

# MULTILAYER CERAMIC CHIP CAPACITORS

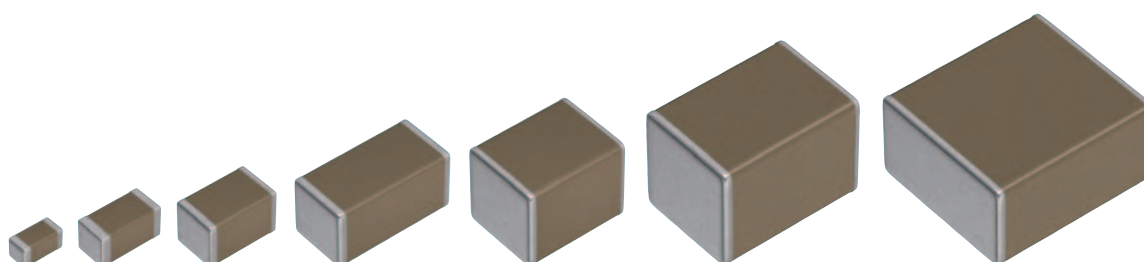
Automotive grade, mid voltage (100 to 630V)

## CGA series

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|             |                         |
|-------------|-------------------------|
| <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

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

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

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

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

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

- We may modify products or discontinue production of a product listed in this catalog without prior notification.
- We provide "Delivery Specification" that explain precautions for the specifications and safety of each product listed in this catalog. We strongly recommend that you exchange these delivery specifications with customers that use one of these products.
- If you plan to export a product listed in this catalog, keep in mind that it may be a restricted item according to the "Foreign Exchange and Foreign Trade Control Law". In such cases, it is necessary to acquire export permission in harmony with this law.
- 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

## Mid voltage (100 to 630V)



Type: 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

Middle voltage CGA series, automotive grade of TDK's multilayer ceramic chip capacitor, is a product which has the high withstanding voltage characteristics. Voltage rating of 100V to 630V with capacitance range up to 15 $\mu$ F has been realized.

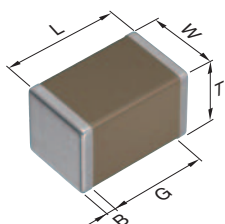
### FEATURES

- Voltage rating of 100V, 250V, 450V and 630V
- Operating temperature range: -55 to +125°C
- C0G temperature characteristic which has excellent stable temperature and DC-bias characteristics is applicable.
- AEC-Q200 compliant.

### APPLICATIONS

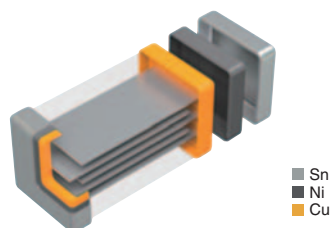
- Wireless Charging units such as DC-DC converter, Inverter, On board charger.
- Decoupling, smoothing, snubber and resonant circuit and so on of high voltage circuit.

### 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         |
|------|-----------|-----------|-----------|-----------|-----------|
| CGA2 | 1.00±0.05 | 0.50±0.05 | 0.50±0.05 | 0.10 min. | 0.30 min. |
| CGA3 | 1.60±0.10 | 0.80±0.10 | 0.80±0.10 | 0.20 min. | 0.30 min. |
| CGA4 | 2.00±0.20 | 1.25±0.20 | 1.25±0.20 | 0.20 min. | 0.50 min. |
| CGA5 | 3.20±0.20 | 1.60±0.20 | 1.60±0.20 | 0.20 min. | 1.00 min. |
| CGA6 | 3.20±0.40 | 2.50±0.30 | 2.50±0.30 | 0.20 min. | —         |
| CGA8 | 4.50±0.40 | 3.20±0.40 | 2.50±0.30 | 0.20 min. | —         |
| CGA9 | 5.70±0.40 | 5.00±0.40 | 2.50±0.30 | 0.20 min. | —         |

\*Dimensional tolerances are typical values.

# MULTILAYER CERAMIC CHIP CAPACITORS



## CATALOG NUMBER CONSTRUCTION

| CGA | 9   | P   | 3   | X7S | 2A  | 156 | M   | 250 | K    | 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 |
|------|--------|--------|-------|----------------|
| 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 |
|------|-----------|
| B    | 0.50 mm   |
| C    | 0.60 mm   |
| E    | 0.80 mm   |
| F    | 0.85 mm   |
| H    | 1.15 mm   |
| J    | 1.25 mm   |
| K    | 1.30 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. |
| 4      | 1.2 × R.V. |

### (5) Temperature characteristics

| Temperature characteristics | Temperature coefficient or capacitance change | Temperature range |
|-----------------------------|-----------------------------------------------|-------------------|
| C0G                         | 0±30 ppm/°C                                   | −55 to +125°C     |
| X7R                         | ±15%                                          | −55 to +125°C     |
| X7S                         | ±22%                                          | −55 to +125°C     |
| X7T                         | +22, −33%                                     | −55 to +125°C     |

### (6) Rated voltage (DC)

| Code | Voltage (DC) |
|------|--------------|
| 2A   | 100V         |
| 2E   | 250V         |
| 2W   | 450V         |
| 2J   | 630V         |

### (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 |
|------|-----------|
| 050  | 0.50 mm   |
| 060  | 0.60 mm   |
| 080  | 0.80 mm   |
| 085  | 0.85 mm   |
| 115  | 1.15 mm   |
| 125  | 1.25 mm   |
| 130  | 1.30 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,N | TDK internal code |

## Capacitance range chart

CGA2/1005 [0402 inch]

| Capacitance |      | C0G          | X7S          |
|-------------|------|--------------|--------------|
| (pF)        | Code | 2A<br>(100V) | 2A<br>(100V) |
| 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  |              |              |

Standard thickness  0.50mm
 Background gray: The product which is not recommended to a new design.

 Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

CGA3/1608 [0603 inch]

| Capacitance |      | C0G          |              | X7R          | X7S          |
|-------------|------|--------------|--------------|--------------|--------------|
| (pF)        | Code | 2E<br>(250V) | 2A<br>(100V) | 2A<br>(100V) | 2A<br>(100V) |
| 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  |              |              |              |              |
| 8,200       | 822  |              |              |              |              |
| 10,000      | 103  |              |              |              |              |
| 15,000      | 153  |              |              |              |              |
| 22,000      | 223  |              |              |              |              |
| 33,000      | 333  |              |              |              |              |
| 47,000      | 473  |              |              |              |              |
| 68,000      | 683  |              |              |              |              |
| 100,000     | 104  |              |              |              |              |

Standard thickness 0.80mm

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

Please refer to the capacitance range table at P-11 and after 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

CGA4/2012 [0805 inch]

| Capacitance |      | C0G          |              |              | X7R          |              | X7S          | X7T          |              |
|-------------|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| (pF)        | Code | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 2E<br>(250V) | 2A<br>(100V) | 2A<br>(100V) | 2W<br>(450V) | 2E<br>(250V) |
| 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  |              |              |              |              |              |              |              |              |
| 8,200       | 822  |              |              |              |              |              |              |              |              |
| 10,000      | 103  |              |              |              |              |              |              |              |              |
| 15,000      | 153  |              |              |              |              |              |              |              |              |
| 22,000      | 223  |              |              |              |              |              |              |              |              |
| 33,000      | 333  |              |              |              |              |              |              |              |              |
| 47,000      | 473  |              |              |              |              |              |              |              |              |
| 68,000      | 683  |              |              |              |              |              |              |              |              |
| 100,000     | 104  |              |              |              |              |              |              |              |              |
| 330,000     | 334  |              |              |              |              |              |              |              |              |
| 470,000     | 474  |              |              |              |              |              |              |              |              |
| 680,000     | 684  |              |              |              |              |              |              |              |              |
| 1,000,000   | 105  |              |              |              |              |              |              |              |              |

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 at P-11 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

CGA5/3216 [1206 inch]

| Capacitance |      | C0G          |              |              |              | X7R          |              |              | X7S          | X7T          |              |              |
|-------------|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| (pF)        | Code | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 2J<br>(630V) | 2E<br>(250V) | 2A<br>(100V) | 2A<br>(100V) | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) |
| 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  |              |              |              |              |              |              |              |              |              |              |              |
| 8,200       | 822  |              |              |              |              |              |              |              |              |              |              |              |
| 10,000      | 103  |              |              |              |              |              |              |              |              |              |              |              |
| 15,000      | 153  |              |              |              |              |              |              |              |              |              |              |              |
| 22,000      | 223  |              |              |              |              |              |              |              |              |              |              |              |
| 33,000      | 333  |              |              |              |              |              |              |              |              |              |              |              |
| 47,000      | 473  |              |              |              |              |              |              |              |              |              |              |              |
| 68,000      | 683  |              |              |              |              |              |              |              |              |              |              |              |
| 100,000     | 104  |              |              |              |              |              |              |              |              |              |              |              |
| 150,000     | 154  |              |              |              |              |              |              |              |              |              |              |              |
| 220,000     | 224  |              |              |              |              |              |              |              |              |              |              |              |
| 330,000     | 334  |              |              |              |              |              |              |              |              |              |              |              |
| 470,000     | 474  |              |              |              |              |              |              |              |              |              |              |              |
| 680,000     | 684  |              |              |              |              |              |              |              |              |              |              |              |
| 1,000,000   | 105  |              |              |              |              |              |              |              |              |              |              |              |
| 1,500,000   | 155  |              |              |              |              |              |              |              |              |              |              |              |
| 2,200,000   | 225  |              |              |              |              |              |              |              |              |              |              |              |
| 3,300,000   | 335  |              |              |              |              |              |              |              |              |              |              |              |

Standard thickness    0.60 mm    0.85 mm    1.15 mm    1.30 mm    1.60 mm

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

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

## CGA6/3225 [1210 inch]

| Capacitance |      | C0G          |              |              |              | X7R          |              |              | X7S          | X7T          |              |              |
|-------------|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| (pF)        | Code | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 2J<br>(630V) | 2E<br>(250V) | 2A<br>(100V) | 2A<br>(100V) | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) |
| 3,900       | 392  |              |              |              |              |              |              |              |              |              |              |              |
| 4,700       | 472  |              |              |              |              |              |              |              |              |              |              |              |
| 5,600       | 562  |              |              |              |              |              |              |              |              |              |              |              |
| 6,800       | 682  |              |              |              |              |              |              |              |              |              |              |              |
| 8,200       | 822  |              |              |              |              |              |              |              |              |              |              |              |
| 10,000      | 103  |              |              |              |              |              |              |              |              |              |              |              |
| 15,000      | 153  |              |              |              |              |              |              |              |              |              |              |              |
| 22,000      | 223  |              |              |              |              |              |              |              |              |              |              |              |
| 33,000      | 333  |              |              |              |              |              |              |              |              |              |              |              |
| 47,000      | 473  |              |              |              |              |              |              |              |              |              |              |              |
| 68,000      | 683  |              |              |              |              |              |              |              |              |              |              |              |
| 100,000     | 104  |              |              |              |              |              |              |              |              |              |              |              |
| 150,000     | 154  |              |              |              |              |              |              |              |              |              |              |              |
| 220,000     | 224  |              |              |              |              |              |              |              |              |              |              |              |
| 330,000     | 334  |              |              |              |              |              |              |              |              |              |              |              |
| 470,000     | 474  |              |              |              |              |              |              |              |              |              |              |              |
| 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    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 at P-11 and after for the details such as product thickness and capacitance tolerance.

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range chart

CGA8/4532 [1812 inch]

| Capacitance |      | C0G          |              |              |              | X7R          |              |              | X7S          | X7T          |              |              |
|-------------|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| (pF)        | Code | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 2J<br>(630V) | 2E<br>(250V) | 2A<br>(100V) | 2A<br>(100V) | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) |
| 8,200       | 822  |              |              |              |              |              |              |              |              |              |              |              |
| 10,000      | 103  |              |              |              |              |              |              |              |              |              |              |              |
| 15,000      | 153  |              |              |              |              |              |              |              |              |              |              |              |
| 22,000      | 223  |              |              |              |              |              |              |              |              |              |              |              |
| 33,000      | 333  |              |              |              |              |              |              |              |              |              |              |              |
| 47,000      | 473  |              |              |              |              |              |              |              |              |              |              |              |
| 68,000      | 683  |              |              |              |              |              |              |              |              |              |              |              |
| 100,000     | 104  |              |              |              |              |              |              |              |              |              |              |              |
| 150,000     | 154  |              |              |              |              |              |              |              |              |              |              |              |
| 220,000     | 224  |              |              |              |              |              |              |              |              |              |              |              |
| 330,000     | 334  |              |              |              |              |              |              |              |              |              |              |              |
| 470,000     | 474  |              |              |              |              |              |              |              |              |              |              |              |
| 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    1.60 mm    2.00 mm    2.30 mm    2.50 mm    3.20 mm

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

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

CGA9/5750 [2220 inch]

| Capacitance |      | C0G          |              |              |              | X7R          |              |              | X7S          | X7T          |              |              |
|-------------|------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| (pF)        | Code | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) | 2A<br>(100V) | 2J<br>(630V) | 2E<br>(250V) | 2A<br>(100V) | 2A<br>(100V) | 2J<br>(630V) | 2W<br>(450V) | 2E<br>(250V) |
| 68,000      | 683  |              |              |              |              |              |              |              |              |              |              |              |
| 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  |              |              |              |              |              |              |              |              |              |              |              |
| 15,000,000  | 156  |              |              |              |              |              |              |              |              |              |              |              |

