

# MULTILAYER CERAMIC CHIP CAPACITORS

Automotive Grade, General (Up to 50V)

## CGA series

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|             |                         |
|-------------|-------------------------|
| <b>CGA1</b> | <b>0603 [0201 inch]</b> |
| <b>CGA2</b> | <b>1005 [0402 inch]</b> |
| <b>CGA3</b> | <b>1608 [0603 inch]</b> |
| <b>CGA4</b> | <b>2012 [0805 inch]</b> |
| <b>CGA5</b> | <b>3216 [1206 inch]</b> |
| <b>CGA6</b> | <b>3225 [1210 inch]</b> |
| <b>CGA8</b> | <b>4532 [1812 inch]</b> |
| <b>CGA9</b> | <b>5750 [2220 inch]</b> |

\* 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 on this catalog are intended for use in automotive electronic equipment under a normal operation and use condition.

The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.

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 the each catalog, 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                                       | (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.

- 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.
- Any reproduction or transferring of the contents of this catalog is prohibited without prior permission from our company.
- 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.
- 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                  |

# CGA series

## General (Up to 50V)



Type: CGA1/0603 [0201 inch], CGA2/1005 [0402 inch], CGA3/1608 [0603 inch],  
CGA4/2012 [0805 inch], CGA5/3216 [1206 inch], CGA6/3225 [1210 inch],  
CGA8/4532 [1812 inch], CGA9/5750 [2220 inch]

### SERIES OVERVIEW

TDK multilayer ceramic chip capacitor CGA series is a product for surface mount which multiple sheets of dielectric and conductive material are layered alternately. The monolithic structure ensures superior mechanical strength and reliability.

Also the lower ESR, ESL and better frequency characteristics are offered by the simple structure than other capacitors. The capacitance range is up to 47 $\mu$ F and the line-up has been expanding to the region of the film capacitor or electrolytic capacitor.

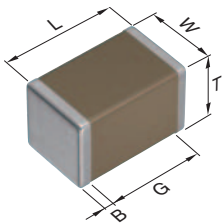
### FEATURES

- The superior mechanical strength and reliability due to the monolithic structure.
- Low ESR, ESL and excellent frequency characteristics allow for a circuit design that closely conforms to theoretical values.
- Low self-heating and high ripple resistance due to low ESR.
- No polarity.
- AEC-Q200 compliant.

### APPLICATIONS

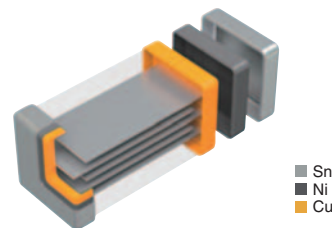
- Automotive electronic equipment (Engine control units, Sensor modules and Battery line smoothing)
- LC resonance circuit (COG).
- Applications requiring higher reliability

### SHAPE & DIMENSIONS



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

### PRODUCT STRUCTURE



The structure which multiple sheets of dielectric and conductive material are layered alternately. The superior mechanical strength and reliability are realized by the monolithic and simple structure.

Dimensions in mm

| Type | L               | W               | T               | B         | G         |
|------|-----------------|-----------------|-----------------|-----------|-----------|
| CGA1 | 0.60 $\pm$ 0.03 | 0.30 $\pm$ 0.03 | 0.30 $\pm$ 0.03 | 0.10 min. | 0.20 min. |
| CGA2 | 1.00 $\pm$ 0.05 | 0.50 $\pm$ 0.05 | 0.50 $\pm$ 0.05 | 0.10 min. | 0.30 min. |
| CGA3 | 1.60 $\pm$ 0.10 | 0.80 $\pm$ 0.10 | 0.80 $\pm$ 0.10 | 0.20 min. | 0.30 min. |
| CGA4 | 2.00 $\pm$ 0.20 | 1.25 $\pm$ 0.20 | 1.25 $\pm$ 0.20 | 0.20 min. | 0.50 min. |
| CGA5 | 3.20 $\pm$ 0.20 | 1.60 $\pm$ 0.20 | 1.60 $\pm$ 0.20 | 0.20 min. | 1.00 min. |
| CGA6 | 3.20 $\pm$ 0.40 | 2.50 $\pm$ 0.30 | 2.50 $\pm$ 0.30 | 0.20 min. | —         |
| CGA8 | 4.50 $\pm$ 0.40 | 3.20 $\pm$ 0.40 | 2.50 $\pm$ 0.30 | 0.20 min. | —         |
| CGA9 | 5.70 $\pm$ 0.40 | 5.00 $\pm$ 0.40 | 2.50 $\pm$ 0.30 | 0.20 min. | —         |

\*Dimensional tolerances are typical values.

**CATALOG NUMBER CONSTRUCTION**

|            |          |          |          |            |           |            |          |            |          |          |
|------------|----------|----------|----------|------------|-----------|------------|----------|------------|----------|----------|
| <b>CGA</b> | <b>9</b> | <b>N</b> | <b>3</b> | <b>X7R</b> | <b>1E</b> | <b>476</b> | <b>M</b> | <b>230</b> | <b>K</b> | <b>B</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 |
|------|--------|--------|-------|----------------|
| 1    | CC0201 | 0.60   | 0.30  | 0.10           |
| 2    | CC0402 | 1.00   | 0.50  | 0.10           |
| 3    | CC0603 | 1.60   | 0.80  | 0.20           |
| 4    | CC0805 | 2.00   | 1.25  | 0.20           |
| 5    | CC1206 | 3.20   | 1.60  | 0.20           |
| 6    | CC1210 | 3.20   | 2.50  | 0.20           |
| 8    | CC1812 | 4.50   | 3.20  | 0.20           |
| 9    | CC2220 | 5.70   | 5.00  | 0.20           |

## (3) Thickness code

| Code | Thickness |
|------|-----------|
| A    | 0.30 mm   |
| B    | 0.50 mm   |
| C    | 0.60 mm   |
| E    | 0.80 mm   |
| F    | 0.85 mm   |
| H    | 1.15 mm   |
| J    | 1.25 mm   |
| L    | 1.60 mm   |
| M    | 2.00 mm   |
| N    | 2.30 mm   |
| P    | 2.50 mm   |
| Q    | 2.80 mm   |
| R    | 3.20 mm   |

## (4) Voltage condition for life test

| Symbol | Condition  |
|--------|------------|
| 1      | 1 × R.V.   |
| 2      | 2 × R.V.   |
| 3      | 1.5 × R.V. |

## (5) Temperature characteristics

| Temperature characteristics | Temperature coefficient or capacitance change | Temperature range |
|-----------------------------|---|-------------------|
| C0G                         | 0±30 ppm/°C                                   | -55 to +125°C     |
| X5R                         | ±15%  | -55 to +85°C      |
| X7R                         | ±15%  | -55 to +125°C     |
| X7S                         | ±22%  | -55 to +125°C     |

## (6) Rated voltage (DC)

| Code | Voltage (DC) |
|------|--------------|
| 0J   | 6.3V         |
| 1A   | 10V          |
| 1C   | 16V          |
| 1E   | 25V          |
| 1V   | 35V          |
| 1H   | 50V          |

## (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 |
|------|-----------|
| C    | ±0.25pF   |
| D    | ±0.50pF   |
| J    | ±5%       |
| K    | ±10%      |
| M    | ±20%      |

## (9) Thickness

| Code | Thickness |
|------|-----------|
| 030  | 0.30 mm   |
| 050  | 0.50 mm   |
| 060  | 0.60 mm   |
| 080  | 0.80 mm   |
| 085  | 0.85 mm   |
| 115  | 1.15 mm   |
| 125  | 1.25 mm   |
| 160  | 1.60 mm   |
| 200  | 2.00 mm   |
| 230  | 2.30 mm   |
| 250  | 2.50 mm   |
| 280  | 2.80 mm   |
| 320  | 3.20 mm   |

## (10) Packaging style

| Code | Style                 |
|------|-----------------------|
| A    | 178mm reel, 4mm pitch |
| B    | 178mm reel, 2mm pitch |
| K    | 178mm reel, 8mm pitch |

## (11) Special reserved code

| Code  | Description       |
|-------|-------------------|
| A,B,C | TDK internal code |

## Capacitance range chart

CGA1/0603 [0201 inch]

| Capacitance |      | C0G         |             | X7R         |             |             |             |              |
|-------------|------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| (pF)        | Code | 1H<br>(50V) | 1E<br>(25V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) | 1A<br>(10V) | 0J<br>(6.3V) |
| 1           | 010  | ■           | ■           |             |             |             |             |              |
| 1.5         | 1R5  | ■           | ■           |             |             |             |             |              |
| 2           | 020  | ■           | ■           |             |             |             |             |              |
| 2.2         | 2R2  | ■           | ■           |             |             |             |             |              |
| 3           | 030  | ■           | ■           |             |             |             |             |              |
| 3.3         | 3R3  | ■           | ■           |             |             |             |             |              |
| 4           | 040  | ■           | ■           |             |             |             |             |              |
| 4.7         | 4R7  | ■           | ■           |             |             |             |             |              |
| 5           | 050  | ■           | ■           |             |             |             |             |              |
| 6           | 060  | ■           | ■           |             |             |             |             |              |
| 6.8         | 6R8  | ■           | ■           |             |             |             |             |              |
| 7           | 070  | ■           | ■           |             |             |             |             |              |
| 8           | 080  | ■           | ■           |             |             |             |             |              |
| 9           | 090  | ■           | ■           |             |             |             |             |              |
| 10          | 100  | ■           | ■           |             |             |             |             |              |
| 12          | 120  | ■           | ■           |             |             |             |             |              |
| 15          | 150  | ■           | ■           |             |             |             |             |              |
| 18          | 180  | ■           | ■           |             |             |             |             |              |
| 22          | 220  | ■           | ■           |             |             |             |             |              |
| 27          | 270  | ■           | ■           |             |             |             |             |              |
| 33          | 330  | ■           | ■           |             |             |             |             |              |
| 39          | 390  | ■           | ■           |             |             |             |             |              |
| 47          | 470  | ■           | ■           |             |             |             |             |              |
| 56          | 560  | ■           | ■           |             |             |             |             |              |
| 68          | 680  | ■           | ■           |             |             |             |             |              |
| 82          | 820  | ■           | ■           |             |             |             |             |              |
| 100         | 101  | ■           | ■           | ■           | ■           | ■           |             |              |
| 150         | 151  |             |             | ■           | ■           | ■           |             |              |
| 220         | 221  |             |             |             |             |             |             |              |
| 330         | 331  |             |             | ■           | ■           | ■           |             |              |
| 470         | 471  |             |             |             |             |             |             |              |
| 680         | 681  |             |             |             |             |             |             |              |
| 1,000       | 102  |             |             |             | ■           | ■           |             |              |
| 1,500       | 152  |             |             |             |             |             |             |              |
| 2,200       | 222  |             |             |             |             |             |             |              |
| 3,300       | 332  |             |             |             | ■           | ■           |             |              |
| 4,700       | 472  |             |             |             |             |             |             |              |
| 6,800       | 682  |             |             |             |             |             | ■           | ■            |
| 10,000      | 103  |             |             |             |             |             | ■           | ■            |

Standard thickness ■ 0.30mm

■ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.

