

## MULTILAYER CERAMIC CHIP CAPACITORS

### **C Series Commercial Grade High Voltage (1000V and over)**

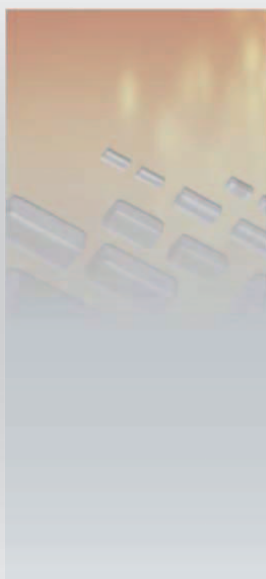
Type:

**C3225 [EIA CC1210]**

**C4520 [EIA CC1808]**

**C4532 [EIA CC1812]**

**C5750 [EIA CC2220]**



# 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.
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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                  |



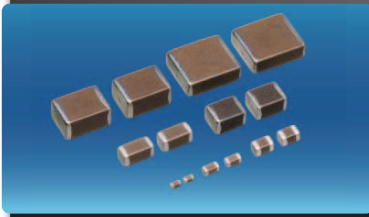
Lead Free



RoHS COMPLIANT



Ecological



# C Series

## High Voltage (1000V and over)

Type: C3225 [EIA CC1210], C4520 [EIA CC1808], C4532 [EIA CC1812], C5750 [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.

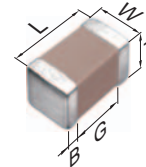
### Applications

- Inverter circuits with a liquid crystal backlight
- LAN card
- General high voltage circuits
- Noise bypass for power supply
- Transceiver for LAN
- Hub, etc.

### 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

C • 4532 • X7R • 3A • 103 • K • 200 • K • A

#### Series Name

#### Dimensions L x W (mm)

| Code  | Length      | Width       | Terminal  |
|-------|-------------|-------------|-----------|
| C3225 | 3.20 ± 0.40 | 2.50 ± 0.30 | 0.20 min. |
| C4520 | 4.50 ± 0.40 | 2.00 ± 0.30 | 0.20 min. |
| C4532 | 4.50 ± 0.40 | 3.20 ± 0.40 | 0.20 min. |
| C5750 | 5.70 ± 0.40 | 5.00 ± 0.40 | 0.20 min. |

#### Temperature Characteristics

| Temperature Characteristics | Temperature Coefficient or Capacitance Change | Temperature Range |
|-----------------------------|---|-------------------|
| C0G                         | 0±30 ppm/°C                                   | -55 to +125°C     |
| CH                          | 0±60 ppm/°C                                   | -25 to +85°C      |
| JB                          | ±10%  | -25 to +85°C      |
| X7R                         | ±15%  | -55 to +125°C     |

#### Rated Voltage (DC)

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

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

# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Chart

## EIA CC1210 [C3225]

### Capacitance Range Chart

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

Rated Voltage: 1KV (3A)

| Capacitance |      | Tolerance    | C0G<br>3A<br>(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

## EIA CC1808 [C4520]

### Capacitance Range Chart

Temperature Characteristics: C0G ( $0 \pm 30 \text{ ppm}/^\circ\text{C}$ ), CH ( $0 \pm 60 \text{ ppm}/^\circ\text{C}$ ), JB ( $\pm 10\%$ ), X7R ( $\pm 15\%$ )