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

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

■ Please refer to the capacitance range table at P-11 and after 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: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 1pF         | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A010C080AA    |
| 1.5pF       | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A1R5C080AA    |
| 2pF         | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A020C080AA    |
| 2.2pF       | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A2R2C080AA    |
| 3pF         | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A030C080AA    |
| 3.3pF       | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A3R3C080AA    |
| 4pF         | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A040C080AA    |
| 4.7pF       | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A4R7C080AA    |
| 5pF         | 1608       | 0.80±0.10      | ±0.25pF               |                         |                         |                         | CGA3E2C0G2A050C080AA    |
| 6pF         | 1608       | 0.80±0.10      | ±0.50pF               |                         |                         |                         | CGA3E2C0G2A060D080AA    |
| 6.8pF       | 1608       | 0.80±0.10      | ±0.50pF               |                         |                         |                         | CGA3E2C0G2A6R8D080AA    |
| 7pF         | 1608       | 0.80±0.10      | ±0.50pF               |                         |                         |                         | CGA3E2C0G2A070D080AA    |
| 8pF         | 1608       | 0.80±0.10      | ±0.50pF               |                         |                         |                         | CGA3E2C0G2A080D080AA    |
| 9pF         | 1608       | 0.80±0.10      | ±0.50pF               |                         |                         |                         | CGA3E2C0G2A090D080AA    |
| 10pF        | 1608       | 0.80±0.10      | ±0.50pF               |                         |                         |                         | CGA3E2C0G2A100D080AA    |
| 12pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A120J080AA    |
| 15pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A150J080AA    |
| 18pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A180J080AA    |
| 22pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A220J080AA    |
| 27pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A270J080AA    |
| 33pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A330J080AA    |
| 39pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A390J080AA    |
| 47pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A470J080AA    |
| 56pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A560J080AA    |
| 68pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A680J080AA    |
| 82pF        | 1608       | 0.80±0.10      | ±5%                   |                         |                         |                         | CGA3E2C0G2A820J080AA    |
| 100pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B2C0G2A101J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E101J080AA    | CGA3E2C0G2A101J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W101J060AA    |                         | CGA4C2C0G2A101J060AA    |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C4C0G2J101J060AA    |                         |                         |                         |
| 120pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B2C0G2A121J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E121J080AA    | CGA3E2C0G2A121J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W121J060AA    |                         |                         |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C4C0G2J121J060AA    |                         |                         |                         |
| 150pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B2C0G2A151J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E151J080AA    | CGA3E2C0G2A151J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W151J060AA    |                         |                         |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C4C0G2J151J060AA    |                         |                         |                         |
| 180pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B2C0G2A181J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E181J080AA    | CGA3E2C0G2A181J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W181J060AA    |                         |                         |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C4C0G2J181J060AA    |                         |                         |                         |
| 220pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B2C0G2A221J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E221J080AA    | CGA3E2C0G2A221J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W221J060AA    |                         | CGA4C2C0G2A221J060AA    |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C4C0G2J221J060AA    |                         |                         |                         |
| 270pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B2C0G2A271J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E271J080AA    | CGA3E2C0G2A271J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W271J060AA    |                         |                         |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C4C0G2J271J060AA    |                         |                         |                         |
| 330pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B2C0G2A331J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E331J080AA    | CGA3E2C0G2A331J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W331J060AA    |                         |                         |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C4C0G2J331J060AA    |                         |                         |                         |
| 390pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B2C0G2A391J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E391J080AA    | CGA3E2C0G2A391J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W391J060AA    |                         |                         |
|             | 3216       | 0.60±0.15      | ±5%                   | CGA5C4C0G2J391J060AA    |                         |                         |                         |
| 470pF       | 1005       | 0.50±0.10      | ±5%                   |                         |                         |                         | CGA2B2C0G2A471J050BA    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E471J080AA    | CGA3E2C0G2A471J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W471J060AA    |                         | CGA4C2C0G2A471J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5F4C0G2J471J085AA    |                         |                         |                         |
| 560pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A561J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E561J080AA    | CGA3E2C0G2A561J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W561J060AA    |                         |                         |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5F4C0G2J561J085AA    |                         |                         |                         |

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

## 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: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 680pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A681J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E681J080AA    | CGA3E2C0G2A681J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W681J060AA    |                         |                         |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5F4C0G2J681J085AA    |                         |                         |                         |
| 820pF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A821J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E821J080AA    | CGA3E2C0G2A821J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W821J060AA    | CGA4C3C0G2E821J060AA    |                         |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5F4C0G2J821J085AA    |                         |                         |                         |
| 1nF         | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A102J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E102J080AA    | CGA3E2C0G2A102J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W102J060AA    |                         | CGA4C2C0G2A102J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5F4C0G2J102J085AA    |                         | CGA4F3C0G2E102J085AA    |                         |
| 1.2nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A122J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E122J080AA    | CGA3E2C0G2A122J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W122J060AA    |                         | CGA4C2C0G2A122J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5F4C0G2J122J085AA    |                         | CGA4F3C0G2E122J085AA    |                         |
| 1.5nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A152J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E152J080AA    | CGA3E2C0G2A152J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W152J060AA    | CGA4F3C0G2E152J085AA    | CGA4C2C0G2A152J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5H4C0G2J152J115AA    |                         |                         |                         |
| 1.8nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A182J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E182J080AA    | CGA3E2C0G2A182J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W182J060AA    |                         | CGA4C2C0G2A182J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5H4C0G2J182J115AA    |                         | CGA4F3C0G2E182J125AA    |                         |
| 2.2nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A222J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E222J080AA    | CGA3E2C0G2A222J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W222J060AA    |                         | CGA4C2C0G2A222J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5H4C0G2J222J115AA    |                         | CGA4F3C0G2E222J125AA    |                         |
| 2.7nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A272J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E272J080AA    | CGA3E2C0G2A272J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W272J060AA    |                         | CGA4C2C0G2A272J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5L4C0G2J272J160AA    |                         | CGA4F3C0G2E272J125AA    |                         |
| 3.3nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A332J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E332J080AA    | CGA3E2C0G2A332J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W332J060AA    |                         | CGA4C2C0G2A332J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5L4C0G2J332J160AA    |                         | CGA4F3C0G2E332J125AA    |                         |
| 3.9nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A392J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E392J080AA    | CGA3E2C0G2A392J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W392J060AA    |                         | CGA4C2C0G2A392J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5F4C0G2J392J085AA    |                         | CGA4F3C0G2E392J115AA    |                         |
| 4.7nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A472J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E472J080AA    | CGA3E2C0G2A472J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W472J060AA    |                         | CGA4C2C0G2A472J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5F4C0G2J472J085AA    |                         | CGA4F3C0G2E472J115AA    |                         |
| 5.6nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A562J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E562J080AA    | CGA3E2C0G2A562J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W562J060AA    |                         | CGA4C2C0G2A562J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5H4C0G2J562J115AA    |                         | CGA4F3C0G2E562J115AA    |                         |
| 6.8nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A682J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E682J080AA    | CGA3E2C0G2A682J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W682J060AA    |                         | CGA4C2C0G2A682J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5H4C0G2J682J115AA    |                         | CGA4F3C0G2E682J115AA    |                         |
| 8.2nF       | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A822J050BC    |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E822J080AA    | CGA3E2C0G2A822J080AA    |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W822J060AA    |                         | CGA4C2C0G2A822J060AA    |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5L4C0G2J822J160AA    |                         | CGA4F3C0G2E822J160AA    |                         |
| 4532        | 1005       | 0.50±0.05      | ±5%                   |                         |                         |                         | CGA2B1C0G2A4532J050BC   |
|             | 1608       | 0.80±0.10      | ±5%                   |                         |                         | CGA3E3C0G2E4532J080AA   | CGA3E2C0G2A4532J080AA   |
|             | 2012       | 0.60±0.15      | ±5%                   |                         | CGA4C4C0G2W4532J060AA   |                         | CGA4C2C0G2A4532J060AA   |
|             | 3216       | 0.85±0.15      | ±5%                   | CGA5L4C0G2J4532J160AA   |                         | CGA4F3C0G2E4532J160AA   |                         |

