

# MULTILAYER CERAMIC CHIP CAPACITORS

Automotive grade, serial design

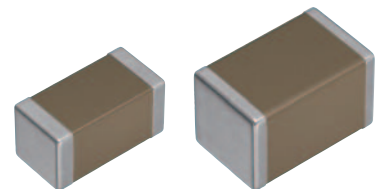
## CEU series

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CEU3 1608 [0603 inch]

CEU4 2012 [0805 inch]

\* Dimensions code: JIS[EIA]



## REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

### SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using this products.

#### REMINDERS

1. The products listed in this specification are intended for use in automotive applications under normal operation and usage conditions. The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality requires a more stringent level of safety or reliability, or whose failure, malfunction or defect could cause serious damage to society, person or property.

Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet. If you intend to use the products in the applications listed below or if you have special requirements exceeding the range or conditions set forth in this specification, please contact us.

- |  |  |
|--|--|
| (1) Aerospace/aviation equipment   | (8) Public information-processing equipment                                  |
| (2) Transportation equipment (electric trains, ships, etc.)                          | (9) Military equipment   |
| (3) Medical equipment (excepting Pharmaceutical Affairs Law classification Class1,2) | (10) Electric heating apparatus, burning equipment                           |
| (4) Power-generation control equipment   | (11) Disaster prevention/crime prevention equipment                          |
| (5) Atomic energy-related equipment  | (12) Safety equipment  |
| (6) Seabed equipment   | (13) Other applications that are not considered general-purpose applications |
| (7) Transportation control equipment   |  |

When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.

In addition, although the products listed in this specification are intended for use in automotive applications as described above, they are not prohibited to use in general electronic equipment, whose performance and/or quality doesn't require a more stringent level of safety or reliability, or whose failure, malfunction or defect could not cause serious damage to society, person or property. Therefore, the description of this caution will be applied, when the products are used in general electronic equipment under a normal operation and usage conditions.

- We may modify products or discontinue production of a product listed in this catalog without prior notification.
- 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.
- 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.
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- 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.

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

# CEU series

## Serial design



Type: CEU3/1608 [0603 inch], CEU4/2012 [0805 inch]

### SERIES OVERVIEW

Serial design CEU series, automotive grade of TDK's multilayer ceramic chip capacitor, is a product which has two capacitors in series in single body construction. The structure decreases risk of short circuit failures due to mechanical flex cracks. Additionally, CEU series has higher mechanical endurance by flexible resin layers which absorbs thermal and mechanical stress. The capacitance range is up to 100nF.

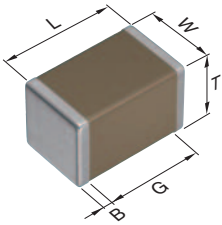
### FEATURES

- Serial structure decreases risk of short circuit failures due to mechanical flex cracks.
- Higher mechanical endurance is realized by flexible resin layers.
- AEC-Q200 compliant.

### APPLICATIONS

- Fail-safe design in battery line.
- For circuits requiring safer design

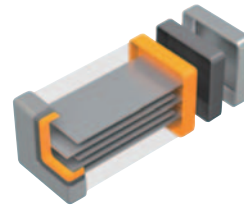
### SHAPE & DIMENSIONS



L	Body length
W	Body width
T	Body height
B	Terminal width
G	Terminal spacing

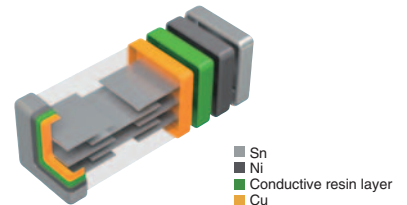
### PRODUCT STRUCTURE

General



A general structure which opposite inner electrodes are alternately stacked.

Serial design



A product which has two capacitors in series in single body construction and flexible resin layer.

Dimensions in mm

Type	L	W	T	B	G
CEU3	1.60+0.20,-0.10	0.80+0.15,-0.10	0.80+0.15,-0.10	0.20min.	0.30min.
CEU4	2.00+0.30,-0.20	1.25+0.25,-0.20	1.25+0.25,-0.20	0.20min.	0.50min.

\*Dimensional tolerances are typical values.

**CATALOG NUMBER CONSTRUCTION**

<b>CEU</b>	<b>4</b>	<b>J</b>	<b>2</b>	<b>X7R</b>	<b>1H</b>	<b>104</b>	<b>K</b>	<b>125</b>	<b>A</b>	<b>E</b>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

## (1) Series

## (2) Dimensions L x W (mm)

Code	EIA	Length	Width	Terminal width
3	CC0603	1.60	0.80	0.20
4	CC0805	2.00	1.25	0.20

## (3) Thickness code

Code	Thickness
E	0.80 mm
J	1.25 mm

## (4) Voltage condition for life test

Symbol	Condition
2	2 × R.V.

