

# REMINDERS

Please read this before using the product.

## SAFETY REMINDERS

### REMINDERS

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2. We may modify products or discontinue production of a product listed in this catalog without prior notification.
3. We provide "Delivery Specification" that explain precautions for the specifications and safety of each product listed in this catalog. We strongly recommend that you exchange these delivery specifications with customers that use one of these products.
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8. The descriptions in this catalog apply as of February 2009.

# Mid Voltage Multilayer Ceramic Chip Capacitors for Automobile

## CGA Series

Conformity to RoHS Directive

### FEATURES

- With the adoption of a unique design structure for high voltages, a compact capacitor with a high breakdown voltage has been realized.
- The capacitor can be used over a wide range of operating temperatures from  $-55$  to  $+125^{\circ}\text{C}$ .
- Rated voltage Edc: 100V, 250V, and 630V are supported.

### PRODUCT IDENTIFICATION

CGA 5 H 2 X7R 2A 333 K  
(1) (2) (3) (4) (5) (6) (7) (8)

#### (1) Series name

#### (2) Dimensions

3	1608(1.6×0.8mm)
4	2012(2.0×1.25mm)
5	3216(3.2×1.6mm)
6	3225(3.2×2.5mm)

#### (3) Thickness T

C	0.60mm
D	0.70mm
E	0.80mm
F	0.85mm
G	1.10mm
H	1.15mm
J	1.25mm
K	1.30mm
L	1.60mm
M	2.00mm
N	2.30mm

#### (4) Voltage conditions at the time of high temperature loading

(Shown below are guaranteed applied voltages in a high temperature load test. [Maximum operating temperature/1000h])

1	Product with the rated voltage×1 guaranteed
2	Product with the rated voltage×2 guaranteed
3	Product with the rated voltage×1.5 guaranteed
4	Product with the rated voltage×1.2 guaranteed

#### (5) CapacitanceTemperature characteristics

##### Class 1 (Temperature compensation)

Temperature characteristics	Capacitance change	Temperature range
C0G	$0\pm 30\text{ppm}/^{\circ}\text{C}$	$-25$ to $+125^{\circ}\text{C}$

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

Temperature characteristics	Capacitance change	Temperature range
X7R	$\pm 15\%$	$-55$ to $+125^{\circ}\text{C}$

#### (6) Product with the rated voltage Edc

2A	100V
2E	250V
2J	630V

#### (7) Nominal capacitance

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

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

101	100pF
104	100,000pF(0.1μF)
105	1,000,000pF(1μF)

#### (8) CapacitanceTolerance

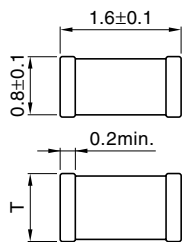
J	+5%
K	+10%

• Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

• All specifications are subject to change without notice.  
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## CGA3(C1608[EIA: CC0603]) Type

### SHAPES AND DIMENSIONS



Dimensions in mm



### CAPACITANCE RANGES: CLASS 1 (TEMPERATURE COMPENSATION)

#### TEMPERATURE CHARACTERISTICS: C0G(0±30ppm/°C)

RATED VOLTAGE E<sub>dc</sub>: 250V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
100	±5%	0.8±0.1	3	CGA3E3C0G2E101J
120	±5%	0.8±0.1	3	CGA3E3C0G2E121J
150	±5%	0.8±0.1	3	CGA3E3C0G2E151J
180	±5%	0.8±0.1	3	CGA3E3C0G2E181J
220	±5%	0.8±0.1	3	CGA3E3C0G2E221J
270	±5%	0.8±0.1	3	CGA3E3C0G2E271J
330	±5%	0.8±0.1	3	CGA3E3C0G2E331J
390	±5%	0.8±0.1	3	CGA3E3C0G2E391J
470	±5%	0.8±0.1	3	CGA3E3C0G2E471J
560	±5%	0.8±0.1	3	CGA3E3C0G2E561J
680	±5%	0.8±0.1	3	CGA3E3C0G2E681J

