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## MULTILAYER CERAMIC CHIP CAPACITORS



### **CKG Series Commercial Grade MEGACAP Type**

**Type:**

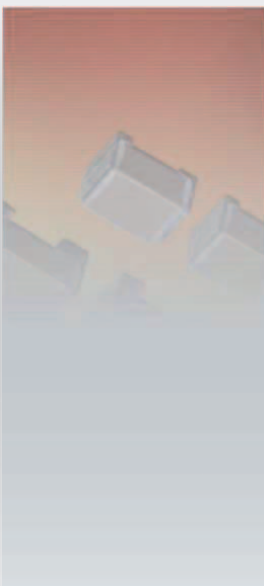
**CKG32K [EIA CC1210]**

**CKG45K [EIA CC1812]**

**CKG45N [EIA CC1812]**

**CKG57K [EIA CC2220]**

**CKG57N [EIA CC2220]**



# REMINDERS

Please read before using this product

## SAFETY REMINDERS

### REMINDERS

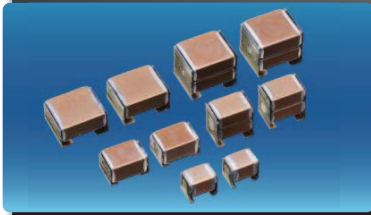
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Notice: Effective January 2013, TDK will use a new catalog number which adds product thickness and packaging specification detail. This new catalog number should be referenced on all catalog orders going forward, and is not applicable for OEM part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

# MULTILAYER CERAMIC CHIP CAPACITORS



## CKG Series MEGACAP Type

Type:CKG32K [EIA CC1210], CKG45K [EIA CC1812],  
CKG45N [EIA CC1812], CKG57K [EIA CC2220], CKG57N [EIA CC2220]

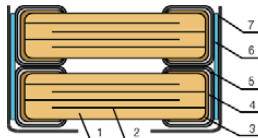
### Features

- Higher mechanical endurance is realized by metal frame connected to termination of MLCC.
- Twice capacitance is realized by double-stacked structure without changing footprint.
- Lower ESR and ESL than Al caps.
- Capable of absorbing thermal and mechanical stress.
- Improved vibration performance.

### Applications

- Smoothing circuits
- DC-DC converters, inverters, battery chargers
- LED, HID
- Temperature variable applications
- Piezoelectric-effect countermeasure

### Design Structure



| No. | Name               | Material           |                    |
|-----|--------------------|--------------------|--------------------|
|     |                    | class 1            | class 2            |
| (1) | Ceramic dielectric | CaZrO <sub>3</sub> | BaTiO <sub>3</sub> |
| (2) | Inner electrode    | Nickel (Ni)        |                    |
| (3) | Terminal           | Copper (Cu)        |                    |
| (4) |                    | Nickel (Ni)        |                    |
| (5) |                    | Tin (Sn)           |                    |
| (6) | Metal frame joint  | High temp solder   |                    |
| (7) | Metal frame        | 42 alloy           |                    |

### Shape & Dimensions

Single Type



|   |                      |
|---|----------------------|
| L | Body Length          |
| W | Body Width           |
| T | Body Height          |
| E | Metal Terminal Width |

Stacked Type



|   |                      |
|---|----------------------|
| L | Body Length          |
| W | Body Width           |
| T | Body Height          |
| E | Metal Terminal Width |

### Catalog Number Construction

CKG • 57 • N • X7S • 1C • 107 • M • 500 • J • H

#### Series Name

#### Dimensions L x W (mm)

| Code | Length      | Width       | Metal Terminal Width |
|------|-------------|-------------|----------------------|
| 32   | 3.60 ± 0.30 | 2.60 ± 0.30 | 0.80 ± 0.15          |
| 45   | 5.00 ± 0.50 | 3.50 ± 0.50 | 1.10 ± 0.30          |
| 57   | 6.00 ± 0.50 | 5.00 ± 0.50 | 1.60 ± 0.30          |

#### Structure

| Code | Description  |
|------|--------------|
| K    | Single Type  |
| N    | Stacked Type |

#### Temperature Characteristics

| Temperature Characteristics | Temperature Coefficient or Capacitance Change | Temperature Range |
|-----------------------------|---|-------------------|
| C0G                         | 0±30ppm/°C                                    | -55 to +125°C     |
| X5R                         | ±15%  | -55 to +85°C      |
| X7R                         | ±15%  | -55 to +125°C     |
| X7S                         | ±22%  | -55 to +125°C     |
| X7T                         | +22,-33%                                      | -55 to +125°C     |

