



MULTILAYER CERAMIC CHIP CAPACITORS



CLL Series Commercial Grade Ultra Low Inductance

Type: **CLLC1A [EIA CC0603]**
 CLLE1A [EIA CC0805]
 CLLG1A [EIA CC1206]

Issue date:
Dec 2014



REMINDERS

Please read before using this product

SAFETY REMINDERS



REMINDERS

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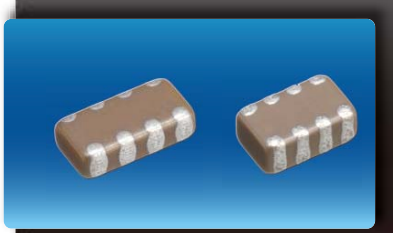
(Example)

| Catalog Issued date | Catalog Number | Item Description (On Delivery Label) |
|------------------------|---------------------|--------------------------------------|
| Prior to January 2013 | C1608C0G1E103J | C1608C0G1E103JT000N |
| January 2013 and Later | C1608C0G1E103J080AA | C1608C0G1E103JT000N |



CLL Series Ultra Low Inductance

Type: CLLC1A [EIA CC0603], CLLE1A [EIA CC0805],
CLLG1A [EIA CC1206]



Features



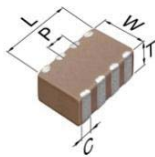
- Features a unique internal structure that cancels magnetic fields to reduce equivalent series inductance.
- Eight side terminal electrodes in one capacitor.
- Small and low profile design enables undersurface mounting for semiconductor packages.

Applications



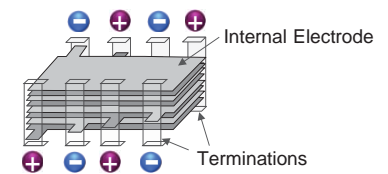
- Decoupling CPU power line
- High speed digital IC, decoupling
- GPU, CPU

Shape & Dimensions



| | |
|---|------------------|
| L | Body Length |
| W | Body Width |
| T | Body Height |
| C | Terminal Width |
| P | Terminal Spacing |

Design Structure



Catalog Number Construction

CLL • E1A • X7S • 0G • 685 • M • 050 • A • C

Series Name

Dimensions L x W (mm)

| Code | Length | Width |
|------|-------------|-------------|
| C1A | 1.60 ± 0.10 | 0.80 ± 0.10 |
| E1A | 2.00 ± 0.15 | 1.25 ± 0.15 |
| G1A | 3.20 ± 0.15 | 1.60 ± 0.15 |

Temperature Characteristics

| Temperature Characteristics | Capacitance Change | Temperature Range |
|-----------------------------|--------------------|-------------------|
| X6S | ±22% | -55 to +105°C |
| X7R | ±15% | -55 to +125°C |
| X7S | ±22% | -55 to +125°C |

Rated Voltage (DC)

| Code | Voltage (DC) |
|------|--------------|
| 0G | 4.0V |
| 0J | 6.3V |
| 1A | 10V |

Nominal Capacitance (pF)

The capacitance is expressed in three digit codes and in units of pico Farads (pF). The first and second digits identify the first and second significant figures of the capacitance. The third digit identifies the multiplier. R designates a decimal point.

Ex. 0R2 = 0.2pF; 103 = 10,000pF; 105 = 1,000,000pF = 100nF = 1μF

Capacitance Tolerance

| Code | Tolerance |
|------|-----------|
| M | ± 20% |

Nominal Thickness

| Code | Thickness |
|------|-----------|
| 050 | 0.50 mm |
| 055 | 0.55 mm |
| 085 | 0.85 mm |

Packaging Style

| Code | Style |
|------|-------------------------|
| A | 178 mm Reel, 4 mm Pitch |

Special Reserved Code

| Code | Description |
|------|-------------------|
| C | TDK Internal Code |



Capacitance Range Chart

CLLC1A(1608) [EIA CC0603]