MULTILAYER CERAMIC CHIP CAPACITORS TDK

Capacitance range chart

CGA2/1005 [0402 inch]

| Capacitance |      | COG      | X5R      |          |          |          |          | X7R      |          |          |          |          | X7S       |          |          |
|-------------|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|
| (pF)        | Code | 1H (50V) | 1H (50V) | 1V (35V) | 1E (25V) | 1C (16V) | 1A (10V) | 1H (50V) | 1V (35V) | 1E (25V) | 1C (16V) | 1A (10V) | 0J (6.3V) | 1C (16V) | 1A (10V) |
| 1           | 010  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 1.5         | 1R5  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 2           | 020  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 2.2         | 2R2  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 3           | 030  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 3.3         | 3R3  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 4           | 040  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 4.7         | 4R7  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 5           | 050  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 6           | 060  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 6.8         | 6R8  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 7           | 070  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 8           | 080  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 9           | 090  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 10          | 100  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 12          | 120  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 15          | 150  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 18          | 180  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 22          | 220  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 27          | 270  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 33          | 330  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 39          | 390  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 47          | 470  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 56          | 560  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 68          | 680  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 82          | 820  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 100         | 101  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 120         | 121  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 150         | 151  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 180         | 181  | █        |          |          |          |          |          |          |          |          |          |          |           |          |          |
| 220         | 221  | █        | █        |          |          |          |          | █        |          |          |          |          |           |          |          |
| 270         | 271  | █        | █        |          |          |          |          | █        |          |          |          |          |           |          |          |
| 330         | 331  | █        | █        |          |          |          |          | █        |          |          |          |          |           |          |          |
| 390         | 391  | █        | █        |          |          |          |          | █        |          |          |          |          |           |          |          |
| 470         | 471  | █        | █        |          |          |          |          | █        |          |          |          |          |           |          |          |
| 560         | 561  | █        | █        |          |          |          |          | █        |          |          |          |          |           |          |          |
| 680         | 681  | █        | █        |          |          |          |          | █        |          |          |          |          |           |          |          |
| 820         | 821  | █        | █        |          |          |          |          | █        |          |          |          |          |           |          |          |
| 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  | █        | █        | █        | █        |          |          | █        | █        | █        |          |          |           |          |          |
| 150,000     | 154  | █        | █        | █        | █        |          |          | █        | █        | █        |          |          |           |          |          |
| 220,000     | 224  | █        | █        | █        | █        |          |          | █        | █        | █        |          |          |           |          |          |
| 330,000     | 334  | █        | █        | █        | █        |          |          | █        | █        | █        |          |          | █         | █        |          |
| 470,000     | 474  | █        | █        | █        | █        |          |          | █        | █        | █        |          |          | █         | █        |          |

Standard thickness  0.50mm

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


█ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.

⚠ 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.

## Capacitance range chart

CGA3/1608 [0603 inch]

| Capacitance |      | C0G         | X5R         | X7R         |
|-------------|------|-------------|-------------|-------------|
| (pF)        | Code | 1H<br>(50V) | 1H<br>(50V) | 1H<br>(50V) |
| 1           | 010  |             |             |             |
| 1.5         | 1R5  |             |             |             |
| 2           | 020  |             |             |             |
| 2.2         | 2R2  |             |             |             |
| 3           | 030  |             |             |             |
| 3.3         | 3R3  |             |             |             |
| 4           | 040  |             |             |             |
| 4.7         | 4R7  |             |             |             |
| 5           | 050  |             |             |             |
| 6           | 060  |             |             |             |
| 6.8         | 6R8  |             |             |             |
| 7           | 070  |             |             |             |
| 8           | 080  |             |             |             |
| 9           | 090  |             |             |             |
| 10          | 100  |             |             |             |
| 12          | 120  |             |             |             |
| 15          | 150  |             |             |             |
| 18          | 180  |             |             |             |
| 22          | 220  |             |             |             |
| 27          | 270  |             |             |             |
| 33          | 330  |             |             |             |
| 39          | 390  |             |             |             |
| 47          | 470  |             |             |             |
| 56          | 560  |             |             |             |
| 68          | 680  |             |             |             |
| 82          | 820  |             |             |             |
| 100         | 101  |             |             |             |
| 120         | 121  |             |             |             |
| 150         | 151  |             |             |             |
| 180         | 181  |             |             |             |
| 220         | 221  |             |             |             |
| 270         | 271  |             |             |             |
| 330         | 331  |             |             |             |
| 390         | 391  |             |             |             |
| 470         | 471  |             |             |             |
| 560         | 561  |             |             |             |
| 680         | 681  |             |             |             |
| 820         | 821  |             |             |             |
| 1,000       | 102  |             |             |             |
| 1,200       | 122  |             |             |             |
| 1,500       | 152  |             |             |             |
| 1,800       | 182  |             |             |             |
| 2,200       | 222  |             |             |             |
| 2,700       | 272  |             |             |             |
| 3,300       | 332  |             |             |             |
| 3,900       | 392  |             |             |             |
| 4,700       | 472  |             |             |             |
| 5,600       | 562  |             |             |             |
| 6,800       | 682  |             |             |             |
| 8200        | 822  |             |             |             |
| 10,000      | 103  |             |             |             |
| 15,000      | 153  |             |             |             |
| 22,000      | 223  |             |             |             |
| 33,000      | 333  |             |             |             |
| 47,000      | 473  |             |             |             |
| 68,000      | 683  |             |             |             |

Standard thickness  0.80mm Background gray: The product which is not recommended to a new design.


■ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.

 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.

## Capacitance range chart

CGA3/1608 [0603 inch]

| Capacitance |      | X5R         |             |             |             |             |              | X7R         |             |             |             |              | X7S         |             |
|-------------|------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|
| (pF)        | Code | 1H<br>(50V) | 1V<br>(35V) | 1E<br>(25V) | 1C<br>(16V) | 1A<br>(10V) | 0J<br>(6.3V) | 1H<br>(50V) | 1V<br>(35V) | 1E<br>(25V) | 1C<br>(16V) | 0J<br>(6.3V) | 1C<br>(16V) | 1A<br>(10V) |
| 100,000     | 104  | ■           | ■           | ■           |             |             |              | ■           | ■           | ■           |             |              |             |             |
| 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  | ■           | ■           | ■           | ■           | ■           | ■            | ■           | ■           | ■           | ■           | ■            | ■           | ■           |

Standard thickness  0.80mm Background gray: The product which is not recommended to a new design.


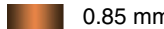

■ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.




## Capacitance range chart

CGA4/2012 [0805 inch]

| Capacitance |      | COG | X5R      |          |          |          |          | X7R      |          |          |          |          | X7S      |           |          |
|-------------|------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|
| (pF)        | Code |     | 1H (50V) | 1H (50V) | 1V (35V) | 1E (25V) | 1C (16V) | 1A (10V) | 1H (50V) | 1V (35V) | 1E (25V) | 1C (16V) | 1A (10V) | 0J (6.3V) | 1C (16V) |
| 1,000       | 102  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 1,200       | 122  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 1,500       | 152  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 1,800       | 182  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 2,200       | 222  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 2,700       | 272  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 3,300       | 332  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 3,900       | 392  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 4,700       | 472  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 5,600       | 562  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 6,800       | 682  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 8,200       | 822  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 10,000      | 103  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 15,000      | 153  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 22,000      | 223  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 33,000      | 333  | █   |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 100,000     | 104  |     |          |          |          |          |          |          |          |          |          |          |          |           |          |
| 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  |     | █        | █        | █        | █        | █        | █        | █        | █        | █        | █        | █        |           |          |
| 6,800,000   | 685  |     | █        | █        | █        | █        | █        | █        | █        | █        | █        | █        | █        | █         |          |
| 10,000,000  | 106  |     | █        | █        | █        | █        | █        | █        | █        | █        | █        | █        | █        | █         | █        |

Standard thickness  0.60 mm  0.85 mm  1.25 mm

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



█ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.


# MULTILAYER CERAMIC CHIP CAPACITORS

## Capacitance range chart

## CGA5/3216 [1206 inch]

| Capacitance |      | COG | X5R      |          |          |          | X7R      |          |          |          |          | X7S       |          |  |
|-------------|------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|--|
| (pF)        | Code |     | 1H (50V) | 1H (50V) | 1V (35V) | 1E (25V) | 1C (16V) | 1H (50V) | 1V (35V) | 1E (25V) | 1C (16V) | 0J (6.3V) | 1A (10V) |  |
| 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  |     |          |          |          |          |          |          |          |          |          |           |          |  |
| 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  |     |          |          |          |          |          |          |          |          |          |           |          |  |
| 15,000,000  | 156  |     |          |          |          |          |          |          |          |          |          |           |          |  |
| 22,000,000  | 226  |     |          |          |          |          |          |          |          |          |          |           |          |  |

Standard thickness  0.60 mm  0.85 mm  1.15 mm  1.60 mm






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


█ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

## CGA6/3225 [1210 inch]

| Capacitance |      | COG | X7R      |          |          |          | X7S      |           |
|-------------|------|-----|----------|----------|----------|----------|----------|-----------|
| (pF)        | Code |     | 1H (50V) | 1H (50V) | 1E (25V) | 1C (16V) | 1H (50V) | 0J (6.3V) |
| 22,000      | 223  | █   |          |          |          |          |          |           |
| 33,000      | 333  |     |          |          |          |          |          |           |
| 47,000      | 473  |     |          |          |          |          |          |           |
| 68,000      | 683  |     |          |          |          |          |          |           |
| 100,000     | 104  |     |          |          |          |          |          |           |
| 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  |     |          |          |          |          |          |           |
| 15,000,000  | 156  |     |          |          |          |          |          |           |
| 22,000,000  | 226  |     |          |          |          |          |          |           |
| 33,000,000  | 336  |     |          |          |          |          |          |           |
| 47,000,000  | 476  |     |          |          |          |          |          |           |

Standard thickness  1.25 mm  1.60 mm  2.00 mm  2.30 mm  2.50 mm

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

█ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.


