



**THE DATASHEET OF  
CGA8M1C0G3F221K200KA**



# MULTILAYER CERAMIC CHIP CAPACITORS

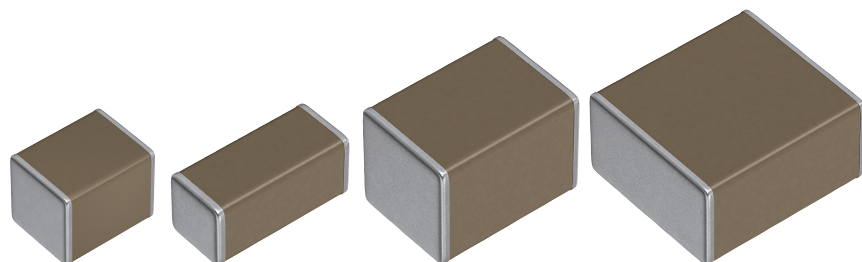
Automotive grade, high voltage (1,000V and over)

## CGA series

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<b>CGA6</b>	<b>3225 [EIA 1210]</b>
<b>CGA7</b>	<b>4520 [EIA 1808]</b>
<b>CGA8</b>	<b>4532 [EIA 1812]</b>
<b>CGA9</b>	<b>5750 [EIA 2220]</b>

\* Dimensions code: JIS[EIA]



## REMINDERS FOR USING THESE PRODUCTS

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

### SAFETY REMINDERS

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

### REMINDERS

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

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

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

- We may modify products or discontinue production of a product listed in this catalog without prior notification.
- We provide "Delivery Specification" that explain precautions for the specifications and safety of each product listed in this catalog. We strongly recommend that you exchange these delivery specifications with customers that use one of these products.
- If you plan to export a product listed in this catalog, keep in mind that it may be a restricted item according to the "Foreign Exchange and Foreign Trade Control Law". In such cases, it is necessary to acquire export permission in harmony with this law.
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- This catalog only applies to products purchased through our company or one of our company's official agencies. This catalog does not apply to products that are purchased through other third parties.

Notice: Effective January 2013, TDK will use a new catalog number which adds product thickness and packaging specification detail. This new catalog number should be referenced on all catalog orders going forward, and is not applicable for OEM part number orders. Please be aware the last five digits of the catalog number will differ from the item description (internal control number) on the product label. Contact your local TDK Sales representative for more information.

(Example)

Catalog issued date	Catalog number	Item description (on delivery label)
Prior to January 2013	C1608C0G1E103J(080AA)	C1608C0G1E103JT000N
January 2013 and later	C1608C0G1E103J080AA	C1608C0G1E103JT000N

# CGA series

## High voltage (1,000V and over)



Type: CGA6/3225 [EIA 1210], CGA7/4520 [EIA 1808], CGA8/4532 [EIA 1812],  
CGA9/5750 [EIA 2220]

### SERIES OVERVIEW

High voltage CGA series, automotive grade of TDK's multilayer ceramic chip capacitor, is a product having a high withstanding voltage characteristic. The lineup is voltage rating of 1,000V to 3,000V with capacitance range up to 33nF.

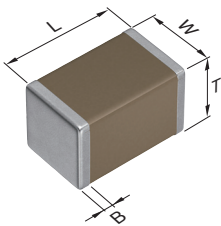
### FEATURES

- Voltage rating: 1,000V, 1,250V, 2,000V, 3,000V
- Operating temperature range: -55~+125°C
- C0G type having excellent stable temperature and DC-bias characteristics is also available
- Qualified based on AEC-Q200

### APPLICATION

- Decoupling, snubber and resonant circuits of high voltage circuits
- Wireless charging units, DC-DC converter, Inverter

### SHAPE & DIMENSIONS



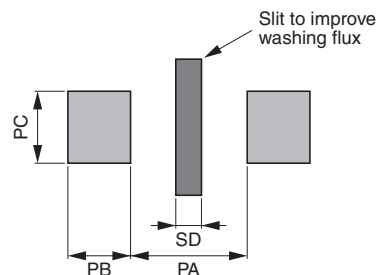
L	Body length
W	Body width
T	Body height
B	Terminal width

Dimensions in mm

Type	L	W	T	B
CGA6	3.20±0.40	2.50±0.30	2.50±0.30	0.20 min.
CGA7	4.50±0.40	2.00±0.20	2.00±0.20	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	2.80±0.30	0.20 min.

