000	1.0 kHz ± 10% fo Voltage: 1.0	r cap > 1000 pF			
Insulation	Resistance	100,000MΩ or 1000MΩ - μF, whichever is less	Charge device with 60 ± 5 secs @ roo				
Dielectric	: Strength	No breakdown or visual defects	Charge device with 250 1-5 seconds, w/charge limited to 50 Note: Charge device with for 500V	and discharge current mA (max) h 150% of rated voltage			
	Appearance	No defects	Deflection	n: 2mm			
Resistance to Flexure	Capacitance Variation	±5% or ±.5 pF, whichever is greater	Test Time: 3	30 seconds 7 1mm/sec			
Stresses	Q	Meets Initial Values (As Above)					
	Insulation Resistance	≥ Initial Value x 0.3	901	mm —			
Solder	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					
	Capacitance Variation	≤ ±2.5% or ±.25 pF, whichever is greater	Die desire in estantia				
Resistance to Solder Heat	Q	Meets Initial Values (As Above)	Dip device in eutectic s seconds. Store at room				
Solder Heat	Insulation Resistance	Meets Initial Values (As Above)	hours before measuring	g electrical properties.			
	Dielectric Strength	Meets Initial Values (As Above)					
	Appearance	No visual defects	Step 1: -55°C ± 2°	30 ± 3 minutes			
	Capacitance Variation	≤ ±2.5% or ±.25 pF, whichever is greater	Step 2: Room Temp	≤ 3 minutes			
Thermal Shock	Q	Meets Initial Values (As Above)	Step 3: +125°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 24 hours at roo				
	Appearance	No visual defects					
	Capacitance Variation	≤ ±3.0% or ± .3 pF, whichever is greater	Charge device with twice chamber set a	ce rated voltage in test			
Load Life	Q	≥ 30 pF: Q≥ 350 ≥10 pF, <30 pF: Q≥ 275 +5C/2 <10 pF: Q≥ 200 +10C	for 1000 hou	ırs (+48, -0).			
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from test chamber and stabilize at ro temperature for 24 hours before measuring.				
	Dielectric Strength	Meets Initial Values (As Above)					
	Appearance	No visual defects					
	Capacitance Variation	≤ ±5.0% or ± .5 pF, whichever is greater	Store in a test chamber s	set at 85°C ± 2°C/ 85% ±			
Load Humidity	Q	≥ 30 pF: Q≥ 350 ≥10 pF, <30 pF: Q≥ 275 +5C/2 <10 pF: Q≥ 200 +10C	5% relative humidity for 1000 hours (+48, -0) with rated voltage applied.  Remove from chamber and stabilize at room temperature for 24 ± 2 hours before measuring.				
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)					
	Dielectric Strength	Meets Initial Values (As Above)					