⚠ 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.

## Capacitance range chart

CGA8/4532 [1812 inch]

| Capacitance |      | COG | X7R         |             |             |             |
|-------------|------|-----|-------------|-------------|-------------|-------------|
| (pF)        | Code |     | 1H<br>(50V) | 1H<br>(50V) | 1E<br>(25V) | 1C<br>(16V) |
| 47,000      | 473  |     |             |             |             |             |
| 68,000      | 683  |     |             |             |             |             |
| 100,000     | 104  |     |             |             |             |             |
| 150,000     | 154  |     |             |             |             |             |
| 220,000     | 224  |     |             |             |             |             |
| 1,500,000   | 155  |     |             |             |             |             |
| 2,200,000   | 225  |     |             |             |             |             |
| 3,300,000   | 335  |     |             |             |             |             |
| 4,700,000   | 475  |     |             |             |             |             |
| 6,800,000   | 685  |     |             |             |             |             |
| 10,000,000  | 106  |     |             |             |             |             |
| 15,000,000  | 156  |     |             |             |             |             |
| 22,000,000  | 226  |     |             |             |             |             |
| 33,000,000  | 336  |     |             |             |             |             |

Standard thickness  1.60 mm  2.00 mm  2.30 mm  2.50 mm  2.80 mm  3.20 mm

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


■ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

CGA9/5750 [2220 inch]

| Capacitance |      | X7R |
|-------------|------|-----|
| (pF)        | Code |     |
| 4,700,000   | 475  |     |
| 6,800,000   | 685  |     |
| 10,000,000  | 106  |     |
| 15,000,000  | 156  |     |
| 22,000,000  | 226  |     |
| 47,000,000  | 476  |     |

Standard thickness  2.00 mm  2.30 mm  2.50 mm

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

■ Please refer to the capacitance range table after P-12 for the details such as product thickness and capacitance tolerance.

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

Temperature characteristics: C0G (-55 to +125°C, 0±30ppm/°C)

| Capacitance | Dimensions | Thickness (mm) | Capacitance tolerance | Catalog number         |                        |
|-------------|------------|----------------|-----------------------|------------------------|------------------------|
|             |            |                |                       | Rated voltage Edc: 50V | Rated voltage Edc: 25V |
| 1pF         | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H010C030BA   | CGA1A2C0G1E010C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H010C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H010C080AA   |                        |
| 1.5pF       | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H1R5C030BA   | CGA1A2C0G1E1R5C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H1R5C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H1R5C080AA   |                        |
| 2pF         | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H020C030BA   | CGA1A2C0G1E020C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H020C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H020C080AA   |                        |
| 2.2pF       | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H2R2C030BA   | CGA1A2C0G1E2R2C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H2R2C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H2R2C080AA   |                        |
| 3pF         | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H030C030BA   | CGA1A2C0G1E030C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H030C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H030C080AA   |                        |
| 3.3pF       | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H3R3C030BA   | CGA1A2C0G1E3R3C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H3R3C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H3R3C080AA   |                        |
| 4pF         | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H040C030BA   | CGA1A2C0G1E040C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H040C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H040C080AA   |                        |
| 4.7pF       | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H4R7C030BA   | CGA1A2C0G1E4R7C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H4R7C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H4R7C080AA   |                        |
| 5pF         | 0603       | 0.30±0.03      | ±0.25pF               | CGA1A2C0G1H050C030BA   | CGA1A2C0G1E050C030BA   |
|             | 1005       | 0.50±0.05      | ±0.25pF               | CGA2B2C0G1H050C050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.25pF               | CGA3E2C0G1H050C080AA   |                        |
| 6pF         | 0603       | 0.30±0.03      | ±0.50pF               | CGA1A2C0G1H060D030BA   | CGA1A2C0G1E060D030BA   |
|             | 1005       | 0.50±0.05      | ±0.50pF               | CGA2B2C0G1H060D050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.50pF               | CGA3E2C0G1H060D080AA   |                        |
| 6.8pF       | 0603       | 0.30±0.03      | ±0.50pF               | CGA1A2C0G1H6R8D030BA   | CGA1A2C0G1E6R8D030BA   |
|             | 1005       | 0.50±0.05      | ±0.50pF               | CGA2B2C0G1H6R8D050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.50pF               | CGA3E2C0G1H6R8D080AA   |                        |
| 7pF         | 0603       | 0.30±0.03      | ±0.50pF               | CGA1A2C0G1H070D030BA   | CGA1A2C0G1E070D030BA   |
|             | 1005       | 0.50±0.05      | ±0.50pF               | CGA2B2C0G1H070D050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.50pF               | CGA3E2C0G1H070D080AA   |                        |
| 8pF         | 0603       | 0.30±0.03      | ±0.50pF               | CGA1A2C0G1H080D030BA   | CGA1A2C0G1E080D030BA   |
|             | 1005       | 0.50±0.05      | ±0.50pF               | CGA2B2C0G1H080D050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.50pF               | CGA3E2C0G1H080D080AA   |                        |
| 9pF         | 0603       | 0.30±0.03      | ±0.50pF               | CGA1A2C0G1H090D030BA   | CGA1A2C0G1E090D030BA   |
|             | 1005       | 0.50±0.05      | ±0.50pF               | CGA2B2C0G1H090D050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.50pF               | CGA3E2C0G1H090D080AA   |                        |
| 10pF        | 0603       | 0.30±0.03      | ±0.50pF               | CGA1A2C0G1H100D030BA   | CGA1A2C0G1E100D030BA   |
|             | 1005       | 0.50±0.05      | ±0.50pF               | CGA2B2C0G1H100D050BA   |                        |
|             | 1608       | 0.80±0.10      | ±0.50pF               | CGA3E2C0G1H100D080AA   |                        |
| 12pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H120J030BA   | CGA1A2C0G1E120J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H120J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H120J080AA   |                        |
| 15pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H150J030BA   | CGA1A2C0G1E150J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H150J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H150J080AA   |                        |
| 18pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H180J030BA   | CGA1A2C0G1E180J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H180J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H180J080AA   |                        |
| 22pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H220J030BA   | CGA1A2C0G1E220J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H220J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H220J080AA   |                        |
| 27pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H270J030BA   | CGA1A2C0G1E270J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H270J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H270J080AA   |                        |
| 33pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H330J030BA   | CGA1A2C0G1E330J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H330J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H330J080AA   |                        |
| 39pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H390J030BA   | CGA1A2C0G1E390J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H390J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H390J080AA   |                        |
| 47pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H470J030BA   | CGA1A2C0G1E470J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H470J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H470J080AA   |                        |

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Please note that the contents may change without any prior notice due to reasons such as upgrading.

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

Temperature characteristics: C0G (-55 to +125°C, 0±30ppm/°C)

| Capacitance | Dimensions | Thickness (mm) | Capacitance tolerance | Catalog number         |                        |
|-------------|------------|----------------|-----------------------|------------------------|------------------------|
|             |            |                |                       | Rated voltage Edc: 50V | Rated voltage Edc: 25V |
| 56pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H560J030BA   | CGA1A2C0G1E560J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H560J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H560J080AA   |                        |
| 68pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H680J030BA   | CGA1A2C0G1E680J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H680J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H680J080AA   |                        |
| 82pF        | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H820J030BA   | CGA1A2C0G1E820J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H820J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H820J080AA   |                        |
| 100pF       | 0603       | 0.30±0.03      | ±5%                   | CGA1A2C0G1H101J030BA   | CGA1A2C0G1E101J030BA   |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H101J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H101J080AA   |                        |
| 120pF       | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H121J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H121J080AA   |                        |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H151J050BA   |                        |
| 150pF       | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H151J080AA   |                        |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H181J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H181J080AA   |                        |
| 220pF       | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H221J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H221J080AA   |                        |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H271J050BA   |                        |
| 270pF       | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H271J080AA   |                        |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H331J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H331J080AA   |                        |
| 330pF       | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H391J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H391J080AA   |                        |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H471J050BA   |                        |
| 470pF       | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H471J080AA   |                        |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H561J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H561J080AA   |                        |
| 560pF       | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H681J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H681J080AA   |                        |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H821J050BA   |                        |
| 680pF       | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H821J080AA   |                        |
|             | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H821J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H821J080AA   |                        |
| 820pF       | 1005       | 0.50±0.05      | ±5%                   | CGA2B2C0G1H102J050BA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H102J080AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H102J060AA   |                        |
| 1nF         | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H122J080AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H122J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H152J080AA   |                        |
| 1.2nF       | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H152J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H182J080AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H182J060AA   |                        |
| 1.5nF       | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H222J080AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H222J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H272J080AA   |                        |
| 1.8nF       | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H272J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H332J080AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H332J060AA   |                        |
| 2.2nF       | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H392J080AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H392J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H472J080AA   |                        |
| 2.7nF       | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H472J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H562J080AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H562J060AA   |                        |
| 3.3nF       | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H682J080AA   |                        |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C2C0G1H682J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H822J080AA   |                        |
| 3.9nF       | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H822J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H103J080AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4C2C0G1H103J060AA   |                        |
| 4.7nF       | 3216       | 0.60±0.15      | ±5%                   | CGA5C2C0G1H103J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H153J085AA   |                        |
|             | 2012       | 0.60±0.15      | ±5%                   | CGA4F2C0G1H153J085AA   |                        |
| 5.6nF       | 3216       | 0.60±0.15      | ±5%                   | CGA5C2C0G1H153J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H223J125AA   |                        |
|             | 2012       | 1.25±0.20      | ±5%                   | CGA4J2C0G1H223J125AA   |                        |
| 6.8nF       | 3216       | 0.60±0.15      | ±5%                   | CGA5C2C0G1H223J060AA   |                        |
|             | 1608       | 0.80±0.10      | ±5%                   | CGA3E2C0G1H223J125AA   |                        |
|             | 3225       | 1.25±0.20      | ±5%                   | CGA6J2C0G1H223J125AA   |                        |