Rated Voltage: 3KV (3F), 2KV (3D), 1KV (3A)

| Capacitance |      | Tolerance                              | C0G         | CH          | JB          |             | X7R         |             |
|-------------|------|--|-------------|-------------|-------------|-------------|-------------|-------------|
| (pF)        | Code |  | 3F<br>(3KV) | 3F<br>(3KV) | 3D<br>(2KV) | 3A<br>(1KV) | 3D<br>(2KV) | 3A<br>(1KV) |
| 10          | 100  | F: $\pm 1 \text{ pF}$<br>K: $\pm 10\%$ |             |             |             |             |             |             |
| 12          | 120  |  |             |             |             |             |             |             |
| 15          | 150  |  |             |             |             |             |             |             |
| 18          | 180  |  |             |             |             |             |             |             |
| 22          | 220  |  |             |             |             |             |             |             |
| 27          | 270  |  |             |             |             |             |             |             |
| 33          | 330  |  |             |             |             |             |             |             |
| 39          | 390  |  |             |             |             |             |             |             |
| 47          | 470  |  |             |             |             |             |             |             |
| 56          | 560  |  |             |             |             |             |             |             |
| 68          | 680  | K: $\pm 10\%$<br>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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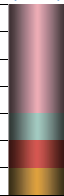
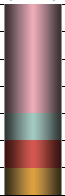







## Capacitance Range Chart

# EIA CC1812 [C4532]






### Capacitance Range Chart

Temperature Characteristics: C0G (0±30ppm/°C), CH (0±60ppm/°C), JB (±10%), X7R (±15%)

Rated Voltage: 3KV (3F), 2KV (3D), 1KV (3A)

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

Standard Thickness

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


## Capacitance Range Chart

# EIA CC2220 [C5750]


### 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: COG (-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                 | C4520C0G3F100F085KA    |                        |
| 12 pF       | 4520 | 0.85 ± 0.15    | ± 10%                 | C4520C0G3F120K085KA    |                        |
| 15 pF       | 4520 | 1.10 ± 0.20    | ± 10%                 | C4520C0G3F150K110KA    |                        |
| 18 pF       | 4520 | 1.10 ± 0.20    | ± 10%                 | C4520C0G3F180K110KA    |                        |
| 22 pF       | 4520 | 1.10 ± 0.20    | ± 10%                 | C4520C0G3F220K110KA    |                        |
| 27 pF       | 4520 | 1.60 ± 0.20    | ± 10%                 | C4520C0G3F270K160KA    |                        |
| 33 pF       | 4520 | 1.60 ± 0.20    | ± 10%                 | C4520C0G3F330K160KA    |                        |
| 39 pF       | 4520 | 1.60 ± 0.20    | ± 10%                 | C4520C0G3F390K160KA    |                        |
| 47 pF       | 4520 | 1.60 ± 0.20    | ± 10%                 | C4520C0G3F470K160KA    |                        |
| 56 pF       | 4520 | 2.00 ± 0.20    | ± 10%                 | C4520C0G3F560K200KA    |                        |
| 68 pF       | 4520 | 2.00 ± 0.20    | ± 10%                 | C4520C0G3F680K200KA    |                        |
| 82 pF       | 4520 | 2.00 ± 0.20    | ± 10%                 | C4520C0G3F820K200KA    |                        |
| 100 pF      | 4520 | 2.00 ± 0.20    | ± 10%                 | C4520C0G3F101K200KA    |                        |
|             | 4532 | 1.60 ± 0.20    | ± 10%                 | C4532C0G3F101K160KA    |                        |
| 120 pF      | 4532 | 1.60 ± 0.20    | ± 10%                 | C4532C0G3F121K160KA    |                        |
| 150 pF      | 4532 | 1.60 ± 0.20    | ± 10%                 | C4532C0G3F151K160KA    |                        |
| 180 pF      | 4532 | 1.60 ± 0.20    | ± 10%                 | C4532C0G3F181K160KA    |                        |
| 220 pF      | 4532 | 2.00 ± 0.20    | ± 10%                 | C4532C0G3F221K200KA    |                        |
| 270 pF      | 4532 | 2.30 ± 0.20    | ± 10%                 | C4532C0G3F271K230KA    |                        |
| 330 pF      | 4532 | 2.50 ± 0.30    | ± 10%                 | C4532C0G3F331K250KA    |                        |
| 1 nF        | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A102J200AC    |
| 1.2 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A122J200AC    |
| 1.5 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A152J200AC    |
| 1.8 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A182J200AC    |
| 2.2 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A222J200AC    |
| 2.7 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A272J200AC    |
| 3.3 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A332J200AC    |
| 3.9 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A392J200AC    |
| 4.7 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A472J200AC    |
| 5.6 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A562J200AC    |
| 6.8 nF      | 3225 | 2.00 ± 0.20    | ± 5%                  |                        | C3225C0G3A682J200AC    |
| 8.2 nF      | 3225 | 2.30 ± 0.20    | ± 5%                  |                        | C3225C0G3A822J230AC    |
| 10 nF       | 3225 | 2.50 ± 0.30    | ± 5%                  |                        | C3225C0G3A103J250AC    |
|             | 5750 | 2.80 ± 0.30    | ± 5%                  |                        | C5750C0G3A103J280KC    |
| 12 nF       | 3225 | 2.50 ± 0.30    | ± 5%                  |                        | C3225C0G3A123J250AC    |
|             | 5750 | 2.80 ± 0.30    | ± 5%                  |                        | C5750C0G3A123J280KC    |
| 15 nF       | 3225 | 2.50 ± 0.30    | ± 5%                  |                        | C3225C0G3A153J250AC    |
|             | 5750 | 2.80 ± 0.30    | ± 5%                  |                        | C5750C0G3A153J280KC    |
| 18 nF       | 3225 | 2.50 ± 0.30    | ± 5%                  |                        | C3225C0G3A183J250AC    |
|             | 5750 | 2.80 ± 0.30    | ± 5%                  |                        | C5750C0G3A183J280KC    |
| 22 nF       | 3225 | 2.50 ± 0.30    | ± 5%                  |                        | C3225C0G3A223J250AC    |
|             | 5750 | 2.80 ± 0.30    | ± 5%                  |                        | C5750C0G3A223J280KC    |
| 27 nF       | 5750 | 2.80 ± 0.30    | ± 5%                  |                        | C5750C0G3A273J280KC    |
| 33 nF       | 5750 | 2.80 ± 0.30    | ± 5%                  |                        | C5750C0G3A333J280KC    |

