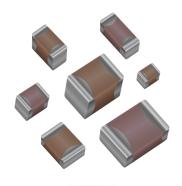
MLCC Tin/Lead Termination "B" (LD Series)

COG (NPO) - 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)

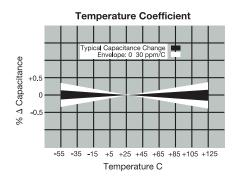
LD05	<u>5</u>	<u>A</u>	101	J	<u>A</u>	<u>B</u>	2	<u>A</u>
Size LD02 - 0402 LD03 - 0603 LD04 - 0504* LD05 - 0805 LD06 - 1206 LD10 - 1210 LD12 - 1812 LD13 - 1825 LD14 - 2225 LD20 - 2220	Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	Dielectric COG (NPO) = A X7R = C X5R = D X8R = F	Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	Capacitance Tolerance $B = \pm .10 \text{ pF} (<10 \text{ pF})$ $C = \pm .25 \text{ pF} (<10 \text{ pF})$ $D = \pm .50 \text{ pF} (<10 \text{ pF})$ $F = \pm 1\% (\ge 10 \text{ pF})$ $G = \pm 2\% (\ge 10 \text{ pF})$ $J = \pm 5\%$ $K = \pm 10\%$ $M = \pm 20\%$	Failure Rate A = Not Applicable 4 = Automotive	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

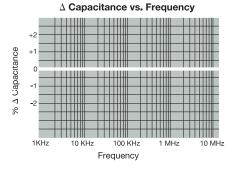
*LD04 has the same CV ranges as LD03.

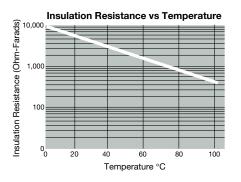
See FLEXITERM® section for CV options

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

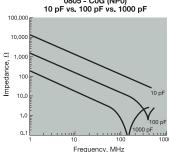
Contact factory for non-specified capacitance values.

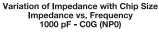


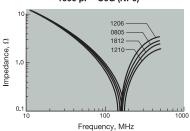




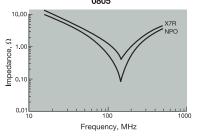
Variation of Impedance with Cap Value Impedance vs. Frequency 0805 - COG (NPO) 10 pF vs. 100 pF vs. 1000 pF







Variation of Impedance with Ceramic Formulation Impedance vs. Frequency 1000 pF - COG (NPO) vs X7R 0805





The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.





Parame	ter/Test	NP0 Specification Limits	Measuring Conditions
Operating Tem	perature Range	-55°C to +125°C	Temperature Cycle Chamber
Capac	itance	Within specified tolerance	Freq.: 1.0 MHz ± 10% for cap ≤ 1000 pF
(2	<30 pF: Q≥ 400+20 x Cap Value ≥30 pF: Q≥ 1000	1.0 kHz ± 10% for cap > 1000 pF Voltage: 1.0Vrms ± .2V
Insulation	Resistance	100,000ΜΩ or 1000ΜΩ - μF, whichever is less	Charge device with rated voltage for 60 ± 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	Deflection: 2mm
Resistance to Flexure	Capacitance Variation	±5% or ±.5 pF, whichever is greater	Test Time: 30 seconds 7 1mm/sec
Stresses	Q	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 eutectic solder at 230 ± 5°C for 5.0 ± 0.5 seconds
	Appearance	No defects, <25% leaching of either end terminal	
	Capacitance Variation	≤ ±2.5% or ±.25 pF, whichever is greater	Dia during in contrasting allows a 00000 for 00
Resistance to Solder Heat	Q	Meets Initial Values (As Above)	Dip device in eutectic solder at 260°C for 60 seconds. Store at room temperature for 24 ± 2
Solder Fleat	Insulation Resistance	Meets Initial Values (As Above)	hours before measuring 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 and measure after 24 hours at room temperature
	Appearance	No visual defects	
	Capacitance Variation	≤ ±3.0% or ± .3 pF, whichever is greater	Charge device with twice rated voltage in test chamber set at 125°C ± 2°C
Load Life	Q	≥ 30 pF: Q≥ 350 ≥10 pF, <30 pF: Q≥ 275 +5C/2 <10 pF: Q≥ 200 +10C	for 1000 hours (+48, -0). Remove from test chamber and stabilize at room
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	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 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.
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from chamber and stabilize at room temperature for 24 ± 2 hours before measuring.
	Dielectric Strength	Meets Initial Values (As Above)	