## COG (NPO) - Capacitance Range



			-						□ I D05										
SIZE			LD02				03				LD05					LD0			
Solderi Packagi			flow/Wa All Paper				//Wave Paper				flow/War er/Embos					Reflow/ aper/Em			
	mm		.00 ± 0.1				± 0.15				.01 ± 0.20					3.20 ±			-
(L) Length	(in.)		040 ± 0.0				± 0.006)				79 ± 0.00				(	(0.126 ±			
W) Width	mm		.50 ± 0.1				± 0.15				.25 ± 0.20					1.60 ±			
,	(in.)		020 ± 0.0 .25 ± 0.1			(0.032 :	± 0.006) ± 0.15				.50 ± 0.0					0.063 ±			
(t) Terminal	mm (in.)		.25 ± 0.1 )10 ± 0.0			(0.014					.50 ± 0.23					0.50 ± (0.020 ±			
	WVDC	16	25	50	16	25	50	100	16	25	50	100	200	16	25	50	100	200	500
Сар	0.5	C	С	О	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
(pF)	1.0	С	С	C C	G G	G G	G	G G	J	J	J	J	J	J	J	J	J	J	J
	1.2 1.5	C	C	C	G	G	G G	G	J	J	J	J	J	J	J	J	J	J	J
	1.8	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	2.2	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	2.7	C	C	C	G	G	G	G G	J	J	J	J	J	J	J	J	J	J	J
	3.3	C	C	C	G G	G G	G	G	J	J	J	J	J	J	J	J	J	J	J
	4.7	C	C	C	G	G	G	G	J	J	J	J	J	Ĵ	J	Ĵ	Ĵ	Ĵ	J
	5.6	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	6.8 8.2	C C	C	C	G G	G G	G G	G G	J	J   J	J	J   J	J   J	J   J	J	J	J	J	J J
	10	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	12	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	15	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	18 22	C C	C	C C	G G	G G	G G	G G	J	J   J	J	J   J	J	J	J	J	J	J	J
	27	С	С	С	G	G	G	G	Ĵ	J	, ,	J	J	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	J
	33	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	39 47	C	C	C C	G G	G G	G G	G G	J	J	J	J   J	J   J	J	J	J	J	J	J
	56	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
İ	68	С	С	С	G	G	Ğ	G	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	J	J	J
	82	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	100 120	C	C	C	G G	G G	G G	G G	J	J	J	J   J	J	J	J	J	J	J	J
	150	C	Č	C	G	Ğ	Ğ	Ğ	J	J	J	J	J	J	J	J	J	Ĵ	Ĵ
	180	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	220	C C	С	С	G	G G	G	G	J	J	J	J	J	J	J	J	J	J	M
	270 330	C	C	C	G G	G	G	G G	J	J	J	J	M M	J	J	J	J	J	M
	390	C	c	C	G	G	G	Ğ	Ĵ	Ĵ	Ĵ	Ĵ	M	Ĵ	Ĵ	Ĵ	J	J	M
	470	С	С	С	G	G	G		J	J	J	J	M	J	J	J	J	J	М
	560 680				G G	G G	G G		J	J	J	J	М	J	J	J	J	J	M P
	820				G	G	G		J	J	J	J		J	J	J	J	М	
	1000				G	G	G		J	J	J	J		J	J	J	J	Q	
	1200 1500					G			J	J	J			J	J	J	J	Q	
	1800								J	J	J			J	J	J M	M	Q	
	2200								J	J	N			Ĵ	J	М	Р		
	2700								J	J	N			J	J	M	P	-	$\vdash$
	3300 3900								J	J   J				J	J	M M	l P		
	4700								J	J				J	J	M	P		
	5600													J	J	М			
	6800 8200													M M	M M				
Сар	0.010													M	M				$\vdash$
(pF)	0.012																		
	0.015		ļ	-	~	W-									-	1	-	-	$\sqcup$
	0.018 0.022		~			7	1												
	0.022			_		.لا	Ţ⊤												
	0.033		,				_												
	0.039				4														
	0.047		-		Tt l		_								-		-	-	$\vdash$
	0.082																		
	0.1		-					4.5		-					-				
	WVDC	16	25	50	16	25	50	100	16	25	50 LD05	100	200	16	25	50	100	200	500
	SIZE		LD02			LD	03				LD05					LD0	0		

Letter	Α	С	E	G	J	K	М	N	Р	Q	Х	Υ	Z
Max.	0.33	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)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)
			PAPER						EMB	OSSED			