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

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## Capacitance range table

Temperature characteristics: C0G (-55 to +125°C, 0±30ppm/°C)

| Capacitance | Dimensions | Thickness<br>(mm) | Capacitance<br>tolerance | Catalog number                       |
|-------------|------------|-------------------|--------------------------|--------------------------------------|
|             |            |                   |                          | Rated voltage Edc: 50V               |
| 33nF        | 2012       | 1.25±0.20         | ±5%                      | <a href="#">CGA4J2C0G1H333J125AA</a> |
|             | 3216       | 0.85±0.15         | ±5%                      | <a href="#">CGA5F2C0G1H333J085AA</a> |
|             | 3225       | 1.60±0.20         | ±5%                      | <a href="#">CGA6L2C0G1H333J160AA</a> |
| 47nF        | 3216       | 1.15±0.15         | ±5%                      | <a href="#">CGA5H2C0G1H473J115AA</a> |
|             | 3225       | 2.00±0.20         | ±5%                      | <a href="#">CGA6M2C0G1H473J200AA</a> |
|             | 4532       | 1.60±0.20         | ±5%                      | <a href="#">CGA8L2C0G1H473J160KA</a> |
| 68nF        | 3216       | 1.60±0.20         | ±5%                      | <a href="#">CGA5L2C0G1H683J160AA</a> |
|             | 3225       | 2.00±0.20         | ±5%                      | <a href="#">CGA6M2C0G1H683J200AA</a> |
|             | 4532       | 1.60±0.20         | ±5%                      | <a href="#">CGA8L2C0G1H683J160KA</a> |
| 100nF       | 3216       | 1.60±0.20         | ±5%                      | <a href="#">CGA5L2C0G1H104J160AA</a> |
|             | 3225       | 2.50±0.30         | ±5%                      | <a href="#">CGA6P2C0G1H104J250AA</a> |
|             | 4532       | 2.00±0.20         | ±5%                      | <a href="#">CGA8M2C0G1H104J200KA</a> |
| 150nF       | 4532       | 2.50±0.30         | ±5%                      | <a href="#">CGA8P2C0G1H154J250KA</a> |
| 220nF       | 4532       | 3.20±0.30         | ±5%                      | <a href="#">CGA8R2C0G1H224J320KA</a> |

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

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

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

| Capacitance | Dimensions | Thickness (mm) | Capacitance tolerance | Catalog number         |                        |                        |
|-------------|------------|----------------|-----------------------|------------------------|------------------------|------------------------|
|             |            |                |                       | Rated voltage Edc: 50V | Rated voltage Edc: 35V | Rated voltage Edc: 25V |
| 220pF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H221K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H221M050BA   |                        |                        |
| 330pF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H331K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H331M050BA   |                        |                        |
| 470pF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H471K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H471M050BA   |                        |                        |
| 680pF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H681K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H681M050BA   |                        |                        |
| 1nF         | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H102K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H102M050BA   |                        |                        |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H102K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H102M080AA   |                        |                        |
| 1.5nF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H152K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H152M050BA   |                        |                        |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H152K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H152M080AA   |                        |                        |
| 2.2nF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H222K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H222M050BA   |                        |                        |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H222K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H222M080AA   |                        |                        |
| 3.3nF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H332K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H332M050BA   |                        |                        |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H332K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H332M080AA   |                        |                        |
| 4.7nF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H472K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H472M050BA   |                        |                        |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H472K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H472M080AA   |                        |                        |
| 6.8nF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X5R1H682K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X5R1H682M050BA   |                        |                        |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H682K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H682M080AA   |                        |                        |
| 10nF        | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X5R1H103K050BB   | CGA2B3X5R1V103K050BB   | CGA2B2X5R1E103K050BA   |
|             |            |                | ±20%                  | CGA2B3X5R1H103M050BB   | CGA2B3X5R1V103M050BB   | CGA2B2X5R1E103M050BA   |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H103K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H103M080AA   |                        |                        |
| 15nF        | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X5R1H153K050BB   | CGA2B3X5R1V153K050BB   | CGA2B2X5R1E153K050BA   |
|             |            |                | ±20%                  | CGA2B3X5R1H153M050BB   | CGA2B3X5R1V153M050BB   | CGA2B2X5R1E153M050BA   |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H153K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H153M080AA   |                        |                        |
| 22nF        | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X5R1H223K050BB   | CGA2B3X5R1V223K050BB   | CGA2B2X5R1E223K050BA   |
|             |            |                | ±20%                  | CGA2B3X5R1H223M050BB   | CGA2B3X5R1V223M050BB   | CGA2B2X5R1E223M050BA   |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H223K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H223M080AA   |                        |                        |
| 33nF        | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X5R1H333K050BB   | CGA2B3X5R1V333K050BB   | CGA2B2X5R1E333K050BA   |
|             |            |                | ±20%                  | CGA2B3X5R1H333M050BB   | CGA2B3X5R1V333M050BB   | CGA2B2X5R1E333M050BA   |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H333K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H333M080AA   |                        |                        |
| 47nF        | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X5R1H473K050BB   | CGA2B3X5R1V473K050BB   | CGA2B2X5R1E473K050BA   |
|             |            |                | ±20%                  | CGA2B3X5R1H473M050BB   | CGA2B3X5R1V473M050BB   | CGA2B2X5R1E473M050BA   |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H473K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H473M080AA   |                        |                        |
| 68nF        | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X5R1H683K050BB   | CGA2B3X5R1V683K050BB   | CGA2B3X5R1E683K050BB   |
|             |            |                | ±20%                  | CGA2B3X5R1H683M050BB   | CGA2B3X5R1V683M050BB   | CGA2B3X5R1E683M050BB   |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H683K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X5R1H683M080AA   |                        |                        |
| 100nF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X5R1H104K050BB   | CGA2B3X5R1V104K050BB   | CGA2B3X5R1E104K050BB   |
|             |            |                | ±20%                  | CGA2B3X5R1H104M050BB   | CGA2B3X5R1V104M050BB   | CGA2B3X5R1E104M050BB   |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X5R1H104K080AA   |                        | CGA3E2X5R1E104K080AA   |
|             |            |                | ±20%                  | CGA3E2X5R1H104M080AA   |                        | CGA3E2X5R1E104M080AA   |
| 150nF       | 1608       | 0.80±0.10      | ±10%                  | CGA3E3X5R1H154K080AB   | CGA3E3X5R1V154K080AB   | CGA3E2X5R1E154K080AA   |
|             |            |                | ±20%                  | CGA3E3X5R1H154M080AB   | CGA3E3X5R1V154M080AB   | CGA3E2X5R1E154M080AA   |
|             | 2012       | 1.25±0.20      | ±10%                  | CGA4J2X5R1H154K125AA   |                        |                        |
|             |            |                | ±20%                  | CGA4J2X5R1H154M125AA   |                        |                        |

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

MULTILAYER CERAMIC CHIP CAPACITORS 

Capacitance range table

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

| Capacitance | Dimensions      | Thickness (mm)  | Capacitance tolerance | Catalog number         |                        |                        |
|-------------|-----------------|-----------------|-----------------------|------------------------|------------------------|------------------------|
|             |                 |                 |                       | Rated voltage Edc: 50V | Rated voltage Edc: 35V | Rated voltage Edc: 25V |
| 220nF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E3X5R1H224K080AB   | CGA3E3X5R1V224K080AB   | CGA3E2X5R1E224K080AA   |
|             |                 |                 | ±20%                  | CGA3E3X5R1H224M080AB   | CGA3E3X5R1V224M080AB   | CGA3E2X5R1E224M080AA   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J2X5R1H224K125AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA4J2X5R1H224M125AA   |                        |                        |
| 330nF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E3X5R1H334K080AB   | CGA3E3X5R1V334K080AB   | CGA3E3X5R1E334K080AB   |
|             |                 |                 | ±20%                  | CGA3E3X5R1H334M080AB   | CGA3E3X5R1V334M080AB   | CGA3E3X5R1E334M080AB   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J2X5R1H334K125AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA4J2X5R1H334M125AA   |                        |                        |
| 470nF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E3X5R1H474K080AB   | CGA3E3X5R1V474K080AB   | CGA3E3X5R1E474K080AB   |
|             |                 |                 | ±20%                  | CGA3E3X5R1H474M080AB   | CGA3E3X5R1V474M080AB   | CGA3E3X5R1E474M080AB   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X5R1H474K125AB   | CGA4J3X5R1V474K125AB   | CGA4J2X5R1E474K125AA   |
|             |                 |                 | ±20%                  | CGA4J3X5R1H474M125AB   | CGA4J3X5R1V474M125AB   | CGA4J2X5R1E474M125AA   |
| 680nF       | 1608            | 0.80±0.10       | ±10%                  | CGA5L2X5R1H474K160AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA5L2X5R1H474M160AA   |                        |                        |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA3E3X5R1H684K080AB   | CGA3E3X5R1V684K080AB   | CGA3E3X5R1E684K080AB   |
|             |                 |                 | ±20%                  | CGA3E3X5R1H684M080AB   | CGA3E3X5R1V684M080AB   | CGA3E3X5R1E684M080AB   |
| 1µF         | 1608            | 0.80±0.10       | ±10%                  | CGA4J3X5R1H684K125AB   | CGA4J3X5R1V684K125AB   | CGA4J2X5R1E684K125AA   |
|             |                 |                 | ±20%                  | CGA4J3X5R1H684M125AB   | CGA4J3X5R1V684M125AB   | CGA4J2X5R1E684M125AA   |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA5L2X5R1H684K160AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA5L2X5R1H684M160AA   |                        |                        |
| 1.5µF       | 2012            | 1.25±0.20       | ±10%                  | CGA3E3X5R1H105K080AB   | CGA3E3X5R1V105K080AB   | CGA3E3X5R1E105K080AB   |
|             |                 |                 | ±20%                  | CGA3E3X5R1H105M080AB   | CGA3E3X5R1V105M080AB   | CGA3E3X5R1E105M080AB   |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA4J3X5R1H105K125AB   | CGA4J3X5R1V105K125AB   | CGA4J2X5R1E105K125AA   |
|             |                 |                 | ±20%                  | CGA4J3X5R1H105M125AB   | CGA4J3X5R1V105M125AB   | CGA4J2X5R1E105M125AA   |
| 2.2µF       | 2012            | 1.25±0.20       | ±10%                  | CGA5L2X5R1H105K160AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA5L2X5R1H105M160AA   |                        |                        |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA4J3X5R1H155K125AB   | CGA4J3X5R1V155K125AB   | CGA4J3X5R1E155K125AB   |
|             |                 |                 | ±20%                  | CGA4J3X5R1H155M125AB   | CGA4J3X5R1V155M125AB   | CGA4J3X5R1E155M125AB   |
| 3.3µF       | 2012            | 1.25±0.20       | ±10%                  | CGA5L3X5R1H155K160AB   | CGA5L3X5R1V155K160AB   | CGA5L2X5R1E155K160AA   |
|             |                 |                 | ±20%                  | CGA5L3X5R1H155M160AB   | CGA5L3X5R1V155M160AB   | CGA5L2X5R1E155M160AA   |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA4J3X5R1H225K125AB   | CGA4J3X5R1V225K125AB   | CGA4J3X5R1E225K125AB   |
|             |                 |                 | ±20%                  | CGA4J3X5R1H225M125AB   | CGA4J3X5R1V225M125AB   | CGA4J3X5R1E225M125AB   |
| 4.7µF       | 2012            | 1.25±0.20       | ±10%                  | CGA5L3X5R1H225K160AB   | CGA5L3X5R1V225K160AB   | CGA5L2X5R1E225K160AA   |
|             |                 |                 | ±20%                  | CGA5L3X5R1H225M160AB   | CGA5L3X5R1V225M160AB   | CGA5L2X5R1E225M160AA   |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA4J3X5R1H335K125AB   | CGA4J3X5R1V335K125AB   | CGA4J3X5R1E335K125AB   |
|             |                 |                 | ±20%                  | CGA4J3X5R1H335M125AB   | CGA4J3X5R1V335M125AB   | CGA4J3X5R1E335M125AB   |
| 6.8µF       | 2012            | 1.25±0.20       | ±10%                  | CGA5L3X5R1H335K160AB   | CGA5L3X5R1V335K160AB   | CGA5L2X5R1E335K160AA   |
|             |                 |                 | ±20%                  | CGA5L3X5R1H335M160AB   | CGA5L3X5R1V335M160AB   | CGA5L2X5R1E335M160AA   |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA4J3X5R1H475K125AB   | CGA4J3X5R1V475K125AB   | CGA4J3X5R1E475K125AB   |
|             |                 |                 | ±20%                  | CGA4J3X5R1H475M125AB   | CGA4J3X5R1V475M125AB   | CGA4J3X5R1E475M125AB   |
| 10µF        | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA5L3X5R1H475K160AB   | CGA5L3X5R1V475K160AB   | CGA5L2X5R1E475K160AA   |
|             |                 |                 | ±20%                  | CGA5L3X5R1H475M160AB   | CGA5L3X5R1V475M160AB   | CGA5L2X5R1E475M160AA   |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA5L3X5R1H685K160AB   | CGA5L3X5R1V685K160AB   | CGA5L3X5R1E685K160AB   |
|             |                 |                 | ±20%                  | CGA5L3X5R1H685M160AB   | CGA5L3X5R1V685M160AB   | CGA5L3X5R1E685M160AB   |
| 3216        | 1.60+0.30,-0.10 | ±10%            | CGA5L3X5R1H106K160AB  | CGA5L3X5R1V106K160AB   | CGA5L3X5R1E106K160AB   |                        |
|             |                 | ±20%            | CGA5L3X5R1H106M160AB  | CGA5L3X5R1V106M160AB   | CGA5L3X5R1E106M160AB   |                        |