RATED VOLTAGE E<sub>dc</sub>: 100V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
100	±5%	0.8±0.1	2	CGA3E2C0G2A101J
120	±5%	0.8±0.1	2	CGA3E2C0G2A121J
150	±5%	0.8±0.1	2	CGA3E2C0G2A151J
180	±5%	0.8±0.1	2	CGA3E2C0G2A181J
220	±5%	0.8±0.1	2	CGA3E2C0G2A221J
270	±5%	0.8±0.1	2	CGA3E2C0G2A271J
330	±5%	0.8±0.1	2	CGA3E2C0G2A331J
390	±5%	0.8±0.1	2	CGA3E2C0G2A391J
470	±5%	0.8±0.1	2	CGA3E2C0G2A471J
560	±5%	0.8±0.1	2	CGA3E2C0G2A561J
680	±5%	0.8±0.1	2	CGA3E2C0G2A681J
820	±5%	0.8±0.1	2	CGA3E2C0G2A821J
1,000	±5%	0.8±0.1	2	CGA3E2C0G2A102J
1,200	±5%	0.8±0.1	2	CGA3E2C0G2A122J

### CAPACITANCE RANGES: CLASS 2

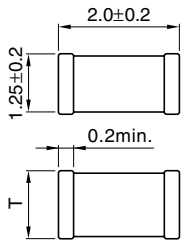
#### TEMPERATURE CHARACTERISTICS: X7R(±15%)

RATED VOLTAGE E<sub>dc</sub>: 100V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
1,000	±10%	0.8±0.1	2	CGA3E2X7R2A102K
1,500	±10%	0.8±0.1	2	CGA3E2X7R2A152K
2,200	±10%	0.8±0.1	2	CGA3E2X7R2A222K
3,300	±10%	0.8±0.1	2	CGA3E2X7R2A332K
4,700	±10%	0.8±0.1	2	CGA3E2X7R2A472K
6,800	±10%	0.8±0.1	2	CGA3E2X7R2A682K
10,000	±10%	0.8±0.1	2	CGA3E2X7R2A103K
15,000	±10%	0.8±0.1	2	CGA3E2X7R2A153K
22,000	±10%	0.8±0.1	2	CGA3E2X7R2A223K

## CGA4(C2012[EIA: CC0805]) Type

### SHAPES AND DIMENSIONS



Dimensions in mm



### CAPACITANCE RANGES: CLASS 1 (TEMPERATURE COMPENSATION)

#### TEMPERATURE CHARACTERISTICS: C0G(0±30ppm/°C)

RATED VOLTAGE E<sub>dc</sub>: 250V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
820	±5%	0.6±0.15	3	CGA4C3C0G2E821J
1,000	±5%	0.85±0.15	3	CGA4F3C0G2E102J
1,200	±5%	0.85±0.15	3	CGA4F3C0G2E122J
1,500	±5%	0.85±0.15	3	CGA4F3C0G2E152J
1,800	±5%	1.25±0.20	3	CGA4J3C0G2E182J
2,200	±5%	1.25±0.20	3	CGA4J3C0G2E222J
2,700	±5%	1.25±0.20	3	CGA4J3C0G2E272J

RATED VOLTAGE E<sub>dc</sub>: 100V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
1,000	±5%	0.6±0.15	2	CGA4C2C0G2A102J
1,200	±5%	0.6±0.15	2	CGA4C2C0G2A122J
1,500	±5%	0.6±0.15	2	CGA4C2C0G2A152J
1,800	±5%	0.85±0.15	2	CGA4F2C0G2A182J
2,200	±5%	0.85±0.15	2	CGA4F2C0G2A222J
2,700	±5%	1.25±0.20	2	CGA4J2C0G2A272J
3,300	±5%	1.25±0.20	2	CGA4J2C0G2A332J
3,900	±5%	1.25±0.20	2	CGA4J2C0G2A392J
4,700	±5%	1.25±0.20	2	CGA4J2C0G2A472J