Capacitance Range Chart

Temperature Characteristics: X6S ($\pm 22\%$), X7R ($\pm 15\%$), X7S ($\pm 22\%$)
 Rated Voltage: 4V (0G)

| Capacitance (pF) | Code | Tolerance | X6S | X7R | X7S |
|------------------|------|---------------|---------|---------|---------|
| | | | 0G (4V) | 0G (4V) | 0G (4V) |
| 47,000 | 473 | M: $\pm 20\%$ | | | |
| 100,000 | 104 | | | | |
| 330,000 | 334 | | | | |
| 470,000 | 474 | | | | |
| 680,000 | 684 | | | | |
| 1,000,000 | 105 | | | | |
| 2,200,000 | 225 | | | | |
| 4,700,000 | 475 | | | | |



Capacitance Range Chart

CLLE1A(2012) [EIA CC0805]

Capacitance Range Chart

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$)
 Rated Voltage: 10V (1A), 6.3V (0J), 4V (0G)

| Capacitance (pF) | Code | Tolerance | X7R | | | X7S | | |
|------------------|------|---------------|----------|-----------|---------|----------|-----------|---------|
| | | | 1A (10V) | 0J (6.3V) | 0G (4V) | 1A (10V) | 0J (6.3V) | 0G (4V) |
| 47,000 | 473 | M: $\pm 20\%$ | | | | | | |
| 100,000 | 104 | | | | | | | |
| 150,000 | 154 | | | | | | | |
| 220,000 | 224 | | | | | | | |
| 330,000 | 334 | | | | | | | |
| 470,000 | 474 | | | | | | | |
| 680,000 | 684 | | | | | | | |
| 1,000,000 | 105 | | | | | | | |
| 1,500,000 | 155 | | | | | | | |
| 2,200,000 | 225 | | | | | | | |
| 4,700,000 | 475 | | | | | | | |
| 6,800,000 | 685 | | | | | | | |



Capacitance Range Chart

CLLG1A(3216) [EIA CC1206]

Capacitance Range Chart

Temperature Characteristics: X7R ($\pm 15\%$)
 Rated Voltage: 10V (1A), 6.3V (0J)

| Capacitance (pF) | Code | Tolerance | X7R | |
|------------------|------|---------------|----------|-----------|
| | | | 1A (10V) | 0J (6.3V) |
| 1,000,000 | 105 | M: $\pm 20\%$ | | |
| 2,200,000 | 225 | | | |

Standard Thickness

- 0.50 mm
- 0.85 mm



Capacitance Range Table

Class 2 (Temperature Stable)

Temperature Characteristics: X6S (-55 to +105°C, ±22%)

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | | |
|-------------|------|----------------|-----------------------|------------------------|-------------------------|-------------------------|
| | | | | Rated Voltage Edc: 10V | Rated Voltage Edc: 6.3V | Rated Voltage Edc: 4.0V |
| 4.7 µF | 1608 | 0.50 ± 0.05 | ± 20% | | | CLLC1AX6S0G475M050AC |

Class 2 (Temperature Stable)

Temperature Characteristics: X7R (-55 to +125°C, ±15%)

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | | |
|-------------|------|------------------|-----------------------|------------------------|-------------------------|-------------------------|
| | | | | Rated Voltage Edc: 10V | Rated Voltage Edc: 6.3V | Rated Voltage Edc: 4.0V |
| 47 nF | 2012 | 0.50 ± 0.05 | ± 20% | | | CLLE1AX7R0G473M050AC |
| | 1608 | 0.50 ± 0.05 | ± 20% | | | CLLC1AX7R0G104M050AC |
| 100 nF | 2012 | 0.50 +0.05/-0.10 | ± 20% | CLLE1AX7R1A104M050AC | | |
| | | 0.50 ± 0.05 | ± 20% | | | CLLE1AX7R0G104M050AC |
| 150 nF | 2012 | 0.50 +0.05/-0.10 | ± 20% | CLLE1AX7R1A154M050AC | | |
| 220 nF | 2012 | 0.50 +0.05/-0.10 | ± 20% | CLLE1AX7R1A224M050AC | | |
| 330 nF | 2012 | 0.50 +0.05/-0.10 | ± 20% | CLLE1AX7R1A334M050AC | | |
| 470 nF | 2012 | 0.50 +0.05/-0.10 | ± 20% | | CLLE1AX7R0J474M050AC | |
| 680 nF | 2012 | 0.50 +0.05/-0.10 | ± 20% | | CLLE1AX7R0J684M050AC | |
| 1 µF | 2012 | 0.85 ± 0.10 | ± 20% | | CLLE1AX7R0J105M085AC | CLLE1AX7R0G105M085AC |
| | 3216 | 0.85 ± 0.10 | ± 20% | CLLG1AX7R1A105M085AC | | |
| 1.5 µF | 2012 | 0.85 ± 0.10 | ± 20% | | CLLE1AX7R0J155M085AC | |
| 2.2 µF | 3216 | 0.85 ± 0.10 | ± 20% | | CLLG1AX7R0J225M085AC | |

