

# Multilayer Ceramic Chip Capacitors

For automobile(Metal cap type)

## CKG series

Type:            **CKG32K**  
                     **CKG45K**  
                     **CKG45N**  
                     **CKG57K**  
                     **CKG57N**

Issue date:     August 2011

- All specifications are subject to change without notice.
  - Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
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# REMINDERS

Please read this before using the product.

## SAFETY REMINDERS

### REMINDERS

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8. The descriptions in this catalog apply as of August, 2011.

# Multilayer Ceramic Chip Capacitors For Automobile(Metal Cap Type)

Conformity to RoHS Directive

## CKG Series

### FEATURES

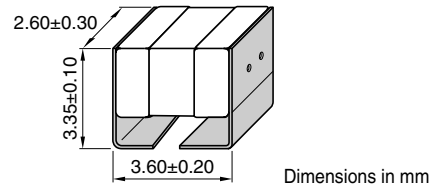
- A unique structure that ensures high reliability.
- The series realizes high reliability, even when used on aluminum or alumina substrates with a significantly different coefficient of thermal expansion, through the use of metal caps that absorb stress caused by heat and mechanical shock.
- Ideal for switching regulators that operate at high frequencies due to small ESR and ESL.

### APPLICATION EXAMPLES

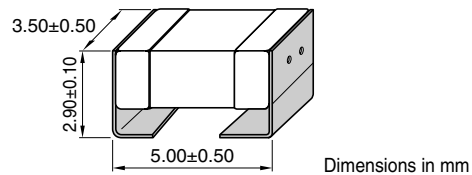
- Anti-lock braking units that require high reliability
- HID or LED lighting units used in severe temperature environments
- Replacement for electrolytic capacitors or tantalum capacitors for which heat generation due to ESR is a concern.

### SHAPES AND DIMENSIONS

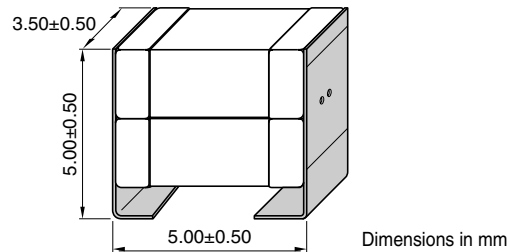
#### CKG32K



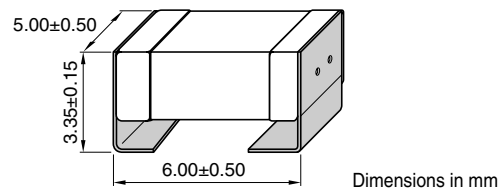
#### CKG45K



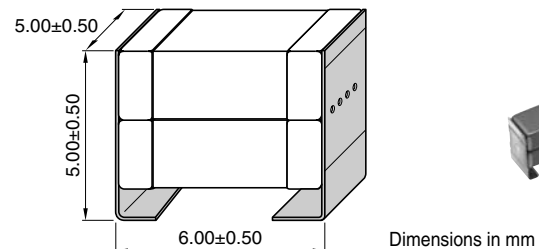
#### CKG45N



#### CKG57K



#### CKG57N



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## PRODUCT IDENTIFICATION

CKG 57 K X7R 1E 476 M ( 500 J C )  
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

### (1) Series name

### (2) Dimensions L×W

|    |                                   |
|----|-----------------------------------|
| 32 | 3.8×2.9mm<br>(Element: 3.2×2.5mm) |
| 45 | 5.5×4.0mm<br>(Element: 4.5×3.2mm) |
| 57 | 6.5×5.5mm<br>(Element: 5.7×5.0mm) |

### (3) Structure

|   |                    |
|---|--------------------|
| K | Single layer       |
| N | Two stacked layers |

### (4) Capacitance temperature characteristics

#### Class 2 (Temperature stable and general purpose)

| Temperature characteristics | Capacitance change | Temperature range |
|-----------------------------|--------------------|-------------------|
| 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     |

### (5) Rated voltage E<sub>dc</sub>

|    |      |
|----|------|
| 1C | 16V  |
| 1E | 25V  |
| 1H | 50V  |
| 2A | 100V |
| 2E | 250V |
| 2W | 450V |
| 2J | 630V |

### (6) Nominal capacitance

The capacitance is expressed in three digit codes and in units of pico farads (pF).

The first and second digits identify the first and second significant figures of the capacitance.

The third digit identifies the multiplier.