#### Rated Voltage (DC)

| Code | Voltage (DC) |
|------|--------------|
| 1C   | 16V          |
| 1E   | 25V          |
| 1H   | 50V          |
| 2A   | 100V         |
| 2E   | 250V         |
| 2W   | 450V         |
| 2J   | 630V         |
| 3A   | 1000V        |

#### 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. 105 = 1,000,000pF = 1,000nF = 1µF; 107 = 100,000,000pF = 100,000nF = 100µF

#### Capacitance Tolerance

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

#### Nominal Thickness

| Code | Thickness |
|------|-----------|
| 290  | 2.90mm    |
| 335  | 3.35mm    |
| 500  | 5.00mm    |

#### Packaging Style

| Code | Style                 |
|------|-----------------------|
| A    | 178mm Reel, 4mm Pitch |
| J    | 330mm Reel, 8mm Pitch |

#### Special Reserved Code

| Code | Description |
|------|-------------|
| H    | MEGACAP     |

⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use. Please note that the contents may change without any prior notice due to reasons such as upgrading.

# MULTILAYER CERAMIC CHIP CAPACITORS TDK

## Capacitance Range Chart

## CKG32K [EIA CC1210]

### Capacitance Range Chart

Temperature Characteristics: C0G (0±30ppm/°C), X7R (±15%), X7S (±22%), X7T (+22,-33%)

Rated voltage: 1KV (3A), 630V (2J), 450V (2W), 250V (2E), 100V (2A), 50V (1H), 25V (1E)

| Capacitance |      | Tolerance                               | C0G      |           |           |           |           | X7R       |           |           |          |          | X7S       |          | X7T       |           |           |
|-------------|------|---|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|-----------|----------|-----------|-----------|-----------|
| (pF)        | Code |   | 3A (1KV) | 2J (630V) | 2W (450V) | 2E (250V) | 2A (100V) | 2J (630V) | 2E (250V) | 2A (100V) | 1H (50V) | 1E (25V) | 2A (100V) | 1H (50V) | 2J (630V) | 2W (450V) | 2E (250V) |
| 1,000       | 102  | C0G ;<br>J:±5%                          | ■        |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 1,200       | 122  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 1,500       | 152  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 1,800       | 182  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 2,200       | 222  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 2,700       | 272  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 3,300       | 332  | X7R, X7S<br>X7T ;<br>K:± 10%<br>M:± 20% |          | ■         | ■         |           |           |           |           |           |          |          |           |          |           |           |           |
| 3,900       | 392  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 4,700       | 472  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 5,600       | 562  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 6,800       | 682  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 8,200       | 822  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 10,000      | 103  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 15,000      | 153  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 22,000      | 223  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 33,000      | 333  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 47,000      | 473  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 68,000      | 683  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 100,000     | 104  |   |          |           |           |           |           |           |           |           |          |          |           | ■        |           |           |           |
| 150,000     | 154  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 220,000     | 224  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 330,000     | 334  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 470,000     | 474  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 1,000,000   | 105  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 2,200,000   | 225  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 3,300,000   | 335  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 4,700,000   | 475  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 6,800,000   | 685  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |
| 10,000,000  | 106  |   |          |           |           |           |           |           |           |           |          |          |           |          |           |           |           |

Standard thickness  3.35 mm

## Capacitance Range Chart

## CKG45K [EIA CC1812]

### Capacitance Range Chart

Temperature Characteristics: X7R (±15%), X7S (±22%), X7T (+22,-33%)

Rated voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

| Capacitance |      | Tolerance        | X7R       |           |           |          |          |          | X7S       |          |          | X7T       |           |           |
|-------------|------|------------------|-----------|-----------|-----------|----------|----------|----------|-----------|----------|----------|-----------|-----------|-----------|
| (pF)        | Code |                  | 2J (630V) | 2E (250V) | 2A (100V) | 1H (50V) | 1E (25V) | 1C (16V) | 2A (100V) | 1H (50V) | 1C (16V) | 2J (630V) | 2W (450V) | 2E (250V) |
| 100,000     | 104  | K:±10%<br>M:±20% | ■         |           |           |          |          |          |           |          |          |           |           |           |
| 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  |                  |           |           |           |          |          |          |           |          |          |           |           |           |
| 3,300,000   | 335  |                  |           |           |           |          |          |          |           |          |          |           |           |           |
| 4,700,000   | 475  |                  |           |           |           |          |          |          |           |          |          |           |           |           |
| 10,000,000  | 106  |                  |           |           |           |          |          |          |           |          |          |           |           |           |
| 22,000,000  | 226  | M:±20%           |           |           |           |          |          |          |           |          |          |           |           |           |