**CAPACITANCE RANGES: CLASS 2****TEMPERATURE CHARACTERISTICS: X7R( $\pm 15\%$ )**RATED VOLTAGE E<sub>dc</sub>: 250V

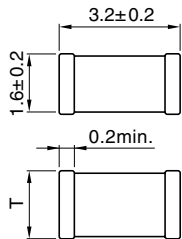
Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
1,000	$\pm 10\%$	0.85 $\pm$ 0.15	3	CGA4F3X7R2E102K
1,500	$\pm 10\%$	0.85 $\pm$ 0.15	3	CGA4F3X7R2E152K
2,200	$\pm 10\%$	0.85 $\pm$ 0.15	3	CGA4F3X7R2E222K
3,300	$\pm 10\%$	0.85 $\pm$ 0.15	3	CGA4F3X7R2E332K
4,700	$\pm 10\%$	0.85 $\pm$ 0.15	3	CGA4F3X7R2E472K
6,800	$\pm 10\%$	1.25 $\pm$ 0.20	3	CGA4J3X7R2E682K
10,000	$\pm 10\%$	1.25 $\pm$ 0.20	3	CGA4J3X7R2E103K
15,000	$\pm 10\%$	1.25 $\pm$ 0.20	3	CGA4J3X7R2E153K
22,000	$\pm 10\%$	1.25 $\pm$ 0.20	3	CGA4J3X7R2E223K

RATED VOLTAGE E<sub>dc</sub>: 100V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
1,000	$\pm 10\%$	0.85 $\pm$ 0.15	2	CGA4F2X7R2A102K
1,500	$\pm 10\%$	0.85 $\pm$ 0.15	2	CGA4F2X7R2A152K
2,200	$\pm 10\%$	0.85 $\pm$ 0.15	2	CGA4F2X7R2A222K
3,300	$\pm 10\%$	0.85 $\pm$ 0.15	2	CGA4F2X7R2A332K
4,700	$\pm 10\%$	0.85 $\pm$ 0.15	2	CGA4F2X7R2A472K
6,800	$\pm 10\%$	0.85 $\pm$ 0.15	2	CGA4F2X7R2A682K
10,000	$\pm 10\%$	0.85 $\pm$ 0.15	2	CGA4F2X7R2A103K
15,000	$\pm 10\%$	1.25 $\pm$ 0.20	2	CGA4J2X7R2A153K
22,000	$\pm 10\%$	1.25 $\pm$ 0.20	2	CGA4J2X7R2A223K
33,000	$\pm 10\%$	1.25 $\pm$ 0.20	2	CGA4J2X7R2A333K
47,000	$\pm 10\%$	1.25 $\pm$ 0.20	2	CGA4J2X7R2A473K
68,000	$\pm 10\%$	0.85 $\pm$ 0.15	2	CGA4F2X7R2A683K
100,000	$\pm 10\%$	1.25 $\pm$ 0.20	2	CGA4J2X7R2A104K

## CGA5(C3216[EIA: CC1206]) Type

### SHAPES AND DIMENSIONS



Dimensions in mm



### CAPACITANCE RANGES: CLASS 1 (TEMPERATURE COMPENSATION)

#### TEMPERATURE CHARACTERISTICS: C0G(0±30ppm/°C)

RATED VOLTAGE E<sub>dc</sub>: 630V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
100	±5%	0.6±0.15	4	CGA5C4C0G2J101J
120	±5%	0.6±0.15	4	CGA5C4C0G2J121J
150	±5%	0.6±0.15	4	CGA5C4C0G2J151J
180	±5%	0.6±0.15	4	CGA5C4C0G2J181J
220	±5%	0.6±0.15	4	CGA5C4C0G2J221J
270	±5%	0.6±0.15	4	CGA5C4C0G2J271J
330	±5%	0.6±0.15	4	CGA5C4C0G2J331J
390	±5%	0.6±0.15	4	CGA5C4C0G2J391J
470	±5%	0.85±0.15	4	CGA5F4C0G2J471J
560	±5%	0.85±0.15	4	CGA5F4C0G2J561J
680	±5%	0.85±0.15	4	CGA5F4C0G2J681J
820	±5%	0.85±0.15	4	CGA5F4C0G2J821J
1,000	±5%	0.85±0.15	4	CGA5F4C0G2J102J
1,200	±5%	0.85±0.15	4	CGA5F4C0G2J122J
1,500	±5%	1.15±0.15	4	CGA5H4C0G2J152J
1,800	±5%	1.15±0.15	4	CGA5H4C0G2J182J
2,200	±5%	1.15±0.15	4	CGA5H4C0G2J222J
2,700	±5%	1.60±0.20	4	CGA5L4C0G2J272J
3,300	±5%	1.60±0.20	4	CGA5L4C0G2J332J

