



MULTILAYER CERAMIC CHIP CAPACITORS

C Series Commercial Grade Low ESL Reverse Geometry

Type: C0510 [EIA CC0204]
C0816 [EIA CC0306]
C1220 [EIA CC0508]
C1632 [EIA CC0612]

Issue date:
Dec 2014



REMINDERS

Please read before using this product

SAFETY REMINDERS



REMINDERS

1. If you intend to use a product listed in this catalog for a purpose that may cause loss of life or other damage, you must contact our company's sales window.
2. We may modify products or discontinue production of a product listed in this catalog without prior notification.
3. We provide "Delivery Specification" that explain precautions for the specifications and safety of each product listed in this catalog. We strongly recommend that you exchange these delivery specifications with customers that use one of these products.
4. If you plan to export a product listed in this catalog, keep in mind that it may be a restricted item according to the "Foreign Exchange and Foreign Trade Control Law". In such cases, it is necessary to acquire export permission in harmony with this law.
5. Any reproduction or transferring of the contents of this catalog is prohibited without prior permission from our company.
6. We are not responsible for problems that occur related to the intellectual property rights or other rights of our company or a third party when you use a product listed in this catalog. We do not grant license of these rights.
7. This catalog only applies to products purchased through our company or one of our company's official agencies. This catalog does not apply to products that are purchased through other third parties.

Notice: Effective January 2013, TDK will use a new catalog number which adds product thickness and packaging specification detail. This new catalog number should be referenced on all catalog orders going forward, and is not applicable for OEM part number orders. Please be aware the last five digits of the catalog number will differ from the item description (internal control number) on the product label. Contact your local TDK Sales representative for more information.

(Example)

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



C Series Low ESL Reverse Geometry

Type: C0510 [EIA CC0204], C0816 [EIA CC0306], C1220 [EIA CC0508], C1632 [EIA CC0612]



Features



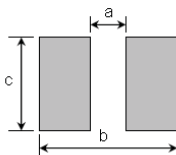
- Positioning the electrodes along the length of the chip device, reduces ESR and ESL components over conventional products.
- Provides high frequency noise suppression effect because the resonating frequency is high.
- Flipped geometry provides low inductance (less than 400 pH).
- Provides stabilization of power line voltage.
- Suitable for IC decoupling application.

Applications



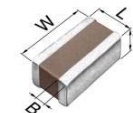
- Decoupling CPU power line
- Bias line in CPU
- High speed digital IC/decoupling
- PC, cell phones, camcorders, etc.

PC Board Pattern



| Size | Dimensions (mm) | | |
|-------|-----------------|-----|-----|
| | a | b | c |
| C0510 | 0.2 | 0.6 | 1.0 |
| C0816 | 0.3 | 1.0 | 1.6 |
| C1220 | 0.5 | 1.6 | 2.0 |
| C1632 | 0.75 | 2.2 | 3.2 |

Shape & Dimensions



| | |
|---|----------------|
| L | Body Length |
| W | Body Width |
| T | Body Height |
| B | Terminal Width |



Catalog Number Construction

C • 1632 • X5R • 0J • 106 • M • 130 • A • C

Series Name

Dimensions L x W (mm)

| Code | Length | Width | Terminal |
|------|-------------|-------------|-----------|
| 0510 | 0.52 ± 0.05 | 1.00 ± 0.05 | 0.10 min. |
| 0816 | 0.80 ± 0.10 | 1.60 ± 0.10 | 0.10 min. |
| 1220 | 1.25 ± 0.20 | 2.00 ± 0.20 | 0.20 min. |
| 1632 | 1.60 ± 0.20 | 3.20 ± 0.20 | 0.20 min. |

Temperature Characteristics

| Temperature Characteristics | Capacitance Change | Temperature Range |
|-----------------------------|--------------------|-------------------|
| JB | ±10% | -25 to +85°C |
| X5R | ±15% | -55 to +85°C |
| X6S | ±22% | -55 to +105°C |
| X7R | ±15% | -55 to +125°C |
| X7S | ±22% | -55 to +125°C |

Rated Voltage (DC)

| Code | Voltage (DC) | Code | Voltage (DC) |
|------|--------------|------|--------------|
| 0E | 2.5V | 1C | 16V |
| 0G | 4.0V | 1E | 25V |
| 0J | 6.3V | 1H | 50V |
| 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 = 1μF

