

MULTILAYER CERAMIC CHIP CAPACITORS



CGA Series Automotive Grade High Voltage (1000V and over)

Type:

**CGA6 [EIA CC1210]
CGA7 [EIA CC1808]
CGA8 [EIA CC1812]
CGA9 [EIA CC2220]**



REMINDERS

Please read before using this product

SAFETY REMINDERS

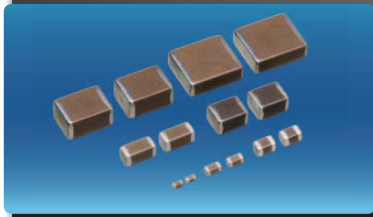
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Notice: Effective January 2013, TDK will use a new catalog number which adds product thickness and packaging specification detail. This new catalog number should be referenced on all catalog orders going forward, and is not applicable for OEM part 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 High Voltage (1000V and over)

Type: CGA6 [EIA CC1210], CGA7 [EIA CC1808], CGA8 [EIA CC1812], CGA9 [EIA CC2220]

Features

- Advanced design provides improved withstand voltage characteristics.
- TDK's proprietary internal electrode structure and the use of low-dielectric-strength material result in highly reliable performance in high-voltage applications.
- Complies with ISO8802-3 for LAN applications.
- Designed exclusively for reflow soldering.
- AEC-Q200 compliant.

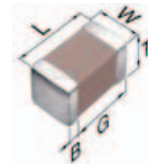
Applications

- Wireless Charging units, such as a DC-DC converter, a charger on board, etc for EV and PHEV.
- Snubber of a high voltage circuit, resonant circuit, time constant circuit and surge protection for EV and HEV.

Cautions

- A slit of about 1mm on the circuit board is recommended to improve removal of the flux after soldering.
- Ensure that this product is completely dried following washing.
- Because this product will be subjected to high voltages, use only low-activity rosin flux (with 0.2% max. of chlorine).
- Using this product with aluminum circuit boards must be considered a special implementation because the high heat stress levels are involved. In case of using aluminum circuit boards, please contact TDK.

Shape & Dimensions



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

Catalog Number Construction

CGA • 8 • M • 1 • X7R • 3A • 103 • K • 200 • K • A

Series Name

Dimensions L x W (mm)

| Code | Length | Width | Terminal |
|------|-------------|-------------|-----------|
| 6 | 3.20 ± 0.40 | 2.50 ± 0.30 | 0.20 min. |
| 7 | 4.50 ± 0.40 | 2.00 ± 0.30 | 0.20 min. |
| 8 | 4.50 ± 0.40 | 3.20 ± 0.40 | 0.20 min. |
| 9 | 5.70 ± 0.40 | 5.00 ± 0.40 | 0.20 min. |

Thickness T Code (mm)

| Code | Thickness | Code | Thickness |
|------|-----------|------|-----------|
| F | 0.85 mm | M | 2.00 mm |
| G | 1.10 mm | N | 2.30 mm |
| K | 1.30 mm | P | 2.50 mm |
| L | 1.60 mm | Q | 2.80 mm |

Voltage Condition for Life Test

| Symbol | Condition |
|--------|-----------|
| 1 | 1 × R.V. |

Temperature Characteristics

| Temperature Characteristics | Temperature Coefficient of Capacitance Change | Temperature Range |
|-----------------------------|---|-------------------|
| C0G | 0±30 ppm/°C | -55 to +125°C |
| X7R | ±15% | -55 to +125°C |

Rated Voltage (DC)

| Code | Voltage (DC) |
|------|--------------|
| 3A | 1,000V |
| 3D | 2,000V |
| 3F | 3,000V |

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.

