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)

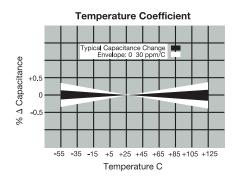
LD05	5	A	101	J	<u>A</u>	<u>B</u>	2	<u>A</u>
Size LD02 - 0402 LD03 - 0603 LD04 - 0504* LD05 - 0805 LD06 - 1206 LD10 - 1210 LD12 - 1812 LD13 - 1825 LD14 - 2225 LD20 - 2220	Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	Dielectric COG (NP0) = A X7R = C X5R = D X8R = F	Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	Capacitance Tolerance $B = \pm .10 \text{ pF} (<10 \text{ pF})$ $C = \pm .25 \text{ pF} (<10 \text{ pF})$ $D = \pm .50 \text{ pF} (<10 \text{ pF})$ $F = \pm 1\% (\ge 10 \text{ pF})$ $G = \pm 2\% (\ge 10 \text{ pF})$ $J = \pm 5\%$ $K = \pm 10\%$ $M = +20\%$	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

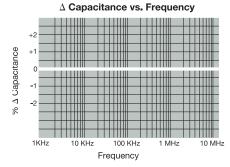
 $M = \pm 20\%$

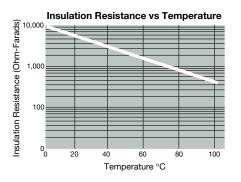
*LD04 has the same CV ranges as LD03.

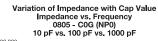
See FLEXITERM® section for CV options

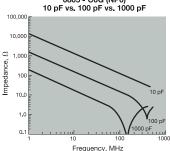
NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers. Contact factory for non-specified capacitance values.

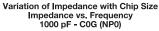


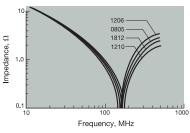




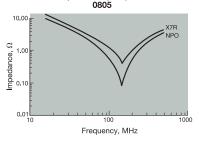








Variation of Impedance with Ceramic Formulation Impedance vs. Frequency 1000 pF - C0G (NP0) vs X7R





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 Temp	perature Range	-55°C to +125°C	Temperature Cycle Chamber
Capac	itance	Within specified tolerance	Freq.: 1.0 MHz ± 10% for cap ≤ 1000 pF
C)	<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	ability	≥ 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 daria in catasti callar 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 Heat	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