\* Dimensional tolerances are typical values.

### RECOMMENDED CONDITIONS



- It is recommended to provide a slit (about 1mm width) in the board under the components to improve washing flux.
- Please make sure to dry detergent up completely before.
- It is recommended to use low activated flux (Chlorine content: less than 0.1wt%) such rosin due to high voltage usage.
- When mounting on an aluminum substrate, it is more likely to be affected by heat stress from the substrate. Please inquire separate specification when mounted on the substrate.

**CATALOG NUMBER CONSTRUCTION**

<b>CGA</b>	<b>6</b>	<b>P</b>	<b>1</b>	<b>COG</b>	<b>3B</b>	<b>103</b>	<b>G</b>	<b>250</b>	<b>A</b>	<b>C</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
6	1210	3.20	2.50	0.20 min.
7	1808	4.50	2.00	0.20 min.
8	1812	4.50	3.20	0.20 min.
9	2220	5.70	5.00	0.20 min.

**(3)Thickness code**

Code	Thickness
F	0.85 mm
G	1.10 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

**(4)Voltage condition for life test**

Symbol	Condition
1	1 x R.V.

**(5)Temperature characteristics**

Temperature characteristics	Temperature coefficient or capacitance change	Temperature range
COG	0±30 ppm/°C	-55 to +125°C
X7R	±15%	-55 to +125°C

**(6)Rated voltage (DC)**

Code	Voltage (DC)
3A	1,000V
3B	1,250V
3D	2,000V
3F	3,000V

**(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
F	±1pF
G	±2%
J	±5%
K	±10%
M	±20%

**(9)Thickness**

Code	Thickness
085	0.85 mm
110	1.10 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

**(10)Packaging style**

Code	Style
A	178mm reel, 4mm pitch
K	178mm reel, 8mm pitch




**(11)Special reserved code**

Code	Description
A,C	TDK internal code

## Capacitance range chart

## CGA6/3225 [EIA 1210]

Capacitance		COG	
(pF)	Code	3B (1,250V)	3A (1,000V)
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		
12,000	123		
15,000	153		
18,000	183		
22,000	223		

Standard thickness  2.00 mm  2.30 mm  2.50 mm






■ Click the charts for details.

■ For details such as the catalog numbers, please refer to the capacitance range table on page 7 and after.

## Capacitance range chart

## CGA7/4520 [EIA 1808]

Capacitance		COG	X7R	
(pF)	Code	3F (3,000V)	3D (2,000V)	3A (1,000V)
10	100			
15	150			
22	220			
33	330			
47	470			
56	560			
68	680			
82	820			
100	101			
470	471			
1,000	102			








Standard thickness  0.85 mm  1.10 mm  1.30 mm  1.60 mm  2.00 mm

■ Click the charts for details.

■ For details such as the catalog numbers, please refer to the capacitance range table on page 7 and after.

## Capacitance range chart

## CGA8/4532 [EIA 1812]

Capacitance		COG	X7R		
(pF)	Code		3F (3,000V)	3D (2,000V)	3A (1,000V)
100	101				
150	151				
220	221				
330	331				
2,200	222				
4,700	472				
10,000	103				





Standard thickness  1.30 mm  1.60 mm  2.00 mm  2.50 mm


■ Click the charts for details.

■ For details such as the catalog numbers, please refer to the capacitance range table on page 7 and after.

## Capacitance range chart

## CGA9/5750 [EIA 2220]

Capacitance		COG
(pF)	Code	
10,000	103	
15,000	153	
22,000	223	
33,000	333	

Standard thickness  2.80 mm

■ Click the charts for details.

■ For details such as the catalog numbers, please refer to the capacitance range table on page 7 and after.