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

## MULTILAYER CERAMIC CHIP CAPACITORS



## 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: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 10nF        | 1608       | 0.80±0.10         | ±5%                      |                         |                         |                         | CGA3E1C0G2A103J080AC    |
|             | 2012       | 1.25±0.20         | ±5%                      |                         |                         | CGA4J3C0G2E103J125AA    | CGA4J2C0G2A103J125AA    |
|             | 3216       | 1.15±0.15         | ±5%                      |                         |                         | CGA5H3C0G2E103J115AA    | CGA5H2C0G2A103J115AA    |
|             |            | 1.60±0.20         | ±5%                      | CGA5L4C0G2J103J160AA    | CGA5L4C0G2W103J160AA    |                         |                         |
|             | 3225       | 1.25±0.20         | ±5%                      | CGA6J4C0G2J103J125AA    |                         |                         |                         |
|             |            | 1.60±0.20         | ±5%                      |                         |                         | CGA6L3C0G2E103J160AA    |                         |
|             | 4532       | 1.60±0.20         | ±5%                      | CGA8L4C0G2J103J160KA    |                         |                         |                         |
| 15nF        | 2012       | 0.85±0.15         | ±5%                      |                         |                         |                         | CGA4F1C0G2A153J085AC    |
|             | 3216       | 1.15±0.15         | ±5%                      |                         |                         |                         | CGA5H2C0G2A153J115AA    |
|             |            | 1.60±0.30,-0.10   | ±5%                      |                         | CGA5L4C0G2W153J160AA    |                         |                         |
|             |            | 1.60±0.20         | ±5%                      |                         |                         | CGA5L3C0G2E153J160AA    |                         |
|             | 3225       | 1.25±0.20         | ±5%                      |                         |                         |                         | CGA6J2C0G2A153J125AA    |
|             |            | 1.60±0.20         | ±5%                      | CGA6L4C0G2J153J160AA    |                         |                         |                         |
|             | 4532       | 2.50±0.30         | ±5%                      | CGA8P4C0G2J153J250KA    |                         | CGA6M3C0G2E153J200AA    |                         |
| 22nF        | 2012       | 1.25±0.20         | ±5%                      |                         |                         |                         | CGA4J1C0G2A223J125AC    |
|             | 3216       | 1.60±0.30,-0.10   | ±5%                      |                         |                         | CGA5L3C0G2E223J160AA    |                         |
|             |            | 1.60±0.20         | ±5%                      |                         |                         |                         | CGA5L2C0G2A223J160AA    |
|             | 3225       | 1.60±0.20         | ±5%                      |                         |                         | CGA6L3C0G2E223J160AA    | CGA6L2C0G2A223J160AA    |
|             |            | 2.30±0.20         | ±5%                      | CGA6N4C0G2J223J230AA    | CGA6N4C0G2W223J230AA    |                         |                         |
|             | 4532       | 1.60±0.20         | ±5%                      |                         |                         | CGA8L3C0G2E223J160KA    |                         |
| 33nF        |            | 3.20±0.30         | ±5%                      | CGA8R4C0G2J223J320KA    |                         |                         |                         |
|             | 2012       | 1.25±0.20         | ±5%                      |                         |                         |                         | CGA4J1C0G2A333J125AC    |
|             | 3216       | 1.60±0.30,-0.10   | ±5%                      |                         |                         |                         | CGA5L2C0G2A333J160AA    |
|             |            | 2.00±0.20         | ±5%                      |                         |                         |                         | CGA6M2C0G2A333J200AA    |
|             | 3225       | 2.30±0.20         | ±5%                      |                         |                         | CGA6N3C0G2E333J230AA    |                         |
|             |            | 2.50±0.30         | ±5%                      | CGA6P4C0G2J333J250AA    | CGA6P4C0G2W333J250AA    |                         |                         |
|             | 4532       | 2.00±0.20         | ±5%                      | CGA8M4C0G2J333J200KA    |                         | CGA8M3C0G2E333J200KA    |                         |
| 47nF        | 3216       | 1.15±0.15         | ±5%                      |                         |                         |                         | CGA5H1C0G2A473J115AC    |
|             | 3225       | 2.30±0.20         | ±5%                      |                         |                         |                         | CGA6N2C0G2A473J230AA    |
|             |            | 2.50±0.30         | ±5%                      |                         |                         | CGA6P3C0G2E473J250AA    |                         |
|             | 4532       | 2.00±0.20         | ±5%                      |                         |                         |                         | CGA8M2C0G2A473J200KA    |
|             |            | 2.30±0.20         | ±5%                      |                         | CGA8N4C0G2W473J230KA    |                         |                         |
|             |            | 3.20±0.30         | ±5%                      | CGA8R4C0G2J473J320KA    |                         | CGA8R3C0G2E473J320KA    |                         |
| 68nF        | 3216       | 1.60±0.20         | ±5%                      |                         |                         |                         | CGA5L1C0G2A683J160AC    |
|             | 3225       | 2.30±0.20         | ±5%                      |                         |                         |                         | CGA6N2C0G2A683J230AA    |
|             |            | 2.30±0.20         | ±5%                      |                         |                         | CGA8N4C0G2E683J230KN    |                         |
|             | 4532       | 2.50±0.30         | ±5%                      |                         |                         |                         | CGA8P2C0G2A683J250KA    |
|             |            | 3.20±0.30         | ±5%                      |                         | CGA8R4C0G2W683J320KA    |                         |                         |
|             | 5750       | 2.30±0.20         | ±5%                      | CGA9N1C0G2J683J230KC    |                         |                         |                         |
| 100nF       | 3216       | 1.60±0.20         | ±5%                      |                         |                         |                         | CGA5L1C0G2A104J160AC    |
|             | 4532       | 3.20±0.30         | ±5%                      |                         |                         | CGA8R4C0G2E104J320KN    | CGA8R2C0G2A104J320KA    |
|             |            | 5750              | 2.80±0.30                | ±5%                     | CGA9Q1C0G2J104J280KC    | CGA9Q4C0G2W104J280KA    |                         |
| 150nF       | 5750       | 2.30±0.20         | ±5%                      |                         |                         | CGA9N4C0G2E154J230KN    | CGA9N2C0G2A154J230KA    |

