LAND GRID ARRAY (LGA) CAPACITORS

Land Grid Array (LGA) capacitors are based on the first Low ESL MLCC technology created to specifically address the design needs of current day Power Delivery Networks (PDNs). This is the 3rd low inductance capacitor technology developed by AVX. LGA technology provides engineers with new options. The LGA internal structure and manufacturing technology eliminates the historic need for a device to be physically small to create small current loops to minimize inductance.

The first family of LGA products are 2 terminal devices. A 2 terminal 0306 LGA delivers ESL performance that is equal to or better than an 0306 8 terminal IDC. The 2 terminal 0805 LGA delivers ESL performance that approaches the 0508 8 terminal IDC. New designs that would have used 8 terminal IDCs are moving to 2 terminal LGAs because the layout is easier for a 2 terminal device and manufacturing yield is better for a 2 terminal LGA versus an 8 terminal IDC.

LGA technology is also used in a 4 terminal family of products that AVX is sampling and will formerly introduce in 2008. Beyond 2008, there are new multi-terminal LGA product families that will provide even more attractive options for PDN designers.

LOW INDUCTANCE CHIP ARRAYS (LICA®)

The LICA® product family is the result of a joint development effort between AVX and IBM to develop a high performance MLCC family of decoupling capacitors. LICA was introduced in the 1980s and remains the leading choice of designers in high performance semiconductor packages and high reliability board level decoupling applications.

LICA® products are used in 99.999% uptime semiconductor package applications on both ceramic and organic substrates. The C4 solder ball termination option is the perfect compliment to flip-chip packaging technology. Mainframe class CPUs, ultimate performance multi-chip modules, and communications systems that must have the reliability of 5 9's use LICA®.

LICA® products with either Sn/Pb or Pb-free solder balls are used for decoupling in high reliability military and aerospace applications. These LICA® devices are used for decoupling of large pin count FPGAs, ASICs, CPUs, and other high power ICs with low operating voltages.

When high reliability decoupling applications require the very lowest ESL capacitors, LICA® products are the best option.