Ex. 100=10pF; 101=100pF; 333=33,000pF

Capacitance Tolerance

| Code | Tolerance |
|------|-----------|
| F | ± 1pF |
| J | ± 5% |
| K | ± 10% |
| M | ± 20% |

Nominal Thickness

| Code | Thickness | Code | Thickness | Code | Thickness |
|------|-----------|------|-----------|------|-----------|
| 085 | 0.85 mm | 160 | 1.60 mm | 250 | 2.50 mm |
| 110 | 1.10 mm | 200 | 2.00 mm | 280 | 2.80 mm |
| 130 | 1.30 mm | 230 | 2.30 mm | | |

Packaging Style

| Code | Style |
|------|-------------------------|
| A | 178 mm Reel, 4 mm Pitch |
| K | 178 mm Reel, 8 mm Pitch |

Special Reserved Code

| Code | Description |
|------|-------------------|
| A, C | TDK Internal Code |

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MULTILAYER CERAMIC CHIP CAPACITORS



Capacitance Range Chart

CGA6(3225) [EIA CC1210]

Capacitance Range Chart

Temperature Characteristics: C0G ($0 \pm 30 \text{ ppm}/^\circ\text{C}$)

Rated Voltage: 1KV (3A)

| Capacitance | | Tolerance | C0G 3A (1KV) |
|-------------|------|--------------|--------------------|
| (pF) | Code | | |
| 1,000 | 102 | J: $\pm 5\%$ | |
| 1,200 | 122 | | |
| 1,500 | 152 | | |
| 1,800 | 182 | | |
| 2,200 | 222 | | |
| 2,700 | 272 | | |
| 3,300 | 332 | | |
| 3,900 | 392 | | |
| 4,700 | 472 | | |
| 5,600 | 562 | | |
| 6,800 | 682 | | |
| 8,200 | 822 | | |
| 10,000 | 103 | | |
| 12,000 | 123 | | |
| 15,000 | 153 | | |
| 18,000 | 183 | | |
| 22,000 | 223 | | |

Standard Thickness

- 2.00 mm
- 2.30 mm
- 2.50 mm

Capacitance Range Chart

CGA7(4520) [EIA CC1808]

Capacitance Range Chart

Temperature Characteristics: C0G ($0 \pm 30 \text{ ppm}/^\circ\text{C}$), X7R ($\pm 15\%$)

Rated Voltage: 3000V (3F), 2000V (3D), 1000V (3A)

| Capacitance | | Tolerance | C0G | | | X7R | | |
|-------------|------|--|-------------|-------------|-------------|-----|--|--|
| (pF) | Code | | 3F (3KV) | 3D (2KV) | 3A (1KV) | | | |
| 10 | 100 | F: $\pm 1 \text{ pF}$ K: $\pm 10\%$ | | | | | | |
| 12 | 120 | | | | | | | |
| 15 | 150 | | | | | | | |
| 18 | 180 | | | | | | | |
| 22 | 220 | | | | | | | |
| 27 | 270 | | | | | | | |
| 33 | 330 | | | | | | | |
| 39 | 390 | | | | | | | |
| 47 | 470 | | | | | | | |
| 56 | 560 | | | | | | | |
| 68 | 680 | K: $\pm 10\%$ M: $\pm 20\%$ | | | | | | |
| 82 | 820 | | | | | | | |
| 100 | 101 | | | | | | | |
| 470 | 471 | | | | | | | |
| 1,000 | 102 | | | | | | | |

Standard Thickness

- 0.85 mm
- 1.10 mm
- 1.30 mm
- 1.60 mm
- 2.00 mm

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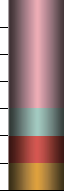



Capacitance Range Chart

CGA8(4532) [EIA CC1812]






Capacitance Range Chart

Temperature Characteristics: C0G (0±30ppm/°C), X7R (±15%)