C0G (NP0) - Capacitance Range



PREFERRED SIZES ARE SHADED

SIZE LD02 LD03 LD06 LD06 Reflow/Wave Reflow/]		
Pages/Embossed Page	SIZE			LD02			LD	03				LD05					LD0	6		
Column	Solder	ing	Re	flow/Wa	ave		Reflow	v/Wave			Re	flow/Wa	ve				Reflow/\	Wave		
Cl. Length Cl. Decoration Cl. Length Cl. Decoration Cl. Length Cl. Decoration	Packag															Pa				
Wywer Case	(L) Length	(in.)	(0.0	040 ± 0.0	004)		(0.063	± 0.006)			(0.0	79 ± 0.0	08)			(0.126 ± 0	0.008)		
(1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	W) Width		(0.0	020 ± 0.0	004)		(0.032:	± 0.006)			(0.0	0.0 ± 0.0	08)			(0.063 ± 0	0.008)		
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2.7 C						G	G			J			J	J						J J
3.0 C C C G G G G G G J J J J		2.7	С	С	С	G	G	G	G	J	J	J	J	J	J	Ĵ	J	J	J	J
4.7 C															_					J J
6.8 C C C C G G G G G G J J J J J J J J J J		4.7	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J J
10		6.8	С	С	С	G	G	G	G	J	J	J	J	J	Ĵ	J	J	J	J	Ĵ
12												_								J J
18		12	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J J
The color of the		18	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
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A7		33	С	C C C C C C C C			G	G	G	J		J	J	J			J	J		J
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R2																				J J
120		82	С	C			G	G	G	J	J	J	J	J	J	J	J	J	J	J
180		120	С	C C G C C G C C G			G	G	G	J	J	J	J	J	J	J	J	J	J	J
C					C C G C C G															J
330											J					J				M M
A70		330	С	С	С	G	G	G	G	J		J	J	М	J		J	J	J	М
Cap									G											M M
820 G G G G J J J J J J J J J J J J J J J														М						M P
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A700		3300								J	J	IN			J	J	М	P		
Size LD02 LD05 LD05 LD06																				
S200		5600																		
(pF) 0.012 0.015 0.022 0.027 0.033 0.039 0.047 0.068 0.082 0.1 WVDC 16 25 50 16 25 50 100 16 25 50 100 200 16 25 50 100 200 SIZE LD02 LD03 LD05	Con	8200													М	М				
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0.1		0.068		Ī	-															
SIZE LD02 LD03 LD05 LD06		0.1																		
			16					100	16	25		100	200	16	25			200	500	
	Letter						K	I M			P)	Y		J	7	1		
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	Max.	0.33					1.94	1.02	1.27		1.40	1.52	1.7	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)	Thickness	(0.013)	(0.0			(0.035)) (0.	.037)	(0.040)	(0.05)	0) (0	.055)				(0.090)	(0.10	0) (0	0.110)	