Standard thickness  2.90 mm

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# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Chart

## CKG57K [EIA CC2220]

### Capacitance Range Chart

Temperature Characteristics: X7R ( $\pm 15\%$ ), X7S ( $\pm 22\%$ ), X7T (+22, -33%)

Rated voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

| Capacitance |      | Tolerance                      | X7R          |              |              |             |             |             | X7S          |             |             | X7T          |              |              |
|-------------|------|--------------------------------|--------------|--------------|--------------|-------------|-------------|-------------|--------------|-------------|-------------|--------------|--------------|--------------|
| (pF)        | Code |                                | 2J<br>(630V) | 2E<br>(250V) | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) | 2A<br>(100V) | 1H<br>(50V) | 1C<br>(16V) | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) |
| 220,000     | 224  | K: $\pm 10\%$<br>M: $\pm 20\%$ |              |              |              |             |             |             |              |             |             |              |              |              |
| 330,000     | 334  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 470,000     | 474  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 680,000     | 684  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 1,000,000   | 105  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 1,500,000   | 155  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 2,200,000   | 225  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 3,300,000   | 335  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 4,700,000   | 475  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 6,800,000   | 685  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 10,000,000  | 106  | M: $\pm 20\%$                  |              |              |              |             |             |             |              |             |             |              |              |              |
| 15,000,000  | 156  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 22,000,000  | 226  |                                |              |              |              |             |             |             |              |             |             |              |              |              |
| 47,000,000  | 476  |                                |              |              |              |             |             |             |              |             |             |              |              |              |

Standard thickness 3.35 mm

# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Chart

## CKG45N [EIA CC1812]

### Capacitance Range Chart

Temperature Characteristics: X5R ( $\pm 15\%$ ), X7R ( $\pm 15\%$ ), X7S ( $\pm 22\%$ ), X7T (+22,-33%)

Rated voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

| Capacitance |      | Tolerance     | X5R         |             | X7R          |              |              |             |             |             |
|-------------|------|---------------|-------------|-------------|--------------|--------------|--------------|-------------|-------------|-------------|
| (pF)        | Code |               | 1H<br>(50V) | 1C<br>(16V) | 2J<br>(630V) | 2E<br>(250V) | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) |
| 220,000     | 224  | M: $\pm 20\%$ |             |             | ■            |              |              |             |             |             |
| 470,000     | 474  |               |             |             |              | ■            |              |             |             |             |
| 1,000,000   | 105  |               |             |             |              |              | ■            |             |             |             |
| 2,200,000   | 225  |               |             |             |              |              | ■            | ■           |             |             |
| 3,300,000   | 335  |               |             |             |              |              |              | ■           |             |             |
| 4,700,000   | 475  |               |             |             |              |              | ■            |             |             |             |
| 6,800,000   | 685  |               |             |             |              |              |              | ■           |             |             |
| 10,000,000  | 106  |               | ■           |             |              |              |              |             | ■           |             |
| 22,000,000  | 226  |               |             |             |              |              |              |             |             | ■           |
| 47,000,000  | 476  |               |             | ■           |              |              |              |             |             |             |

| Capacitance |      | Tolerance     | X7S          |             |             | X7T          |              |              |
|-------------|------|---------------|--------------|-------------|-------------|--------------|--------------|--------------|
| (pF)        | Code |               | 2A<br>(100V) | 1H<br>(50V) | 1C<br>(16V) | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) |
| 330,000     | 334  | M: $\pm 20\%$ |              |             |             | ■            |              |              |
| 470,000     | 474  |               |              |             |             |              | ■            |              |
| 680,000     | 684  |               |              |             |             |              |              | ■            |
| 1,000,000   | 105  |               |              |             |             |              |              |              |
| 1,500,000   | 155  |               |              |             |             |              |              | ■            |
| 2,200,000   | 225  |               |              |             |             |              |              |              |
| 6,800,000   | 685  |               | ■            |             |             |              |              |              |
| 10,000,000  | 106  |               |              | ■           |             |              |              |              |
| 47,000,000  | 476  |               |              |             | ■           |              |              |              |

Standard thickness

■ 5.00 mm

# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Chart

## CKG57N [EIA CC2220]


### Capacitance Range Chart

Temperature Characteristics: X5R ( $\pm 15\%$ ), X7R ( $\pm 15\%$ ), X7S ( $\pm 22\%$ ), X7T ( $+22, -33\%$ )