## COG (NPO) - Capacitance Range

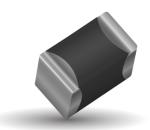


SIZE	:			LD10					LD12				LD1	3			LD14	
Solderi	ing		R	eflow On	ly			F	Reflow On	ıly			Reflow	Only			Reflow Only	
Packag				er/Embo					I Emboss				All Emb				All Embossed	
(L) Length	mm (in.)			3.20 + 0.2 126 ± 0.0					4.50 ± 0.3 177 ± 0.0				4.50 ± (0.177 ±			(	5.72 ± 0.25 0.225 ± 0.010	))
W) Width	mm (in.)		2	2.50 ± 0.2 098 ± 0.0	:0			- ;	3.20 ± 0.2 126 ± 0.0	.0			6.40 ± (0.252 ±	0.40			6.35 ± 0.25 0.250 ± 0.010	
(t) Terminal	mm		C	0.50 ± 0.2	:5				$0.61 \pm 0.3$	6			0.61 ±	0.36			0.64 ± 0.39	
(c) reminal	(in.) WVDC	25	50	020 ± 0.0 100	200	500	25	50	024 ± 0.0 100	200	500	50	(0.024 ±		200	50	0.025 ± 0.015 100	200
Cap	0.5																	
(pF)	1.0 1.2																	
	1.5																	
	1.8 2.2																<b>&gt;</b>	I I
	2.7															_ <\_\		
	3.3 3.9															(		$\mathcal{F}$
	4.7															_ `	<u> </u>	
	5.6 6.8																a-t	
	8.2																1 * *	
	10 12					J												
	15					J												
	18 22					J												
	27					J												
	33 39					J												
	47					J												
	56 68					J												
	82					J												
	100 120					J												
	150					J												
	180 220					J												
	270					J												
	330 390					J M												
	470					М												
	560 680	J	J	J	J	M M												
	820	J	J	J	J	М												
	1000 1200	J	J	J	J M	M M	K K	K	K K	K K	M M	M M	M		M M	M M	M M	P P
	1500	J	J	J	М	М	K	K	K	K	М	М	M		М	М	М	Р
	1800 2200	J	J	J	M Q		K	K	K K	K K	M P	M M	M		M M	M M	M M	P P
	2700	J	J	J	à		K	K	K	Р	Q	М	М		М	М	М	Р
	3300 3900	J	J J	J M			P P	P P	P P	P P	Q	M M	M		M M	M M	M M	P P
	4700	J	J	М			P	P	P P	P P	Ŷ	М	M		М	М	M M	P P
	5600 6800	J	J				Р	Р	Q	Q	Y	M M	М		M M	М	М	P
Сар	8200 0.010	J	J				P P	P P	Q Q	Q Q	Y	M M	M			M M	M M	P P
(pF)	0.012	J	J				Р	Р	Q	Χ	Y	М	M			М	М	P
	0.015 0.018						P P	P P	Q X	X	Y	M P	M			M M	M M	Y
	0.022						Р	Р	Х	Χ		Р	IVI			М	Υ	Y
	0.027 0.033				$\vdash$		Q	X	X	Z Z		P P				P P	Y	Υ
	0.039						Х	Х	Z	Z		Р				Р		
	0.047						Z	Z	Z Z	Z		Р				P P		$\vdash$
	0.082						Z	Z	Z							Q		
	0.1 WVDC	25	50	100	200	500	Z 25	50	Z 100	200	500	50	10	)	200	Q 50	100	200
SIZE		- ,		LD10					LD12				LD1				LD14	
Letter	A	С		Е	G	J		K	М		N	Р	Q	Х	Y	Z	1	
Max.	0.33	0.56		0.71	0.90	0.9		1.02	1.27		.40	1.52	1.78	2.29	2.54	2.79	1	
Thickness	(0.013)	(0.022)		0.028)	(0.035)	(0.0		(0.040)	(0.050	1	055)	(0.060)	(0.070)	(0.090)	(0.100			
			F	PAPER								EMBO	SSED					



## X8R - General Specifications





AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

**Not RoHS Compliant** 

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

LD05	<u>5</u>	F T	101	<del>_</del>	<u>A</u>	<u>B</u>	<u>2</u>	A
Size LD02 - 0402 LD03 - 0603 LD04 - 0504* LD05 - 0805 LD06 - 1206 LD10 - 1210 LD12 - 1812 LD13 - 1825 LD14 - 2225 LD20 - 2220	Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	Dielectric X8R = F	Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	Capacitance Tolerance B = ±.10 pF (<10pF) C = ±.25 pF (<10pF) D = ±.50 pF (<10pF) F = ±1% (≥ 10 pF) G = ±2% (≥ 10 pF) J = ±5% K = ±10% M = ±20%	Failure Rate A = Not Applicable	Terminations B = 5% min lead X = FLEXITERM® with 5% min lead**  **X7R only	Packaging 2 = 7" Reel 4 = 13" Reel Contact Factory For Multiples*	Special Code A = Std. Product

LD04 has the same CV ranges as LD03.

See FLEXITERM® section for CV options

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

Contact factory for non-specified capacitance values.





Parame	ter/Test	X8R Specification Limits	Measuring (	Conditions
Operating Tem	perature Range	-55°C to +150°C	Temperature C	ycle Chamber
Сарас	itance	Within specified tolerance	 	Hz + 10%
Dissipation	on Factor	≤ 2.5% for ≥ 50V DC rating ≤ 3.5% for 25V DC and 16V DC rating	Voltage: 1.0	
Insulation	Resistance	100,000MΩ or 1000MΩ - μF, whichever is less	Charge device with 120 ± 5 secs @ roo	
Dielectric	: Strength	No breakdown or visual defects	Charge device with 250 1-5 seconds, w/charge limited to 50 Note: Charge device with for 500V	and discharge current mA (max) n 150% of rated voltage
	Appearance	No defects	Deflectio	n: 2mm
Resistance to	Capacitance Variation	≤ ±12%	Test Time: 3	
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)	V	
	Insulation Resistance	≥ Initial Value x 0.3	90 n	mm
Solder	rability	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutectic for 5.0 ± 0.5	
	Appearance	No defects, <25% leaching of either end terminal		
	Capacitance Variation	≤ ±7.5%		
Resistance to Solder Heat	Dissipation Factor	Meets Initial Values (As Above)	Dip device in eutectic s seconds. Store at room	temperature for 24 ± 2
	Insulation Resistance	Meets Initial Values (As Above)	hours before measuring	g electrical 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
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	≤ 3 minutes
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles 24 ± 2 hours at ro	
	Appearance	No visual defects		
	Capacitance Variation	≤ ±12.5%	Charge device with 1.5 r test chamber set	
Load Life	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	for 1000 hou	
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from test chamb temperature for 24 ± 2 ho	
	Dielectric Strength	Meets Initial Values (As Above)		
	Appearance	No visual defects		
	Capacitance Variation	≤ ±12.5%	Store in a test chamber s 5% relative humidi	
Load Humidity	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	(+48, -0) with rated	l voltage applied.
i idillidity	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from chamber temperature an 24 ± 2 hours bef	d humidity for
	Dielectric Strength	Meets Initial Values (As Above)	24 1 2 Hours ben	ore measuring.