R designates a decimal point.

|     |                     |
|-----|---------------------|
| 474 | 470,000pF           |
| 225 | 2,200,000pF (2.2μF) |

### (7) Capacitance tolerance

| Symbol | Tolerance |
|--------|-----------|
| M      | ±20%      |

### (8) Dimensions T

Expressed by a three-digit number in mm units.

The second and third digits denote the first and second decimal places, respectively.

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

### (9) Packaging style

|   |                            |
|---|----------------------------|
| A | ø178mm reel with 4mm-pitch |
| B | ø178mm reel with 2mm-pitch |
| C | ø178mm reel with 1mm-pitch |
| D | ø330mm reel with 4mm-pitch |
| E | ø330mm reel with 2mm-pitch |
| F | ø330mm reel with 1mm-pitch |
| H | Bulk(bag)                  |
| J | ø330mm reel with 8mm-pitch |
| K | ø178mm reel with 8mm-pitch |

### (10) TDK internal code

In brochures issued in August, 2011 and later, the product thickness and packing specifications are described at the end of the ordering name [the product name described in brochures] in parentheses.

Since the existing ordering name could not clearly express the product thickness and packing specifications, it has been changed to a new product description method that solves this inconvenience.

Please be aware that the last five digits of the ordering name on the delivery label and those in the brochure differ.

No changes have been made to the delivery name.

(Example)

| Brochure issued date  | Ordering name (description in the brochure) | Delivery name (description on the delivery label) |
|-----------------------|---|---|
| Prior to July, 2011   | C1608X5R1C105K                              | C1608X5R1C105KT000N                               |
| August, 2011 or later | C1608X5R1C105K(080AA)                       | C1608X5R1C105KT000N                               |

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**CAPACITANCE RANGES: CLASS 2****TEMPERATURE CHARACTERISTICS: X5R(±15%)**

| Capacitance | Dimension<br>L×W | Thickness<br>T(mm) | Capacitance<br>tolerance | Part No.                |                         |                         |                         |
|-------------|------------------|--------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|             |                  |                    |                          | Rated voltage Edc: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 10μF        | 6555             | 5.00±0.50          | ±20%                     | CKG57NX5R2A106M(500JA)  |                         |                         |                         |

**TEMPERATURE CHARACTERISTICS: X5R(±15%)**

| Capacitance | Dimension<br>L×W | Thickness<br>T(mm) | Capacitance<br>tolerance | Part No.               |                        |                        |
|-------------|------------------|--------------------|--------------------------|------------------------|------------------------|------------------------|
|             |                  |                    |                          | Rated voltage Edc: 50V | Rated voltage Edc: 25V | Rated voltage Edc: 16V |
| 22μF        | 6555             | 5.00±0.50          | ±20%                     | CKG57NX5R1H226M(500JA) |                        |                        |
| 47μF        | 6555             | 5.00±0.50          | ±20%                     | CKG57NX5R1E476M(500JA) |                        |                        |
| 100μF       | 6555             | 5.00±0.50          | ±20%                     | CKG57NX5R1C107M(500JA) |                        |                        |

**TEMPERATURE CHARACTERISTICS: X7R(±15%)**

| Capacitance | Dimension<br>L×W | Thickness<br>T(mm) | Capacitance<br>tolerance | Part No.                |                         |                         |                         |
|-------------|------------------|--------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|             |                  |                    |                          | Rated voltage Edc: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 47nF        | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7R2J473M(335AA)  |                         |                         |                         |
| 100nF       | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7R2E104M(335AA)  |                         |                         |                         |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7R2J104M(290JA)  |                         |                         |                         |
| 220nF       | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7R2E224M(335AA)  |                         |                         |                         |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7R2E224M(290JA)  |                         |                         |                         |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG45NX7R2J224M(500JA)  |                         |                         |                         |
| 470nF       | 3829             | 3.35±0.10          | ±20%                     | CKG57KX7R2J224M(335JA)  |                         |                         |                         |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG32KX7R2A474M(335AA)  |                         |                         |                         |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG45KX7R2E474M(290JA)  |                         |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG45NX7R2E474M(500JA)  |                         |                         |                         |
| 1μF         | 3829             | 3.35±0.10          | ±20%                     | CKG57KX7R2E474M(335JA)  |                         |                         |                         |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG32KX7R2A105M(335AA)  |                         |                         |                         |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG45KX7R2A105M(290JA)  |                         |                         |                         |
| 2.2μF       | 3829             | 3.35±0.10          | ±20%                     | CKG45NX7R2E105M(500JA)  |                         |                         |                         |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG57KX7R2E105M(335JA)  |                         |                         |                         |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG57NX7R2E105M(500JA)  |                         |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG32KX7R2A225M(335AA)  |                         |                         |                         |
| 3.3μF       | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7R2A225M(290JA)  |                         |                         |                         |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG45NX7R2A225M(500JA)  |                         |                         |                         |
| 4.7μF       | 5540             | 5.00±0.50          | ±20%                     | CKG57KX7R2A225M(335JA)  |                         |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7R2A225M(500JA)  |                         |                         |                         |
| 10μF        | 5540             | 5.00±0.50          | ±20%                     | CKG57KX7R2A335M(335JA)  |                         |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG45NX7R2A475M(500JA)  |                         |                         |                         |
| 4.7μF       | 6555             | 3.35±0.15          | ±20%                     | CKG57NX7R2A475M(500JA)  |                         |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57KX7R2A475M(335JA)  |                         |                         |                         |
| 10μF        | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7R2A106M(500JA)  |                         |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7R2A106M(500JA)  |                         |                         |                         |