Rated voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

| Capacitance |      | Tolerance     | X5R          |             |             |             | X7R          |              |              |             |             |             |
|-------------|------|---------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|-------------|-------------|-------------|
| (pF)        | Code |               | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) | 2J<br>(630V) | 2E<br>(250V) | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) |
| 470,000     | 474  | M: $\pm 20\%$ |              |             |             |             | ■            |              |              |             |             |             |
| 1,000,000   | 105  |               |              |             |             |             |              | ■            |              |             |             |             |
| 2,200,000   | 225  |               |              |             |             |             |              | ■            | ■            |             |             |             |
| 4,700,000   | 475  |               |              |             |             |             |              |              | ■            | ■           |             |             |
| 10,000,000  | 106  |               | ■            |             |             |             |              |              | ■            | ■           |             |             |
| 22,000,000  | 226  |               |              | ■           |             |             |              |              |              |             | ■           |             |
| 33,000,000  | 336  |               |              |             |             |             |              |              |              |             |             | ■           |
| 47,000,000  | 476  |               |              |             | ■           |             |              |              |              |             |             | ■           |
| 100,000,000 | 107  |               |              |             |             | ■           |              |              |              |             | ■           |             |

| Capacitance |      | Tolerance     | X7S          |             |             |             | X7T          |              |              |
|-------------|------|---------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|
| (pF)        | Code |               | 2A<br>(100V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) |
| 680,000     | 684  | M: $\pm 20\%$ |              |             |             |             | ■            |              |              |
| 1,000,000   | 105  |               |              |             |             |             |              | ■            |              |
| 1,500,000   | 155  |               |              |             |             |             |              | ■            |              |
| 2,200,000   | 225  |               |              |             |             |             |              |              | ■            |
| 3,300,000   | 335  |               |              |             |             |             |              |              | ■            |
| 22,000,000  | 226  |               | ■            | ■           |             |             |              |              |              |
| 47,000,000  | 476  |               |              |             | ■           |             |              |              |              |
| 100,000,000 | 107  |               |              |             |             | ■           |              |              |              |

Standard thickness  
 5.00 mm



# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Table

### Class 1 (Temperature Compensating)

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

| Capacitance | Dimensions | Thickness (mm) | Capacitance Tolerance | Catalog number         |                         |                         |                         |                         |
|-------------|------------|----------------|-----------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|             |            |                |                       | Rated voltage Edc: 1KV | Rated voltage Edc: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 1 nF        | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A102J335AH   |                         |                         |                         |                         |
| 1.2 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A122J335AH   |                         |                         |                         |                         |
| 1.5 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A152J335AH   |                         |                         |                         |                         |
| 1.8 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A182J335AH   |                         |                         |                         |                         |
| 2.2 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A222J335AH   |                         |                         |                         |                         |
| 2.7 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A272J335AH   |                         |                         |                         |                         |
| 3.3 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A332J335AH   |                         |                         |                         |                         |
| 3.9 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A392J335AH   |                         |                         |                         |                         |
| 4.7 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A472J335AH   |                         |                         |                         |                         |
| 5.6 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A562J335AH   |                         |                         |                         |                         |
| 6.8 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A682J335AH   |                         |                         |                         |                         |
| 8.2 nF      | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A822J335AH   |                         |                         |                         |                         |
| 10 nF       | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A103J335AH   |                         |                         |                         |                         |
| 15 nF       | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A153J335AH   |                         |                         |                         |                         |
| 22 nF       | 3225       | 3.35±0.10      | ±5%                   | CKG32KC0G3A223J335AH   | CKG32KC0G2J223J335AH    | CKG32KC0G2W223J335AH    |                         |                         |
| 33 nF       | 3225       | 3.35±0.10      | ±5%                   |                        | CKG32KC0G2J333J335AH    | CKG32KC0G2W333J335AH    | CKG32KC0G2E333J335AH    |                         |
| 47 nF       | 3225       | 3.35±0.10      | ±5%                   |                        |                         |                         | CKG32KC0G2E473J335AH    |                         |
| 68 nF       | 3225       | 3.35±0.10      | ±5%                   |                        |                         |                         |                         | CKG32KC0G2A683J335AH    |