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# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Table

### Class 1 (Temperature Compensating)

Temperature Characteristics: CH (-25 to +85°C, 0±60ppm/°C)

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number         |  |
|-------------|------|----------------|-----------------------|------------------------|--|
|             |      |                |                       | Rated VoltageEdc : 3KV |  |
| 10 pF       | 4520 | 0.85 ± 0.15    | ± 1pF                 | C4520CH3F100F085KA     |  |
| 12 pF       | 4520 | 0.85 ± 0.15    | ± 10%                 | C4520CH3F120K085KA     |  |
| 15 pF       | 4520 | 1.10 ± 0.20    | ± 10%                 | C4520CH3F150K110KA     |  |
| 18 pF       | 4520 | 1.10 ± 0.20    | ± 10%                 | C4520CH3F180K110KA     |  |
| 22 pF       | 4520 | 1.10 ± 0.20    | ± 10%                 | C4520CH3F220K110KA     |  |
| 27 pF       | 4520 | 1.60 ± 0.20    | ± 10%                 | C4520CH3F270K160KA     |  |
| 33 pF       | 4520 | 1.60 ± 0.20    | ± 10%                 | C4520CH3F330K160KA     |  |
| 39 pF       | 4520 | 1.60 ± 0.20    | ± 10%                 | C4520CH3F390K160KA     |  |
| 47 pF       | 4520 | 1.60 ± 0.20    | ± 10%                 | C4520CH3F470K160KA     |  |
| 56 pF       | 4520 | 2.00 ± 0.20    | ± 10%                 | C4520CH3F560K200KA     |  |
| 68 pF       | 4520 | 2.00 ± 0.20    | ± 10%                 | C4520CH3F680K200KA     |  |
| 82 pF       | 4520 | 2.00 ± 0.20    | ± 10%                 | C4520CH3F820K200KA     |  |
| 100 pF      | 4520 | 2.00 ± 0.20    | ± 10%                 | C4520CH3F101K200KA     |  |
|             | 4532 | 1.60 ± 0.20    | ± 10%                 | C4532CH3F101K160KA     |  |
| 120 pF      | 4532 | 1.60 ± 0.20    | ± 10%                 | C4532CH3F121K160KA     |  |
| 150 pF      | 4532 | 1.60 ± 0.20    | ± 10%                 | C4532CH3F151K160KA     |  |
| 180 pF      | 4532 | 1.60 ± 0.20    | ± 10%                 | C4532CH3F181K160KA     |  |
| 220 pF      | 4532 | 2.00 ± 0.20    | ± 10%                 | C4532CH3F221K200KA     |  |
| 270 pF      | 4532 | 2.30 ± 0.20    | ± 10%                 | C4532CH3F271K230KA     |  |
| 330 pF      | 4532 | 2.50 ± 0.30    | ± 10%                 | C4532CH3F331K250KA     |  |