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

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MULTILAYER CERAMIC CHIP CAPACITORS 

Capacitance range table

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

| Capacitance | Dimensions | Thickness (mm)  | Capacitance tolerance | Catalog number         |                        |                         |
|-------------|------------|-----------------|-----------------------|------------------------|------------------------|-------------------------|
|             |            |                 |                       | Rated voltage Edc: 16V | Rated voltage Edc: 10V | Rated voltage Edc: 6.3V |
| 33nF        | 1005       | 0.50±0.05       | ±10%                  | CGA2B2X5R1C333K050BA   |                        |                         |
|             |            |                 | ±20%                  | CGA2B2X5R1C333M050BA   |                        |                         |
| 47nF        | 1005       | 0.50±0.05       | ±10%                  | CGA2B2X5R1C473K050BA   |                        |                         |
|             |            |                 | ±20%                  | CGA2B2X5R1C473M050BA   |                        |                         |
| 68nF        | 1005       | 0.50±0.05       | ±10%                  | CGA2B2X5R1C683K050BA   |                        |                         |
|             |            |                 | ±20%                  | CGA2B2X5R1C683M050BA   |                        |                         |
| 100nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B2X5R1C104K050BA   | CGA2B2X5R1A104K050BA   |                         |
|             |            |                 | ±20%                  | CGA2B2X5R1C104M050BA   | CGA2B2X5R1A104M050BA   |                         |
| 150nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B1X5R1C154K050BC   | CGA2B3X5R1A154K050BB   |                         |
|             |            |                 | ±20%                  | CGA2B1X5R1C154M050BC   | CGA2B3X5R1A154M050BB   |                         |
| 220nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B1X5R1C224K050BC   | CGA2B3X5R1A224K050BB   |                         |
|             |            |                 | ±20%                  | CGA2B1X5R1C224M050BC   | CGA2B3X5R1A224M050BB   |                         |
|             | 1608       | 0.80±0.10       | ±10%                  | CGA3E2X5R1C224K080AA   |                        |                         |
|             |            |                 | ±20%                  | CGA3E2X5R1C224M080AA   |                        |                         |
| 330nF       | 1608       | 0.80±0.10       | ±10%                  | CGA3E2X5R1C334K080AA   | CGA3E2X5R1A334K080AA   |                         |
|             |            |                 | ±20%                  | CGA3E2X5R1C334M080AA   | CGA3E2X5R1A334M080AA   |                         |
| 470nF       | 1608       | 0.80±0.10       | ±10%                  | CGA3E2X5R1C474K080AA   | CGA3E2X5R1A474K080AA   |                         |
|             |            |                 | ±20%                  | CGA3E2X5R1C474M080AA   | CGA3E2X5R1A474M080AA   |                         |
| 680nF       | 1608       | 0.80±0.10       | ±10%                  | CGA3E2X5R1C684K080AA   | CGA3E2X5R1A684K080AA   |                         |
|             |            |                 | ±20%                  | CGA3E2X5R1C684M080AA   | CGA3E2X5R1A684M080AA   |                         |
|             | 2012       | 1.25±0.20       | ±10%                  | CGA4J2X5R1C684K125AA   |                        |                         |
|             |            |                 | ±20%                  | CGA4J2X5R1C684M125AA   |                        |                         |
| 1µF         | 1608       | 0.80±0.10       | ±10%                  | CGA3E1X5R1C105K080AC   | CGA3E2X5R1A105K080AA   |                         |
|             |            |                 | ±20%                  | CGA3E1X5R1C105M080AC   | CGA3E2X5R1A105M080AA   |                         |
|             | 2012       | 1.25±0.20       | ±10%                  | CGA4J2X5R1C105K125AA   |                        |                         |
|             |            |                 | ±20%                  | CGA4J2X5R1C105M125AA   |                        |                         |
| 1.5µF       | 1608       | 0.80±0.10       | ±10%                  | CGA3E1X5R1C155K080AC   | CGA3E3X5R1A155K080AB   |                         |
|             |            |                 | ±20%                  | CGA3E1X5R1C155M080AC   | CGA3E3X5R1A155M080AB   |                         |
|             | 2012       | 1.25±0.20       | ±10%                  | CGA4J2X5R1C155K125AA   | CGA4J2X5R1A155K125AA   |                         |
|             |            |                 | ±20%                  | CGA4J2X5R1C155M125AA   | CGA4J2X5R1A155M125AA   |                         |
| 2.2µF       | 1608       | 0.80±0.10       | ±10%                  | CGA3E1X5R1C225K080AC   | CGA3E3X5R1A225K080AB   |                         |
|             |            |                 | ±20%                  | CGA3E1X5R1C225M080AC   | CGA3E3X5R1A225M080AB   |                         |
|             | 2012       | 1.25±0.20       | ±10%                  | CGA4J2X5R1C225K125AA   | CGA4J2X5R1A225K125AA   |                         |
|             |            |                 | ±20%                  | CGA4J2X5R1C225M125AA   | CGA4J2X5R1A225M125AA   |                         |
| 3.3µF       | 1608       | 0.80±0.10       | ±10%                  |                        | CGA3E1X5R1A335K080AC   | CGA3E3X5R0J335K080AB    |
|             |            |                 | ±20%                  |                        | CGA3E1X5R1A335M080AC   | CGA3E3X5R0J335M080AB    |
|             | 2012       | 1.25±0.20       | ±10%                  | CGA4J3X5R1C335K125AB   | CGA4J2X5R1A335K125AA   |                         |
|             |            |                 | ±20%                  | CGA4J3X5R1C335M125AB   | CGA4J2X5R1A335M125AA   |                         |
|             | 1608       | 0.80±0.10       | ±10%                  |                        |                        | CGA3E1X5R0J475K080AC    |
|             |            |                 | ±20%                  |                        |                        | CGA3E1X5R0J475M080AC    |
| 4.7µF       | 2012       | 1.25±0.20       | ±10%                  | CGA4J3X5R1C475K125AB   | CGA4J2X5R1A475K125AA   |                         |
|             |            |                 | ±20%                  | CGA4J3X5R1C475M125AB   | CGA4J2X5R1A475M125AA   |                         |
|             | 3216       | 1.60+0.30,-0.10 | ±10%                  | CGA5L2X5R1C475K160AA   |                        |                         |
|             |            |                 | ±20%                  | CGA5L2X5R1C475M160AA   |                        |                         |
| 6.8µF       | 2012       | 1.25±0.20       | ±10%                  | CGA4J1X5R1C685K125AC   | CGA4J3X5R1A685K125AB   |                         |
|             |            |                 | ±20%                  | CGA4J1X5R1C685M125AC   | CGA4J3X5R1A685M125AB   |                         |
|             | 3216       | 1.60+0.30,-0.10 | ±10%                  | CGA5L2X5R1C685K160AA   |                        |                         |
|             |            |                 | ±20%                  | CGA5L2X5R1C685M160AA   |                        |                         |
| 10µF        | 2012       | 1.25±0.20       | ±10%                  | CGA4J1X5R1C106K125AC   | CGA4J3X5R1A106K125AB   |                         |
|             |            |                 | ±20%                  | CGA4J1X5R1C106M125AC   | CGA4J3X5R1A106M125AB   |                         |
|             | 3216       | 1.60+0.30,-0.10 | ±10%                  | CGA5L1X5R1C106K160AC   |                        |                         |
|             |            |                 | ±20%                  | CGA5L1X5R1C106M160AC   |                        |                         |
| 15µF        | 3216       | 1.60+0.30,-0.10 | ±20%                  | CGA5L1X5R1C156M160AC   |                        |                         |
| 22µF        | 3216       | 1.60+0.30,-0.10 | ±20%                  | CGA5L1X5R1C226M160AC   |                        |                         |