C0G (NP0) - Capacitance Range



PREFERRED SIZES ARE SHADED

	_ 1																
SIZ				LD10 Reflow On	lv				LD12 Reflow Or	ılı			LD13 Reflow Only			LD14 Reflow Only	
Packag				er/Embo	<u> </u>				I Emboss				All Embossed			All Embossed	
(L) Length	mm		- ;	3.20 + 0.2	0				4.50 ± 0.3	0			4.50 ± 0.30			5.72 ± 0.25	
-	(in.) mm			126 ± 0.0 2.50 ± 0.2					177 ± 0.0 3.20 ± 0.2				(0.177 ± 0.012) 6.40 ± 0.40)	(0.225 ± 0.010) 6.35 ± 0.25)
W) Width	(in.) mm			098 ± 0.0					126 ± 0.0				0.252 ± 0.016 0.61 ± 0.36)	(0.250 ± 0.010) 0.64 ± 0.39)
(t) Terminal	(in.)		(0.	020 ± 0.0	10)			(0.	024 ± 0.0	14)			(0.024 ± 0.014)			0.025 ± 0.015)	
Сар	WVDC 0.5	25	50	100	200	500	25	50	100	200	500	50	100	200	50	100	200
(pF)	1.0																
	1.2 1.5																
	1.8 2.2															>	√ \//
	2.7														_ <_\		
	3.3 3.9																
	4.7 5.6														_ `	$\overline{}$	
	6.8															t	
	8.2 10					J											
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	15 18			 		J		+-+				+					
	22 27					J											
	33					J											
	39 47					J											
	56	56 68				J											
	82	8 2				J											
	100 120					J											
	150					J											
	180 220					J											
	270 330					J											
	390					М											
	470 560	J	J	J	J	M M											
	680	J	J	J	J	М											
	820 1000	J	J	J	J	M M	K	K	K	K	М	M	М	М	М	М	Р
	1200 1500	J J	J	J	M M	M M	K K	K	K K	K K	M M	M M	M M	M M	M M	M M	P P
	1800	J	J	J	М		K	K	K	K	М	М	М	М	М	М	P
	2200 2700	J	J	J	Q Q		K K	K	K K	K P	P Q	M M	M M	M M	M M	M M	P P
	3300 3900	J J	J	J M			K K	K K	K K	P P	Q	M M	M M	M M	M M	M M	P P
	4700	Ĵ	J	M			K	K	K	P	Q	М	М	М	М	М	Р
	5600 6800	٦	J				K K	K K	M M	P X	Х	M M	M M	M M	M M	М	P P
Сар	8200 0.010	J J	J				K	M M	M M			M M	M M		M M	M M	P P
(pF)	0.012	J	J				K	М	IVI			М	М		М	М	Р
	0.015 0.018						M	M				M P	M		M M	M M	Y
	0.022						М	М				Р			М	Υ	Υ
	0.027 0.033						M	M				P P			P P	Υ	Υ
	0.039 0.047						M M	M M				P P			P P		
	0.068						М	М							Р		
	0.082 0.1		L_	L			М	М							Q Q		
	WVDC	25	50	100	200	500	25	50	100	200	500	50	100	200	50	100	200
SIZ				LD10					LD12				LD13			LD14	
Letter Max.	0.33	0.5		E 0.71	G 0.90	J 0.9		1.02	M 1.27		.40	P 1.52	Q > 1.78 2.1		2.79	-	
Max. Thickness	(0.013)							(0.040)	(0.050		055)		0.070) (0.0				
		1	F	PAPER								EMBOSS					

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	101	<u>J</u>	<u>A</u>	<u>B</u>	2	<u>A</u>
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 = \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

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.





Paramet	ter/Test	X8R Specification Limits	Measuring (Conditions
Operating Temp	perature Range	-55°C to +150°C	Temperature C	ycle Chamber
Capac	itance	Within specified tolerance		U- 1 100/
Dissipatio	on Factor	≤ 2.5% for ≥ 50V DC rating ≤ 3.5% for 25V DC and 16V DC rating	Freq.: 1.0 k Voltage: 1.0	
Insulation I	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)		
	Insulation Resistance	≥ Initial Value x 0.3	90 r	mm —
Solder	Solderability Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutection for 5.0 ± 0.9	solder at 230 ± 5°C seconds
	Appearance	No defects, <25% leaching of either end terminal		
		≤ ±7.5%	Dia desire in conservation	- Ll + 00000 for 00
Resistance to Solder Heat	•	Meets Initial Values (As Above)	Dip device in eutectic s seconds. Store at room	temperature for 24 ± 2
		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	ated voltage (≤ 10V) in
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	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	(+48, -0) with rated	
Humidity	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.