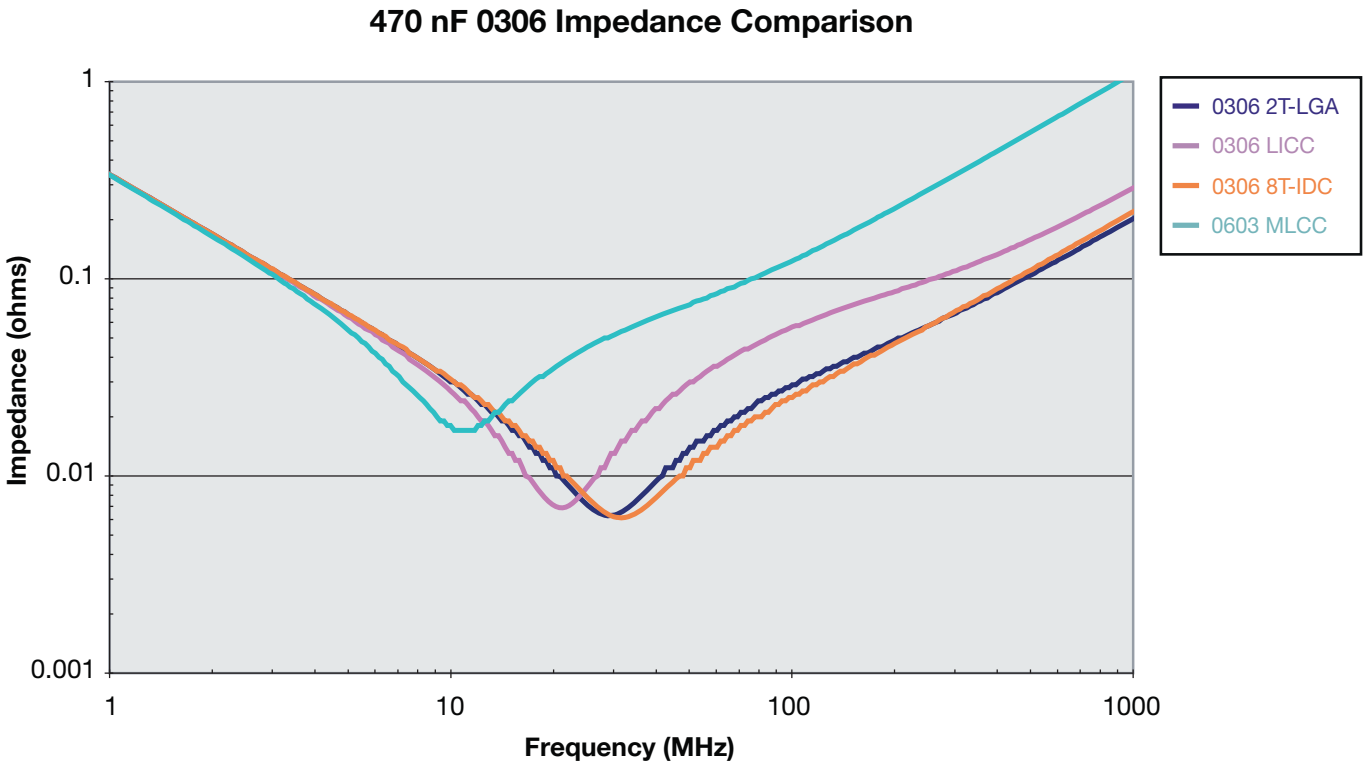


Figure 2 MLCC, LICC, IDC, and LGA technologies deliver different levels of equivalent series inductance (ESL).

Low Inductance Ceramic Capacitors

LICC (Low Inductance Chip Capacitors) 0306/0508/0612 RoHS Compliant

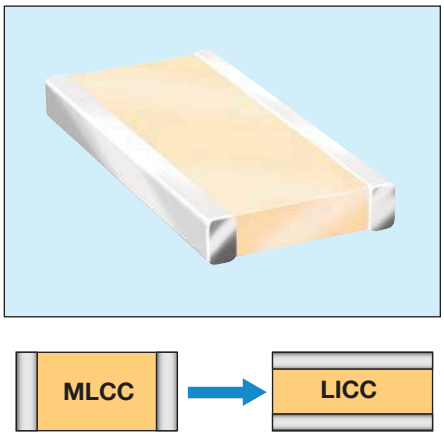
GENERAL DESCRIPTION

The key physical characteristic determining equivalent series inductance (ESL) of a capacitor is the size of the current loop it creates. The smaller the current loop, the lower the ESL.

A standard surface mount MLCC is rectangular in shape with electrical terminations on its shorter sides. A Low Inductance Chip Capacitor (LICC) sometimes referred to as Reverse Geometry Capacitor (RGC) has its terminations on the longer sides of its rectangular shape. The image on the right shows the termination differences between an MLCC and an LICC.

When the distance between terminations is reduced, the size of the current loop is reduced. Since the size of the current loop is the primary driver of inductance, an 0306 with a smaller current loop has significantly lower ESL then an 0603. The reduction in ESL varies by EIA size, however, ESL is typically reduced 60% or more with an LICC versus a standard MLCC.

AVX LICC products are available with a lead-free finish of plated Nickel/Tin.



RoHS COMPLIANT

PERFORMANCE CHARACTERISTICS

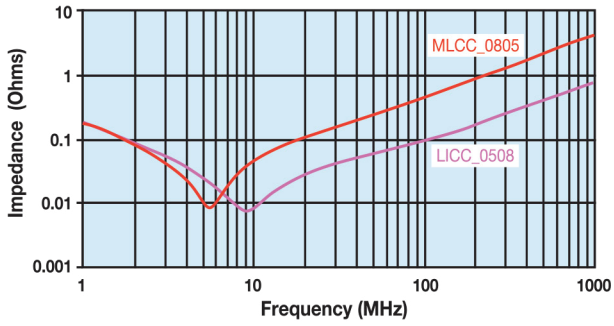
Capacitance Tolerances	K = ±10%; M = ±20%
Operation Temperature Range	X7R = -55°C to +125°C X5R = -55°C to +85°C X7S = -55°C to +125°C
Temperature Coefficient	X7R, X5R = ±15%; X7S = ±22%
Voltage Ratings	4, 6.3, 10, 16, 25 VDC
Dissipation Factor	4V, 6.3V = 6.5% max; 10V = 5.0% max; 16V = 3.5% max; 25V = 3.0% max
Insulation Resistance (@+25°C, RVDC)	100,000MΩ min, or 1,000MΩ per µF min.,whichever is less

