

# Low Inductance Capacitors with SnPb Terminations



## LD16/LD17/LD18 Tin-Lead Termination "B"

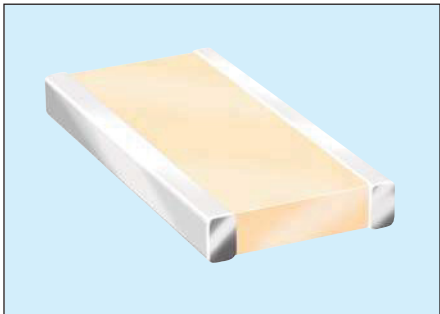
### GENERAL DESCRIPTION

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 than 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 termination for high reliability military and aerospace applications that must avoid tin whisker reliability issues.



### PERFORMANCE CHARACTERISTICS

|                                      |                                                                                                                                                                        |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capacitance Tolerances               | K = $\pm 10\%$ ; M = $\pm 20\%$                                                                                                                                        |
| Operation Temperature Range          | X7R = $-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$<br>X5R = $-55^{\circ}\text{C}$ to $+85^{\circ}\text{C}$<br>X7S = $-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$ |
| Temperature Coefficient              | X7R, X5R = $\pm 15\%$ ; X7S = $\pm 22\%$                                                                                                                               |
| Voltage Ratings                      | 4, 6.3, 10, 16, 25 VDC                                                                                                                                                 |
| Dissipation Factor                   | 4V, 6.3V = 6.5% max; 10V = 5.0% max;<br>16V = 3.5% max; 25V = 3.0% max                                                                                                 |
| Insulation Resistance (@+25°C, RVDC) | 100,000M $\Omega$ min, or 1,000M $\Omega$ per $\mu\text{F}$ min., whichever is less                                                                                    |

**\*Not RoHS Compliant**

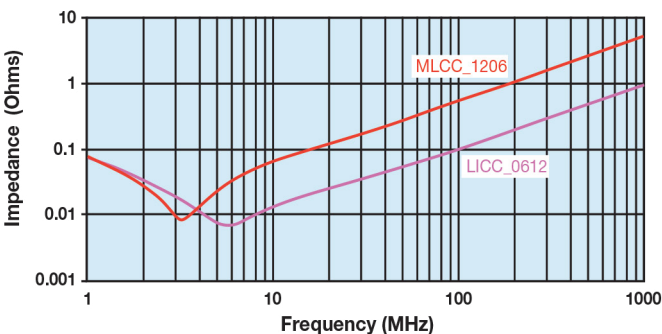
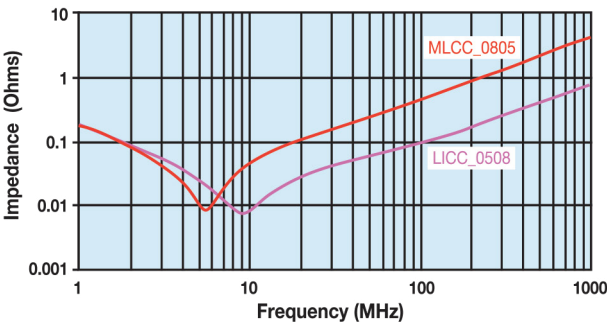
### HOW TO ORDER

| LD18                                      | Z                                                              | D                                        | 105                             | M                                | A            | B               | 2                           | A*                                                                      |
|-------------------------------------------|----------------------------------------------------------------|------------------------------------------|---------------------------------|----------------------------------|--------------|-----------------|-----------------------------|-------------------------------------------------------------------------|
| Size                                      | Voltage                                                        | Dielectric                               | Capacitance Code (In pF)        | Capacitance Tolerance            | Failure Rate | Terminations    | Packaging Available         | Thickness                                                               |
| LD16 = 0306<br>LD17 = 0508<br>LD18 = 0612 | 4 = 4V<br>6 = 6.3V<br>Z = 10V<br>Y = 16V<br>3 = 25V<br>5 = 50V | C = X7R<br>D = X5R<br>W = X6S<br>Z = X7S | 2 Sig. Digits + Number of Zeros | K = $\pm 10\%$<br>M = $\pm 20\%$ | A = N/A      | B = 5% min lead | 2 = 7" Reel<br>4 = 13" Reel | mm (in)<br>0.56 (0.022)<br>0.76 (0.030)<br>1.02 (0.040)<br>1.27 (0.050) |

\*See the thickness tables on the next page.

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

### TYPICAL IMPEDANCE CHARACTERISTICS



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with SnPb Terminations

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| SIZE      |            | LD16<br>(0306)  |    |    |    | LD17<br>(0508)  |    |    |    |    | LD18<br>(0612)  |    |    |    |    |
|-----------|------------|-----------------|----|----|----|-----------------|----|----|----|----|-----------------|----|----|----|----|
| Packaging |            | Embossed        |    |    |    | Embossed        |    |    |    |    | Embossed        |    |    |    |    |
| Length    | mm         | 0.81 ± 0.15     |    |    |    | 1.27 ± 0.25     |    |    |    |    | 1.60 ± 0.25     |    |    |    |    |
|           | (in.)      | (0.032 ± 0.006) |    |    |    | (0.050 ± 0.010) |    |    |    |    | (0.063 ± 0.010) |    |    |    |    |
| Width     | mm         | 1.60 ± 0.15     |    |    |    | 2.00 ± 0.25     |    |    |    |    | 3.20 ± 0.25     |    |    |    |    |
|           | (in.)      | (0.063 ± 0.006) |    |    |    | (0.080 ± 0.010) |    |    |    |    | (0.126 ± 0.010) |    |    |    |    |
| Cap Code  | WVDC       | 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  |    |    |    | 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