## 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: 630V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 1nF         | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A102K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A102M080AA    |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H4X7R2J102K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H4X7R2J102M115AA    |                         |                         |
| 1.5nF       | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A152K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A152M080AA    |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H4X7R2J152K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H4X7R2J152M115AA    |                         |                         |
| 2.2nF       | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A222K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A222M080AA    |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H4X7R2J222K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H4X7R2J222M115AA    |                         |                         |
| 3.3nF       | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A332K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A332M080AA    |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H4X7R2J332K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H4X7R2J332M115AA    |                         |                         |
| 4.7nF       | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A472K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A472M080AA    |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H4X7R2J472K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H4X7R2J472M115AA    |                         |                         |
| 6.8nF       | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A682K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A682M080AA    |
|             | 2012       | 1.25±0.20      | ±10%                  |                         | CGA4J3X7R2E682K125AA    |                         |
|             |            |                | ±20%                  |                         | CGA4J3X7R2E682M125AA    |                         |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H4X7R2J682K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H4X7R2J682M115AA    |                         |                         |
| 10nF        | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A103K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A103M080AA    |
|             | 2012       | 1.25±0.20      | ±10%                  |                         | CGA4J3X7R2E103K125AA    |                         |
|             |            |                | ±20%                  |                         | CGA4J3X7R2E103M125AA    |                         |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H4X7R2J103K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H4X7R2J103M115AA    |                         |                         |
| 15nF        | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A153K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A153M080AA    |
|             | 2012       | 1.25±0.20      | ±10%                  |                         | CGA4J3X7R2E153K125AA    |                         |
|             |            |                | ±20%                  |                         | CGA4J3X7R2E153M125AA    |                         |
|             |            | 1.15±0.15      | ±10%                  | CGA5H3X7R2E153K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H3X7R2E153M115AA    |                         |                         |
|             | 3216       | 1.30±0.20      | ±10%                  | CGA5K4X7R2J153K130AA    |                         |                         |
|             |            |                | ±20%                  | CGA5K4X7R2J153M130AA    |                         |                         |
| 22nF        | 1608       | 0.80±0.10      | ±10%                  |                         |                         | CGA3E2X7R2A223K080AA    |
|             |            |                | ±20%                  |                         |                         | CGA3E2X7R2A223M080AA    |
|             | 2012       | 1.25±0.20      | ±10%                  |                         | CGA4J3X7R2E223K125AA    |                         |
|             |            |                | ±20%                  |                         | CGA4J3X7R2E223M125AA    |                         |
|             |            | 1.15±0.15      | ±10%                  | CGA5H3X7R2E223K115AA    |                         |                         |
|             |            |                | ±20%                  | CGA5H3X7R2E223M115AA    |                         |                         |
|             | 3216       | 1.30±0.20      | ±10%                  | CGA5K4X7R2J223K130AA    |                         |                         |
|             |            |                | ±20%                  | CGA5K4X7R2J223M130AA    |                         |                         |
| 33nF        | 2012       | 1.25±0.20      | ±10%                  |                         |                         | CGA4J2X7R2A333K125AA    |
|             |            |                | ±20%                  |                         |                         | CGA4J2X7R2A333M125AA    |
|             |            | 1.15±0.15      | ±10%                  |                         |                         | CGA5H2X7R2A333K115AA    |
|             |            |                | ±20%                  |                         |                         | CGA5H2X7R2A333M115AA    |
|             | 3216       | 1.60±0.20      | ±10%                  | CGA5L4X7R2J333K160AA    | CGA5L3X7R2E333K160AA    |                         |
|             |            |                | ±20%                  | CGA5L4X7R2J333M160AA    | CGA5L3X7R2E333M160AA    |                         |
| 47nF        | 2012       | 1.25±0.20      | ±10%                  |                         |                         | CGA4J2X7R2A473K125AA    |
|             |            |                | ±20%                  |                         |                         | CGA4J2X7R2A473M125AA    |
|             |            | 1.15±0.15      | ±10%                  |                         |                         | CGA5H2X7R2A473K115AA    |
|             |            |                | ±20%                  |                         |                         | CGA5H2X7R2A473M115AA    |
|             | 3216       | 1.60±0.20      | ±10%                  |                         | CGA5L3X7R2E473K160AA    |                         |
|             |            |                | ±20%                  |                         | CGA5L3X7R2E473M160AA    |                         |
|             | 3225       | 2.00±0.20      | ±10%                  | CGA6M4X7R2J473K200AA    |                         |                         |
|             |            |                | ±20%                  | CGA6M4X7R2J473M200AA    |                         |                         |
| 68nF        | 3216       | 1.60±0.20      | ±10%                  |                         | CGA5L3X7R2E683K160AA    | CGA5L2X7R2A683K160AA    |
|             |            |                | ±20%                  |                         | CGA5L3X7R2E683M160AA    | CGA5L2X7R2A683M160AA    |
|             | 3225       | 2.00±0.20      | ±10%                  | CGA6M4X7R2J683K200AA    |                         |                         |
|             |            |                | ±20%                  | CGA6M4X7R2J683M200AA    |                         |                         |
|             |            |                | ±10%                  | CGA8L4X7R2J683K160KA    |                         |                         |
|             | 4532       | 1.60±0.20      | ±20%                  | CGA8L4X7R2J683M160KA    |                         |                         |