**TEMPERATURE CHARACTERISTICS: X7R(±15%)**

| Capacitance | Dimension<br>L×W | Thickness<br>T(mm) | Capacitance<br>tolerance | Part No.               |                        |                        |
|-------------|------------------|--------------------|--------------------------|------------------------|------------------------|------------------------|
|             |                  |                    |                          | Rated voltage Edc: 50V | Rated voltage Edc: 25V | Rated voltage Edc: 16V |
| 1μF         | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7R1H105M(335AA) |                        |                        |
| 1.5μF       | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7R1H155M(290JA) |                        |                        |
| 3.3μF       | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7R1H335M(290JA) |                        |                        |
|             | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7R1H335M(500JA) |                        |                        |
| 4.7μF       | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7R1E475M(335AA) |                        |                        |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7R1H475M(290JC) |                        |                        |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG45KX7R1E475M(290JA) |                        |                        |
| 6.8μF       | 5540             | 5.00±0.50          | ±20%                     | CKG57KX7R1H475M(335JA) |                        |                        |
|             | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7R1H685M(500JA) |                        |                        |
| 10μF        | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7R1E106M(335AC) |                        |                        |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7R1C106M(290JA) |                        |                        |
|             | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7R1H106M(500JC) |                        |                        |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG45NX7R1E106M(500JA) |                        |                        |
| 15μF        | 6555             | 5.00±0.50          | ±20%                     | CKG57KX7R1E106M(335JA) |                        |                        |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57KX7R1C156M(335JA) |                        |                        |
| 22μF        | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7R1C226M(290JC) |                        |                        |
|             | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7R1C226M(500JA) |                        |                        |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG57KX7R1E226M(335JA) |                        |                        |
| 33μF        | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7R1H226M(500JC) |                        |                        |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7R1E226M(500JA) |                        |                        |
| 47μF        | 5540             | 5.00±0.50          | ±20%                     | CKG57NX7R1C336M(500JA) |                        |                        |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG45NX7R1C476M(500JC) |                        |                        |
| 100μF       | 6555             | 3.35±0.15          | ±20%                     | CKG57KX7R1C476M(335JC) |                        |                        |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7R1E476M(500JC) |                        |                        |
| 100μF       | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7R1C107M(500JC) |                        |                        |

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**CAPACITANCE RANGES: CLASS 2**
**TEMPERATURE CHARACTERISTICS: X7S(±22%)**

| Capacitance | Dimension<br>L×W | Thickness<br>T(mm) | Capacitance<br>tolerance | Part No.                |                         |                         |                         |
|-------------|------------------|--------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|             |                  |                    |                          | Rated voltage Edc: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 3.3μF       | 3829             | 3.35±0.10          | ±20%                     |                         |                         |                         | CKG32KX7S2A335M(335AA)  |
|             | 5540             | 2.90±0.10          | ±20%                     |                         |                         |                         | CKG45KX7S2A335M(290JA)  |
| 4.7μF       | 3829             | 3.35±0.10          | ±20%                     |                         |                         |                         | CKG32KX7S2A475M(335AA)  |
|             | 5540             | 2.90±0.10          | ±20%                     |                         |                         |                         | CKG45KX7S2A475M(290JA)  |
| 6.8μF       | 5540             | 5.00±0.50          | ±20%                     |                         |                         |                         | CKG45NX7S2A685M(500JA)  |
|             | 6555             | 3.35±0.15          | ±20%                     |                         |                         |                         | CKG57KX7S2A685M(335JA)  |
| 10μF        | 5540             | 5.00±0.50          | ±20%                     |                         |                         |                         | CKG45NX7S2A106M(500JA)  |
|             | 6555             | 3.35±0.15          | ±20%                     |                         |                         |                         | CKG57KX7S2A106M(335JA)  |
| 15μF        | 6555             | 3.35±0.15          | ±20%                     |                         |                         |                         | CKG57KX7S2A156M(335JA)  |
| 22μF        | 6555             | 5.00±0.50          | ±20%                     |                         |                         |                         | CKG57NX7S2A226M(500JA)  |