		-				-										l			
SIZI	E		LD02			LD	003				LD05					LD0	6		
Solder	ing	Re	eflow/Wa	ave		Reflow	v/Wave			Re	eflow/Wa	ive				Reflow/\	Nave		
Packag	ging mm		All Pape .00 ± 0.1				aper ± 0.15				er/Embo .01 ± 0.2				Pa	3.20 ± 0			
(L) Length	(in.)	(0.0	0.0 ± 0.0	004)		(0.063	± 0.006)			(0.	0.0 ± 0.0	08)			(0.126 ± ((800.0		
W) Width	mm (in.)	(0.0	0.50 ± 0.1 020 ± 0.0	004)		(0.032	± 0.15 ± 0.006)			(0.	.25 ± 0.2 049 ± 0.0	08)			(1.60 ± 0 0.063 ± 0	(800.0		
(t) Terminal	mm (in.)		0.25 ± 0.1 010 ± 0.0				± 0.15 ± 0.006)				0.50 ± 0.2 020 ± 0.0				(0.50 ± 0 0.020 ± 0			
Сар	WVDC 0.5	16 C	25 C	50 C	16 G	25 G	50 G	100 G	16 J	25 J	50 J	100 J	200 J	16 J	25 J	50 J	100 J	200 J	500 J
(pF)	1.0	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	1.2 1.5	C C	C	C	G G	G G	G G	G G	J J	J	J	J	J J	J	J	7 7	7 7	J	J
	1.8 2.2	C	C	C	G	G G	G G	G	J	J	J	J	J J	J	J	J	J	J	J
	2.7	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	3.3 3.9	C	C	C	G G	G G	G G	G G	J	J	J	J	J	J	J	J	J	J	J
	4.7 5.6	C	C	C	G G	G G	G G	G	J J	J	J	J	J J	J	J	J	J	J	J
	6.8 8.2	C	C	C	G	G G	G	G	J J	J	J	J	J J	J	J	J	J	J	J J
	10	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	12 15	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
	18 22	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
	27 33	C C	C	C	G	G G	G	G	J J	J	J	J	J J	J	J	J	J	J	J J
	39	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	47 56	C C	C	C	G	G G	G	G	J J	J	J	J	J J	J	J	J	J	J	J J
	68 82	C C	C	C	G G	G G	G G	G	J	J	J	J	J J	J J	J	J	J J	J	J J
	100	С	С	С	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J
	120 150	C C	C	C	G G	G G	G G	G G	J	J	J	J	J J	J	J	J	J	J	J
	180 220	C C	C	C	G	G G	G G	G	J J	J	J	J	J J	J	J	J	J J	J	J M
	270 330	C	C	C	G	G G	G	G	J	J	J	J	M M	J	J	J	J	J	M M
	390	С	С	С	G	G	G	G	J	J	J	J	М	J	J	J	J	J	М
	470 560	С	С	С	G G	G G	G G		J	J	J	J	M M	J	J	J	J	J	M
	680 820				G G	G G	G G		J J	J	J	J		J	J	J	J J	J M	Р
	1000 1200				G	G G	G		J J	J	J	J		J	J	J	J	Q	
	1500					G			J	J	J			J	J	J	М	Q	
	1800 2200								J	J	J			J	J	M M	M P		
	2700 3300								J J	J	N			J	J	M M	P P		
	3900 4700								J J	J				J J	J	M M	P P		
	5600								J	J				J	J	M			
	6800 8200													M M	M M				
Cap (pF)	0.010 0.012													М	М				
	0.015		<u> </u>	_	 	F. 141	l _												
	0.022		~			₩-	*												
	0.027 0.033		† () .	الل	↑ _ –					\vdash						$\vdash \vdash \vdash$	
	0.039 0.047																		
	0.068 0.082		Ī		1		_												
	0.1																		
	WVDC SIZE	16	25 LD02	50	16	25 I D	50 0 3	100	16	25	50 LD05	100	200	16	25	50 LD0	100 6	200	500
Letter	A			E	G		J	K	М		N	P)	X	Y		Z	1
Max.	0.33	0.5	56	0.71	0.90		1.94	1.02	1.27		1.40	1.52	1.7	78	2.29	2.54		2.79	
Thickness	(0.013)	(0.0		(0.028) PAPER	(0.035) (0.	.037)	(0.040)	(0.05	0) (0	.055)	(0.060)	(0.0 BOSSED	-	(0.090)	(0.10	0) (0.110)	
				PAPER								ΕM	BUSSED						

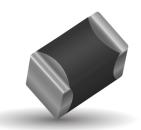
COG (NPO) - Capacitance Range



SIZ	E .			LD10					LD12				LD13			LD14	
Solder			F	Reflow On	ly			F	eflow Or	nly			Reflow Only			Reflow Only	
Packa	ging		Pap	er/Embo	ssed			Al	l Emboss	sed			All Embossed			All Embossed	
(L) Length	mm (in.)			3.20 + 0.2 126 ± 0.0					l.50 ± 0.3 177 ± 0.0				4.50 ± 0.30 (0.177 ± 0.012)	(5.72 ± 0.25 (0.225 ± 0.010	,
W) Width	mm (in.)		2	2.50 ± 0.2 098 ± 0.0	.0			3	3.20 ± 0.2 126 ± 0.0	20			6.40 ± 0.40 (0.252 ± 0.016			6.35 ± 0.25 (0.250 ± 0.010	
(t) Terminal	mm		(0.50 ± 0.2	:5			(0.61 ± 0.3	36			0.61 ± 0.36	•		0.64 ± 0.39	
(4)	(in.) WVDC	25	(0. 50	020 ± 0.0 100	200	500	25	(0. 50	024 ± 0.0 100	200	500	50	(0.024 ± 0.014 100	200	50	0.025 ± 0.015 100	200
Cap	0.5 1.0																
(pF)	1.2																
	1.5 1.8																
	2.2																W
	2.7 3.3														\vdash \checkmark) ÎT
	3.9 4.7																1
	5.6															a-t	
	6.8 8.2															' '	
	10 12					J											
	15 18					J						-	1	-			
	22					J											
	27 33					J											
	39 47					J											
	56					J											
	68 82					J											
	100 120					J											
	150					J											
	180 220					J											
	270					J											
	330 390					J M											
	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	M	Р
	1200 1500	J	J	J	M M	M M	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	M	М	М	М	Р
	2200 2700	J	J	J	Q Q		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 Q	M M	M M	M M	M M	M M	P P
	4700	J	J	M			K	K	K	Р	Q	М	М	М	М	М	Р
	5600 6800	J J	J				K K	K K	M M	P X	Х	M M	M M	M M	M M	M M	P P
Сар	8200 0.010	J J	J				K	M	M M			M M	M M		M M	M M	P P
(pF)	0.012	J	J				K	М	141			М	М		М	М	Р
	0.015 0.018						M	M				M P	M		M M	M M	Y
	0.022 0.027						M M	M M				P P			M P	Y Y	Y
	0.033						М	М				Р			Р		,
	0.039 0.047						M	M M				P P			P P		
	0.068 0.082						M M	M M							P Q		
	0.1														Q		
SIZ	WVDC	25	50	100 LD10	200	500	25	50	100 LD12	200	500	50	100 LD13	200	50	100 LD14	200
											. ,						
Letter Max.	A 0.33	0.5		E 0.71	G 0.90	J 0.9		K 1.02	M 1.27		.40	P 1.52		X Y 29 2.54	2.79	+	
Thickness	(0.013)		(0.022) (0.028) (0.035) (0.0				(0.040)	(0.050		055)	(0.060)	(0.070) (0.0	090) (0.100				
												EMBOS	SED				