Rated Voltage: 3000V (3F), 2000V (3D), 1000V (3A)

| Capacitance | | Tolerance | C0G | | | X7R | | |
|-------------|------|-----------|---|---|---|---|--|--|
| (pF) | Code | | 3F (3KV) | 3D (2KV) | 3A (1KV) | | | |
| 100 | 101 | K: ± 10% |  | | | | | |
| 120 | 121 | | | | | | | |
| 150 | 151 | | | | | | | |
| 180 | 181 | | | | | | | |
| 220 | 221 | | | | | | | |
| 270 | 271 | | | | | | | |
| 330 | 331 | | | | | | | |
| 2,200 | 222 | K: ± 10% | |  | | | | |
| 4,700 | 472 | M: ± 20% | | |  | | | |
| 10,000 | 103 | | | | |  | | |

Standard Thickness

| | |
|---|---------|
|  | 1.30 mm |
|  | 1.60 mm |
|  | 2.00 mm |
|  | 2.30 mm |
|  | 2.50 mm |


Capacitance Range Chart

CGA9(5750) [EIA CC2220]


Capacitance Range Chart

Temperature Characteristics: C0G (0±30ppm/°C)

Rated Voltage: 1KV (3A)

| Capacitance | | Tolerance | C0G |
|-------------|------|-----------|---|
| (pF) | Code | | 3A (1KV) |
| 10,000 | 103 | J: ± 5% |  |
| 12,000 | 123 | | |
| 15,000 | 153 | | |
| 18,000 | 183 | | |
| 22,000 | 223 | | |
| 27,000 | 273 | | |
| 33,000 | 333 | | |

Standard Thickness

| | |
|---|---------|
|  | 2.80 mm |
|---|---------|

MULTILAYER CERAMIC CHIP CAPACITORS



Capacitance Range Table

Class 1 (Temperature Compensating)

Temperature Characteristics: C0G (-55 to +125°C, 0±30ppm/°C)