X8R - Capacitance Range

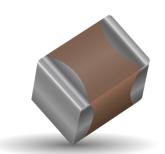


	SIZ	ΖE			LDC)3		L	D05			LD06	
		WVD	C	2	5V	50V		25V		50V	25V		50V
271	Cap	270			3	G							
331	(pF)	330		(3	G		J		J			
471		470		(3	G		J		J			
681		680		(3	G		J		J			
102		1000		(3	G		J		J	J		J
152		1500			3	G		J		J	J		J
182		1800			3	G		J		J	J		J
222		2200			3	G		J		۲	J		J
272		2700		(3	G		J		J	J		J
332		3300		(3	G		J		J	J		J
392		3900		(3	G		J		J	J		J
472		4700		(3	G		J		J	J		J
562		5600		(3	G		J		J	J		J
682		6800		1	3	G		J		J	J		J
822	Cap	8200		1	3	G		J		J	J		J
103	(µF)	0.01			3	G		J		J	J		J
123		0.012			3	G		J		J	J		J
153		0.015		1	3	G		J		J	J		J
183		0.018			3	G		J		J	J		J
223		0.022			3	G		J		J	J		J
273		0.022 0.027			3	G		J		J	J		J
333		0.033			3	G		J		J	J		J
393		0.039			3	G		J		J	J		J
473		0.047			3	G		J		J	J		J
563		0.056			3			N		N	М		М
683		0.068			3			N		N	М		М
823		0.082						N		N	М		М
104		0.1						N		N	М		М
124		0.12			ĺ			N		N	М		М
154		0.15						N		N	М		М
184		0.18		İ				N			М		М
224		0.22						N			M		M
274		0.27									М		М
334		0.33					i				М		М
394		0.39		İ							M		
474		0.47									M		
684		0.68		1									
824	0.82			İ									
105													
		WVD		2	5V	50V		25V		50V	25V		50V
	SIZ				LDC				D05			LD06	
1 - 11 - 11						l v					T V	I V	
Letter	A C E			G	J	K	M	N	P	Q	X	Y	Z

	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
Т	hickness	(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			

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)

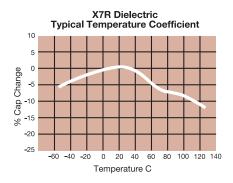
LD05	<u>5</u>	<u>c</u>	101]	<u>A</u>	<u>B</u>	<u>2</u>	<u>A</u>
Size LD03 - 0603 LD04 - 0504* LD05 - 0805 LD06 - 1206 LD10 - 1210 LD12 - 1812 LD13 - 1825 LD14 - 2225 LD20 - 2220	Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	Dielectric X7R = C	Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	Capacitance Tolerance $B = \pm .10 \text{ pF} (<10 \text{ pF})$ $C = \pm .25 \text{ pF} (<10 \text{ pF})$ $D = \pm .50 \text{ pF} (<10 \text{ pF})$ $F = \pm 1\% (\ge 10 \text{ pF})$ $G = \pm 2\% (\ge 10 \text{ pF})$ $J = \pm 5\%$ $K = \pm 10\%$ $M = \pm 20\%$	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

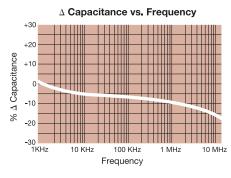
^{*}LD04 has the same CV ranges as LD03.

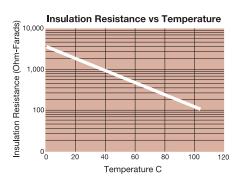
See FLEXITERM® section for CV options

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

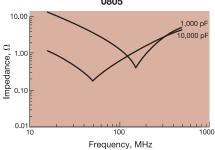
Contact factory for non-specified capacitance values.

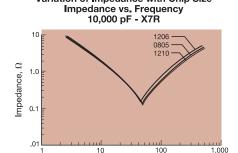






Variation of Impedance with Cap Value Impedance vs. Frequency 1,000 pF vs. 10,000 pF - X7R 0805