RATED VOLTAGE E<sub>dc</sub>: 250V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
3,300	±5%	0.85±0.15	3	CGA5F3C0G2E332J
3,900	±5%	1.15±0.15	3	CGA5H3C0G2E392J
4,700	±5%	1.15±0.15	3	CGA5H3C0G2E472J
5,600	±5%	1.15±0.15	3	CGA5H3C0G2E562J
6,800	±5%	1.60±0.20	3	CGA5L3C0G2E682J
8,200	±5%	1.60±0.20	3	CGA5L3C0G2E822J

RATED VOLTAGE E<sub>dc</sub>: 100V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
3,900	±5%	0.6±0.15	2	CGA5C2C0G2A392J
4,700	±5%	0.85±0.15	2	CGA5F2C0G2A472J
5,600	±5%	0.85±0.15	2	CGA5F2C0G2A562J
6,800	±5%	1.15±0.15	2	CGA5H2C0G2A682J
8,200	±5%	1.15±0.15	2	CGA5H2C0G2A822J
10,000	±5%	1.15±0.15	2	CGA5H2C0G2A103J

**CAPACITANCE RANGES: CLASS 2****TEMPERATURE CHARACTERISTICS: X7R( $\pm 15\%$ )**RATED VOLTAGE E<sub>dc</sub>: 630V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
1,000	$\pm 10\%$	1.15 $\pm$ 0.15	4	CGA5H4X7R2J102K
1,500	$\pm 10\%$	1.15 $\pm$ 0.15	4	CGA5H4X7R2J152K
2,200	$\pm 10\%$	1.15 $\pm$ 0.15	4	CGA5H4X7R2J222K
3,300	$\pm 10\%$	1.15 $\pm$ 0.15	4	CGA5H4X7R2J332K
4,700	$\pm 10\%$	1.15 $\pm$ 0.15	4	CGA5H4X7R2J472K
6,800	$\pm 10\%$	1.15 $\pm$ 0.15	4	CGA5H4X7R2J682K
10,000	$\pm 10\%$	1.15 $\pm$ 0.15	4	CGA5H4X7R2J103K
15,000	$\pm 10\%$	1.30 $\pm$ 0.20	4	CGA5K4X7R2J153K
22,000	$\pm 10\%$	1.30 $\pm$ 0.20	4	CGA5K4X7R2J223K
33,000	$\pm 10\%$	1.60 $\pm$ 0.20	4	CGA5L4X7R2J333K

RATED VOLTAGE E<sub>dc</sub>: 250V

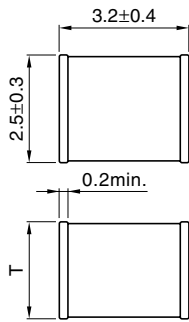
Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
15,000	$\pm 10\%$	1.15 $\pm$ 0.15	3	CGA5H3X7R2E153K
22,000	$\pm 10\%$	1.15 $\pm$ 0.15	3	CGA5H3X7R2E223K
33,000	$\pm 10\%$	1.60 $\pm$ 0.20	3	CGA5L3X7R2E333K
47,000	$\pm 10\%$	1.60 $\pm$ 0.20	3	CGA5L3X7R2E473K
68,000	$\pm 10\%$	1.60 $\pm$ 0.20	3	CGA5L3X7R2E683K
100,000	$\pm 10\%$	1.60 $\pm$ 0.20	3	CGA5L3X7R2E104K

