# Multilayer Ceramic Chip Capacitors

## For automobile(Safety design type)

## CEU series

**Type:** **CEU3(C1608[EIA CC0603])**
**CEU4(C2012[EIA CC0805])**

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.

# REMINDERS

Please read this before using the 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.
4. If you plan to export a product listed in this catalog, keep in mind that it may be a restricted item according to the "Foreign Exchange and Foreign Trade Control Law". In such cases, it is necessary to acquire export permission in harmony with this law.
5. Any reproduction or transferring of the contents of this catalog is prohibited without prior permission from our company.
6. We are not responsible for problems that occur related to the intellectual property rights or other rights of our company or a third party when you use a product listed in this catalog. We do not grant license of these rights.
7. This catalog only applies to products purchased through our company or one of our company's official agencies. This catalog does not apply to products that are purchased through other third parties.
8. The descriptions in this catalog apply as of August, 2011.

# Multilayer Ceramic Chip Capacitors For Automobile(Safety Design Type)

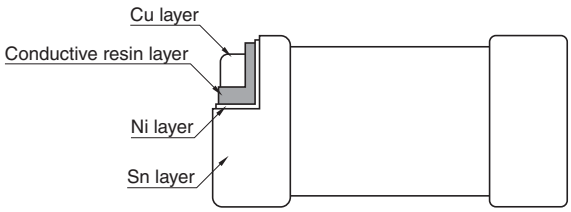
**Conformity to RoHS Directive**

## CEU Series

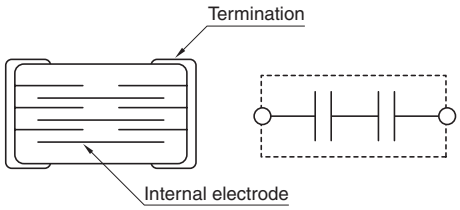
### FEATURES

- Focuses on high quality, with a unique termination structure*1 and an internal structure that enhances its redundant design*2 .
- The resin termination layer plated on the external terminations*1 absorbs external mechanical stress and protects the ceramic body.
  Moreover, the serial structure*2 of the internal electrodes reduces the risk of electrical breakdown in the case of a crack occurring.

*1 Conductive resin termination structure



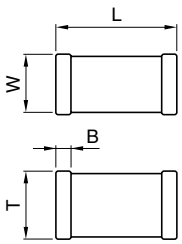

*2 Internal structure and equivalent circuit




### APPLICATION EXAMPLES

- Power-lines of on-board batteries without protective circuits

### SHAPES AND DIMENSIONS




### DIMENSIONS

The dimensions of each product are described within the product name.

#### Dimensions L×W

The fourth digit number in the product name corresponds to the dimensions of L×W.
Refer to the table below for specific values.

Dimensions in mm

| Dimension code | L | W | B |
|---|---|---|---|
| 3 | 1.6±0.1 | 0.8±0.1 | 0.2min. |
| 4 | 2.0±0.2 | 1.25±0.2 | 0.2min. |

• Dimension tolerances are typical values.

#### Product's Thickness T

The value in parentheses at the end of the product name corresponds to thickness T.
Refer to the table of "CAPACITANCE RANGES" for specific values.

- For more information about the products of other capacitance or data, please contact us.
- 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.

## PRODUCT IDENTIFICATION

| CEU | 3 | E | 2 | X7R | 1H | 223 | K | ( | 080 | A | A | ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | | (9) | (10) | (11) | |

(1) Series name

(2) Dimensions L×W

| | |
|---|---|
| 3 | 1.6×0.8mm |
| 4 | 2.0×1.25mm |

(3) Dimensions T

| | |
|---|---|
| E | 0.80mm |
| J | 1.25mm |

(4) Test voltage of loading at high temperature (Guaranteed applied voltages)

| | |
|---|---|
| 1 | 1× the rated voltage |
| 2 | 2×the rated voltage |
| 3 | 1.5×the rated voltage |
| 4 | 1.2×the rated voltage |
| 5 | 1.1×the rated voltage |

(5) Capacitance temperature characteristics

Class 2 (Temperature stable and general purpose)

| Temperature characteristics | Capacitance change | Temperature range |
|---|---|---|
| X7R | ±15% | –55 to +125°C |

(6) Rated voltage Edc

| | |
|---|---|
| 1H | 50V |

(7) 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.

| | |
|---|---|
| 333 | 33,000pF |
| 104 | 100,000pF |

(8) Capacitance tolerance

| Symbol | Tolerance | Applicable capacitance range |
|---|---|---|
| K | ±10% | Over 10pF |
| M | ±20% | |

(9) Dimensions T

Expressed by a three-digit number in mm units.