■ 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<br>(mm) | Capacitance<br>tolerance | Catalog number          |                         |                         |
|-------------|------------|-------------------|--------------------------|-------------------------|-------------------------|-------------------------|
|             |            |                   |                          | Rated voltage Edc: 630V | Rated voltage Edc: 250V | Rated voltage Edc: 100V |
| 100nF       | 2012       | 1.25±0.20         | ±10%                     |                         |                         | CGA4J2X7R2A104K125AA    |
|             |            |                   | ±20%                     |                         |                         | CGA4J2X7R2A104M125AA    |
|             | 3216       | 1.60±0.20         | ±10%                     |                         | CGA5L3X7R2E104K160AA    | CGA5L2X7R2A104K160AA    |
|             |            |                   | ±20%                     |                         | CGA5L3X7R2E104M160AA    | CGA5L2X7R2A104M160AA    |
|             | 3225       | 2.00±0.20         | ±10%                     |                         | CGA6M3X7R2E104K200AA    |                         |
| 150nF       |            |                   | ±20%                     |                         | CGA6M3X7R2E104M200AA    |                         |
|             | 4532       | 2.30±0.20         | ±10%                     | CGA8N4X7R2J104K230KA    |                         |                         |
|             |            |                   | ±20%                     | CGA8N4X7R2J104M230KA    |                         |                         |
|             | 3216       | 1.60±0.20         | ±10%                     |                         |                         | CGA5L2X7R2A154K160AA    |
|             |            |                   | ±20%                     |                         |                         | CGA5L2X7R2A154M160AA    |
| 220nF       | 3225       | 2.00±0.20         | ±10%                     |                         | CGA6M3X7R2E154K200AA    |                         |
|             |            |                   | ±20%                     |                         | CGA6M3X7R2E154M200AA    |                         |
|             | 4532       | 1.60±0.20         | ±10%                     |                         | CGA8L3X7R2E154K160KA    |                         |
|             |            |                   | ±20%                     |                         | CGA8L3X7R2E154M160KA    |                         |
|             | 5750       | 1.60±0.20         | ±10%                     | CGA9L4X7R2J154K160KA    |                         |                         |
| 330nF       |            |                   | ±20%                     | CGA9L4X7R2J154M160KA    |                         |                         |
|             | 3216       | 1.15±0.15         | ±10%                     |                         |                         | CGA5H2X7R2A224K115AA    |
|             |            |                   | ±20%                     |                         |                         | CGA5H2X7R2A224M115AA    |
|             | 3225       | 2.00±0.20         | ±10%                     |                         | CGA6M3X7R2E224K200AA    |                         |
|             |            |                   | ±20%                     |                         | CGA6M3X7R2E224M200AA    |                         |
| 470nF       | 4532       | 2.30±0.20         | ±10%                     |                         | CGA8N3X7R2E224K230KA    |                         |
|             |            |                   | ±20%                     |                         | CGA8N3X7R2E224M230KA    |                         |
|             | 5750       | 2.30±0.20         | ±10%                     | CGA9N4X7R2J224K230KA    |                         |                         |
|             |            |                   | ±20%                     | CGA9N4X7R2J224M230KA    |                         |                         |
|             | 3216       | 1.30±0.20         | ±10%                     |                         |                         | CGA5K2X7R2A334K130AA    |
| 680nF       |            |                   | ±20%                     |                         |                         | CGA5K2X7R2A334M130AA    |
|             | 3225       | 2.00±0.20         | ±10%                     |                         |                         | CGA6M2X7R2A334K200AA    |
|             |            |                   | ±20%                     |                         |                         | CGA6M2X7R2A334M200AA    |
|             | 4532       | 2.30±0.20         | ±10%                     |                         | CGA8N3X7R2E334K230KA    |                         |
|             |            |                   | ±20%                     |                         | CGA8N3X7R2E334M230KA    |                         |
| 1µF         | 5750       | 1.60±0.20         | ±10%                     |                         | CGA9L3X7R2E334K160KA    |                         |
|             |            |                   | ±20%                     |                         | CGA9L3X7R2E334M160KA    |                         |
|             | 3216       | 1.60±0.20         | ±10%                     |                         |                         | CGA5L2X7R2A474K160AA    |
|             |            |                   | ±20%                     |                         |                         | CGA5L2X7R2A474M160AA    |
|             | 3225       | 2.00±0.20         | ±10%                     |                         |                         | CGA6M2X7R2A474K200AA    |
| 1.5µF       |            |                   | ±20%                     |                         |                         | CGA6M2X7R2A474M200AA    |
|             | 4532       | 2.30±0.20         | ±10%                     |                         | CGA8N3X7R2E474K230KA    |                         |
|             |            |                   | ±20%                     |                         | CGA8N3X7R2E474M230KA    |                         |
|             | 5750       | 2.30±0.20         | ±10%                     |                         | CGA9N3X7R2E474K230KA    |                         |
|             |            |                   | ±20%                     |                         | CGA9N3X7R2E474M230KA    |                         |
| 1.5µF       | 3216       | 1.60±0.20         | ±10%                     |                         |                         | CGA5L2X7R2A684K160AA    |
|             |            |                   | ±20%                     |                         |                         | CGA5L2X7R2A684M160AA    |
|             | 3225       | 1.60±0.20         | ±10%                     |                         |                         | CGA6L2X7R2A684K160AA    |
|             |            |                   | ±20%                     |                         |                         | CGA6L2X7R2A684M160AA    |
|             | 4532       | 2.30±0.20         | ±10%                     |                         | CGA8N2X7R2A684K230KA    |                         |
| 1.5µF       |            |                   | ±20%                     |                         | CGA8N2X7R2A684M230KA    |                         |
|             | 5750       | 1.60±0.20         | ±10%                     |                         | CGA9L2X7R2A684K160KA    |                         |
|             |            |                   | ±20%                     |                         | CGA9L2X7R2A684M160KA    |                         |
|             |            | 2.30±0.20         | ±10%                     | CGA9N3X7R2E684K230KA    |                         |                         |
|             |            |                   | ±20%                     | CGA9N3X7R2E684M230KA    |                         |                         |
| 1.5µF       | 3216       | 1.60±0.20         | ±10%                     |                         |                         | CGA5L2X7R2A105K160AA    |
|             |            |                   | ±20%                     |                         |                         | CGA5L2X7R2A105M160AA    |
|             | 3225       | 2.00±0.20         | ±10%                     |                         |                         | CGA6M2X7R2A105K200AA    |
|             |            |                   | ±20%                     |                         |                         | CGA6M2X7R2A105M200AA    |
|             | 4532       | 2.30±0.20         | ±10%                     |                         |                         | CGA8N2X7R2A105K230KA    |
| 1.5µF       |            |                   | ±20%                     |                         |                         | CGA8N2X7R2A105M230KA    |
|             | 5750       | 2.30±0.20         | ±10%                     | CGA9N3X7R2E105K230KA    |                         |                         |
|             |            |                   | ±20%                     | CGA9N3X7R2E105M230KA    |                         |                         |
|             | 3225       | 2.00±0.20         | ±10%                     |                         |                         | CGA6M3X7R2A155K200AB    |
|             |            |                   | ±20%                     |                         |                         | CGA6M3X7R2A155M200AB    |
| 1.5µF       | 4532       | 2.30±0.20         | ±10%                     |                         |                         | CGA8N2X7R2A155K230KA    |
|             |            |                   | ±20%                     |                         |                         | CGA8N2X7R2A155M230KA    |
|             | 5750       | 2.30±0.20         | ±10%                     |                         |                         | CGA9N2X7R2A155K230KA    |
|             |            |                   | ±20%                     |                         |                         | CGA9N2X7R2A155M230KA    |