RATED VOLTAGE E<sub>dc</sub>: 100V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
33,000	$\pm 10\%$	1.15 $\pm$ 0.15	2	CGA5H2X7R2A333K
47,000	$\pm 10\%$	1.15 $\pm$ 0.15	2	CGA5H2X7R2A473K
68,000	$\pm 10\%$	1.60 $\pm$ 0.20	2	CGA5L2X7R2A683K
100,000	$\pm 10\%$	1.60 $\pm$ 0.20	2	CGA5L2X7R2A104K
150,000	$\pm 10\%$	1.60 $\pm$ 0.20	2	CGA5L2X7R2A154K
220,000	$\pm 10\%$	1.15 $\pm$ 0.15	2	CGA5H2X7R2A224K
330,000	$\pm 10\%$	1.30 $\pm$ 0.20	2	CGA5K2X7R2A334K
470,000	$\pm 10\%$	1.60 $\pm$ 0.20	2	CGA5L2X7R2A474K
680,000	$\pm 10\%$	1.60 $\pm$ 0.20	2	CGA5L2X7R2A684K
1,000,000	$\pm 10\%$	1.60 $\pm$ 0.20	2	CGA5L2X7R2A105K

## CGA6(C3225[EIA: CC1210]) Type

### SHAPES AND DIMENSIONS



Dimensions in mm

### CAPACITANCE RANGES: CLASS 1 (TEMPERATURE COMPENSATION)

#### TEMPERATURE CHARACTERISTICS: C0G(0±30ppm/°C)

RATED VOLTAGE E<sub>dc</sub>: 630V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
3,900	±5%	1.25±0.20	4	CGA6J4C0G2J392J
4,700	±5%	1.60±0.20	4	CGA6L4C0G2J472J
5,600	±5%	1.60±0.20	4	CGA6L4C0G2J562J
6,800	±5%	2.00±0.20	4	CGA6M4C0G2J682J

RATED VOLTAGE E<sub>dc</sub>: 250V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
10,000	±5%	1.60±0.20	3	CGA6L3C0G2E103J
15,000	±5%	2.00±0.20	3	CGA6M3C0G2E153J

RATED VOLTAGE E<sub>dc</sub>: 100V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
15,000	±5%	1.25±0.20	2	CGA6J2C0G2A153J
22,000	±5%	1.60±0.20	2	CGA6L2C0G2A223J
33,000	±5%	2.00±0.20	2	CGA6M2C0G2A333J
47,000	±5%	2.30±0.20	2	CGA6N2C0G2A473J

### CAPACITANCE RANGES: CLASS 2

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

RATED VOLTAGE E<sub>dc</sub>: 630V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
47,000	±10%	2.00±0.20	4	CGA6M4X7R2J473K
68,000	±10%	2.00±0.20	4	CGA6M4X7R2J683K

RATED VOLTAGE E<sub>dc</sub>: 250V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
100,000	±10%	2.00±0.20	3	CGA6M3X7R2E104K
150,000	±10%	2.00±0.20	3	CGA6M3X7R2E154K
220,000	±10%	2.00±0.20	3	CGA6M3X7R2E224K

RATED VOLTAGE E<sub>dc</sub>: 100V

Capacitance (pF)	Tolerance	Thickness T (mm)	Voltage conditions at the time of high temperature loading	Part No.
330,000	±10%	2.00±0.20	2	CGA6M2X7R2A334K
470,000	±10%	2.00±0.20	2	CGA6M2X7R2A474K
680,000	±10%	1.60±0.20	2	CGA6L2X7R2A684K
1,000,000	±10%	2.00±0.20	2	CGA6M2X7R2A105K
1,500,000	±10%	2.00±0.20	3	CGA6M3X7R2A155K
2,200,000	±10%	2.30±0.20	3	CGA6N3X7R2A225K

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