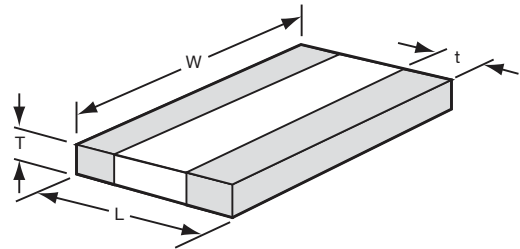
= X6S

| mm (in.)       |              |
|----------------|--------------|
| LD16<br>(0306) |              |
| Code           | Thickness    |
| A              | 0.56 (0.022) |

| mm (in.)       |              |
|----------------|--------------|
| LD17<br>(0508) |              |
| Code           | Thickness    |
| S              | 0.56 (0.022) |
| V              | 0.76 (0.030) |
| A              | 1.02 (0.040) |

| mm (in.)       |              |
|----------------|--------------|
| LD18<br>(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



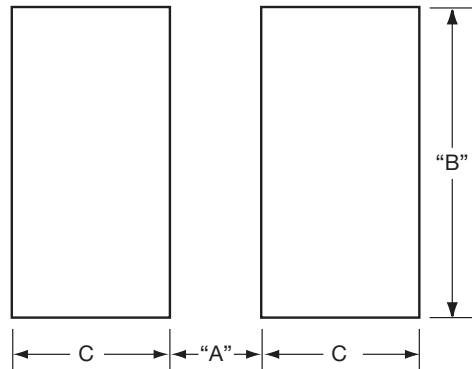
PHYSICAL DIMENSIONS

| mm (in.)       |                                |                                |                           |
|----------------|--------------------------------|--------------------------------|---------------------------|
| Size           | L                              | W                              | t                         |
| LD16<br>(0306) | 0.81 ± 0.15<br>(0.032 ± 0.006) | 1.60 ± 0.15<br>(0.063 ± 0.006) | 0.13 min.<br>(0.005 min.) |
| LD17<br>(0508) | 1.27 ± 0.25<br>(0.050 ± 0.010) | 2.00 ± 0.25<br>(0.080 ± 0.010) | 0.13 min.<br>(0.005 min.) |
| LD18<br>(0612) | 1.60 ± 0.25<br>(0.063 ± 0.010) | 3.20 ± 0.25<br>(0.126 ± 0.010) | 0.13 min.<br>(0.005 min.) |

T - See Range Chart for Thickness and Codes

PAD LAYOUT DIMENSIONS

| mm (in.)       |              |              |               |
|----------------|--------------|--------------|---------------|
| Size           | A            | B            | C             |
| LD16<br>(0306) | 0.31 (0.012) | 1.52 (0.060) | 0.51 (0.020)  |
| LD17<br>(0508) | 0.51 (0.020) | 2.03 (0.080) | 0.76 (0.030)  |
| LD18<br>(0612) | 0.76 (0.030) | 3.05 (0.120) | 0.635 (0.025) |



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[LD18YD105KAB2A](#) [LD18YC105KAB2A](#) [LD175C104KAB2A](#) [LD163C103KAB2A](#) [LD16ZC104MAB2A](#)  
[LD18ZD225KAB2A](#) [LD166C224KAB2A](#) [LD17YC104KAB2A](#) [LD18YC104KAB2A](#) [LD183C104KAB2S](#)  
[LD186C225KAB2A](#) [LD18ZC104KAB2A](#) [LD175C103KAB2A](#) [LD16ZC104KAB2A](#) [LD16ZC224KAB2A](#)  
[LD16ZC224MAB2A](#) [LD173C103KAB2S](#) [LD175C102KAB2V](#) [LD175C103KAB2V](#) [LD175C104KAB2W](#)  
[LD17YC104KAB2V](#) [LD17YC153KAB2S](#) [LD17YC222KAB2S](#) [LD17YC563KAB2S](#) [LD18ZC225KAB2A](#)  
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[LD18ZC105KAB2V](#) [LD18YC105KAB2A\500](#) [LD18YD105KAB2A\500](#) [LD17ZC224KAB2A\500](#) [LD17ZC224KAB2S\500](#)  
[LD17ZC224KAB2U\500](#) [LD173C102KAB2W](#) [LD17YC153KAB2U](#) [LD17YC563KAB2U](#) [LD17ZC224KAB2U](#)  
[LD173C563KAB2U](#) [LD163C223KAB2A](#) [LD16ZC224MAB2S](#) [LD163C102KAB2S](#) [LD166C103KAB2S](#)  
[LD16YC103KAB2S](#) [LD16ZC104KAB2S](#) [LD173C563KAB2S](#) [LD163C103KAB2S](#) [LD16YC102KAB2S](#)  
[LD183C104KAB2U](#) [LD16YC103KAB2A](#) [LD166C104KAB2S](#) [LD16ZC103KAB2S](#) [LD16ZC102KAB2S](#)  
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