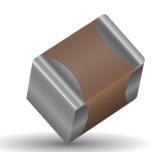


	SIZE	LD	03	LD	05	LD	06		
	WVDC	25V	50V	25V	50V	25V	50V		
271	Cap 270	G	G						
331	(pF) 330	G	G	J	J				
471	470	G	G	J	J				
681	680	G	G	J	J				
102	1000	G	G	J	J	J	J		
152	1500	G	G	J	J	J	J		
182	1800	G	G	J	J	J	J		
222	2200	G	G	J	J	J	J		
272	2700	G	G	J	J	J	J		
332	3300	G	G	J	J	J	J		
392	3900	G	G	J	J	J	J		
472	4700	G	G	J	J	J	J		
562	5600	G	G	J	J	J	J		
682	6800	G	G	J	J	J	J		
822		G G		J	J	J	J		
103	(μF) 0.01	G G		J	J	J	J		
123	0.012	G	G	J	J	J	J		
153	0.015	G	G	J	J	J	J		
183	0.018	G	G	J	J	J	J		
223	0.022	G	G	J	J	J	J		
273	0.027	G	G	J	J	J	J		
333	0.033	G	G	J	J	J	J		
393	0.039	G	G	J	J	J	J		
473	0.047	G	G	J	J	J	J		
563	0.056	G		N	N	М	M		
683		G		N	N	М	M		
823	0.082			N	N	М	M		
104	0.1			N	N	М	М		
124	0.12			N	N	М	M		
154	0.15			N	N	М	M		
184	0.18			N		М	M		
224	0.22			N		М	M		
274	0.27					М	M		
334	0.33					М	M		
394	0.39					М			
474	0.47					М			
684	0.68								
824	0.82								
105	1								
	WVDC	25V	50V	25V	50V	25V 50V			
	SIZE	LD	03	LD(	05	LD06			

Letter	Α	С	Е	G	J	K	М	N	Р	Q	Х	Υ	Z
Max.	0.33	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)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)
			PAPER						EMBC	SSED			

### X7R - General Specifications





AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

**Not RoHS Compliant** 

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

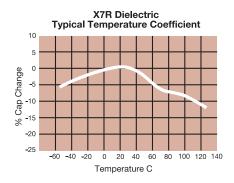
LD05	5	<u>c</u>	101	J	<u>A</u>	<u>B</u>	2	<u>A</u>
Size LD03 - 0603 LD04 - 0504* LD05 - 0805 LD06 - 1206 LD10 - 1210 LD12 - 1812 LD13 - 1825 LD14 - 2225 LD20 - 2220	Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	Dielectric X7R = C	Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	Capacitance Tolerance B = $\pm$ .10 pF (<10pF) C = $\pm$ .25 pF (<10pF) D = $\pm$ .50 pF (<10pF) F = $\pm$ 1% ( $\geq$ 10 pF) G = $\pm$ 2% ( $\geq$ 10 pF) J = $\pm$ 5% K = $\pm$ 10% M = $\pm$ 20%	Failure Rate A = Not Applicable	Terminations B = 5% min lead X = FLEXITERM® with 5% min lead**  **X7R only	Packaging 2 = 7" Reel 4 = 13" Reel Contact Factory For Multiples*	Special Code A = Std. Product

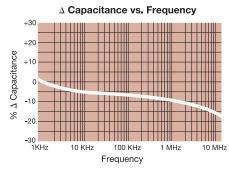
<sup>\*</sup>LD04 has the same CV ranges as LD03.

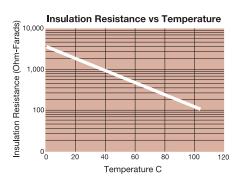
See FLEXITERM® section for CV options

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

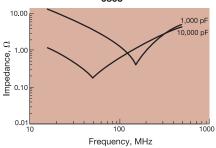
Contact factory for non-specified capacitance values.