Frequency, MHz

Variation of Impedance with Chip Size

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

10 100 1206 0805 1210

11 10 100 1,000 Frequency, MHz





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	\leq 10% for \geq 50V DC rating \leq 12.5% for 25V DC rating \leq 12.5% for 25V and 16V DC rating \leq 12.5% for \leq 10V DC rating	Freq.: 1.0 k Voltage: 1.0'	
Insulation	Dissipation Resistance Solderability Appearance Capacitance Variation Pactor Insulation Resistance Capacitance Variation Pactor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Dissipation Factor Dissipation Factor Dissipation Factor	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
	Capacitance issipation Factor ulation Resistance delectric Strength Appearance Capacitance Variation Pactor Insulation Resistance Solderability Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Dissipation Factor Insulation Resistance Dielectric Strength Appearance Capacitance Variation Capacitance Variation Appearance Capacitance Variation	No defects	Deflectio	n: 2mm
Resistance to		≤ ±12%	Test Time: 3	30 seconds 7 1mm/sec
Flexure Stresses	Factor	Meets Initial Values (As Above)		
		≥ Initial Value x 0.3	90 n	mm
Solder	ability	≥ 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		
	Variation	≤ ±7.5%		
Resistance to Solder Heat	Factor	Meets Initial Values (As Above)	Dip device in eutectic s seconds. Store at room	temperature for 24 ± 2
		Meets Initial Values (As Above)	hours before measuring	g electrical properties.
		Meets Initial Values (As Above)		
	· · ·	No visual defects	Step 1: -55°C ± 2°	30 ± 3 minutes
	Variation	≤ ±7.5%	Step 2: Room Temp	≤ 3 minutes
Thermal Shock		Meets Initial Values (As Above)	Step 3: +125°C ± 2°	30 ± 3 minutes
		Meets Initial Values (As Above)	Step 4: Room Temp	≤ 3 minutes
		Meets Initial Values (As Above)	Repeat for 5 cycles 24 ± 2 hours at ro	
	Appearance	No visual defects		
		≤ ±12.5%	Charge device with 1.5 r	
Load Life		≤ Initial Value x 2.0 (See Above)	test chamber set for 1000 hou	
		≥ Initial Value x 0.3 (See Above)	Remove from test chamb temperature for 24 ± 2 ho	
		Meets Initial Values (As Above)		
	Appearance	No visual defects		
		≤ ±12.5%	Store in a test chamber s 5% relative humidi	
Load Humidity	•	≤ Initial Value x 2.0 (See Above)	(+48, -0) with rated	l voltage applied.
riumanty	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.

X7R - Capacitance Range



PREFERRED SIZES ARE SHADED

																							1			
SIZE	E		LD02					LD03	3						LD05	;						LD	06			
Solder	ing	Ref	flow/W	ave			Ref	low/W	/ave					Ref	low/W	ave						Reflow	/Wave	•		
Packad	ina	Α	II Pap	er			A	II Par	er				F	Paper	/Emb	osse	d				Pai	per/Er	nbos	sed		
(L) Length	mm	1.0	00 ± 0.	10			1.0	60 ± 0	.15					2.0	01 ± 0.	.20						3.20 ±	0.20			
() - 3	(in.) mm		40 ± 0. 50 ± 0.					63 ± 0 81 ± 0							79 ± 0. 25 ± 0.						(0.126 ± 1.60		8)		
W) Width	(in.)		30 ± 0. 20 ± 0.					32 ± 0							49 ± 0.						(1.00 ± 0.063		8)		
(t) Terminal	mm	0.:	25 ± 0.	.15			0.3	35 ± 0	.15					0.	50 ± 0.	.25						0.50 ±	0.25			
WVD	(in.)	(0.0°	10 ± 0.	006) 50	6.2	10	(0.0 ⁻	14 ± 0		100	200	6.2	10	(0.0	20 ± 0.		100	200	6.2	10	16	0.020 ±		0) 100	200	500
Cap	100	10	25	50	6.3	10	10	25	50	100	200	6.3	10	16	25	50	100	200	6.3	10	10	25	50	100	200	300
(pF)	150																									
(F-)	220			С																						i i
	330			С					G	G	G		J	J	J	J	J	J								K
	470			С					G	G	G		J	J	J	J	J	J								K
	680			С					G	G	G		J	J	J	J	J	J								K
	1000 1500			C		G G				G G	G		J	J	J	J	J	J		J	J	J	J	J	J	K
	2200			C						G			J	J	J	J	J	J		J	J	J	J	J	J	M
	3300		С	C		G							J	J	J	J	J	J		J	J	J	J	J	J	М
	4700		С	С		G				G		İ	J	J	J	J	J	J	ĺ	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
Cap	0.010	С	С			G C				G			J	J	J	J	J	J		J	J	J	J	J	J	Р
(μF)	0.015 0.022	C						G	G				J J	J	J	J	J	J		J J	J	J	J	J	M	
	0.022	C						G	G				J	J	J	J	N	IN		J	J	J	J	J	M	\vdash
	0.047	U					G	G	G				J	J	Ĵ	Ĵ	N			J	Ĵ	Ĵ	J	Ĵ	M	
	0.068						G	G	G				J	J	J	J	N			J	J	J	J	J	Р	
	0.10		C*			G	G	G	G				J	J	J	J	N			J	J	J	J	Р	Р	
	0.15				G	G							J	J	J	N	N			J	J	J	J	Q		
	0.22				G	G							J N	J N	N N	N N	N N			J	J	J M	J P	Q	<u> </u>	
	0.33							J*					N	N	N	N	N			J M	M	M	P	Q		
	0.68												N	N	N	14	14			M	M	Q	Q	Q		
	1.0					J*	J*						N	N	N*					М	М	Q	Q	Q		
	1.5											İ							İ	Р	Q	Q			'	l l
	2.2				J*										P*					Q	Q	Q				
	3.3												Dit	Dit						O.t.	O.t.	O.t.				
	4.7 10											p*	P*	P*						Q* Q*	Q* Q*	Q* Q				
-	22											F"	F						0*	Ų"	Ų"	Ų			\vdash	
	47																		٧ .							
	100																									
	WVDC	16	25	50	6.3	10	16	25	50	100	200	6.3	10	16	25	50	100	200	6.3	10	16	25	50	100	200	500
	SIZE		LD02					LD03	3						LD05							LD	U6			
Letter	Α		С		Е		G				K	1	И	N	Т	Р		Q		Х		Υ		Z		
Max.	0.33		0.56		 0.71	G J 1 0.90 0.94				.02		27	1.4		1.5	2	1.78		2.29		2.54	+	<u>-</u> 2.79			
Thickness	(0.013)		0.00								040)		050)	(0.0	-	(0.06		(0.07)		(0.090	0) (0.100		2.75).110)		
	(0.010)				0.028) (0.035) (0.037) (PAPER			(5.0	- 10/	(0.0	, , ,	,0.0			MBOS		-) '	(3.030	·/ [(5.100	, _ (c	,,,,,	-			