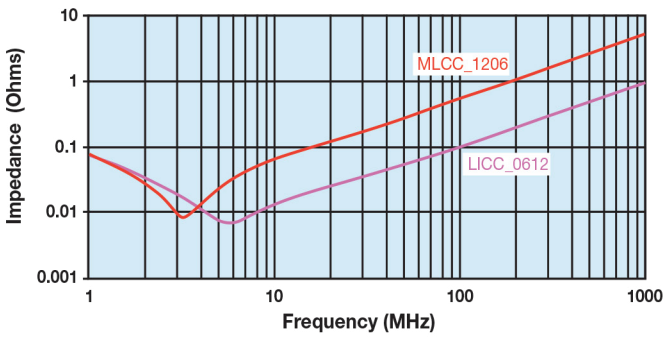
HOW TO ORDER

0612	Z	D	105	M	A	T	2	A*
Size 0306 0508 0612	**Voltage** 4 = 4V 6 = 6.3V Z = 10V Y = 16V 3 = 25V 5 = 50V	**Dielectric** C = X7R D = X5R W = X6S Z = X7S	**Capacitance Code (In pF)** 2 Sig. Digits + Number of Zeros	**Capacitance Tolerance** K = ±10% M = ±20%	**Failure Rate** A = N/A 4 = Automotive**	**Terminations** T = Plated Ni and Sn	**Packaging** Available 2 = 7" Reel 4 = 13" Reel	**Thickness** Thickness mm (in) 0.56 (0.022) 0.76 (0.030) 1.02 (0.040) 1.27 (0.050)

***See the thickness tables on the next page.**
****Select voltages for Automotive version, contact factory**
NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers.

TYPICAL IMPEDANCE CHARACTERISTICS





SIZE		0306					0508					0612				
Packaging		Embossed					Embossed					Embossed				
Length	mm (in.)	0.81 + 0.15 (0.032 ± 0.006)					1.27 + 0.25 (0.050 ± 0.010)					1.60 + 0.25 (0.063 ± 0.010)				
Width	mm (in.)	1.60 + 0.15 (0.063 ± 0.006)					2.00 + 0.25 (0.080 ± 0.010)					3.20 + 0.25 (0.126 ± 0.010)				
Cap Code	WVDC	4	6.3	10	16	25	6.3	10	16	25	50	6.3	10	16	25	50
102	Cap 0.001		A	A	A	A	S	S	S	S	V	S	S	S	S	V
222	(µF) .0022		A	A	A	A	S	S	S	S	V	S	S	S	S	V
332	0.0033		A	A	A	A	S	S	S	S	V	S	S	S	S	V
472	0.0047		A	A	A	A	S	S	S	S	V	S	S	S	S	V
682	0.0068		A	A	A	A	S	S	S	S	V	S	S	S	S	V
103	0.01		A	A	A	A	S	S	S	S	V	S	S	S	S	V
153	0.015		A	A	A	A	S	S	S	S	V	S	S	S	S	W
223	0.022		A	A	A	A	S	S	S	S	V	S	S	S	S	W
333	0.033		A	A	A		S	S	S	V	V	S	S	S	S	W
473	0.047		A	A	A		S	S	S	V	A	S	S	S	S	W
683	0.068		A	A	A		S	S	S	A	A	S	S	S	V	W
104	0.1		A	A	A		S	S	V	A	A	S	S	S	V	W
154	0.15		A	A			S	S	V			S	S	S	W	W
224	0.22		A	A			S	S	A			S	S	V	W	
334	0.33						V	V	A			S	S	V		
474	0.47						V	V	A			S	S	V		
684	0.68						A	A				V	V	W		
105	1	A					A	A				V	V	A		
155	1.5						A					W	W			
225	2.2											A	A			
335	3.3											A				
475	4.7															
685	6.8															
106	10															

Solid = X7R = X5R = X7S = X6S

mm (in.)

0306	
Code	Thickness
A	0.56 (0.022)

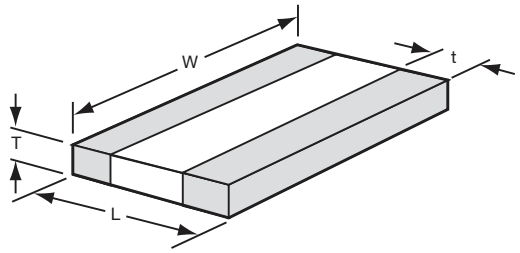
mm (in.)

0508	
Code	Thickness
S	0.56 (0.022)
V	0.76 (0.030)
A	1.02 (0.040)

mm (in.)