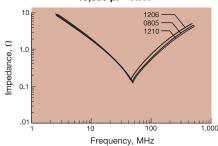




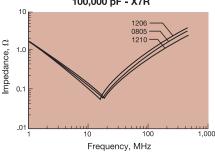
Variation of Impedance with Cap Value Impedance vs. Frequency 1,000 pF vs. 10,000 pF - X7R 0805



Variation of Impedance with Chip Size Impedance vs. Frequency 10,000 pF - X7R



Variation of Impedance with Chip Size Impedance vs. Frequency 100,000 pF - X7R







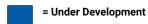
Parame	ter/Test	X7R Specification Limits	Measuring (	Conditions
Operating Tem	perature Range	-55°C to +125°C	Temperature C	ycle Chamber
Capac	itance	Within specified tolerance		
Dissipati	on Factor	≤ 10% for ≥ 50V DC rating ≤ 12.5% for 25V DC rating ≤ 12.5% for 25V and 16V DC rating ≤ 12.5% for ≤ 10V DC rating	Freq.: 1.0 k Voltage: 1.0'	
Insulation	Resistance	100,000MΩ or 1000MΩ - μF, whichever is less	Charge device with 120 ± 5 secs @ roo	
Dielectric	: Strength	No breakdown or visual defects	Charge device with 250 1-5 seconds, w/charge limited to 50 Note: Charge device with for 500V	and discharge current mA (max) n 150% of rated voltage
	Appearance	No defects	Deflectio	n: 2mm
Resistance to	Capacitance Variation	≤ ±12%	Test Time: 3	
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)	V	
	Insulation Resistance	≥ Initial Value x 0.3	90 r	nm —
Solder	rability	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutectic for 5.0 ± 0.5	
	Appearance	No defects, <25% leaching of either end terminal		
	Capacitance Variation	≤ ±7.5%		
Resistance to Solder Heat	Dissipation Factor	Meets Initial Values (As Above)	Dip device in eutectic s seconds. Store at room	temperature for 24 ± 2
	Insulation Resistance	Meets Initial Values (As Above)	hours before measuring	g electrical 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
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	≤ 3 minutes
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles 24 ± 2 hours at ro	
	Appearance	No visual defects		
	Capacitance Variation	≤ ±12.5%	Charge device with 1.5 r	
Load Life	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	for 1000 hou	
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from test chamb temperature for 24 ± 2 h	
	Dielectric Strength	Meets Initial Values (As Above)		
	Appearance	No visual defects		
	Capacitance Variation	≤ ±12.5%	Store in a test chamber s 5% relative humidi	
Load Humidity	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	(+48, -0) with rated	l voltage applied.
Humbulty	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from chamber temperature an	d humidity for
	Dielectric Strength	Meets Initial Values (As Above)	24 ± 2 hours bef	ore measuring.