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | |
|-------------|------|----------------|-----------------------|------------------------|------------------------|
| | | | | Rated VoltageEdc : 3KV | Rated VoltageEdc : 1KV |
| 10 pF | 4520 | 0.85 ± 0.15 | ± 1pF | CGA7F1C0G3F100F085KA | |
| 12 pF | 4520 | 0.85 ± 0.15 | ± 10% | CGA7F1C0G3F120K085KA | |
| 15 pF | 4520 | 1.10 ± 0.20 | ± 10% | CGA7G1C0G3F150K110KA | |
| 18 pF | 4520 | 1.10 ± 0.20 | ± 10% | CGA7G1C0G3F180K110KA | |
| 22 pF | 4520 | 1.10 ± 0.20 | ± 10% | CGA7G1C0G3F220K110KA | |
| 27 pF | 4520 | 1.60 ± 0.20 | ± 10% | CGA7L1C0G3F270K160KA | |
| 33 pF | 4520 | 1.60 ± 0.20 | ± 10% | CGA7L1C0G3F330K160KA | |
| 39 pF | 4520 | 1.60 ± 0.20 | ± 10% | CGA7L1C0G3F390K160KA | |
| 47 pF | 4520 | 1.60 ± 0.20 | ± 10% | CGA7L1C0G3F470K160KA | |
| 56 pF | 4520 | 2.00 ± 0.20 | ± 10% | CGA7M1C0G3F560K200KA | |
| 68 pF | 4520 | 2.00 ± 0.20 | ± 10% | CGA7M1C0G3F680K200KA | |
| 82 pF | 4520 | 2.00 ± 0.20 | ± 10% | CGA7M1C0G3F820K200KA | |
| 100 pF | 4520 | 2.00 ± 0.20 | ± 10% | CGA7M1C0G3F101K200KA | |
| | 4532 | 1.60 ± 0.20 | ± 10% | CGA8L1C0G3F101K160KA | |
| 120 pF | 4532 | 1.60 ± 0.20 | ± 10% | CGA8L1C0G3F121K160KA | |
| 150 pF | 4532 | 1.60 ± 0.20 | ± 10% | CGA8L1C0G3F151K160KA | |
| 180 pF | 4532 | 1.60 ± 0.20 | ± 10% | CGA8L1C0G3F181K160KA | |
| 220 pF | 4532 | 2.00 ± 0.20 | ± 10% | CGA8M1C0G3F221K200KA | |
| 270 pF | 4532 | 2.30 ± 0.20 | ± 10% | CGA8N1C0G3F271K230KA | |
| 330 pF | 4532 | 2.50 ± 0.30 | ± 10% | CGA8P1C0G3F331K250KA | |
| 1 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A102J200AC |
| 1.2 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A122J200AC |
| 1.5 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A152J200AC |
| 1.8 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A182J200AC |
| 2.2 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A222J200AC |
| 2.7 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A272J200AC |
| 3.3 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A332J200AC |
| 3.9 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A392J200AC |
| 4.7 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A472J200AC |
| 5.6 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A562J200AC |
| 6.8 nF | 3225 | 2.00 ± 0.20 | ± 5% | | CGA6M1C0G3A682J200AC |
| 8.2 nF | 3225 | 2.30 ± 0.20 | ± 5% | | CGA6N1C0G3A822J230AC |
| 10 nF | 3225 | 2.50 ± 0.30 | ± 5% | | CGA6P1C0G3A103J250AC |
| | 5750 | 2.80 ± 0.30 | ± 5% | | CGA9Q1C0G3A103J280KC |
| 12 nF | 3225 | 2.50 ± 0.30 | ± 5% | | CGA6P1C0G3A123J250AC |
| | 5750 | 2.80 ± 0.30 | ± 5% | | CGA9Q1C0G3A123J280KC |
| 15 nF | 3225 | 2.50 ± 0.30 | ± 5% | | CGA6P1C0G3A153J250AC |
| | 5750 | 2.80 ± 0.30 | ± 5% | | CGA9Q1C0G3A153J280KC |
| 18 nF | 3225 | 2.50 ± 0.30 | ± 5% | | CGA6P1C0G3A183J250AC |
| | 5750 | 2.80 ± 0.30 | ± 5% | | CGA9Q1C0G3A183J280KC |
| 22 nF | 3225 | 2.50 ± 0.30 | ± 5% | | CGA6P1C0G3A223J250AC |
| | 5750 | 2.80 ± 0.30 | ± 5% | | CGA9Q1C0G3A223J280KC |
| 27 nF | 5750 | 2.80 ± 0.30 | ± 5% | | CGA9Q1C0G3A273J280KC |
| 33 nF | 5750 | 2.80 ± 0.30 | ± 5% | | CGA9Q1C0G3A333J280KC |

Class 2 (Temperature Stable)

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

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number | |
|-------------|------|----------------|-----------------------|------------------------|------------------------|
| | | | | Rated VoltageEdc : 2KV | Rated VoltageEdc : 1KV |
| 470 pF | 4520 | 1.30 ± 0.20 | ± 10% | CGA7K1X7R3D471K130KA | CGA7K1X7R3A471K130KA |
| | | | ± 20% | CGA7K1X7R3D471M130KA | CGA7K1X7R3A471M130KA |
| 1 nF | 4520 | 1.30 ± 0.20 | ± 10% | CGA7K1X7R3D102K130KA | CGA7K1X7R3A102K130KA |
| | | | ± 20% | CGA7K1X7R3D102M130KA | CGA7K1X7R3A102M130KA |
| 2.2 nF | 4532 | 1.30 ± 0.20 | ± 10% | CGA8K1X7R3D222K130KA | |
| | | | ± 20% | CGA8K1X7R3D222M130KA | |
| 4.7 nF | 4532 | 1.60 ± 0.20 | ± 10% | | CGA8L1X7R3A472K160KA |
| | | | ± 20% | | CGA8L1X7R3A472M160KA |
| 10 nF | 4532 | 2.00 ± 0.20 | ± 10% | | CGA8M1X7R3A103K200KA |
| | | | ± 20% | | CGA8M1X7R3A103M200KA |

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