### Class 2 (Temperature Stable)

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

| Capacitance | Dimensions | Thickness (mm) | Capacitance Tolerance | Catalog number          |                        |                        |                        |
|-------------|------------|----------------|-----------------------|-------------------------|------------------------|------------------------|------------------------|
|             |            |                |                       | Rated voltage Edc: 100V | Rated voltage Edc: 50V | Rated voltage Edc: 25V | Rated voltage Edc: 16V |
| 10 µF       | 4532       | 5.00±0.50      | ±20%                  |                         | CKG45NX5R1H106M500JH   |                        |                        |
|             | 5750       | 5.00±0.50      | ±20%                  | CKG57NX5R2A106M500JH    |                        |                        |                        |
| 22 µF       | 5750       | 5.00±0.50      | ±20%                  |                         | CKG57NX5R1H226M500JH   |                        |                        |
| 47 µF       | 4532       | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG45NX5R1C476M500JH   |
|             | 5750       | 5.00±0.50      | ±20%                  |                         |                        | CKG57NX5R1E476M500JH   |                        |
| 100 µF      | 5750       | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG57NX5R1C107M500JH   |

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# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Table

### Class 2 (Temperature Stable)

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

| Capacitance | Dimensions | Thickness (mm) | Capacitance Tolerance | Catalog number          |                         |                         |                        |
|-------------|------------|----------------|-----------------------|-------------------------|-------------------------|-------------------------|------------------------|
|             |            |                |                       | Rated voltage Edc: 630V | Rated voltage Edc: 250V | Rated voltage Edc: 100V | Rated voltage Edc: 50V |
| 47 nF       | 3225       | 3.35±0.10      | ±10%                  | CKG32KX7R2J473K335AH    |                         |                         |                        |
|             |            |                | ±20%                  | CKG32KX7R2J473M335AH    |                         |                         |                        |
| 100 nF      | 3225       | 3.35±0.10      | ±10%                  |                         | CKG32KX7R2E104K335AH    |                         |                        |
|             |            |                | ±20%                  |                         | CKG32KX7R2E104M335AH    |                         |                        |
|             | 4532       | 2.90±0.10      | ±10%                  | CKG45KX7R2J104K290JH    |                         |                         |                        |
|             |            |                | ±20%                  | CKG45KX7R2J104M290JH    |                         |                         |                        |
| 220 nF      | 3225       | 3.35±0.10      | ±10%                  |                         | CKG32KX7R2E224K335AH    |                         |                        |
|             |            |                | ±20%                  |                         | CKG32KX7R2E224M335AH    |                         |                        |
|             | 4532       | 2.90±0.10      | ±10%                  |                         | CKG45KX7R2E224K290JH    |                         |                        |
|             |            |                | ±20%                  |                         | CKG45KX7R2E224M290JH    |                         |                        |
| 470 nF      | 3225       | 3.35±0.10      | ±10%                  |                         |                         | CKG32KX7R2A474K335AH    |                        |
|             |            |                | ±20%                  |                         |                         | CKG32KX7R2A474M335AH    |                        |
|             | 4532       | 2.90±0.10      | ±10%                  |                         | CKG45KX7R2E474K290JH    |                         |                        |
|             |            |                | ±20%                  |                         | CKG45KX7R2E474M290JH    |                         |                        |
| 1 µF        | 3225       | 3.35±0.10      | ±10%                  |                         |                         | CKG32KX7R2A105K335AH    | CKG32KX7R1H105K335AH   |
|             |            |                | ±20%                  |                         |                         | CKG32KX7R2A105M335AH    | CKG32KX7R1H105M335AH   |
|             | 4532       | 2.90±0.10      | ±10%                  |                         |                         | CKG45KX7R2A105K290JH    |                        |
|             |            |                | ±20%                  |                         |                         | CKG45KX7R2A105M290JH    |                        |
| 1.5 µF      | 3225       | 3.35±0.10      | ±10%                  |                         | CKG45NX7R2E105M500JH    |                         |                        |
|             |            |                | ±20%                  |                         | CKG45NX7R2E105M500JH    |                         |                        |
|             | 4532       | 2.90±0.10      | ±10%                  |                         | CKG57KX7R2E105K335JH    | CKG57KX7R2A105K335JH    |                        |
|             |            |                | ±20%                  |                         | CKG57KX7R2E105M335JH    | CKG57KX7R2A105M335JH    |                        |
| 2.2 µF      | 3225       | 3.35±0.10      | ±10%                  |                         |                         | CKG32KX7R2A225K335AH    |                        |
|             |            |                | ±20%                  |                         |                         | CKG32KX7R2A225M335AH    |                        |
|             | 4532       | 2.90±0.10      | ±10%                  |                         |                         | CKG45KX7R2A225K290JH    |                        |
|             |            |                | ±20%                  |                         |                         | CKG45KX7R2A225M290JH    |                        |
| 1.5 µF      | 3225       | 3.35±0.10      | ±10%                  |                         |                         | CKG45NX7R2A225M500JH    |                        |
|             |            |                | ±20%                  |                         |                         | CKG45NX7R2A225M500JH    |                        |
|             | 4532       | 2.90±0.10      | ±10%                  |                         |                         | CKG57KX7R2A225K335JH    |                        |
|             |            |                | ±20%                  |                         |                         | CKG57KX7R2A225M335JH    |                        |
| 2.2 µF      | 3225       | 3.35±0.10      | ±10%                  |                         |                         | CKG57NX7R2E225M500JH    |                        |
|             |            |                | ±20%                  |                         |                         | CKG57NX7R2E225M500JH    |                        |
|             | 4532       | 2.90±0.10      | ±10%                  |                         |                         | CKG57NX7R2E225M500JH    |                        |
|             |            |                | ±20%                  |                         |                         | CKG57NX7R2E225M500JH    |                        |