					LD03										□□ LD06											
	ZE lering	Def	LD02				Def	LD03 low/W						D-4	LD05 low/W							LD Reflow				
	aging		II Pap					II Pap								ossed						Reflow aper/Er				
	mm		$00 \pm 0$					$50 \pm 0$							$01 \pm 0$							3.20 ±		<del>, cu</del>		
(L) Length	(in.)		40 ± 0					53 ± 0.							79 ± 0.						(	0.126 ±		8)		
W) Width	mm		50 ± 0					31 ± 0.							25 ± 0.						,	1.60 ±				
	(in.)		20 ± 0 25 ± 0					32 ± 0. 35 ± 0.							49 ± 0. 50 ± 0.						(	0.063 ± 0.50 ±		B)		
(t) Termina	al mm (in.)		25 ± 0 10 ± 0					14 ± 0.													(	± 0.020 ± 0.020		n)		
W	/DC	16	25	50	6.3	10	16	25	50	100	200	(0.020 ± 0.010) 0   6.3   10   16   25   50   100   200					200	6.3	10	16	25	50	100	200	500	
Сар	100	10		00	0.0		10		00	100	200	0.0		10	20	00	100	200	0.0	10	10	20	00	100	200	000
(pF)	150																									
(P.)	220			С																						
	330			C					G	G	G		J	J	J	J	J	J								К
	470			С					G	G	G		J	J	J	J	J	J								Κ
	680			С					G	G	G		J	J	J	J	J	J								K
	1000			С			G G G						J	J	J	J	J	J								K
	1500			С					G	G			J	J	J	J	J	J		J	J	J	J	J	J	М
	2200			С		GGG										J		J	J	J	J	J	J	М		
	3300		С	С					G	G			J	J	J	J	J	J		J	J	J	J	J	J	М
	4700		С	С					G	G							J		J	J	J	J	J	J	M	
	6800	С	С						G	G			J	J	J	J	J	J		J	J	J	J	J	J	Р
Сар	0.010	С	С	ļ					G	G			J	J	J	J	J	J		J	J	J	J	J	J	Р
(µF)	0.015	С						G	G				J	J	J	J	J	J		J	J	J	J	J	M	
	0.022	С						G	G				J	J	J	J	J	N		J	J	J	J	J	М	
	0.033	С						G	G				J	J	J	J	N			J	J	J	J	J	М	
	0.047						G	G	G				J	J	J	J	N			J	J	J	J	J	M	
	0.068		C*				G	G	G G				J	J	J	J	N			J	J	J	J	J P	P	
	0.10 0.15		C*		_	G G	G	G	G				J	J	-	J	N			J	J	J	J		Р	
	0.15				G G	G							J	J	J	N N	N N			J	J   J	J J	J	Q		
	0.22				G	G							N	N	N	N	N			J	J	M	P	Q		
	0.33							J*					N	N	N	N	N			M	M	M	P	Q		
	0.47												N	N	N		14			M	M	Q	Q	Q		
	1.0					J*	J*						N	N	N*					M	M	Q	0	0		$\vdash$
	1.5																			P	Q	Q		_		
	2.2				J*										P*					Q	Q	Q				
	3.3																									
	4.7												P*	P*						Q*	Q*	Q*				
	10											P*	Р							Q*	Q*	Q				
	22																		Q*							
	47																									
	100																									
	WVDC	16	25	50					6.3	10	16	25	50	100	200	6.3	10	16	25	50	100	200	500			
	SIZE		LD02			LD03								LD05							LD	06				

Letter	Α	С	Е	G	J	K	М	N	Р	Q	Х	Υ	Z			
Max.	0.33	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)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)			
			PAPER			EMBOSSED										



## X7R - Capacitance Range

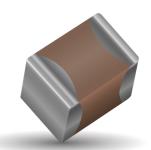


SIZE					LD10					LD	12		LC	13		LD	20			14
Solderii	ng			R	eflow On	ly				Reflov				w Only		Reflo				w Only
Packagi	ing				er/Embo					All Emb				bossed		All Em		bossed		
(L) Length	mm				.20 + 0.2					4.50 ±				± 0.30			± 0.50	5.72 ± 0.25		
(L) Length	(in.)				26 ± 0.0					(0.177 ±				± 0.012)		(0.224 :		(0.225 ± 0.010)		
W) Width	mm									3.20 ±				± 0.40		5.00		6.35 ± 0.25		
	(in.)									(0.126 ±				± 0.016)		(0.197 :		(0.250 ± 0.010)		
(t) Terminal	mm				.50 ± 0.2					0.61 ±				± 0.36			± 0.39			± 0.39
``'	(in.)				20 ± 0.0		000			(0.024 ±				± 0.014)			± 0.015)		(0.025	
WVDC		10	16	25	50	100	200	500	50	100	200	500	50	100	25	50	100	200	50	100
Cap	100																			
(pF)	150 220																		ļ	
	330												-			+				
	470															<b>*</b>	>ِتَـ		$\int \int_{\mathbb{T}}$	
	680																	) _	J/ ±'	_
	1000															†				
	1500	J	J	J	J	J	J	М										4		
	2200	J	J	Ĵ	Ĵ	Ĵ	J	М						İ			. '			
-	3300	J	J	J	J	J	J	М												
	4700	J	J	J	J	J	J	М												
	6800	J	J	J	J	J	J	М												
Сар	0.010	J	J	J	J	J	J	М	K	K	K	K	М	М		Х	Х	Х	М	Р
(µF)	0.015	J	J	J	J	J	J	Р	K	K	K	Р	М	М		Х	X	Х	М	Р
	0.022	J	J	J	J	J	J	Q	K	K	K	Р	М	М		X	Х	Х	М	Р
	0.033	J	J	J	J	J	J	Q	K	K	K	Х	М	М		Х	Х	X	М	Р
	0.047	J	J	J	J	J	J		K	K	K	Z	М	М		Х	X	X	М	Р
	0.068	J	J	J	J	J	М		K	K	K	Z	М	М		Х	Х	Х	М	Р
	0.10	J	J	J	J	J	М		K	K	K	Z	М	M		Х	Х	Х	М	Р
	0.15	J	J	J	J	M	Z		K	K	P		М	М		Х	X	Х	М	P
	0.22	J	J	J	J	Р	Z		K	K	Р		M	М		X	X	X	M	P
	0.33	J	J	J	J	Q			K	М	X		M	М		X	X	X	М	Р
	0.47	M	M	M P	M	Q			K	P			M	M		X	X	Х	M	P P
	0.68	M	M N	P	X	X Z			M M	Q			M M	P P		X	X		M M	P
	1.0 1.5	N	N N	Z	Z	Z			Z IVI	X Z			M	Р		X	X			X
	2.2	N X	X	Z	Z	Z			Z	Z			IVI			X	X		M M	^
	3.3	X	X	Z	Z				Z							X	Z		IVI	
	4.7	X	X	Z	Z				Z	Z						X	Z			
	10	Z	Ž	Z	Z											Z	Z			
	22	Z	Z	_	_										Z	_	_			
	47																			
	100																			
	WVDC	10	16	25	50	100	200	500	50	100	200	500	50	100	25	50	100	200	50	100
SIZE					LD10					LD	12		LD	13		LD		LD14		
		EDIO																		