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 = ±.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
Capac	itance	Within specified tolerance	1 O I	-11- + 100/
Dissipation	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	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 O mA (max) h 150% of rated voltage
	Appearance	No defects	Deflection	n: 2mm
Resistance to	Capacitance Variation	≤ ±12%	Test Time: 3	30 seconds 7 1mm/sec
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)		
	Insulation Resistance	≥ Initial Value x 0.3	90 1	mm —
Solder	ability	≥ 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 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 i 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 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	d voltage applied.
Humidity	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from chamber temperature an	nd humidity for
	Dielectric Strength	Meets Initial Values (As Above)	24 ± 2 hours bef	fore measuring.



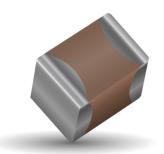


	SIZ	ZE			LD	03			L	D05			LD06	
		WVD	С	25	ōV	50V			25V	5	0V	25V		50V
271	Cap				3	G								
331	(pF)	330		(3	G			J		J			
471		470		(3	G			J		J			
681		680		(3	G			J		J			
102		1000		(3	G			J		J	J		J
152		1500		(3	G			J		J	J		J
182		1800		(3	G			J		J	J		J
222		2200			3	G			J		J	J		J
272		2700		(3	G			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		(3	G			J		J	J		J
822	Cap			(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		(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		0.027			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							N		N	М		М
154		0.15							N		N	М		М
184		0.18							N			М		М
224		0.22							N			М		М
274		0.27										М		М
334		0.33										М		М
394		0.39										М		
474		0.47										М		
684		0.68												
824														
105	105 1													
		WVD	С	25	5V	50V			25V		0V	25V		50V
	SIZ	ZE			LD	03			L	D05			LD06	
Letter	A	С	E	G	J	K	M	, ,	N	Р	Q	l x	Υ	Z
Letter	U 33	0.56	0.71	0 00	0.04	1.02		7	1.40	1 52	1 78	2 20	2.54	

	Letter	Α	С	E	G	J	K	М	N	Р	Q	Х	Υ	Z
	Мах.	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

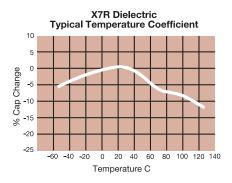
PART NUMBER (SEE PAGE 4 FOR COMPLETE PART NUMBER EXPLANATION)

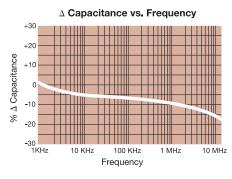
LD05	<u>5</u>	<u>c</u>	101]	<u>A</u>	<u>B</u>	<u>2</u>	<u>A</u>
Size LD03 - 0603 LD04 - 0504* LD05 - 0805 LD06 - 1206 LD10 - 1210 LD12 - 1812 LD13 - 1825 LD14 - 2225 LD20 - 2220	Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	Dielectric X7R = C	Capacitance Code (In 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

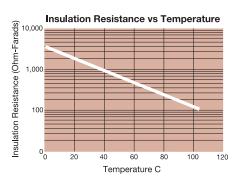
^{*}LD04 has the same CV ranges as LD03.