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## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

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

| Capacitance | Dimensions | Thickness (mm) | Capacitance tolerance | Catalog number         |                        |                        |
|-------------|------------|----------------|-----------------------|------------------------|------------------------|------------------------|
|             |            |                |                       | Rated voltage Edc: 50V | Rated voltage Edc: 35V | Rated voltage Edc: 25V |
| 100pF       | 0603       | 0.30±0.03      | ±10%                  | CGA1A2X7R1H101K030BA   |                        | CGA1A2X7R1E101K030BA   |
|             |            |                | ±20%                  | CGA1A2X7R1H101M030BA   |                        | CGA1A2X7R1E101M030BA   |
| 150pF       | 0603       | 0.30±0.03      | ±10%                  | CGA1A2X7R1H151K030BA   |                        | CGA1A2X7R1E151K030BA   |
|             |            |                | ±20%                  | CGA1A2X7R1H151M030BA   |                        | CGA1A2X7R1E151M030BA   |
| 220pF       | 0603       | 0.30±0.03      | ±10%                  | CGA1A2X7R1H221K030BA   |                        | CGA1A2X7R1E221K030BA   |
|             |            |                | ±20%                  | CGA1A2X7R1H221M030BA   |                        | CGA1A2X7R1E221M030BA   |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H221K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H221M050BA   |                        |                        |
| 330pF       | 0603       | 0.30±0.03      | ±10%                  | CGA1A2X7R1H331K030BA   |                        | CGA1A2X7R1E331K030BA   |
|             |            |                | ±20%                  | CGA1A2X7R1H331M030BA   |                        | CGA1A2X7R1E331M030BA   |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H331K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H331M050BA   |                        |                        |
| 470pF       | 0603       | 0.30±0.03      | ±10%                  | CGA1A2X7R1H471K030BA   |                        | CGA1A2X7R1E471K030BA   |
|             |            |                | ±20%                  | CGA1A2X7R1H471M030BA   |                        | CGA1A2X7R1E471M030BA   |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H471K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H471M050BA   |                        |                        |
| 680pF       | 0603       | 0.30±0.03      | ±10%                  |                        |                        | CGA1A2X7R1E681K030BA   |
|             |            |                | ±20%                  |                        |                        | CGA1A2X7R1E681M030BA   |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H681K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H681M050BA   |                        |                        |
| 1nF         | 0603       | 0.30±0.03      | ±10%                  |                        |                        | CGA1A2X7R1E102K030BA   |
|             |            |                | ±20%                  |                        |                        | CGA1A2X7R1E102M030BA   |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H102K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H102M050BA   |                        |                        |
| 1.5nF       | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X7R1H102K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X7R1H102M080AA   |                        |                        |
|             | 0603       | 0.30±0.03      | ±10%                  |                        |                        | CGA1A2X7R1E152K030BA   |
|             |            |                | ±20%                  |                        |                        | CGA1A2X7R1E152M030BA   |
| 2.2nF       | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H152K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H152M050BA   |                        |                        |
|             | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X7R1H152K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X7R1H152M080AA   |                        |                        |
| 3.3nF       | 0603       | 0.30±0.03      | ±10%                  |                        |                        | CGA1A2X7R1E222K030BA   |
|             |            |                | ±20%                  |                        |                        | CGA1A2X7R1E222M030BA   |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H222K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H222M050BA   |                        |                        |
| 4.7nF       | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X7R1H222K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X7R1H222M080AA   |                        |                        |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H472K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H472M050BA   |                        |                        |
| 6.8nF       | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X7R1H472K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X7R1H472M080AA   |                        |                        |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B2X7R1H682K050BA   |                        |                        |
|             |            |                | ±20%                  | CGA2B2X7R1H682M050BA   |                        |                        |
| 10nF        | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X7R1H682K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X7R1H682M080AA   |                        |                        |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X7R1H103K050BB   | CGA2B3X7R1V103K050BB   | CGA2B2X7R1E103K050BA   |
|             |            |                | ±20%                  | CGA2B3X7R1H103M050BB   | CGA2B3X7R1V103M050BB   | CGA2B2X7R1E103M050BA   |
| 15nF        | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X7R1H103K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X7R1H103M080AA   |                        |                        |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X7R1H153K050BB   | CGA2B3X7R1V153K050BB   | CGA2B2X7R1E153K050BA   |
|             |            |                | ±20%                  | CGA2B3X7R1H153M050BB   | CGA2B3X7R1V153M050BB   | CGA2B2X7R1E153M050BA   |
| 22nF        | 1608       | 0.80±0.10      | ±10%                  | CGA3E2X7R1H153K080AA   |                        |                        |
|             |            |                | ±20%                  | CGA3E2X7R1H153M080AA   |                        |                        |
|             | 1005       | 0.50±0.05      | ±10%                  | CGA2B3X7R1H223K050BB   | CGA2B3X7R1V223K050BB   | CGA2B2X7R1E223K050BA   |
|             |            |                | ±20%                  | CGA2B3X7R1H223M050BB   | CGA2B3X7R1V223M050BB   | CGA2B2X7R1E223M050BA   |
| 1608        | 0.80±0.10  | ±10%           | CGA3E2X7R1H223K080AA  |                        |                        |                        |
|             |            | ±20%           | CGA3E2X7R1H223M080AA  |                        |                        |                        |

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Please note that the contents may change without any prior notice due to reasons such as upgrading.

# MULTILAYER CERAMIC CHIP CAPACITORS TDK

## Capacitance range table

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

| Capacitance | Dimensions      | Thickness (mm)  | Capacitance tolerance | Catalog number         |                        |                        |
|-------------|-----------------|-----------------|-----------------------|------------------------|------------------------|------------------------|
|             |                 |                 |                       | Rated voltage Edc: 50V | Rated voltage Edc: 35V | Rated voltage Edc: 25V |
| 33nF        | 1005            | 0.50±0.05       | ±10%                  | CGA2B3X7R1H333K050BB   | CGA2B3X7R1V333K050BB   | CGA2B1X7R1E333K050BC   |
|             |                 |                 | ±20%                  | CGA2B3X7R1H333M050BB   | CGA2B3X7R1V333M050BB   | CGA2B1X7R1E333M050BC   |
|             | 1608            | 0.80±0.10       | ±10%                  | CGA3E2X7R1H333K080AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA3E2X7R1H333M080AA   |                        |                        |
| 47nF        | 1005            | 0.50±0.05       | ±10%                  | CGA2B3X7R1H473K050BB   | CGA2B3X7R1V473K050BB   | CGA2B1X7R1E473K050BC   |
|             |                 |                 | ±20%                  | CGA2B3X7R1H473M050BB   | CGA2B3X7R1V473M050BB   | CGA2B1X7R1E473M050BC   |
|             | 1608            | 0.80±0.10       | ±10%                  | CGA3E2X7R1H473K080AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA3E2X7R1H473M080AA   |                        |                        |
| 68nF        | 1005            | 0.50±0.05       | ±10%                  | CGA2B3X7R1H683K050BB   | CGA2B3X7R1V683K050BB   | CGA2B3X7R1E683K050BB   |
|             |                 |                 | ±20%                  | CGA2B3X7R1H683M050BB   | CGA2B3X7R1V683M050BB   | CGA2B3X7R1E683M050BB   |
|             | 1608            | 0.80±0.10       | ±10%                  | CGA3E2X7R1H683K080AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA3E2X7R1H683M080AA   |                        |                        |
| 100nF       | 1005            | 0.50±0.05       | ±10%                  | CGA2B3X7R1H104K050BB   | CGA2B3X7R1V104K050BB   | CGA2B3X7R1E104K050BB   |
|             |                 |                 | ±20%                  | CGA2B3X7R1H104M050BB   | CGA2B3X7R1V104M050BB   | CGA2B3X7R1E104M050BB   |
|             | 1608            | 0.80±0.10       | ±10%                  | CGA3E2X7R1H104K080AA   |                        | CGA3E2X7R1E104K080AA   |
|             |                 |                 | ±20%                  | CGA3E2X7R1H104M080AA   |                        | CGA3E2X7R1E104M080AA   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J2X7R1H104K125AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA4J2X7R1H104M125AA   |                        |                        |
| 150nF       | 1005            | 0.50±0.05       | ±10%                  |                        | CGA2B1X7R1V154K050BC   | CGA2B3X7R1E154K050BB   |
|             |                 |                 | ±20%                  |                        | CGA2B1X7R1V154M050BC   | CGA2B3X7R1E154M050BB   |
|             | 1608            | 0.80±0.10       | ±10%                  | CGA3E3X7R1H154K080AB   | CGA3E3X7R1V154K080AB   | CGA3E2X7R1E154K080AA   |
|             |                 |                 | ±20%                  | CGA3E3X7R1H154M080AB   | CGA3E3X7R1V154M080AB   | CGA3E2X7R1E154M080AA   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J2X7R1H154K125AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA4J2X7R1H154M125AA   |                        |                        |
| 220nF       | 1005            | 0.50±0.05       | ±10%                  |                        | CGA2B1X7R1V224K050BC   | CGA2B3X7R1E224K050BB   |
|             |                 |                 | ±20%                  |                        | CGA2B1X7R1V224M050BC   | CGA2B3X7R1E224M050BB   |
|             | 1608            | 0.80±0.10       | ±10%                  | CGA3E3X7R1H224K080AB   | CGA3E3X7R1V224K080AB   | CGA3E1X7R1E224K080AC   |
|             |                 |                 | ±20%                  | CGA3E3X7R1H224M080AB   | CGA3E3X7R1V224M080AB   | CGA3E1X7R1E224M080AC   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J2X7R1H224K125AA   |                        | CGA4J2X7R1E224K125AA   |
|             |                 |                 | ±20%                  | CGA4J2X7R1H224M125AA   |                        | CGA4J2X7R1E224M125AA   |
| 330nF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E3X7R1H334K080AB   | CGA3E1X7R1V334K080AC   | CGA3E3X7R1E334K080AB   |
|             |                 |                 | ±20%                  | CGA3E3X7R1H334M080AB   | CGA3E1X7R1V334M080AC   | CGA3E3X7R1E334M080AB   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J2X7R1H334K125AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA4J2X7R1H334M125AA   |                        |                        |
| 470nF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E3X7R1H474K080AB   | CGA3E1X7R1V474K080AC   | CGA3E3X7R1E474K080AB   |
|             |                 |                 | ±20%                  | CGA3E3X7R1H474M080AB   | CGA3E1X7R1V474M080AC   | CGA3E3X7R1E474M080AB   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X7R1H474K125AB   | CGA4J3X7R1V474K125AB   | CGA4J2X7R1E474K125AA   |
|             |                 |                 | ±20%                  | CGA4J3X7R1H474M125AB   | CGA4J3X7R1V474M125AB   | CGA4J2X7R1E474M125AA   |
| 680nF       | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA5L2X7R1H474K160AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA5L2X7R1H474M160AA   |                        |                        |
|             | 1608            | 0.80±0.10       | ±10%                  |                        | CGA3E1X7R1V684K080AC   | CGA3E1X7R1E684K080AC   |
|             |                 |                 | ±20%                  |                        | CGA3E1X7R1V684M080AC   | CGA3E1X7R1E684M080AC   |
| 2012        | 1.25±0.20       | ±10%            | CGA4J3X7R1H684K125AB  | CGA4J3X7R1V684K125AB   | CGA4J3X7R1E684K125AB   |                        |
|             |                 | ±20%            | CGA4J3X7R1H684M125AB  | CGA4J3X7R1V684M125AB   | CGA4J3X7R1E684M125AB   |                        |
| 1µF         | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA5L2X7R1H684K160AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA5L2X7R1H684M160AA   |                        |                        |
|             | 1608            | 0.80±0.10       | ±10%                  |                        | CGA3E1X7R1V105K080AC   | CGA3E1X7R1E105K080AC   |
|             |                 |                 | ±20%                  |                        | CGA3E1X7R1V105M080AC   | CGA3E1X7R1E105M080AC   |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X7R1H105K125AB   | CGA4J3X7R1V105K125AB   | CGA4J3X7R1E105K125AB   |
|             |                 |                 | ±20%                  | CGA4J3X7R1H105M125AB   | CGA4J3X7R1V105M125AB   | CGA4J3X7R1E105M125AB   |
| 3216        | 1.60+0.30,-0.10 | ±10%            | CGA5L3X7R1H105K160AB  |                        | CGA5L2X7R1E105K160AA   |                        |
|             |                 | ±20%            | CGA5L3X7R1H105M160AB  |                        | CGA5L2X7R1E105M160AA   |                        |
| 1.5µF       | 3225            | 1.60±0.20       | ±10%                  | CGA6L2X7R1H105K160AA   |                        |                        |
|             |                 |                 | ±20%                  | CGA6L2X7R1H105M160AA   |                        |                        |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X7R1H155K125AB   | CGA4J1X7R1V155K125AC   | CGA4J3X7R1E155K125AB   |
|             |                 |                 | ±20%                  | CGA4J3X7R1H155M125AB   | CGA4J1X7R1V155M125AC   | CGA4J3X7R1E155M125AB   |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA5L3X7R1H155K160AB   | CGA5L3X7R1V155K160AB   | CGA5L2X7R1E155K160AA   |
|             |                 |                 | ±20%                  | CGA5L3X7R1H155M160AB   | CGA5L3X7R1V155M160AB   | CGA5L2X7R1E155M160AA   |
| 3225        | 2.00±0.20       | ±10%            | CGA6M2X7R1H155K200AA  |                        |                        |                        |
|             |                 | ±20%            | CGA6M2X7R1H155M200AA  |                        |                        |                        |
| 2.2µF       | 4532            | 1.60±0.20       | ±10%                  | CGA8L2X7R1H155K160KA   |                        |                        |
|             |                 |                 | ±20%                  | CGA8L2X7R1H155M160KA   |                        |                        |
|             | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X7R1H225K125AB   | CGA4J1X7R1V225K125AC   | CGA4J3X7R1E225K125AB   |
|             |                 |                 | ±20%                  | CGA4J3X7R1H225M125AB   | CGA4J1X7R1V225M125AC   | CGA4J3X7R1E225M125AB   |
|             | 3216            | 1.60+0.30,-0.10 | ±10%                  | CGA5L3X7R1H225K160AB   | CGA5L3X7R1V225K160AB   | CGA5L2X7R1E225K160AA   |
|             |                 |                 | ±20%                  | CGA5L3X7R1H225M160AB   | CGA5L3X7R1V225M160AB   | CGA5L2X7R1E225M160AA   |
| 3225        | 2.00±0.20       | ±10%            | CGA6M3X7R1H225K200AB  |                        |                        |                        |
|             |                 | ±20%            | CGA6M3X7R1H225M200AB  |                        |                        |                        |
| 4532        | 1.60±0.20       | ±10%            | CGA8L2X7R1H225K160KA  |                        |                        |                        |
|             |                 | ±20%            | CGA8L2X7R1H225M160KA  |                        |                        |                        |