## (5) Temperature characteristics

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

## (6) Rated voltage (DC)

Code	Voltage (DC)
1H	50V
2A	100V

## (7) 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. R designates a decimal point.

(Example)0R5 = 0.5pF

101 = 100pF

225 = 2,200,000pF = 2.2μF

## (8) Capacitance tolerance

Code	Tolerance
K	±10%
M	±20%

## (9) Thickness

Code	Thickness
080	0.80 mm
125	1.25 mm

## (10) Packaging style

Code	Style
A	178mm reel, 4mm pitch


## (11) Special reserved code


Code	Description
E	Soft termination

## Capacitance range chart

### CEU3/1608 [0603 inch]

Capacitance		X7R	
(pF)	Code	2A (100V)	1H (50V)
1,000	102	■	
1,500	152	■	
2,200	222	■	
3,300	332	■	
4,700	472		■
6,800	682		■
10,000	103		■
15,000	153		■
22,000	223		■
33,000	333		■
47,000	473		■

Standard thickness  0.80mm


 Background gray: The product which is not recommended to a new design.


■ Please refer to the capacitance range table at P-6 for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

### CEU4/2012 [0805 inch]

Capacitance		X7R	
(pF)	Code	2A (100V)	1H (50V)
1,000	102	■	
1,500	152	■	
2,200	222	■	
3,300	332	■	
4,700	472	■	
6,800	682	■	
10,000	103	■	
15,000	153	■	
22,000	223		■
33,000	333		■
47,000	473		■
68,000	683		■
100,000	104		■

Standard thickness  1.25 mm

 Background gray: The product which is not recommended to a new design.

■ Please refer to the capacitance range table at P-6 for the details such as product thickness and capacitance tolerance.

## Capacitance range table

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

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number	
				Rated voltage Edc: 100V	Rated voltage Edc: 50V
1nF	1608	0.80+0.15,-0.10	±10%	<a href="#">CEU3E2X7R2A102K080AE</a>	
			±20%	<a href="#">CEU3E2X7R2A102M080AE</a>	
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R2A102K125AE</a>	
			±20%	<a href="#">CEU4J2X7R2A102M125AE</a>	
1.5nF	1608	0.80+0.15,-0.10	±10%	<a href="#">CEU3E2X7R2A152K080AE</a>	
			±20%	<a href="#">CEU3E2X7R2A152M080AE</a>	
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R2A152K125AE</a>	
			±20%	<a href="#">CEU4J2X7R2A152M125AE</a>	
2.2nF	1608	0.80+0.15,-0.10	±10%	<a href="#">CEU3E2X7R2A222K080AE</a>	
			±20%	<a href="#">CEU3E2X7R2A222M080AE</a>	
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R2A222K125AE</a>	
			±20%	<a href="#">CEU4J2X7R2A222M125AE</a>	
3.3nF	1608	0.80+0.15,-0.10	±10%	<a href="#">CEU3E2X7R2A332K080AE</a>	
			±20%	<a href="#">CEU3E2X7R2A332M080AE</a>	
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R2A332K125AE</a>	
			±20%	<a href="#">CEU4J2X7R2A332M125AE</a>	
4.7nF	1608	0.80+0.15,-0.10	±10%		<a href="#">CEU3E2X7R1H472K080AE</a>
			±20%		<a href="#">CEU3E2X7R1H472M080AE</a>
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R2A472K125AE</a>	
			±20%	<a href="#">CEU4J2X7R2A472M125AE</a>	
6.8nF	1608	0.80+0.15,-0.10	±10%		<a href="#">CEU3E2X7R1H682K080AE</a>
			±20%		<a href="#">CEU3E2X7R1H682M080AE</a>
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R2A682K125AE</a>	
			±20%	<a href="#">CEU4J2X7R2A682M125AE</a>	
10nF	1608	0.80+0.15,-0.10	±10%		<a href="#">CEU3E2X7R1H103K080AE</a>
			±20%		<a href="#">CEU3E2X7R1H103M080AE</a>
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R2A103K125AE</a>	
			±20%	<a href="#">CEU4J2X7R2A103M125AE</a>	
15nF	1608	0.80+0.15,-0.10	±10%		<a href="#">CEU3E2X7R1H153K080AE</a>
			±20%		<a href="#">CEU3E2X7R1H153M080AE</a>
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R2A153K125AE</a>	
			±20%	<a href="#">CEU4J2X7R2A153M125AE</a>	
22nF	1608	0.80+0.15,-0.10	±10%		<a href="#">CEU3E2X7R1H223K080AE</a>
			±20%		<a href="#">CEU3E2X7R1H223M080AE</a>
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R1H223K125AE</a>	
			±20%	<a href="#">CEU4J2X7R1H223M125AE</a>	
33nF	1608	0.80+0.15,-0.10	±10%		<a href="#">CEU3E2X7R1H333K080AE</a>
			±20%		<a href="#">CEU3E2X7R1H333M080AE</a>
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R1H333K125AE</a>	
			±20%	<a href="#">CEU4J2X7R1H333M125AE</a>	
47nF	1608	0.80+0.15,-0.10	±10%	<a href="#">CEU3E2X7R1H473K080AE</a>	
			±20%	<a href="#">CEU3E2X7R1H473M080AE</a>	
	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R1H473K125AE</a>	
			±20%	<a href="#">CEU4J2X7R1H473M125AE</a>	
68nF	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R1H683K125AE</a>	
			±20%	<a href="#">CEU4J2X7R1H683M125AE</a>	
100nF	2012	1.25+0.25,-0.20	±10%	<a href="#">CEU4J2X7R1H104K125AE</a>	
			±20%	<a href="#">CEU4J2X7R1H104M125AE</a>	

■ Gray item: The product which is not recommended to a new design.