= Under Development

X7R - Capacitance Range

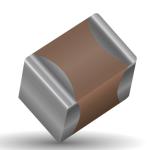


PREFERRED SIZES ARE SHADED

SIZI	E				LD10					LD	12		LD1	13		LD	20		LD	14
Solder	ring			F	teflow Only					Reflov	v Only		Reflow	Only		Reflo	w Only		Reflov	v Only
Packag	ging		,	Pap	er/Embos	sed				All Emb	ossed		All Emb	ossed		All Eml	bossed		All Emi	ossed
(L) Length	mm				3.20 + 0.20					4.50 ±			4.50 ±				± 0.50		5.72	
(=) ==::g:::	(in.)				126 ± 0.00 2.50 ± 0.20	8)				(0.177 ± 3.20 ±			(0.177 ± 6.40 ±				± 0.020) ± 0.40		(0.225 ±	
W) Width	mm (in.)				0.20 098 ± 0.00	8)				(0.126 ±			(0.252 ±				± 0.40 ± 0.016)		(0.250 ±	
(t) Terminal	mm				0.50 ± 0.25	->				0.61 ±			0.61 ±				± 0.39		0.64 ±	0.39
WVD	(in.)	10	16	25	020 ± 0.01	0) 100	200	500	50	(0.024 ±	200	500	(0.024 ±	0.014) 100	25	(0.025 :	± 0.015) 100	200	(0.025 ±	100
Cap	100	10	10	25	30	100	200	300	30	100	200	300	30	100	25	30	100	200	30	100
(pF)	150																_1		W_	•
	220															_ <	<u> </u>		ر ک	T I
	330 470))	-الر	Ψ'
	680																	<u> </u>		
	1000															T		4 t		1
	1500	J	J	J	J	J	J	М										1 .		
	2200 3300	J J	J	J	J	J	J	M												
	4700	J	J	J]	J	J	M												
	6800	Ĵ	Ĵ	J	J	Ĵ	J	M												
Сар	0.010	J	J	J	J	J	J	М	K	K	K	K	М	М		X	Х	Х	М	Р
(μF)	0.015	J	J	J	J	J	J	P	K	K	K	P	M	М		X	X	X	M	P P
-	0.022	J J	J	J	J	J	J	Q	K	K K	K	X	M	M M		X	X	X	M M	P
	0.047	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ	٧ -	K	K	ĸ	Z	M	M		X	x	X	M	P P
	0.068	J	J	J	J	J	М		K	K	K	Z	М	М		X	X	Х	М	Р
	0.10	J	J	J	J	J	M		K	K	K	Z	M	М		X	X	X	М	Р
	0.15 0.22	J	J	J	J	M P	Z Z		K K	K K	P P		M M	M M		X	X	X X	M M	P P
	0.22		J	J	J	Q			K	M	X		M	M		X	X	X	M	P
	0.47	М	М	М	M	Q			K	Р			М	М		X	Х	Х	М	Р
	0.68	M	M	P	X	X			М	Q			М	P		X	X		М	Р
	1.0 1.5	N N	N N	P Z	X Z	Z Z			M Z	X Z			M M	Р		X	X		M M	P X
	2.2	X	X	Z	Z	Z			Z	Z			IVI			x	ı x		M	^
	3.3	Х	Х	Z	Z				Z							Х	Z			
	4.7	X	X	Z	Z				Z							X	Z			
	10 22	Z 	Z	Z	Z			+							Z	Z	Z			
	47																			
	100																			
0	WVDC	10	16	25	50 LD10	100	200	500	50	100	200	500	50	100	25	50	100	200	50	100
SIZI	E		LDIO							LD	12		LD1	3		LD	20		LD	14
Letter	А	C E G J K							М	1	1	Р	Q		X	Υ	Z			
Max.	0.33	0.5		0.71	0.90	0.		1.02	1.27	1.4		1.52	1.78		29	2.54	2.79			
Thickness	(0.013)	(0.0	(0.022) (0.028) (0.035) (0.037) (0.) (0.0)55) ((0.060)	(0.070)	0.0	090) ((0.100)	(0.110	0)		
				PAPER								EMBC	DSSED							