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

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## Capacitance range table

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

| Capacitance | Dimensions | Thickness (mm)  | Capacitance tolerance | Catalog number         |                        |                        |
|-------------|------------|-----------------|-----------------------|------------------------|------------------------|------------------------|
|             |            |                 |                       | Rated voltage Edc: 50V | Rated voltage Edc: 35V | Rated voltage Edc: 25V |
| 3.3µF       | 2012       | 1.25±0.20       | ±10%                  |                        | CGA4J1X7R1V335K125AC   | CGA4J1X7R1E335K125AC   |
|             |            |                 | ±20%                  |                        | CGA4J1X7R1V335M125AC   | CGA4J1X7R1E335M125AC   |
|             | 3216       | 1.60+0.30,-0.10 | ±10%                  | CGA5L3X7R1H335K160AB   | CGA5L1X7R1V335K160AC   | CGA5L1X7R1E335K160AC   |
|             |            |                 | ±20%                  | CGA5L3X7R1H335M160AB   | CGA5L1X7R1V335M160AC   | CGA5L1X7R1E335M160AC   |
|             | 3225       | 2.50±0.30       | ±10%                  | CGA6P3X7R1H335K250AB   |                        |                        |
|             |            |                 | ±20%                  | CGA6P3X7R1H335M250AB   |                        |                        |
| 4532        | 2.00±0.20  | ±10%            | CGA8M2X7R1H335K200KA  |                        |                        |                        |
| 4.7µF       | 2012       | 1.25±0.20       | ±10%                  |                        | CGA4J1X7R1V475K125AC   | CGA4J1X7R1E475K125AC   |
|             |            |                 | ±20%                  |                        | CGA4J1X7R1V475M125AC   | CGA4J1X7R1E475M125AC   |
|             | 3216       | 1.60+0.30,-0.10 | ±10%                  | CGA5L3X7R1H475K160AB   | CGA5L1X7R1V475K160AC   | CGA5L1X7R1E475K160AC   |
|             |            |                 | ±20%                  | CGA5L3X7R1H475M160AB   | CGA5L1X7R1V475M160AC   | CGA5L1X7R1E475M160AC   |
|             | 3225       | 2.50±0.30       | ±10%                  | CGA6P3X7R1H475K250AB   |                        |                        |
|             |            |                 | ±20%                  | CGA6P3X7R1H475M250AB   |                        |                        |
|             | 4532       | 1.60±0.20       | ±10%                  |                        |                        | CGA8L2X7R1E475K160KA   |
|             |            |                 | ±20%                  |                        |                        | CGA8L2X7R1E475M160KA   |
|             |            | 2.00±0.20       | ±10%                  | CGA8M3X7R1H475K200KB   |                        |                        |
|             | 5750       | 2.00±0.20       | ±10%                  | CGA9M2X7R1H475K200KA   |                        |                        |
| 6.8µF       | 3216       | 1.60+0.30,-0.10 | ±10%                  |                        | CGA5L1X7R1V685K160AC   | CGA5L1X7R1E685K160AC   |
|             |            |                 | ±20%                  |                        | CGA5L1X7R1V685M160AC   | CGA5L1X7R1E685M160AC   |
|             | 3225       | 2.50±0.30       | ±10%                  |                        |                        | CGA6P3X7R1E685K250AB   |
|             |            |                 | ±20%                  |                        |                        | CGA6P3X7R1E685M250AB   |
|             | 4532       | 2.50±0.30       | ±10%                  | CGA8P3X7R1H685K250KB   |                        |                        |
|             | 5750       | 2.50±0.30       | ±10%                  | CGA9P2X7R1H685K250KA   |                        |                        |
| 10µF        | 3216       | 1.60+0.30,-0.10 | ±10%                  |                        | CGA5L1X7R1V106K160AC   | CGA5L1X7R1E106K160AC   |
|             |            |                 | ±20%                  |                        | CGA5L1X7R1V106M160AC   | CGA5L1X7R1E106M160AC   |
|             | 3225       | 2.50±0.30       | ±10%                  |                        |                        | CGA6P1X7R1E106K250AC   |
|             |            |                 | ±20%                  |                        |                        | CGA6P1X7R1E106M250AC   |
|             | 4532       | 2.50±0.30       | ±10%                  |                        |                        | CGA8P2X7R1E106K250KA   |
|             |            |                 | ±20%                  |                        |                        | CGA9M2X7R1E106M200KA   |
| 5750        | 2.00±0.20  | ±10%            | CGA9N3X7R1H106K230KB  |                        |                        |                        |
| 15µF        | 3225       | 2.00±0.20       | ±20%                  |                        |                        | CGA6M3X7R1E156M200AB   |
|             | 4532       | 2.80±0.30       | ±20%                  |                        |                        | CGA8Q3X7R1E156M280KB   |
|             | 5750       | 2.30±0.20       | ±20%                  |                        |                        | CGA9N2X7R1E156M230KA   |
| 22µF        | 4532       | 2.50±0.30       | ±20%                  |                        |                        | CGA8P1X7R1E226M250KC   |
|             | 5750       | 2.50±0.30       | ±20%                  |                        |                        | CGA9P2X7R1E226M250KA   |
| 47µF        | 5750       | 2.30±0.20       | ±20%                  |                        |                        | CGA9N3X7R1E476M230KB   |