■ 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<br>(mm) | Capacitance<br>tolerance | Catalog number                       |
|-------------|------------|-------------------|--------------------------|--------------------------------------|
|             |            |                   |                          | Rated voltage Edc: 100V              |
| 2.2μF       | 3225       | 2.30±0.20         | ±10%                     | <a href="#">CGA6N3X7R2A225K230AB</a> |
|             |            |                   | ±20%                     | <a href="#">CGA6N3X7R2A225M230AB</a> |
|             | 4532       | 2.30±0.20         | ±10%                     | <a href="#">CGA8N2X7R2A225K230KA</a> |
|             |            |                   | ±20%                     | <a href="#">CGA8N2X7R2A225M230KA</a> |
|             | 5750       | 2.30±0.20         | ±10%                     | <a href="#">CGA9N2X7R2A225K230KA</a> |
|             |            |                   | ±20%                     | <a href="#">CGA9N2X7R2A225M230KA</a> |
| 3.3μF       | 5750       | 2.30±0.20         | ±10%                     | <a href="#">CGA9N2X7R2A335K230KA</a> |
|             |            |                   | ±20%                     | <a href="#">CGA9N2X7R2A335M230KA</a> |
| 4.7μF       | 5750       | 2.30±0.20         | ±10%                     | <a href="#">CGA9N2X7R2A475K230KA</a> |
|             |            |                   | ±20%                     | <a href="#">CGA9N2X7R2A475M230KA</a> |

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

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

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

| Capacitance | Dimensions | Thickness (mm)  | Capacitance tolerance | Catalog number          |
|-------------|------------|-----------------|-----------------------|-------------------------|
|             |            |                 |                       | Rated voltage Edc: 100V |
| 1nF         | 1005       | 0.50±0.05       | ±10%                  | CGA2B3X7S2A102K050BB    |
|             |            |                 | ±20%                  | CGA2B3X7S2A102M050BB    |
| 1.5nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B3X7S2A152K050BB    |
|             |            |                 | ±20%                  | CGA2B3X7S2A152M050BB    |
| 2.2nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B3X7S2A222K050BB    |
|             |            |                 | ±20%                  | CGA2B3X7S2A222M050BB    |
| 3.3nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B3X7S2A332K050BB    |
|             |            |                 | ±20%                  | CGA2B3X7S2A332M050BB    |
| 4.7nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B3X7S2A472K050BB    |
|             |            |                 | ±20%                  | CGA2B3X7S2A472M050BB    |
| 6.8nF       | 1005       | 0.50±0.05       | ±10%                  | CGA2B3X7S2A682K050BB    |
|             |            |                 | ±20%                  | CGA2B3X7S2A682M050BB    |
| 10nF        | 1005       | 0.50±0.05       | ±10%                  | CGA2B3X7S2A103K050BB    |
|             |            |                 | ±20%                  | CGA2B3X7S2A103M050BB    |
| 33nF        | 1608       | 0.80±0.10       | ±10%                  | CGA3E3X7S2A333K080AB    |
|             |            |                 | ±20%                  | CGA3E3X7S2A333M080AB    |
| 47nF        | 1608       | 0.80±0.10       | ±10%                  | CGA3E3X7S2A473K080AB    |
|             |            |                 | ±20%                  | CGA3E3X7S2A473M080AB    |
| 68nF        | 1608       | 0.80±0.10       | ±10%                  | CGA3E3X7S2A683K080AB    |
|             |            |                 | ±20%                  | CGA3E3X7S2A683M080AB    |
| 100nF       | 1608       | 0.80±0.10       | ±10%                  | CGA3E3X7S2A104K080AB    |
|             |            |                 | ±20%                  | CGA3E3X7S2A104M080AB    |
| 330nF       | 2012       | 1.25±0.20       | ±10%                  | CGA4J3X7S2A334K125AB    |
|             |            |                 | ±20%                  | CGA4J3X7S2A334M125AB    |
| 470nF       | 2012       | 1.25±0.20       | ±10%                  | CGA4J3X7S2A474K125AB    |
|             |            |                 | ±20%                  | CGA4J3X7S2A474M125AB    |
| 680nF       | 2012       | 1.25±0.20       | ±10%                  | CGA4J3X7S2A684K125AB    |
|             |            |                 | ±20%                  | CGA4J3X7S2A684M125AB    |
| 1μF         | 2012       | 1.25±0.20       | ±10%                  | CGA4J3X7S2A105K125AB    |
|             |            |                 | ±20%                  | CGA4J3X7S2A105M125AB    |
| 1.5μF       | 3216       | 1.60±0.20       | ±10%                  | CGA5L3X7S2A155K160AB    |
|             |            |                 | ±20%                  | CGA5L3X7S2A155M160AB    |
| 2.2μF       | 3216       | 1.60±0.20       | ±10%                  | CGA5L3X7S2A225K160AB    |
|             |            |                 | ±20%                  | CGA5L3X7S2A225M160AB    |
| 3.3μF       | 3216       | 1.60+0.30,-0.10 | ±10%                  | CGA5L3X7S2A335K160AB    |
|             |            |                 | ±20%                  | CGA5L3X7S2A335M160AB    |
|             | 3225       | 2.00±0.20       | ±10%                  | CGA6M3X7S2A335K200AB    |
|             |            |                 | ±20%                  | CGA6M3X7S2A335M200AB    |
|             | 4532       | 2.00±0.20       | ±10%                  | CGA8M3X7S2A335K200KB    |
|             |            |                 | ±20%                  | CGA8M3X7S2A335M200KB    |
| 4.7μF       | 3225       | 2.00±0.20       | ±10%                  | CGA6M3X7S2A475K200AB    |
|             |            |                 | ±20%                  | CGA6M3X7S2A475M200AB    |
|             | 4532       | 2.30±0.20       | ±10%                  | CGA8N3X7S2A475K230KB    |
|             |            |                 | ±20%                  | CGA8N3X7S2A475M230KB    |
| 6.8μF       | 5750       | 2.00±0.20       | ±10%                  | CGA9M3X7S2A685K200KB    |
|             |            |                 | ±20%                  | CGA9M3X7S2A685M200KB    |
| 10μF        | 5750       | 2.30±0.20       | ±10%                  | CGA9N3X7S2A106K230KB    |
|             |            |                 | ±20%                  | CGA9N3X7S2A106M230KB    |
| 15μF        | 5750       | 2.50±0.30       | ±20%                  | CGA9P3X7S2A156M250KB    |