Letter	Α	С	E	G	J	K	М	N	Р	Q	Χ	Υ	Z			
Max.	0.33	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)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)			
			PAPER			EMBOSSED										

## **X5R - General Specifications**





AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

**Not RoHS Compliant** 

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

LD05	5	D	101	Ţ	A	В	2	A
Size LD02 - 0402 LD03 - 0603 LD04 - 0504* LD05 - 0805 LD06 - 1206 LD10 - 1210 LD12 - 1812 LD13 - 1825 LD14 - 2225 LD20 - 2220	Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	<b>Dielectric</b> X5R = D	Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	Capacitance Tolerance B = ±.10 pF (<10pF) C = ±.25 pF (<10pF) D = ±.50 pF (<10pF) F = ±1% (≥ 10 pF) G = ±2% (≥ 10 pF) J = ±5% K = ±10% M = ±20%	Failure Rate A = Not Applicable	Terminations B = 5% min lead X = FLEXITERM® with 5% min lead**  **X7R only	Packaging 2 = 7" Reel 4 = 13" Reel Contact Factory For Multiples*	Special Code A = Std. Product

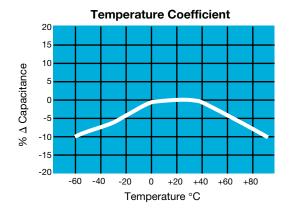
<sup>\*</sup>LD04 has the same CV ranges as LD03.

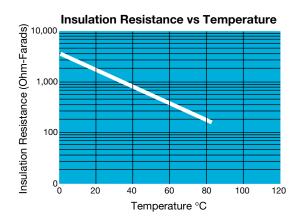
NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.

Contact factory for non-specified capacitance values.

See FLEXITERM® section for CV options

#### TYPICAL ELECTRICAL CHARACTERISTICS









Parame	ter/Test	X5R Specification Limits	Measuring (	Conditions					
Operating Tem	perature Range	-55°C to +85°C	Temperature C	ycle Chamber					
Capac	itance	Within specified tolerance							
Dissipati	on Factor	≤ 2.5% for ≥ 50V DC rating ≤ 3.0% 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 - 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)						
	Appearance	No defects	Deflectio	n: 2mm					
Resistance to	Capacitance Variation	≤ ±12%	Test Time: 3						
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)							
	Insulation Resistance	≥ Initial Value x 0.3	90 r						
Solder	rability	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutectic for 5.0 ± 0.9						
	Appearance	No defects, <25% leaching of either end terminal							
	Capacitance Variation	≤ ±7.5%							
Resistance to Solder Heat	Dissipation Factor	Meets Initial Values (As Above)	Dip device in eutectic s seconds. Store at room	temperature for 24 ± 2					
	Insulation Resistance	Meets Initial Values (As Above)	hours before measuring	g electrical 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: +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 24 ± 2 hours at ro	and measure after om temperature					
	Appearance	No visual defects							
	Capacitance Variation	≤ ±12.5%	Charge device with 1.5 chamber set at 85°C: (+48, -0). Note: Contac	± 2°C for 1000 hours					
Load Life	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	specification part numl	pers that are tested at					
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from test chamb						
	Dielectric Strength	Meets Initial Values (As Above)	temperature for 24 ± 2 h	ours betore measuring.					
	Appearance	No visual defects							
	Capacitance Variation	≤ ±12.5%	Store in a test chamber s 5% relative humidi	ty for 1000 hours					
Load Humidity	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	(+48, -0) with rated	l voltage applied.					
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from chamber temperature an 24 + 2 hours hef	d humidity for					
	Dielectric Strength	Meets Initial Values (As Above)	24 ± 2 hours before measuring.						