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

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

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

| Capacitance | Dimensions      | Thickness (mm)  | Capacitance tolerance | Catalog number         |                        |                         |
|-------------|-----------------|-----------------|-----------------------|------------------------|------------------------|-------------------------|
|             |                 |                 |                       | Rated voltage Edc: 16V | Rated voltage Edc: 10V | Rated voltage Edc: 6.3V |
| 100pF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C101K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C101M030BA   |                        |                         |
| 150pF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C151K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C151M030BA   |                        |                         |
| 220pF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C221K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C221M030BA   |                        |                         |
| 330pF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C331K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C331M030BA   |                        |                         |
| 470pF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C471K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C471M030BA   |                        |                         |
| 680pF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C681K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C681M030BA   |                        |                         |
| 1nF         | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C102K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C102M030BA   |                        |                         |
| 1.5nF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C152K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C152M030BA   |                        |                         |
| 2.2nF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C222K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C222M030BA   |                        |                         |
| 3.3nF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C332K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C332M030BA   |                        |                         |
| 4.7nF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C472K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C472M030BA   |                        |                         |
| 6.8nF       | 0603            | 0.30±0.03       | ±10%                  | CGA1A2X7R1C682K030BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA1A2X7R1C682M030BA   |                        |                         |
| 10nF        | 0603            | 0.30±0.03       | ±10%                  |                        | CGA1A2X7R1A103K030BA   | CGA1A2X7R0J103K030BA    |
|             |                 |                 | ±20%                  |                        | CGA1A2X7R1A103M030BA   | CGA1A2X7R0J103M030BA    |
| 33nF        | 1005            | 0.50±0.05       | ±10%                  | CGA2B2X7R1C333K050BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA2B2X7R1C333M050BA   |                        |                         |
| 47nF        | 1005            | 0.50±0.05       | ±10%                  | CGA2B2X7R1C473K050BA   |                        |                         |
|             |                 |                 | ±20%                  | CGA2B2X7R1C473M050BA   |                        |                         |
| 68nF        | 1005            | 0.50±0.05       | ±10%                  | CGA2B1X7R1C683K050BC   |                        |                         |
|             |                 |                 | ±20%                  | CGA2B1X7R1C683M050BC   |                        |                         |
| 100nF       | 1005            | 0.50±0.05       | ±10%                  | CGA2B1X7R1C104K050BC   |                        |                         |
|             |                 |                 | ±20%                  | CGA2B1X7R1C104M050BC   |                        |                         |
| 150nF       | 1005            | 0.50±0.05       | ±10%                  | CGA2B2X7R1C154K050BA   | CGA2B1X7R1A154K050BC   | CGA2B3X7R0J154K050BB    |
|             |                 |                 | ±20%                  | CGA2B2X7R1C154M050BA   | CGA2B1X7R1A154M050BC   | CGA2B3X7R0J154M050BB    |
| 220nF       | 1005            | 0.50±0.05       | ±10%                  | CGA2B2X7R1C224K050BA   | CGA2B1X7R1A224K050BC   | CGA2B3X7R0J224K050BB    |
|             |                 |                 | ±20%                  | CGA2B2X7R1C224M050BA   | CGA2B1X7R1A224M050BC   | CGA2B3X7R0J224M050BB    |
| 330nF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E2X7R1C224K080AA   |                        |                         |
|             |                 |                 | ±20%                  | CGA3E2X7R1C224M080AA   |                        |                         |
| 470nF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E1X7R1C334K080AC   |                        |                         |
|             |                 |                 | ±20%                  | CGA3E1X7R1C334M080AC   |                        |                         |
| 680nF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E1X7R1C474K080AC   |                        |                         |
|             |                 |                 | ±20%                  | CGA3E1X7R1C474M080AC   |                        |                         |
| 1µF         | 2012            | 1.25±0.20       | ±10%                  | CGA4J2X7R1C474K125AA   |                        |                         |
|             |                 |                 | ±20%                  | CGA4J2X7R1C474M125AA   |                        |                         |
| 1.5µF       | 1608            | 0.80±0.10       | ±10%                  | CGA3E1X7R1C105K080AC   |                        | CGA3E1X7R0J155K080AC    |
|             |                 |                 | ±20%                  | CGA3E1X7R1C105M080AC   |                        | CGA3E1X7R0J155M080AC    |
| 2.2µF       | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X7R1C155K125AB   |                        |                         |
|             |                 |                 | ±20%                  | CGA4J3X7R1C155M125AB   |                        |                         |
| 3.3µF       | 1608            | 0.80±0.10       | ±10%                  |                        |                        | CGA3E1X7R0J225K080AC    |
|             |                 |                 | ±20%                  |                        |                        | CGA3E1X7R0J225M080AC    |
| 4.7µF       | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X7R1C225K125AB   |                        |                         |
|             |                 |                 | ±20%                  | CGA4J3X7R1C225M125AB   |                        |                         |
| 3.3µF       | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X7R1C335K125AB   | CGA4J3X7R1A335K125AB   |                         |
|             |                 |                 | ±20%                  | CGA4J3X7R1C335M125AB   |                        |                         |
| 4.7µF       | 2012            | 1.25±0.20       | ±10%                  | CGA4J3X7R1C475K125AB   | CGA4J3X7R1A475K125AB   |                         |
|             |                 |                 | ±20%                  | CGA4J3X7R1C475M125AB   |                        |                         |
| 3216        | 1.60+0.30,-0.10 | 1.60+0.30,-0.10 | ±10%                  | CGA5L3X7R1C475K160AB   |                        |                         |
|             |                 |                 | ±20%                  | CGA5L3X7R1C475M160AB   |                        |                         |

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

## Capacitance range table

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

| Capacitance | Dimensions | Thickness<br>(mm) | Capacitance<br>tolerance | Catalog number         |                         |
|-------------|------------|-------------------|--------------------------|------------------------|-------------------------|
|             |            |                   |                          | Rated voltage Edc: 16V | Rated voltage Edc: 6.3V |
| 6.8µF       | 2012       | 1.25±0.20         | ±10%                     |                        | CGA4J1X7R0J685K125AC    |
|             |            |                   | ±20%                     |                        | CGA4J1X7R0J685M125AC    |
|             | 3216       | 1.60+0.30,-0.10   | ±10%                     | CGA5L1X7R1C685K160AC   |                         |
|             |            |                   | ±20%                     | CGA5L1X7R1C685M160AC   |                         |
| 10µF        | 2012       | 1.25±0.20         | ±10%                     |                        | CGA4J1X7R0J106K125AC    |
|             |            |                   | ±20%                     |                        | CGA4J1X7R0J106M125AC    |
|             | 3216       | 1.60+0.30,-0.10   | ±10%                     | CGA5L1X7R1C106K160AC   |                         |
|             |            |                   | ±20%                     | CGA5L1X7R1C106M160AC   |                         |
|             | 3225       | 2.00±0.20         | ±10%                     | CGA6M3X7R1C106K200AB   |                         |
|             |            |                   | ±20%                     | CGA6M3X7R1C106M200AB   |                         |
| 15µF        | 3225       | 2.50±0.30         | ±20%                     | CGA6P3X7R1C156M250AB   |                         |
|             | 3216       | 1.60+0.30,-0.10   | ±20%                     |                        | CGA5L1X7R0J226M160AC    |
| 22µF        | 3225       | 2.50±0.30         | ±20%                     | CGA6P1X7R1C226M250AC   |                         |
|             | 4532       | 2.30±0.20         | ±20%                     | CGA8N3X7R1C226M230KB   |                         |
| 33µF        | 4532       | 2.50±0.30         | ±20%                     | CGA8P1X7R1C336M250KC   |                         |
| 47µF        | 5750       | 2.30±0.20         | ±20%                     | CGA9N3X7R1C476M230KB   |                         |

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

## Capacitance range table

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

| Capacitance | Dimensions | Thickness (mm)  | Capacitance tolerance | Catalog number         |                        |                        |                         |
|-------------|------------|-----------------|-----------------------|------------------------|------------------------|------------------------|-------------------------|
|             |            |                 |                       | Rated voltage Edc: 50V | Rated voltage Edc: 16V | Rated voltage Edc: 10V | Rated voltage Edc: 6.3V |
| 330nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B1X7S1C334K050BC   | CGA2B3X7S1A334K050BB   |                        |                         |
|             |            |                 | ±20%                  | CGA2B1X7S1C334M050BC   | CGA2B3X7S1A334M050BB   |                        |                         |
| 470nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B1X7S1C474K050BC   | CGA2B3X7S1A474K050BB   |                        |                         |
|             |            |                 | ±20%                  | CGA2B1X7S1C474M050BC   | CGA2B3X7S1A474M050BB   |                        |                         |
| 1.5µF       | 1608       | 0.80±0.10       | ±10%                  | CGA3E1X7S1C155K080AC   | CGA3E3X7S1A155K080AB   |                        |                         |
|             |            |                 | ±20%                  | CGA3E1X7S1C155M080AC   | CGA3E3X7S1A155M080AB   |                        |                         |
| 2.2µF       | 1608       | 0.80±0.10       | ±10%                  | CGA3E1X7S1C225K080AC   | CGA3E3X7S1A225K080AB   |                        |                         |
|             |            |                 | ±20%                  | CGA3E1X7S1C225M080AC   | CGA3E3X7S1A225M080AB   |                        |                         |
| 4.7µF       | 3225       | 2.30±0.20       | ±10%                  | CGA6N3X7S1H475K230AB   |                        |                        |                         |
|             | 2012       |                 | ±10%                  | CGA4J1X7S1C685K125AC   | CGA4J3X7S1A685K125AB   |                        |                         |
| 6.8µF       | 2012       | 1.25±0.20       | ±20%                  | CGA4J1X7S1C685M125AC   | CGA4J3X7S1A685M125AB   |                        |                         |
|             |            |                 | ±10%                  | CGA6P3X7S1H685K250AB   |                        |                        |                         |
|             | 3225       | 2.50±0.30       | ±10%                  | CGA6P3X7S1H685M250AB   |                        |                        |                         |
|             |            |                 | ±20%                  | CGA6P3X7S1H685M250AB   |                        |                        |                         |
| 10µF        | 2012       | 1.25±0.20       | ±10%                  | CGA4J1X7S1C106K125AC   | CGA4J3X7S1A106K125AB   |                        |                         |
|             |            |                 | ±20%                  | CGA4J1X7S1C106M125AC   | CGA4J3X7S1A106M125AB   |                        |                         |
|             | 3225       | 2.50±0.30       | ±10%                  | CGA6P3X7S1H106K250AB   |                        |                        |                         |
|             |            |                 | ±20%                  | CGA6P3X7S1H106M250AB   |                        |                        |                         |
| 15µF        | 3216       | 1.60+0.30,-0.10 | ±20%                  |                        | CGA5L1X7S1A156M160AC   |                        |                         |
| 22µF        | 3216       | 1.60+0.30,-0.10 | ±20%                  |                        | CGA5L1X7S1A226M160AC   |                        |                         |
| 33µF        | 3225       | 2.50±0.30       | ±20%                  |                        |                        |                        | CGA6P1X7S0J336M250AC    |
| 47µF        | 3225       | 2.50±0.30       | ±20%                  |                        |                        |                        | CGA6P1X7S0J476M250AC    |

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

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