See FLEXITERM® section for CV options

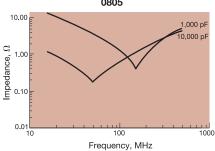
NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers. Contact factory for non-specified capacitance values.



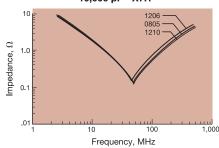




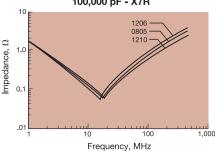
Variation of Impedance with Cap Value Impedance vs. Frequency 1,000 pF vs. 10,000 pF - X7R 0805



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	0 seconds 7 _{1mm/sec}
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)		
	Insulation Resistance	≥ Initial Value x 0.3	90 n	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 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 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	
numany	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



						<u></u>															1					
SIZ	E		LD02					LD03	3						LD05	;						LD	06			
Solde	ring	Ref	flow/W	ave			Ref	low/W	/ave					Ref	low/W	ave						Reflow	/Wave			
Packa	ging	Α	II Pap	er			A	II Par	er					Paper	/Emb	osse	d				Pa	per/Er	nbos	sed		
(L) Length	mm	1.0	00 ± 0.	10			1.0	60 ± 0	.15					2.	01 ± 0.	.20						3.20 ±	0.20			
(L) Length	(in.)		40 ± 0.					63 ± 0							79 ± 0.						(0.126 ±		8)		
W) Width	mm (in.)		50 ± 0. 20 ± 0.					81 ± 0 32 ± 0							25 ± 0. 49 ± 0.						(1.60 ± ± 0.063		8)		
(4) TiI	mm		25 ± 0.					35 ± 0							50 ± 0.							0.50 ±		<u> </u>		
(t) Terminal	(in.)		10 ± 0.		<u> </u>			14 ± 0							20 ± 0.							0.020 ±				
JVW		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
Cap (pF)	100 150																									
(pr)	220			С																						
	330			C					G	G	G		J	J	J	J	J	J								K
	470			С					G	G	G		J	J	Ĵ	J	J	J					ĺ			K
	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	M
	2200 3300		С	C					G	G			J	J	J	J	J	J		J	J	J	J	J	J	M
	4700		C	C			G G G						J	J	J	J	J	J		J	J	J	J	J	J	M
	6800	С	C			GG						J	Ĵ	Ĵ	Ĵ	Ĵ	Ĵ		J	Ĵ	Ĵ	J	Ĵ	Ĵ	P	
Сар	0.010	С	С									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	М	
	0.022	C						G	G				J	J	J	J	J	N		J	J	J	J	J	M	Ш
	0.033 0.047	С					G	G	G				J	J	J	J	N N			J	J	J	J	J	M	
	0.047						G	G	G				J J	J	J	J	N			.1	J	J	J	J	P	
	0.10		C*			G	G	G	G				J	J	J	J	N			J	J	J	J	P	P	Н
	0.15				G	G						İ	J	J	J	N	N			J	J	J	J	Q		i i
	0.22				G	G							J	J	N	N	N			J	J	J	J	Q		Ш
	0.33												N	N	N	N	N			J	J	М	Р	Q		
	0.47 0.68							J*					N N	N	N N	N	N			M M	M	M	P Q	Q		
-	1.0					J*	J*						N	N	N*					M	M	Q	0	Q		
	1.5					U									.,					P	Q	Q	٧	٧		
	2.2				J*							İ	İ		P*					Q	Q	Q				l i
	3.3																									П
	4.7											Di	P*	P*						Q*	Q*	Q*				
	10 22											P*	Р						Q*	Q*	Q*	Q				\Box
	22 47																		Ų"							
	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	06			
1			0		Г				1		V							^		V		V		7	-	
Letter	0.33		C 0.56	1	E 0.71		G 0.90		J).94		K .02		И 27	1.4		P 1.5		Q 1.78	,	X 2.29		Y 2.54	-	Z 2.79		
Max. Thickness	(0.013)		u.56).022)		u. / i).028)		.035)		.037)		.uz 040)		050)	(0.0		(0.06		1.78(0.07)		2.29 (0.090)		2.54 0.100		2.79).110)		
HICKHESS	(0.013)	((J.UZZ)		APER		.033)	(0	.037)	(0.0	040)	(0.0	130)	(0.0	00)		MBOS	(0)	(0.090) (د	0.100) ().110)		
					ALLK											E	MIDOS	JULU								