The second digit corresponds to the first decimal place, and the third digit corresponds to the second decimal place.

| | |
|---|---|
| 080 | 0.80mm |
| 125 | 1.25mm |

(10) 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 |

(11) 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 |

- For more information about the products of other capacitance or data, please contact us.
- 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.

## CAPACITANCE RANGES: CLASS 2

## TEMPERATURE CHARACTERISTICS: X7R(±15%)

| Capacitance | Dimension L×W | Thickness T(mm) | Capacitance tolerance | Part No. Rated voltage Edc: 100V | Rated voltage Edc: 50V |
|---|---|---|---|---|---|
| 1nF | 1608 | 0.80±0.15 | ±10% | CEU3E2X7R2A102K(080AA) | |
| | | | ±20% | CEU3E2X7R2A102M(080AA) | |
| 1.5nF | 1608 | 0.80±0.15 | ±10% | CEU3E2X7R2A152K(080AA) | |
| | | | ±20% | CEU3E2X7R2A152M(080AA) | |
| 2.2nF | 1608 | 0.80±0.15 | ±10% | CEU3E2X7R2A222K(080AA) | |
| | | | ±20% | CEU3E2X7R2A222M(080AA) | |
| 3.3nF | 1608 | 0.80±0.15 | ±10% | CEU3E2X7R2A332K(080AA) | |
| | | | ±20% | CEU3E2X7R2A332M(080AA) | |
| 4.7nF | 1608 | 0.80±0.15 | ±10% | | CEU3E2X7R1H472K(080AA) |
| | | | ±20% | | CEU3E2X7R1H472M(080AA) |
| 6.8nF | 1608 | 0.80±0.15 | ±10% | | CEU3E2X7R1H682K(080AA) |
| | | | ±20% | | CEU3E2X7R1H682M(080AA) |
| 10nF | 1608 | 0.80±0.15 | ±10% | | CEU3E2X7R1H103K(080AA) |
| | | | ±20% | | CEU3E2X7R1H103M(080AA) |
| | 2012 | 1.25±0.20 | ±10% | CEU4J2X7R2A103K(125AA) | |
| | | | ±20% | CEU4J2X7R2A103M(125AA) | |
| 15nF | 1608 | 0.80±0.15 | ±10% | | CEU3E2X7R1H153K(080AA) |
| | | | ±20% | | CEU3E2X7R1H153M(080AA) |
| | 2012 | 1.25±0.20 | ±10% | CEU4J2X7R2A153K(125AA) | |
| | | | ±20% | CEU4J2X7R2A153M(125AA) | |
| 22nF | 1608 | 0.80±0.15 | ±10% | | CEU3E2X7R1H223K(080AA) |
| | | | ±20% | | CEU3E2X7R1H223M(080AA) |
| | 2012 | 1.25±0.20 | ±10% | | CEU4J2X7R1H223K(125AA) |
| | | | ±20% | | CEU4J2X7R1H223M(125AA) |
| 33nF | 1608 | 0.80±0.15 | ±10% | | CEU3E2X7R1H333K(080AA) |
| | | | ±20% | | CEU3E2X7R1H333M(080AA) |
| | 2012 | 1.25±0.20 | ±10% | | CEU4J2X7R1H333K(125AA) |
| | | | ±20% | | CEU4J2X7R1H333M(125AA) |
| 47nF | 1608 | 0.80±0.15 | ±10% | | CEU3E2X7R1H473K(080AA) |
| | | | ±20% | | CEU3E2X7R1H473M(080AA) |
| | 2012 | 1.25±0.20 | ±10% | | CEU4J2X7R1H473K(125AA) |
| | | | ±20% | | CEU4J2X7R1H473M(125AA) |
| 68nF | 2012 | 1.25±0.20 | ±10% | | CEU4J2X7R1H683K(125AA) |
| | | | ±20% | | CEU4J2X7R1H683M(125AA) |
| 100nF | 2012 | 1.25±0.20 | ±10% | | CEU4J2X7R1H104K(125AA) |
| | | | ±20% | | CEU4J2X7R1H104M(125AA) |

- For more information about the products of other capacitance or data, please contact us.
- 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.