Capacitance Tolerance

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

Nominal Thickness

| Code | Thickness |
|------|-----------|
| 030 | 0.30 mm |
| 050 | 0.50 mm |
| 070 | 0.70 mm |
| 085 | 0.85 mm |
| 115 | 1.15 mm |
| 130 | 1.30 mm |

Packaging Style

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

Special Reserved Code

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



Capacitance Range Chart

EIA CC0204 [C0510]

Capacitance Range Chart

Temperature Characteristics: X5R ($\pm 15\%$), X6S ($\pm 22\%$), X7S ($\pm 22\%$)
 Rated Voltage: 16V (1C), 10V (1A), 6.3V (0J), 4V (0G), 2.5V (0E)

| Capacitance (pF) | Code | Tolerance | X5R | | | X6S | | X7S | |
|------------------|------|---------------|----------|----------|-----------|-----------|---------|---------|-----------|
| | | | 1C (16V) | 1A (10V) | 0J (6.3V) | 0J (6.3V) | 0G (4V) | 0G (4V) | 0E (2.5V) |
| 100,000 | 104 | M: $\pm 20\%$ | ■ | | | | ■ | | |
| 220,000 | 224 | | | | | | ■ | | |
| 470,000 | 474 | | ■ | ■ | | ■ | | ■ | |
| 1,000,000 | 105 | | | | ■ | | ■ | | ■ |

Standard Thickness

■ 0.30 mm



Capacitance Range Chart

EIA CC0306 [C0816]

Capacitance Range Chart

Temperature Characteristics: X5R ($\pm 15\%$), X6S ($\pm 22\%$), X7R ($\pm 15\%$), X7S ($\pm 22\%$)
 Rated Voltage: 16V (1C), 10V (1A), 6.3V (0J), 4V (0G)

| Capacitance (pF) | Code | Tolerance | X5R | | | | X6S | X7R | | X7S |
|------------------|------|---------------|----------|----------|-----------|---------|---------|----------|-----------|---------|
| | | | 1C (16V) | 1A (10V) | 0J (6.3V) | 0G (4V) | 0G (4V) | 1C (16V) | 0J (6.3V) | 0G (4V) |
| 10,000 | 103 | M: $\pm 20\%$ | ■ | | | | | ■ | | |
| 22,000 | 223 | | ■ | | | | | ■ | | |
| 47,000 | 473 | | ■ | | | | | ■ | | |
| 100,000 | 104 | | ■ | | | | | ■ | | |
| 220,000 | 224 | | | ■ | | | | | ■ | |
| 470,000 | 474 | | | ■ | ■ | ■ | | | | ■ |
| 1,000,000 | 105 | | ■ | | | | | | | ■ |
| 2,200,000 | 225 | | | | | ■ | ■ | | | |
| 4,700,000 | 475 | | | | | | | | | ■ |

Standard Thickness

■ 0.50 mm



Capacitance Range Chart

EIA CC0508 [C1220]

Capacitance Range Chart

Temperature Characteristics: X5R ($\pm 15\%$), X7R ($\pm 15\%$)
 Rated Voltage: 50V (1H), 25V (1E), 16V (1C), 10V (1A), 6.3V (0J)

| Capacitance (pF) | Code | Tolerance | X5R | | | | X7R | | | |
|------------------|------|---------------|----------|----------|----------|----------|----------|----------|----------|-----------|
| | | | 1H (50V) | 1E (25V) | 1C (16V) | 1A (10V) | 1H (50V) | 1E (25V) | 1C (16V) | 0J (6.3V) |
| 10,000 | 103 | M: $\pm 20\%$ | ■ | | | | ■ | | | |
| 22,000 | 223 | | ■ | | | | ■ | | | |
| 47,000 | 473 | | ■ | | | | ■ | | | |
| 100,000 | 104 | | | ■ | | | | ■ | | |
| 220,000 | 224 | | | | ■ | | | | ■ | |
| 470,000 | 474 | | | | | ■ | | | | ■ |
| 1,000,000 | 105 | | | | | | ■ | | | ■ |

Standard Thickness

■ 0.85 mm



Capacitance Range Chart

EIA CC0612 [C1632]