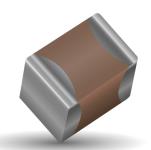




SIZI	E				LD10					LD	12		LD1	3		LD	20		LD	14
Solder	ing			F	Reflow Only					Reflov	v Only		Reflow	Only		Reflov	w Only		Reflov	v Only
Packag	ging			Pap	er/Embos	sed				All Emb	ossed		All Emb	ossed		All Emi	bossed		All Emi	bossed
(L) Length	mm				3.20 + 0.20					4.50 ±			4.50 ±			5.70 ±				± 0.25
(=) ====	(in.)				126 ± 0.00 2.50 ± 0.20	8)				(0.177 ± 3.20 ±			(0.177 ± 6.40 ±			(0.224 ±	± 0.020) ± 0.40		(0.225 ± 6.35 ±	± 0.010)
W) Width	mm (in.)				098 ± 0.20	8)				(0.126 ±			(0.252 ±			(0.197 ±				± 0.23
(t) Terminal	mm				0.50 ± 0.25	->				0.61 ±			0.61 ±			0.64 ±			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	50	± 0.015) 100
Cap	100	10	10	25	30	100	200	300	30	100	200	300	30	100	25	30	100	200	30	100
(pF)	150																		W_	•
	220															_ <	<u> </u>		ر ک	T I
	330 470))	-الر	↓ '
	680																	<u> </u>		
	1000															Τ		To the second		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 J					M													
	6800	Ĵ	Ĵ	J	J	Ĵ	J	M												
Сар	0.010	0 1				М	K	K	K	K	М	М		Х	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	J	J	Ĵ	Ĵ	Ĵ	Ĵ	٧ -	K	K	ĸ	Z	M	M		X	X	X	M	P
	0.068	J	J	J	J	J	М		K	K	K	Z	М	М		Х	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	J	Q			K	M	X		M	M		X	X	X	M	P
	0.47	М	М	М	М	Q			K	Р			М	М		Х	Х	Χ	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	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			\vdash
	47																			
	100																			
0	WVDC	10	16	25	50	100	200	500	50	100	200	500	50	100	25	50	100	200	50	100
SIZI	-	LD10								LD	12		LD1	3		LD	20		LD	14
Letter	Α	C E G J K						K	М	1	1	Р	Q		(Υ	Z			
Max.	0.33	3 0.56 0.71 0.90 0.94 1.02							1.27	1.4		1.52	1.78	2.		2.54	2.79			
Thickness	(0.013)	(0.0	(0.022) (0.028) (0.035) (0.037) (0.0) (0.0)55) ((0.060)	(0.070)	(0.0)90) ((0.100)	(0.110))		
				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)

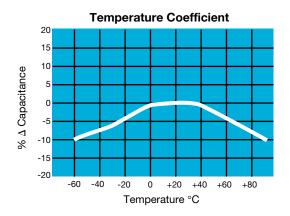
LD05	<u>5</u>	D	101	Ţ	<u>A</u>	<u>B</u>	2	A
Size LD02 - 0402 LD03 - 0603 LD04 - 0504* LD05 - 0805 LD06 - 1206 LD10 - 1210 LD12 - 1812 LD13 - 1825 LD14 - 2225 LD20 - 2220	Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	Dielectric X5R = D	Capacitance Code (In pF) 2 Sig. 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

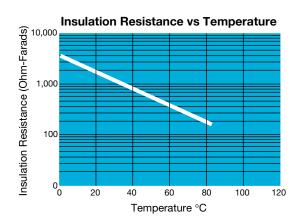
^{*}LD04 has the same CV ranges as LD03.