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# MULTILAYER CERAMIC CHIP CAPACITORS

## Capacitance Range Table

### Class 2 (Temperature Stable)


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

| Capacitance | Dimensions | Thickness (mm) | Capacitance Tolerance | Catalog number          |                        |                        |                        |
|-------------|------------|----------------|-----------------------|-------------------------|------------------------|------------------------|------------------------|
|             |            |                |                       | Rated voltage Edc: 100V | Rated voltage Edc: 50V | Rated voltage Edc: 25V | Rated voltage Edc: 16V |
| 3.3 µF      | 4532       | 2.90±0.10      | ±10%                  |                         | CKG45KX7R1H335K290JH   |                        |                        |
|             |            | 5.00±0.50      | ±20%                  |                         | CKG45KX7R1H335M290JH   |                        |                        |
|             | 5750       | 3.35±0.15      | ±10%                  | CKG57KX7R2A335K335JH    |                        |                        |                        |
|             |            |                | ±20%                  | CKG57KX7R2A335M335JH    |                        |                        |                        |
| 4.7 µF      | 3225       | 3.35±0.10      | ±10%                  |                         |                        | CKG32KX7R1E475K335AH   |                        |
|             |            |                | ±20%                  |                         |                        | CKG32KX7R1E475M335AH   |                        |
|             | 4532       | 2.90±0.10      | ±10%                  |                         |                        | CKG45KX7R1E475K290JH   |                        |
|             |            | 5.00±0.50      | ±20%                  | CKG45NX7R2A475M500JH    |                        | CKG45KX7R1E475M290JH   |                        |
|             | 5750       | 3.35±0.15      | ±10%                  | CKG57KX7R2A475K335JH    | CKG57KX7R1H475K335JH   |                        |                        |
|             |            | 5.00±0.50      | ±20%                  | CKG57KX7R2A475M335JH    | CKG57KX7R1H475M335JH   |                        |                        |
| 6.8 µF      | 4532       | 5.00±0.50      | ±20%                  |                         | CKG45NX7R1H685M500JH   |                        |                        |
|             |            | 3225           | 3.35±0.10             | ±10%                    |                        |                        | CKG32KX7R1E106K335AH   |
|             |            |                | ±20%                  |                         |                        | CKG32KX7R1E106M335AH   |                        |
| 10 µF       | 4532       | 2.90±0.10      | ±10%                  |                         |                        |                        | CKG45KX7R1C106K290JH   |
|             |            | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG45KX7R1C106M290JH   |
|             | 5750       | 3.35±0.15      | ±10%                  |                         |                        | CKG45NX7R1E106M500JH   |                        |
|             |            | 5.00±0.50      | ±20%                  | CKG57NX7R2A106M500JH    | CKG57NX7R1H106M500JH   |                        |                        |
| 15 µF       | 5750       | 3.35±0.15      | ±20%                  |                         |                        |                        | CKG57KX7R1C156M335JH   |
|             |            | 2.90±0.10      | ±20%                  |                         |                        |                        | CKG45KX7R1C226M290JH   |
| 22 µF       | 4532       | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG45NX7R1C226M500JH   |
|             |            | 5750           | 3.35±0.15             | ±20%                    |                        |                        | CKG57KX7R1E226M335JH   |
|             | 5.00±0.50  |                | ±20%                  |                         |                        | CKG57NX7R1E226M500JH   |                        |
| 33 µF       | 5750       | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG57NX7R1C336M500JH   |
| 47 µF       | 5750       | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG57KX7R1E476M335JH   |
| 100 µF      | 5750       | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG57NX7R1E107M500JH   |