Class 2 (Temperature Stable)

Temperature Characteristics: X7S (-55 to +125°C, ±22%)

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | | |
|-------------|------|------------------|-----------------------|------------------------|-------------------------|-------------------------|
| | | | | Rated Voltage Edc: 10V | Rated Voltage Edc: 6.3V | Rated Voltage Edc: 4.0V |
| 47 nF | 1608 | 0.50 ± 0.05 | ± 20% | | | CLLC1AX7S0G473M050AC |
| | 2012 | 0.50 ± 0.05 | ± 20% | | | CLLE1AX7S0G473M050AC |
| 100 nF | 1608 | 0.50 ± 0.05 | ± 20% | | | CLLC1AX7S0G104M050AC |
| | 2012 | 0.50 ± 0.05 | ± 20% | | | CLLE1AX7S0G104M050AC |
| 150 nF | 2012 | 0.50 ± 0.05 | ± 20% | CLLE1AX7S1A154M050AC | | |
| 220 nF | 2012 | 0.50 ± 0.05 | ± 20% | CLLE1AX7S1A224M050AC | | |
| 330 nF | 1608 | 0.50 +0.05/-0.10 | ± 20% | | | CLLC1AX7S0G334M050AC |
| | 2012 | 0.50 ± 0.05 | ± 20% | CLLE1AX7S1A334M050AC | | |
| 470 nF | 1608 | 0.50 +0.05/-0.10 | ± 20% | | | CLLC1AX7S0G474M050AC |
| | 2012 | 0.50 ± 0.05 | ± 20% | | CLLE1AX7S0J474M050AC | |
| 680 nF | 1608 | 0.50 +0.05/-0.10 | ± 20% | | | CLLC1AX7S0G684M050AC |
| | 2012 | 0.50 ± 0.05 | ± 20% | | CLLE1AX7S0J684M050AC | |
| 1 µF | 1608 | 0.50 +0.05/-0.10 | ± 20% | | | CLLC1AX7S0G105M050AC |
| | 2012 | 0.50 +0.05/-0.10 | ± 20% | | | CLLE1AX7S0G105M050AC |
| 1.5 µF | 2012 | 0.50 +0.05/-0.10 | ± 20% | | | CLLE1AX7S0G155M050AC |
| | | 0.85 ± 0.10 | ± 20% | | CLLE1AX7S0J155M085AC | |
| 2.2 µF | 1608 | 0.50 ± 0.05 | ± 20% | | | CLLC1AX7S0G225M050AC |
| | | 0.50 +0.05/-0.10 | ± 20% | | | CLLE1AX7S0G225M050AC |
| | | 0.85 ± 0.10 | ± 20% | | | CLLE1AX7S0G225M085AC |
| 4.7 µF | 2012 | 0.50 ± 0.05 | ± 20% | | | CLLE1AX7S0G475M050AC |
| | | 0.85 ± 0.10 | ± 20% | | | CLLE1AX7S0G475M085AC |
| 6.8 µF | 2012 | 0.50 ± 0.05 | ± 20% | | | CLLE1AX7S0G685M050AC |