Capacitance Range Chart

Temperature Characteristics: X5R ($\pm 15\%$), X7R ($\pm 15\%$), X7S ($\pm 22\%$)
 Rated Voltage: 50V (1H), 25V (1E), 16V (1C), 10V (1A), 6.3V (0J), 4V (0G)

| Capacitance (pF) | Code | Tolerance | X5R | | | | | X7R | | | | | X7S |
|------------------|------|---------------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|-----------|---------|
| | | | 1H (50V) | 1E (25V) | 1C (16V) | 1A (10V) | 0J (6.3V) | 1H (50V) | 1E (25V) | 1C (16V) | 1A (10V) | 0J (6.3V) | 0G (4V) |
| 10,000 | 103 | M: $\pm 20\%$ | █ | | | | | █ | | | | | |
| 22,000 | 223 | | | | | | | █ | | | | | |
| 47,000 | 473 | | | | | | | | | | | | |
| 100,000 | 104 | | | █ | | | | | █ | | | | |
| 220,000 | 224 | | | | █ | | | | | █ | | | |
| 470,000 | 474 | | | | | █ | | | | | █ | | |
| 1,000,000 | 105 | | | | | | █ | | | | | █ | |
| 2,200,000 | 225 | | | | | | | | | | | | █ |
| 4,700,000 | 475 | | | | | | | | | | | | |
| 10,000,000 | 106 | | | | | | | | | | | | █ |

Standard Thickness

- 0.70 mm
- 1.15 mm
- 1.30 mm



Capacitance Range Table

Class 2 (Temperature Stable)

Temperature Characteristics: X5R (-55 to +85°C, ±15%)

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | | | |
|-------------|------|------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|
| | | | | Rated Voltage Edc: 50V | Rated Voltage Edc: 25V | Rated Voltage Edc: 16V | Rated Voltage Edc: 10V |
| 10 nF | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X5R1C103M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | C1220X5R1H103M085AC | | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X5R1H103M070AC | | | |
| 22 nF | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X5R1C223M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | C1220X5R1H223M085AC | | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X5R1H223M070AC | | | |
| 47 nF | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X5R1C473M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | C1220X5R1H473M085AC | | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X5R1H473M070AC | | | |
| 100 nF | 0510 | 0.30 ± 0.05 | ± 20% | | | C0510X5R1C104M030AC | |
| | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X5R1C104M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | | C1220X5R1E104M085AC | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X5R1H104M070AC | | | |
| 220 nF | 0816 | 0.50 ± 0.10 | ± 20% | | | | C0816X5R1A224M050AC |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | | C1220X5R1C224M085AC | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | | C1632X5R1E224M070AC | | |
| | 1632 | 1.15 ± 0.15 | ± 20% | C1632X5R1H224M115AC | | | |
| 470 nF | 0510 | 0.30 ± 0.05 | ± 20% | | C0510X5R1C474M030AC | | C0510X5R1A474M030AC |
| | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X5R1A474M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | | | C1220X5R1A474M085AC | |
| | 1632 | 0.70 ± 0.10 | ± 20% | | C1632X5R1C474M070AC | | |
| 1 µF | 1632 | 1.15 ± 0.15 | ± 20% | | C1632X5R1E474M115AC | | |
| | 0816 | 0.50 ± 0.10 | ± 20% | | C0816X5R1C105M050AC | | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | | | C1220X5R1A105M085AC | |
| | 1632 | 0.70 ± 0.10 | ± 20% | | C1632X5R1A105M070AC | | |
| 2.2 µF | 1632 | 1.15 ± 0.15 | ± 20% | | C1632X5R1C105M115AC | | |
| | 1632 | 1.15 ± 0.15 | ± 20% | | C1632X5R1A225M115AC | | |

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | |
|-------------|------|----------------|-----------------------|-------------------------|-------------------------|
| | | | | Rated Voltage Edc: 6.3V | Rated Voltage Edc: 4.0V |
| 470 nF | 0816 | 0.50 ± 0.10 | ± 20% | C0816X5R0J474M050AC | |
| 1 µF | 0510 | 0.30 ± 0.05 | ± 20% | C0510X5R0J105M030AC | |
| | 0816 | 0.50 ± 0.10 | ± 20% | C0816X5R0J105M050AC | |
| 2.2 µF | 0816 | 0.50 ± 0.10 | ± 20% | C0816X5R0J225M050AC | |
| 4.7 µF | 0816 | 0.50 ± 0.10 | ± 20% | C0816X5R0J475M050AC | |
| | 1632 | 1.30 ± 0.15 | ± 20% | C1632X5R0J475M130AC | |
| 10 µF | 1632 | 1.30 ± 0.15 | ± 20% | C1632X5R0J106M130AC | |

Class 2 (Temperature Stable)