### Class 2 (Temperature Stable)

Temperature Characteristics: JB (-25 to +85°C, ±10%)

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number         |                        |
|-------------|------|----------------|-----------------------|------------------------|------------------------|
|             |      |                |                       | Rated VoltageEdc : 2KV | Rated VoltageEdc : 1KV |
| 470 pF      | 4520 | 1.30 ± 0.20    | ± 10%                 | C4520JB3D471K130KA     | C4520JB3A471K130KA     |
|             |      |                | ± 20%                 | C4520JB3D471M130KA     | C4520JB3A471M130KA     |
|             |      |                | ± 10%                 | C4520JB3D102K130KA     | C4520JB3A102K130KA     |
| 1 nF        | 4520 | 1.30 ± 0.20    | ± 20%                 | C4520JB3D102M130KA     | C4520JB3A102M130KA     |
|             |      |                | ± 10%                 | C4532JB3D222K130KA     |                        |
| 2.2 nF      | 4532 | 1.30 ± 0.20    | ± 20%                 | C4532JB3D222M130KA     |                        |
|             |      |                | ± 10%                 |                        | C4532JB3A472K160KA     |
| 4.7 nF      | 4532 | 1.60 ± 0.20    | ± 20%                 |                        | C4532JB3A472M160KA     |
|             |      |                | ± 10%                 |                        | C4532JB3A103K200KA     |
| 10 nF       | 4532 | 2.00 ± 0.20    | ± 20%                 |                        | C4532JB3A103M200KA     |

### 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%                 | C4520X7R3D471K130KA    | C4520X7R3A471K130KA    |
|             |      |                | ± 20%                 | C4520X7R3D471M130KA    | C4520X7R3A471M130KA    |
|             |      |                | ± 10%                 | C4520X7R3D102K130KA    | C4520X7R3A102K130KA    |
| 1 nF        | 4520 | 1.30 ± 0.20    | ± 20%                 | C4520X7R3D102M130KA    | C4520X7R3A102M130KA    |
|             |      |                | ± 10%                 | C4532X7R3D222K130KA    |                        |
| 2.2 nF      | 4532 | 1.30 ± 0.20    | ± 20%                 | C4532X7R3D222M130KA    |                        |
|             |      |                | ± 10%                 |                        | C4532X7R3A472K160KA    |
| 4.7 nF      | 4532 | 1.60 ± 0.20    | ± 20%                 |                        | C4532X7R3A472M160KA    |
|             |      |                | ± 10%                 |                        | C4532X7R3A103K200KA    |
| 10 nF       | 4532 | 2.00 ± 0.20    | ± 20%                 |                        | C4532X7R3A103M200KA    |

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