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









Parame	ter/Test	X5R Specification Limits	Measuring Conditions									
Operating Tem		-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									
Resistance to	Capacitance Variation	≤ ±12%	Test Time: 3	30 seconds 7 1mm/sec								
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)										
	Insulation Resistance	≥ Initial Value x 0.3	90 mm —									
Solderability		≥ 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										
Resistance to Solder Heat	Capacitance Variation	≤ ±7.5%	Dip device in eutectic solder at 260°C for 60 seconds. Store at room temperature for 24 ± 2 hours before measuring electrical properties.									
	Dissipation Factor	Meets Initial Values (As Above)										
	Insulation Resistance	Meets Initial Values (As Above)										
	Dielectric Strength	Meets Initial Values (As Above)		,								
	Appearance	No visual defects	Step 1: -55°C ± 2°	30 ± 3 minutes								
	Capacitance Variation	≤ ±7.5%	Step 2: Room Temp	≤ 3 minutes								
Thermal Shock	Dissipation Factor	Meets Initial Values (As Above)	Step 3: +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									
	Appearance	No visual defects	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									
	Capacitance Variation	≤ ±12.5%										
Load Life	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	specification part num	bers 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 hours before measuring.									
	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)	5% relative humidity for 1000 hours (+48, -0) with rated voltage applied.									
Humidity	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from chamber and stabilize at room temperature and humidity for 24 ± 2 hours before measuring.									
	Dielectric Strength	Meets Initial Values (As Above)										

X5R - Capacitance Range



PREFERRED SIZES ARE SHADED

		-																																								
SIZ	E	LD02			LD03							LD05							LD06						LD10								12									
Solder	ring		F	Reflo	w/V	/ave		Reflow/Wave								Reflow/Wave							Reflow/Wave						Reflow/Wave													
Packag	ging	All Paper					All Paper								Paper/Embossed							Paper/Embossed						Paper/Embossed														
(L) Length	mm			1.00										2.01 ± 0.20							3.20 ± 0.20						3.20 ± 0.20															
	(in.) mm			.040 0.50		.004)		(0.063 ± 0.006) 0.81 ± 0.15							(0.079 ± 0.008) 1.25 ± 0.20							(0.126 ± 0.008) 1.60 ± 0.20						(0.126 ± 0.008) 2.50 ± 0.20							_							
W) Width	(in.)					.10 .004)			((0.03								0.00			(0.063 ± 0.008)					(0.098 ± 0.008)																
(t) Terminal	mm			0.25	± 0	.15		0.35 ± 0.15 (0.014 ± 0.006)							0.50 ± 0.25							0.50 ± 0.25						0.50 ± 0.25														
WVD	(in.)			0.010 ± 0.006)			1						(0.020 ± 0.010) 0 6.3 10 16 25 35 50					50	(0.020 ± 0.010)						(0.020 ± 0.010) 4 6.3 10 16 25 35 50						63 10 25 50											
Cap	100	4	0.3	10	10	23	30	4	0.3	10	10	23	33	30	0.3	10	10	23	33	30	0.3	10	10	23	33	30	4	0.3	10	10	23	33	30	0.3	10	23	30					
(pF)	150					i																															ĺ					
(1-1)	220		İ				С																														ĺ					
	330	T	T		T		С																			İ				1-	~	>	<	√ -V	٧							
	470		1				С																					~	<		<	_		$\overline{\ \ }$	ን<	+						
	680	L			L		С					L							L					L			L		(_	$\overline{}$	7		L	ノ、	ΨŢ						
	1000						С																						`	_	J	4	_									
	1500						С																								ļ	-										
	2200	\vdash	1	<u> </u>	\vdash	_	С	_		_	_	_		_	\vdash	\vdash	\vdash		<u> </u>	_	_			╙	_	_	\vdash					LI										
	3300						С																												'							
	4700					C								G																							ĺ					
Can	6800	┢	+	-	┢	С		\vdash				_		G					H					⊢								┝			H							
Cap (µF)	0.010 0.015					C						G	G	G																												
(με)	0.015				С	C						G	G	G						N																	ĺ					
	0.022	\vdash	+	\vdash	С							G	G	G					\vdash	N				\vdash							-	-			H		\vdash					
	0.033				C	С						G	G	G						N																	ĺ					
	0.068				C							G		G						N																	ĺ					
	0.10	t	t	С	C	С						G		G				N		N															М							
	0.15											G						N	N																		ĺ					
	0.22		C*								G	G						N	N							Q											ĺ					
	0.33										G	G						N																								
	0.47	C*	C*								G							N						Q	Q								Х				ĺ					
	0.68										G							N	$ldsymbol{ldsymbol{ldsymbol{eta}}}$																L		\vdash					
	1.0	C*	C*	C*					G	G	G	J*					N	N		P*				Q	Q						Χ	X	X				ĺ					
	1.5																														_											
	2.2	C*		_	-	-	-	G*	G*	J*	J*	_			NI.	N	N	N			V	. V	Q	Q							Z	Х			H							
	3.3 4.7					ŀ		J*	J*	J*	J*				N	N N	N*	N*			X	X	V	X						0	7											
	4.7					ŀ		K*	J^	J					P	P	P	IN"			X	X	X	X					Х	Q	Z					Z						
	22	\vdash	+		\vdash	+		K				\vdash			P*	Г	Г		\vdash		X	X	X	X	\vdash			Z	Z	Z	Z				H							
	47					i															X	^		^				Z*	_	_	_						ĺ					
	100					i															,,						Z*	z									ĺ					
	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			10	16	25	35	50	6.3	10	25	50					
	SIZE			L	D02	2			LD03							6.3 10 16 25 35 50 LD05				LD06							Ī	LD10)			6.3 10 25 50 LD12										
																																	_			,						
Letter	A	1												G			J			K	1	١		L	N			Р			Q			Х		Y			Z			
Max.	0.33			56		0.7			0.90).94			.02		1.:			1.4		Ι,	1.5			1.78			2.29	,	2.5			2.7								
Thickness	(0.013))	(0.022) (0.028				(0.028)		0.03	5)	(0)	.03	/)	(0.	.040))	(0.0)	150)	1 (0.0	55)	(0.06	oU)	(0	.07	U)	(0.	.090))	(0.1)	UU)	1 ((0.11)	(0)							

