



MULTILAYER CERAMIC CHIP CAPACITORS

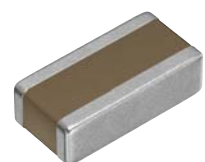
Automotive grade, low ESL reverse geometry

CGA series

CGAE

0510 [0204 inch]

* Dimensions code: JIS[EIA]



REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using this products.

REMINDERS

1. The products listed in this specification are intended for use in automotive applications under normal operation and usage conditions. The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality requires a more stringent level of safety or reliability, or whose failure, malfunction or defect could cause serious damage to society, person or property.

Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet. If you intend to use the products in the applications listed below or if you have special requirements exceeding the range or conditions set forth in this specification, please contact us.

- | | |
|--|--|
| (1) Aerospace/aviation equipment | (8) Public information-processing equipment |
| (2) Transportation equipment (electric trains, ships, etc.) | (9) Military equipment |
| (3) Medical equipment (excepting Pharmaceutical Affairs Law classification Class1,2) | (10) Electric heating apparatus, burning equipment |
| (4) Power-generation control equipment | (11) Disaster prevention/crime prevention equipment |
| (5) Atomic energy-related equipment | (12) Safety equipment |
| (6) Seabed equipment | (13) Other applications that are not considered general-purpose applications |
| (7) Transportation control equipment | |

When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.

In addition, although the products listed in this specification are intended for use in automotive applications as described above, they are not prohibited to use in general electronic equipment, whose performance and/or quality doesn't require a more stringent level of safety or reliability, or whose failure, malfunction or defect could not cause serious damage to society, person or property. Therefore, the description of this caution will be applied, when the products are used in general electronic equipment under a normal operation and usage conditions.

- We may modify products or discontinue production of a product listed in this catalog without prior notification.
- 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.
- 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.
- Any reproduction or transferring of the contents of this catalog is prohibited without prior permission from our company.
- 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.
- 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(080AA) | C1608C0G1E103JT000N |
| January 2013 and later | C1608C0G1E103J080AA | C1608C0G1E103JT000N |

CGA series

Low ESL reverse geometry

Type: CGAE/0510 [0204 inch]



SERIES OVERVIEW

Low ESL reverse geometry CGA series, automotive grade of TDK's multilayer ceramic chip capacitor, is a product whose electrodes rotated 90 degrees compared to general type. The structure makes the current route wider and shorter, therefore ESR/ESL and impedance are reduced.

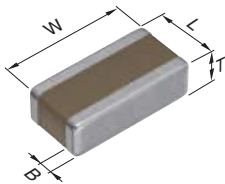
FEATURES

- Reduction in ESR/ESL and impedance due to the reverse geometry structure
- Superior attenuation characteristic in wide bandwidth
- Contributes to reduction in the number of decoupling MLCCs
- AEC-Q200 compliant

APPLICATION

- EMC countermeasure and decoupling use in power lines for automotive applications such as ADAS, autonomous driving system ECU, etc.

SHAPE & DIMENSIONS



| | |
|---|----------------|
| L | Body length |
| W | Body width |
| T | Body height |
| B | Terminal width |

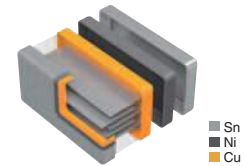
PRODUCT STRUCTURES

General type



The structure which multiple sheets of dielectric and conductive material are stacked alternately

Reverse geometry type



The current route becomes wider and shorter due to the reverse geometry structure which the electrode direction rotated 90 degrees compared to general type.

Dimensions in mm

| Type | L | W | T | B |
|-------|-----------|-----------|-----------|-----------|
| CGAEA | 0.52±0.05 | 1.00±0.05 | 0.30±0.05 | 0.10 min. |
| CGAEB | 0.58±0.10 | 1.10±0.10 | 0.58±0.10 | 0.10 min. |
| CGAEW | 0.50±0.10 | 1.00±0.10 | 0.20±0.05 | 0.10 min. |

*Dimensional tolerances are typical values.

CATALOG NUMBER CONSTRUCTION

| | | | | | | | | | | |
|------------|----------|----------|----------|------------|-----------|------------|----------|------------|----------|----------|
| CGA | E | B | 1 | X7T | 0G | 105 | M | 050 | B | C |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |

(1) Series

(2) Dimensions L x W (mm)

| Dimensions code | EIA | Length | Width | Terminal width |
|-----------------|--------|--------|-------|----------------|
| E | CC0204 | 0.50 | 1.00 | 0.10 |

(3) Thickness code

| Code | Thickness |
|------|-----------|
| A | 0.30mm |
| B | 0.50mm |
| W | 0.20mm |

(4) Voltage condition for life test

| Symbol | Condition |
|--------|------------|
| 1 | 1 x R.V. |
| 2 | 2 x R.V. |
| 3 | 1.5 x R.V. |

(5) Temperature characteristics

| Temperature characteristics | Capacitance change | Temperature range |
|-----------------------------|--------------------|-------------------|
| X7R | ±15% | -55 to +125°C |
| X7T | +22, -33% | -55 to +125°C |

(6) Rated voltage (DC)

| Code | Voltage (DC) |
|------|--------------|
| 1H | 50V |
| 1E | 25V |
| 0J | 6.3V |
| 0G | 4V |

(7) 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.

(Example)0R5 = 0.5pF

101 = 100pF

225 = 2,200,000pF = 2.2μF

(8) Capacitance tolerance

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

(9) Thickness

| Code | Thickness |
|------|-----------|
| 020 | 0.20mm |
| 030 | 0.30mm |
| 050 | 0.50mm |

(10) Packaging style






| Code | Style |
|------|-----------------------|
| B | 178mm reel, 2mm pitch |




(11) Special reserved code

| Code | Description |
|---------|-------------------|
| A, B, C | TDK internal code |

Capacitance range chart

CGAE/0510 [0204 inch]

| Capacitance | | X7R | | X7T | |
|-------------|------|---|---|---|---|
| (pF) | Code | 1H (50V) | 1E (25V) | 0J (6.3V) | 0G (4V) |
| 47,000 | 473 |  |  | | |
| 100,000 | 104 | | |  |  |
| 1,000,000 | 105 | | | |  |

Standard thickness  0.20mm  0.30mm  0.50mm

■ Refer to the capacitance range table below for product thickness and capacitance tolerance.

Capacitance range table

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

| Capacitance | Dimensions | Thickness (mm) | Capacitance tolerance | Catalog number | |
|-------------|------------|-------------------|--------------------------|--------------------------------------|--------------------------------------|
| | | | | Rated voltage Edc: 50V | Rated voltage Edc: 25V |
| 47nF | 0510 | 0.30±0.05 | ±20% | CGAEA1X7R1H473M030BC | CGAEA2X7R1E473M030BA |

Click the part number for details.

Capacitance range table

Temperature characteristic: X7T (-55 to +125°C, +22, -33%)

| Capacitance | Dimensions | Thickness (mm) | Capacitance tolerance | Catalog number | |
|-------------|------------|-------------------|--------------------------|--------------------------------------|--------------------------------------|
| | | | | Rated voltage Edc: 6.3V | Rated voltage Edc: 4V |
| 100nF | 0510 | 0.20±0.05 | ±20% | | CGAEW1X7T0G104M020BC |
| | | 0.30±0.05 | ±20% | CGAEA1X7T0J104M030BC | CGAEA3X7T0G104M030BB |
| 1µF | 0510 | 0.58±0.10 | ±20% | | CGAEB1X7T0G105M050BC |

Click the part number for details.