**TEMPERATURE CHARACTERISTICS: X7S(±22%)**

| Capacitance | Dimension<br>L×W | Thickness<br>T(mm) | Capacitance<br>tolerance | Part No.               |                        |                        |
|-------------|------------------|--------------------|--------------------------|------------------------|------------------------|------------------------|
|             |                  |                    |                          | Rated voltage Edc: 50V | Rated voltage Edc: 25V | Rated voltage Edc: 16V |
| 4.7μF       | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7S1H475M(335AB) |                        |                        |
| 6.8μF       | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7S1H685M(335AB) |                        |                        |
| 10μF        | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7S1H106M(335AB) |                        |                        |
|             | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7S1H106M(500JC) |                        |                        |
| 47μF        | 5540             | 5.00±0.50          | ±20%                     |                        |                        | CKG45NX7S1C476M(500JC) |

**TEMPERATURE CHARACTERISTICS: X7T(+22, -33%)**

| Capacitance | Dimension<br>L×W | Thickness<br>T(mm) | Capacitance<br>tolerance | Part No.                |                         |                         |                         |
|-------------|------------------|--------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|             |                  |                    |                          | Rated voltage Edc: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 150nF       | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7T2J154M(335AA)  |                         |                         |                         |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7T2J154M(290JA)  |                         |                         |                         |
| 220nF       | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7T2W224M(335AA)  |                         |                         |                         |
|             | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7T2J224M(290JA)  |                         |                         |                         |
| 330nF       | 3829             | 3.35±0.10          | ±20%                     | CKG32KX7T2E334M(335AA)  |                         |                         |                         |
|             |                  | 2.90±0.10          | ±20%                     | CKG45KX7T2W334M(290JA)  |                         |                         |                         |
|             | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7T2J334M(500JA)  |                         |                         |                         |
|             |                  | 6555               | 3.35±0.15                | ±20%                    | CKG57KX7T2J334M(335JA)  |                         |                         |
| 470nF       | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7T2W474M(290JA)  |                         |                         |                         |
|             |                  | 5.00±0.50          | ±20%                     | CKG45NX7T2J474M(500JA)  |                         |                         |                         |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG57KX7T2J474M(335JA)  |                         |                         |                         |
|             |                  | 5540               | 2.90±0.10                | ±20%                    | CKG45KX7T2E684M(290JA)  |                         |                         |
| 680nF       | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7T2W684M(500JA)  |                         |                         |                         |
|             |                  | 6555               | 3.35±0.15                | ±20%                    | CKG57KX7T2W684M(335JA)  |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7T2J684M(500JA)  |                         |                         |                         |
| 1μF         | 5540             | 2.90±0.10          | ±20%                     | CKG45KX7T2E105M(290JA)  |                         |                         |                         |
|             |                  | 5.00±0.50          | ±20%                     | CKG45NX7T2W105M(500JA)  |                         |                         |                         |
|             | 6555             | 3.35±0.15          | ±20%                     | CKG57KX7T2W105M(335JA)  |                         |                         |                         |
|             |                  | 5.00±0.50          | ±20%                     | CKG57NX7T2J105M(500JA)  |                         |                         |                         |
| 1.5μF       | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7T2E155M(500JA)  |                         |                         |                         |
|             |                  | 6555               | 3.35±0.15                | ±20%                    | CKG57KX7T2E155M(335JA)  |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7T2W155M(500JA)  |                         |                         |                         |
| 2.2μF       | 5540             | 5.00±0.50          | ±20%                     | CKG45NX7T2E225M(500JA)  |                         |                         |                         |
|             |                  | 6555               | 3.35±0.15                | ±20%                    | CKG57KX7T2E225M(335JA)  |                         |                         |
|             | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7T2W225M(500JA)  |                         |                         |                         |
| 3.3μF       | 6555             | 5.00±0.50          | ±20%                     | CKG57NX7T2E335M(500JA)  |                         |                         |                         |

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