### Class 2 (Temperature Stable)

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

| Capacitance | Dimensions | Thickness (mm) | Capacitance Tolerance | Catalog number          |                        |                        |                        |
|-------------|------------|----------------|-----------------------|-------------------------|------------------------|------------------------|------------------------|
|             |            |                |                       | Rated voltage Edc: 100V | Rated voltage Edc: 50V | Rated voltage Edc: 25V | Rated voltage Edc: 16V |
| 3.3 µF      | 3225       | 3.35±0.10      | ±10%                  | CKG32KX7S2A335K335AH    |                        |                        |                        |
|             |            |                | ±20%                  | CKG32KX7S2A335M335AH    |                        |                        |                        |
|             | 4532       | 2.90±0.10      | ±10%                  | CKG45KX7S2A335K290JH    |                        |                        |                        |
|             |            |                | ±20%                  | CKG45KX7S2A335M290JH    |                        |                        |                        |
| 4.7 µF      | 3225       | 3.35±0.10      | ±10%                  | CKG32KX7S2A475K335AH    | CKG32KX7S1H475K335AH   |                        |                        |
|             |            |                | ±20%                  | CKG32KX7S2A475M335AH    | CKG32KX7S1H475M335AH   |                        |                        |
|             | 4532       | 2.90±0.10      | ±10%                  | CKG45KX7S2A475K290JH    | CKG45KX7S1H475K290JH   |                        |                        |
|             |            |                | ±20%                  | CKG45KX7S2A475M290JH    | CKG45KX7S1H475M290JH   |                        |                        |
| 6.8 µF      | 3225       | 3.35±0.10      | ±10%                  |                         |                        | CKG32KX7S1H685K335AH   |                        |
|             |            |                | ±20%                  |                         |                        | CKG32KX7S1H685M335AH   |                        |
|             | 4532       | 5.00±0.50      | ±20%                  | CKG45NX7S2A685M500JH    |                        |                        |                        |
|             |            | 5750           | 3.35±0.15             | ±10%                    | CKG57KX7S2A685K335JH   |                        |                        |
|             |            |                | ±20%                  | CKG57KX7S2A685M335JH    |                        |                        |                        |
| 10 µF       | 3225       | 3.35±0.10      | ±10%                  |                         |                        | CKG32KX7S1H106K335AH   |                        |
|             |            |                | ±20%                  |                         |                        | CKG32KX7S1H106M335AH   |                        |
|             | 4532       | 5.00±0.50      | ±20%                  | CKG45NX7S2A106M500JH    | CKG45NX7S1H106M500JH   |                        |                        |
|             |            | 5750           | 3.35±0.15             | ±10%                    | CKG57KX7S2A106K335JH   | CKG57KX7S1H106K335JH   |                        |
|             |            |                | ±20%                  | CKG57KX7S2A106M335JH    | CKG57KX7S1H106M335JH   |                        |                        |
| 15 µF       | 5750       | 3.35±0.15      | ±20%                  | CKG57KX7S2A156M335JH    |                        |                        |                        |
| 22 µF       | 4532       | 2.90±0.10      | ±20%                  |                         |                        |                        | CKG45KX7S1C226M290JH   |
|             |            | 5750           | 5.00±0.50             | ±20%                    | CKG57NX7S2A226M500JH   | CKG57NX7S1H226M500JH   |                        |
| 47 µF       | 4532       | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG45NX7S1C476M500JH   |
|             |            | 5750           | 3.35±0.15             | ±20%                    |                        |                        |                        |
|             | 5.00±0.50  |                | ±20%                  |                         |                        | CKG57NX7S1E476M500JH   |                        |
| 100 µF      | 5750       | 5.00±0.50      | ±20%                  |                         |                        |                        | CKG57NX7S1C107M500JH   |

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# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Table