#### **PREFERRED SIZES ARE SHADED**

																	п	D					П														
SIZE				LI	002					L	D0	3					LD	05					LD	06						LD10	)				LD	12	
Solderi	ng		R	eflo	w/W	ave				Reflo	w/\	Vave	9			Re	flow	/Wav	/e			Re	eflow	/Wa	ve				Refl	ow/V	Vave						
Packagi	ing				⊃ap					All					Р	аре				d	F		er/Er			d		Pa		/Emb		ed					
(L) Length	mm				± 0.				,,	1.60			- \			2.01 ± 0.20 3.20 ± 0.20 (0.079 ± 0.008) (0.126 ± 0.008)					3.20 ± 0.20																
, ,	(in.) mm	_			± 0.	004)		+	((	0.8			b)								H		.60 ±				(0.126 ± 0.008) 2.50 ± 0.20									_	
W) Width	(in.)					004)			(0.032 ± 0.006)				1.25 ± 0.20 (0.049 ± 0.008)						063				(0.098 ± 0.008)														
(t) Terminal	mm				± 0.				0.35 ± 0.15						.50 ±						).50 ±							0 ± 0							$\neg$		
WVDC	(in.)	1				006) 25	50	1	163	0.014	4 ± (	125	b)   35	50	63	(0.0 110	20 ±	25	10) 135	150	63	(0.0 110	020 ±	25	10) [35]	50	1	l6 3	0.02	0 ± 0	125	)   35	50	6.3	101	25	50
Cap	100	7	0.5	10	10	25	30	+	0.5	10	10	23	33	30	0.5	10	10	23	33	30	0.5	10	10	23	33	30	7	0.5	10	10	23	33	30	0.5	10	20	30
(pF)	150					İ																															
1	220					İ	С																														
	330						С				İ	İ																İ									$\Box$
l	470						С																							-L'	~	$\geq$	$\leq$	<b>√</b> V	<b>!</b>	_	
	680						С																				L	_	<		$\leq$	_			)_	Т	J
	1000						С																						(	_ `	$\supset$	)	_	سلر	ノ_:	_	- 1
l	1500						С																								\	4					
<b></b>	2200						С	4																			L				4	T					
I	3300					_	С																								. '		_				
i	4700 6800					C								G																							
Сар	0.010					C	Н	+	-					G					┢	-	$\vdash$											┢					Н
Caρ (μF)	0.010					С						G	G	G																							
(μι )	0.013				С	C						G	G	G						N																	
	0.033				c			T				G	G	G						N																	$\Box$
I	0.047				С	С						G	G	G						N	l																
I	0.068				С			İ	İ			G		G						N	İ																
	0.10			С	С	С						G		G				N		N												İ					П
I	0.15											G						N	N																		
	0.22		C*								G	G						N	N							Q											Ш
I	0.33										G	G						N																			
I	0.47	C*	C*								G							N						Q	Q								Х				
<b></b>	0.68	Oth	Odi	Orto				╄		_	G	Lite						N	_	P*				_	_							\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					ш
I	1.0	C*	C*	C*					G	G	G	J*					N	N		P*				Q	Q						Х	Х	Х				
l	1.5 2.2	C*						G*	G*	J*	J*					N	N	N	1				Q	Q							Z	X					
	3.3	C.	$\vdash$	$\vdash$		$\vdash$	$\vdash$	J*	J*	J*	J*	$\vdash$	$\vdash$		N	N	IN	IN	$\vdash$	$\vdash$	Х	Х	Ų	Ų	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$	$\vdash$		^	$\vdash$	$\vdash$	$\vdash$		Н
İ	3.3 4.7							J*	J*	J*	3				N	N	N*	N*			X	X	Х	Х						Q	Z	l					
l	10							K*			1				P	P	P		1		X	x	X	X					Х	Z	Z					Z	
	22						$\vdash$	<u> </u>							P*						X	X	X	X		Н		Z	Z	Z	Z					_	$\Box$
l	47																				Х							Z*				1					
	100																										Z*	Z									
	WVDC	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	6.3	10	16	25	35	50	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	6.3	10	25	50
	SIZE			LI	002					L	D0	ZE LD02 LD03				LD05			LD06				LD10					LD	12								

Letter	Α	С	Е	G	J	K	М	N	Р	Q	Х	Υ	Z									
Max.	0.33	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)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)									
			PAPER						EMBC	SSED		EMBOSSED										

<sup>\*</sup>Optional Specifications - Contact factory

NOTE: Contact factory for non-specified capacitance values