0612	
Code	Thickness
S	0.56 (0.022)
V	0.76 (0.030)
W	1.02 (0.040)
A	1.27 (0.050)

PHYSICAL DIMENSIONS AND PAD LAYOUT



PHYSICAL DIMENSIONS

mm (in.)

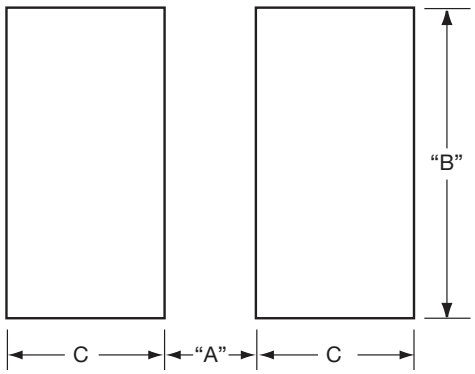
Size	L	W	t
0306	0.81 ± 0.15 (0.032 ± 0.006)	1.60 ± 0.15 (0.063 ± 0.006)	0.13 min. (0.005 min.)
0508	1.27 ± 0.25 (0.050 ± 0.010)	2.00 ± 0.25 (0.080 ± 0.010)	0.13 min. (0.005 min.)
0612	1.60 ± 0.25 (0.063 ± 0.010)	3.20 ± 0.25 (0.126 ± 0.010)	0.13 min. (0.005 min.)

T - See Range Chart for Thickness and Codes

PAD LAYOUT DIMENSIONS

mm (in.)

Size	A	B	C
0306	0.31 (0.012)	1.52 (0.060)	0.51 (0.020)
0508	0.51 (0.020)	2.03 (0.080)	0.76 (0.030)
0612	0.76 (0.030)	3.05 (0.120)	0.635 (0.025)



Mouser Electronics

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Kyocera AVX:

0306YC103KAT2A 0306YC103MAT2A 0306YC153KAT2A 0306YC223KAT2A 0306ZC103KAT2A 0306ZC103MAT2A 0306ZC104KAT2A 0306ZC153KAT2A 0306ZC223KAT2A 0306ZC224KAT2A 0306ZC224MAT2A 0306ZC224MAT4A 0306ZC473KAT2A 0306ZC683KAT2A 05083C103KAT2S 05083C104KAT2A 05083C104MAT2A 05083C223KAT2S 05083C683KAT2A 05085C104KAT2A 05086C103KAT2S 05086C474KAT2V 0508YC103KAT2S 0508ZC104KAT2S 0508ZC224KAT2S 0508ZC474KAT2V 06123C104KAT2V 06123C224KAT2W 06123C473KAT2S 06126C103KAT2S 06126C104KAT2S 06126C105KAT2V 0612YC103KAT2S 0612YC104KAT2S 0612YC105KAT2A 0612YC105MAT2A 0612YC224KAT2V 0612YC473KAT2S 0612YC474KAT2V 0612YC684KAT2W 0612ZC103KAT2S 0612ZC104KAT2S 0612ZC105KAT2V 0612ZC223KAT2S 0612ZC474KAT2S 0612ZC105MAT2V 03063C102KAT2A 03063C103MAT2A 0306ZC104MAT2A 05083C333MAT2V 05085C102KAT2V 05085C103KAT2V 05085C103MAT2V 05085C223KAT2V 05085C223MAT2V 05085C472KAT2V 0508YC104MAT2V 0508ZC224MAT2S 06123C104MAT2V 06123C223MAT2S 06125C103KAT2V 06125C104MAT2W 06125C153MAT2W 06125C222KAT2V 06125C333MAT2W 0612YC334KAT2V 0508YC104KAT2V 03063C222KAT2A 0612YC474MAT2V 0306YC102KAT2A 0306YC102MAT2A 0306YC223MAT2A 0306YC472KAT2A 0306ZC102KAT2A 0306ZC223MAT2A 0306ZC472KAT2A 0306ZC472MAT2A 0306ZC473MAT2A 03063C102MAT2A 03063C153KAT2A 03063C223KAT2A 03063C223MAT2A 03063C332KAT2A 03063C472KAT2A 03063C472MAT2A 03066C102KAT2A 03066C102MAT2A 03066C103KAT2A 03066C104KAT2A 03066C224KAT2A 03066C224MAT2A 03066C224MAT4A 03066C472KAT2A 03066C473KAT2A 03066C473MAT2A 0508ZC474MAT2V 05085C102MAT2V 05085C104KAT4A 0612YC224MAT2V 0612ZC474MAT2S