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	<u>5</u>	D	101	Ţ	<u>A</u>	<u>B</u>	2	<u>A</u>
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 X5R = D	Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	Capacitance Tolerance $B = \pm .10 \text{ pF} (<10 \text{pF})$ $C = \pm .25 \text{ pF} (<10 \text{pF})$ $D = \pm .50 \text{ pF} (<10 \text{pF})$ $F = \pm 1\% (\ge 10 \text{ pF})$ $G = \pm 2\% (\ge 10 \text{ pF})$ $J = \pm 5\%$ $K = \pm 10\%$ $M = \pm 20\%$	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

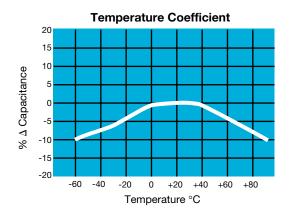
^{*}LD04 has the same CV ranges as LD03.

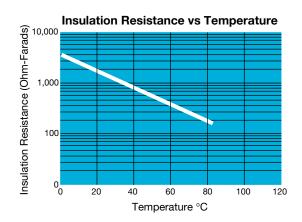
See FLEXITERM® section for CV options

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

Contact factory for non-specified capacitance values.

TYPICAL ELECTRICAL CHARACTERISTICS





50





Parame	ter/Test	X5R Specification Limits	Measuring Conditions								
	perature Range	-55°C to +85°C	Temperature Cycle Chamber								
Capac	itance	Within specified tolerance									
Dissipation	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	30 seconds 7 1mm/sec							
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)	V								
	Insulation Resistance	≥ Initial Value x 0.3	90 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	≤ ±7.5%									
Resistance to Solder Heat	Dissipation Factor	Meets Initial Values (As Above)	Dip device in eutectic solder at 260°C for 60 seconds. Store at room temperature for 24 ± 2 hours before measuring electrical properties.								
	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 and measure after 24 ± 2 hours at room temperature								
	Appearance	No visual defects	0 1 11	v . l							
	Capacitance Variation	≤ ±12.5%	Charge device with 1.5X rated voltage in test chamber set at 85°C ± 2°C for 1000 hours (+48,-0). Note: Contact factory for *optional specification part numbers that are tested at < 1.5X rated voltage.								
Load Life	Dissipation Factor	≤ Initial Value x 2.0 (See Above)									
	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								
	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)	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.								
riumanty	Insulation Resistance	≥ Initial Value x 0.3 (See Above)									
	Dielectric Strength	Meets Initial Values (As Above)									

X5R - Capacitance Range



PREFERRED SIZES ARE SHADED

SIZE																																						
Packaging	SIZ	E			L	D0:	2			LD03					LD05					LD06					LD10								LD	12				
(L) Length (mm (L) (1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0 to 1.0	Solder	ring		F	Reflo	w/V	Vave			Reflow/Wave					Reflow/Wave					Reflow/Wave							Refl	ow/V	Vave									
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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)			
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^{*}Optional Specifications - Contact factory

NOTE: Contact factory for non-specified capacitance values

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