*Optional Specifications - Contact factory

NOTE: Contact factory for non-specified capacitance values

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

AVX:

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LD035A3R3BAB2A LD035A5R1CAB2A LD035A8R2DAB2A LD035A300FAB2A LD035C101KAB2A
LD035C121KAB2A LD053A1R5CAB2A LD033C103KAB4A LD035A271FAB2A LD051A102FAB2A
LD061A152FAB2A LD061A221FAB2A LD061A222FAB2A LD061A472FAB2A LD035A100CAB2A
LD051A331JAB2A LD03YC473JAB2A LD055C823KAB2A LD035A5R6BAB2A LD025A270FAB2A
LD02YC181KAB2A LD06YC184JAB2A LD02ZC151JAB2A LD02YC182JAB2A LD055C183KAB2A
LD023A680FAB2A LD131A682JAB2A LD03YC471KBB1A LD03YC102KBB1A LD03YC103KBB1A
LD053C104KBB1A LD033C273KAB2A LD025A101FAB9A LD051C121KAB2A LD02ZC121JAB2A
LD02YA271KAB2A LD025C331JAB2A LD02YC391JAB2A LD025C222JAB2A LD02YC272JAB2A
LD02YC392JAB2A LD02YC562JAB2A LD02YC822JAB2A LD02YC183KAB2A LD061A182FAB2A
LD121A392FAB2A LD06ZD225KAB2A LD102C104MAB2A LD056D106KAB2A LD06ZC225MAB2A
LD033C182KAB2A LD03YC823KAB2A LD033C103KAB2A LD063C684KAB2A LD035C273KAB2A
LD023C332KAB2A LD063C225KAB2A LD061A1R0CAB2A LD101C274KAB2A LD061C103JAB2A
LD05YD105KAB2A LD06YC105KBJ1A LD052C103KAB2A LD035A681JAB2A LD035A101FAB2A
LD10ZC475KAB2A LD025A2R2JAB2A LD041A4R7DAB1A LD065C563KAB2A LD063A150KAB2A
LD053C474KAB2A LD065A102FAB2A LD03ZC103KAB2A LD03ZC104KAB2A LD035C182KAB2A
LD035C822KAB2A LD065C104JAB1A LD03YC683JAB2A LD065A392FAB2A LD065A472JAB2A
LD025A820GAB2A LD025C821JAB2A LD023C152KAB2A LD023C222KAB2A LD03YC101KAB2A
LD035C681JAB2A LD051A6R8GAB2A LD055C153KAB2A LD065A1R8CAB2A LD063A392FAB2A
LD025A470FABA LD035A102KAB2A LD033A101FAB2A LD03YC105MAB2A LD061A222JAB2A LD10ZC104JAB2A
 LD103C475KAB2A LD03YD105KAB2A LD055C471KAB2A LD103C475MAB2A
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