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

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | |
|-------------|------|----------------|-----------------------|-------------------------|-------------------------|
| | | | | Rated Voltage Edc: 6.3V | Rated Voltage Edc: 4.0V |
| 100 nF | 0510 | 0.30 ± 0.05 | ± 20% | | C0510X6S0G104M030AC |
| 220 nF | 0510 | 0.30 ± 0.05 | ± 20% | | C0510X6S0G224M030AC |
| 470 nF | 0510 | 0.30 ± 0.05 | ± 20% | C0510X6S0J474M030AC | C0510X6S0G474M030AC |
| 1 µF | 0510 | 0.30 ± 0.05 | ± 20% | | C0510X6S0G105M030AC |
| 4.7 µF | 0816 | 0.50 ± 0.10 | ± 20% | | C0816X6S0G475M050AC |



Capacitance Range Table

Class 2 (Temperature Stable)

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

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | | | |
|-------------|------|------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|
| | | | | Rated Voltage Edc: 50V | Rated Voltage Edc: 25V | Rated Voltage Edc: 16V | Rated Voltage Edc: 10V |
| 10 nF | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X7R1C103M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | C1220X7R1H103M085AC | | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X7R1H103M070AC | | | |
| 22 nF | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X7R1C223M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | C1220X7R1H223M085AC | | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X7R1H223M070AC | | | |
| 47 nF | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X7R1C473M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | C1220X7R1H473M085AC | | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X7R1H473M070AC | | | |
| 100 nF | 0816 | 0.50 ± 0.10 | ± 20% | | | C0816X7R1C104M050AC | |
| | 1220 | 0.85 +0.15/-0.25 | ± 20% | | C1220X7R1E104M085AC | | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X7R1H104M070AC | | | |
| 220 nF | 1220 | 0.85 +0.15/-0.25 | ± 20% | | | C1220X7R1C224M085AC | |
| | 1632 | 0.70 ± 0.10 | ± 20% | | C1632X7R1E224M070AC | | |
| | | 1.15 ± 0.15 | ± 20% | C1632X7R1H224M115AC | | | |
| 470 nF | 1632 | 0.70 ± 0.10 | ± 20% | | | C1632X7R1C474M070AC | |
| | | 1.15 ± 0.15 | ± 20% | | C1632X7R1E474M115AC | | |
| | | 0.70 ± 0.10 | ± 20% | | | | C1632X7R1A105M070AC |
| 1 µF | 1632 | 1.15 ± 0.15 | ± 20% | | | C1632X7R1C105M115AC | |
| | | 0.70 ± 0.10 | ± 20% | | | | C1632X7R1A225M115AC |
| 2.2 µF | 1632 | 1.15 ± 0.15 | ± 20% | | | | C1632X7R1A225M115AC |

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | |
|-------------|------|------------------|-----------------------|-------------------------|-------------------------|
| | | | | Rated Voltage Edc: 6.3V | Rated Voltage Edc: 4.0V |
| 220 nF | 0816 | 0.50 ± 0.10 | ± 20% | C0816X7R0J224M050AC | |
| 470 nF | 1220 | 0.85 +0.15/-0.25 | ± 20% | C1220X7R0J474M085AC | |
| 1 µF | 1220 | 0.85 +0.15/-0.25 | ± 20% | C1220X7R0J105M085AC | |
| | 1632 | 0.70 ± 0.10 | ± 20% | C1632X7R0J105M070AC | |
| 2.2 µF | 1632 | 1.15 ± 0.15 | ± 20% | C1632X7R0J225M115AC | |

Class 2 (Temperature Stable)

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

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | | |
|-------------|------|----------------|-----------------------|-------------------------|-------------------------|-------------------------|
| | | | | Rated Voltage Edc: 6.3V | Rated Voltage Edc: 4.0V | Rated Voltage Edc: 2.5V |
| 470 nF | 0510 | 0.30 ± 0.05 | ± 20% | | C0510X7S0G474M030AC | |
| | 0816 | 0.50 ± 0.10 | ± 20% | | C0816X7S0G474M050AC | |
| 1 µF | 0510 | 0.30 ± 0.05 | ± 20% | | | C0510X7S0E105M030AC |
| | 0816 | 0.50 ± 0.10 | ± 20% | | C0816X7S0G105M050AC | |
| 2.2 µF | 0816 | 0.50 ± 0.10 | ± 20% | | C0816X7S0G225M050AC | |
| 4.7 µF | 1632 | 1.30 ± 0.15 | ± 20% | | C1632X7S0G475M130AC | |
| 10 µF | 1632 | 1.30 ± 0.15 | ± 20% | | C1632X7S0G106M130AC | |