### Class 2 (Temperature Stable)

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

| Capacitance | Dimensions | Thickness (mm) | Capacitance Tolerance | Catalog number          |                         |                         |
|-------------|------------|----------------|-----------------------|-------------------------|-------------------------|-------------------------|
|             |            |                |                       | Rated voltage Edc: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V |
| 100 nF      | 3225       | 3.35±0.10      | ±10%                  | CKG32KX7T2J104K335AH    |                         |                         |
|             |            |                | ±20%                  | CKG32KX7T2J104M335AH    |                         |                         |
| 150 nF      | 3225       | 3.35±0.10      | ±10%                  | CKG32KX7T2J154K335AH    |                         |                         |
|             |            |                | ±20%                  | CKG32KX7T2J154M335AH    |                         |                         |
|             | 4532       | 2.90±0.10      | ±10%                  | CKG45KX7T2J154K290JH    |                         |                         |
|             |            |                | ±20%                  | CKG45KX7T2J154M290JH    |                         |                         |
| 220 nF      | 3225       | 3.35±0.10      | ±10%                  | CKG32KX7T2W224K335AH    |                         | CKG32KX7T2E334K335AH    |
|             |            |                | ±20%                  | CKG32KX7T2W224M335AH    |                         | CKG32KX7T2E334M335AH    |
|             | 4532       | 2.90±0.10      | ±10%                  | CKG45KX7T2J224K290JH    |                         | CKG45KX7T2E334K290JH    |
|             |            |                | ±20%                  | CKG45KX7T2J224M290JH    |                         | CKG45KX7T2E334M290JH    |
| 330 nF      | 3225       | 3.35±0.10      | ±10%                  | CKG32KX7T2E334K335AH    |                         |                         |
|             |            |                | ±20%                  | CKG32KX7T2E334M335AH    |                         |                         |
|             | 4532       | 2.90±0.10      | ±10%                  | CKG45KX7T2W334K290JH    |                         | CKG45KX7T2E334K290JH    |
|             |            |                | ±20%                  | CKG45KX7T2W334M290JH    |                         | CKG45KX7T2E334M290JH    |
|             | 5750       | 3.35±0.15      | ±10%                  | CKG45NX7T2J334M500JH    |                         |                         |
|             |            |                | ±20%                  | CKG57KX7T2J334K335JH    |                         |                         |
| 470 nF      | 4532       | 2.90±0.10      | ±10%                  | CKG45KX7T2W474K290JH    |                         | CKG45KX7T2E684K290JH    |
|             |            |                | ±20%                  | CKG45KX7T2W474M290JH    |                         | CKG45KX7T2E684M290JH    |
|             | 5750       | 3.35±0.15      | ±10%                  | CKG45NX7T2J474M500JH    |                         |                         |
|             |            |                | ±20%                  | CKG57KX7T2J474K335JH    |                         |                         |
| 680 nF      | 4532       | 2.90±0.10      | ±10%                  | CKG45KX7T2E684K290JH    |                         |                         |
|             |            |                | ±20%                  | CKG45KX7T2E684M290JH    |                         |                         |
|             | 5750       | 3.35±0.15      | ±10%                  | CKG45NX7T2W684M500JH    |                         | CKG45NX7T2E105K290JH    |
|             |            |                | ±20%                  | CKG57KX7T2W684K335JH    |                         | CKG45NX7T2E105M290JH    |
| 1 µF        | 4532       | 2.90±0.10      | ±10%                  | CKG45NX7T2W105M500JH    |                         | CKG45NX7T2E105K290JH    |
|             |            |                | ±20%                  | CKG57KX7T2W105K335JH    |                         | CKG45NX7T2E105M290JH    |
|             | 5750       | 3.35±0.15      | ±10%                  | CKG57KX7T2W105M335JH    |                         |                         |
|             |            |                | ±20%                  | CKG57NX7T2J105M500JH    |                         |                         |
| 1.5 µF      | 4532       | 5.00±0.50      | ±10%                  | CKG45NX7T2E155M500JH    |                         |                         |
|             |            |                | ±20%                  | CKG57KX7T2E155K335JH    |                         |                         |
|             | 5750       | 3.35±0.15      | ±10%                  | CKG57NX7T2W155M500JH    |                         | CKG57KX7T2E155M335JH    |
|             |            |                | ±20%                  | CKG45NX7T2E225M500JH    |                         | CKG57KX7T2E225K335JH    |
| 2.2 µF      | 4532       | 5.00±0.50      | ±10%                  | CKG45NX7T2E225M500JH    |                         |                         |
|             |            |                | ±20%                  | CKG57KX7T2E225K335JH    |                         |                         |
|             | 5750       | 3.35±0.15      | ±10%                  | CKG57NX7T2W225M500JH    |                         | CKG57KX7T2E225M335JH    |
|             |            |                | ±20%                  | CKG45NX7T2E225M500JH    |                         | CKG57KX7T2E225K335JH    |
| 3.3 µF      | 5750       | 5.00±0.50      | ±20%                  | CKG57NX7T2W225M500JH    |                         | CKG57NX7T2E335M500JH    |

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