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

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

Temperature characteristics: X7T (–55 to +125°C, +22, –33%)

| Capacitance | Dimensions | Thickness (mm) | Capacitance tolerance | Catalog number          |                         |                         |
|-------------|------------|----------------|-----------------------|-------------------------|-------------------------|-------------------------|
|             |            |                |                       | Rated voltage Edc: 630V | Rated voltage Edc: 450V | Rated voltage Edc: 250V |
| 22nF        | 2012       | 1.25±0.20      | ±10%                  |                         | CGA4J4X7T2W223K125AA    |                         |
|             |            |                | ±20%                  |                         | CGA4J4X7T2W223M125AA    |                         |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H1X7T2J223K115AC    |                         |                         |
|             |            |                | ±20%                  | CGA5H1X7T2J223M115AC    |                         |                         |
| 33nF        | 2012       | 1.25±0.20      | ±10%                  |                         | CGA4J4X7T2W333K125AA    | CGA4J3X7T2E333K125AA    |
|             |            |                | ±20%                  |                         | CGA4J4X7T2W333M125AA    | CGA4J3X7T2E333M125AA    |
|             | 3216       | 1.15±0.15      | ±10%                  | CGA5H1X7T2J333K115AC    |                         |                         |
|             |            |                | ±20%                  | CGA5H1X7T2J333M115AC    |                         |                         |
| 47nF        | 2012       | 1.25±0.20      | ±10%                  |                         | CGA4J4X7T2W473K125AA    | CGA4J3X7T2E473K125AA    |
|             |            |                | ±20%                  |                         | CGA4J4X7T2W473M125AA    | CGA4J3X7T2E473M125AA    |
|             | 3216       | 1.60±0.20      | ±10%                  | CGA5L1X7T2J473K160AC    |                         |                         |
|             |            |                | ±20%                  | CGA5L1X7T2J473M160AC    |                         |                         |
| 68nF        | 2012       | 1.25±0.20      | ±10%                  |                         |                         | CGA4J3X7T2E683K125AA    |
|             |            |                | ±20%                  |                         |                         | CGA4J3X7T2E683M125AA    |
|             | 3216       | 1.30±0.20      | ±10%                  |                         | CGA5K4X7T2W683K130AA    |                         |
|             |            |                | ±20%                  |                         | CGA5K4X7T2W683M130AA    |                         |
| 100nF       | 2012       | 1.25±0.20      | ±10%                  |                         |                         | CGA4J3X7T2E104K125AA    |
|             |            |                | ±20%                  |                         |                         | CGA4J3X7T2E104M125AA    |
|             | 3216       | 1.60±0.20      | ±10%                  |                         | CGA5L4X7T2W104K160AA    |                         |
|             |            |                | ±20%                  |                         | CGA5L4X7T2W104M160AA    |                         |
|             | 3225       | 1.60±0.20      | ±10%                  | CGA6L1X7T2J104K160AC    |                         |                         |
|             |            |                | ±20%                  | CGA6L1X7T2J104M160AC    |                         |                         |
| 150nF       | 3216       | 1.30±0.20      | ±10%                  |                         |                         | CGA5K3X7T2E154K130AA    |
|             |            |                | ±20%                  |                         |                         | CGA5K3X7T2E154M130AA    |
|             | 3225       | 2.00±0.20      | ±10%                  | CGA6M1X7T2J154K200AC    |                         |                         |
|             |            |                | ±20%                  | CGA6M1X7T2J154M200AC    |                         |                         |
|             | 4532       | 1.60±0.20      | ±10%                  | CGA8L1X7T2J154K160KC    |                         |                         |
|             |            |                | ±20%                  | CGA8L1X7T2J154M160KC    |                         |                         |
| 220nF       | 3216       | 1.60±0.20      | ±10%                  |                         |                         | CGA5L3X7T2E224K160AA    |
|             |            |                | ±20%                  |                         |                         | CGA5L3X7T2E224M160AA    |
|             | 3225       | 2.00±0.20      | ±10%                  |                         | CGA6M4X7T2W224K200AA    |                         |
|             |            |                | ±20%                  |                         | CGA6M4X7T2W224M200AA    |                         |
|             | 4532       | 2.00±0.20      | ±10%                  | CGA8M1X7T2J224K200KC    |                         |                         |
|             |            |                | ±20%                  | CGA8M1X7T2J224M200KC    |                         |                         |
| 330nF       | 3225       | 2.00±0.20      | ±10%                  |                         |                         | CGA6M3X7T2E334K200AA    |
|             |            |                | ±20%                  |                         |                         | CGA6M3X7T2E334M200AA    |
|             | 4532       | 1.60±0.20      | ±10%                  |                         | CGA8L4X7T2W334K160KA    |                         |
|             |            |                | ±20%                  |                         | CGA8L4X7T2W334M160KA    |                         |
|             | 5750       | 2.00±0.20      | ±10%                  | CGA9M1X7T2J334K200KC    |                         |                         |
|             |            |                | ±20%                  | CGA9M1X7T2J334M200KC    |                         |                         |
| 470nF       | 4532       | 2.30±0.20      | ±10%                  |                         | CGA8N4X7T2W474K230KA    |                         |
|             |            |                | ±20%                  |                         | CGA8N4X7T2W474M230KA    |                         |
|             | 5750       | 2.50±0.30      | ±10%                  | CGA9P1X7T2J474K250KC    |                         |                         |
|             |            |                | ±20%                  | CGA9P1X7T2J474M250KC    |                         |                         |
| 680nF       | 4532       | 1.60±0.20      | ±10%                  |                         |                         | CGA8L3X7T2E684K160KA    |
|             |            |                | ±20%                  |                         |                         | CGA8L3X7T2E684M160KA    |
|             | 5750       | 2.00±0.20      | ±10%                  |                         | CGA9M4X7T2W684K200KA    |                         |
|             |            |                | ±20%                  |                         | CGA9M4X7T2W684M200KA    |                         |
| 1µF         | 4532       | 2.50±0.30      | ±10%                  |                         |                         | CGA8P3X7T2E105K250KA    |
|             |            |                | ±20%                  |                         |                         | CGA8P3X7T2E105M250KA    |
|             | 5750       | 2.50±0.30      | ±10%                  |                         | CGA9P4X7T2W105K250KA    |                         |
|             |            |                | ±20%                  |                         | CGA9P4X7T2W105M250KA    |                         |
| 1.5µF       | 5750       | 2.00±0.20      | ±10%                  |                         |                         | CGA9M3X7T2E155K200KA    |
|             |            |                | ±20%                  |                         |                         | CGA9M3X7T2E155M200KA    |
| 2.2µF       | 5750       | 2.50±0.30      | ±10%                  |                         |                         | CGA9P3X7T2E225K250KA    |
|             |            |                | ±20%                  |                         |                         | CGA9P3X7T2E225M250KA    |

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