# MULTILAYER CERAMIC CHIP CAPACITORS

## Capacitance range table

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

Capacitance	Width (mm)	Thickness (mm)	Capacitance tolerance	Catalog number		
				Rated voltage Edc: 3,000V	Rated voltage Edc: 1,250V	Rated voltage Edc: 1,000V
10pF	4520	0.85±0.15	±1pF	<a href="#">CGA7F1C0G3F100F085KA</a>		
15pF	4520	1.10±0.20	±10%	<a href="#">CGA7G1C0G3F150K110KA</a>		
22pF	4520	1.10±0.20	±10%	<a href="#">CGA7G1C0G3F220K110KA</a>		
33pF	4520	1.60±0.20	±10%	<a href="#">CGA7L1C0G3F330K160KA</a>		
47pF	4520	1.60±0.20	±10%	<a href="#">CGA7L1C0G3F470K160KA</a>		
68pF	4520	2.00±0.20	±10%	<a href="#">CGA7M1C0G3F680K200KA</a>		
100pF	4520	2.00±0.20	±10%	<a href="#">CGA7M1C0G3F101K200KA</a>		
150pF	4532	1.60±0.20	±10%	<a href="#">CGA8L1C0G3F101K160KA</a>		
220pF	4532	1.60±0.20	±10%	<a href="#">CGA8L1C0G3F151K160KA</a>		
330pF	4532	2.00±0.20	±10%	<a href="#">CGA8M1C0G3F221K200KA</a>		
1nF	3225	2.00±0.20	±2%	<a href="#">CGA8P1C0G3F331K250KA</a>	<a href="#">CGA6M1C0G3B102G200AC</a>	<a href="#">CGA6M1C0G3A102G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B102J200AC</a>	<a href="#">CGA6M1C0G3A102J200AC</a>
1.2nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B122G200AC</a>	<a href="#">CGA6M1C0G3A122G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B122J200AC</a>	<a href="#">CGA6M1C0G3A122J200AC</a>
1.5nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B152G200AC</a>	<a href="#">CGA6M1C0G3A152G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B152J200AC</a>	<a href="#">CGA6M1C0G3A152J200AC</a>
1.8nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B182G200AC</a>	<a href="#">CGA6M1C0G3A182G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B182J200AC</a>	<a href="#">CGA6M1C0G3A182J200AC</a>
2.2nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B222G200AC</a>	<a href="#">CGA6M1C0G3A222G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B222J200AC</a>	<a href="#">CGA6M1C0G3A222J200AC</a>
2.7nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B272G200AC</a>	<a href="#">CGA6M1C0G3A272G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B272J200AC</a>	<a href="#">CGA6M1C0G3A272J200AC</a>
3.3nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B332G200AC</a>	<a href="#">CGA6M1C0G3A332G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B332J200AC</a>	<a href="#">CGA6M1C0G3A332J200AC</a>
3.9nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B392G200AC</a>	<a href="#">CGA6M1C0G3A392G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B392J200AC</a>	<a href="#">CGA6M1C0G3A392J200AC</a>
4.7nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B472G200AC</a>	<a href="#">CGA6M1C0G3A472G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B472J200AC</a>	<a href="#">CGA6M1C0G3A472J200AC</a>
5.6nF	3225	2.00±0.20	±2%		<a href="#">CGA6M1C0G3B562G200AC</a>	<a href="#">CGA6M1C0G3A562G200AC</a>
			±5%		<a href="#">CGA6M1C0G3B562J200AC</a>	<a href="#">CGA6M1C0G3A562J200AC</a>
6.8nF	3225	2.00±0.20	±2%		<a href="#">CGA6N1C0G3B682G230AC</a>	<a href="#">CGA6M1C0G3A682G200AC</a>
			±5%		<a href="#">CGA6N1C0G3B682J230AC</a>	<a href="#">CGA6M1C0G3A682J200AC</a>
8.2nF	3225	2.30±0.20	±2%		<a href="#">CGA6P1C0G3B822G250AC</a>	<a href="#">CGA6N1C0G3A822G230AC</a>
			±5%		<a href="#">CGA6P1C0G3B822J250AC</a>	<a href="#">CGA6N1C0G3A822J230AC</a>
10nF	3225	2.50±0.30	±2%		<a href="#">CGA6P1C0G3B103G250AC</a>	<a href="#">CGA6P1C0G3A103G250AC</a>
			±5%		<a href="#">CGA6P1C0G3B103J250AC</a>	<a href="#">CGA6P1C0G3A103J250AC</a>
12nF	3225	2.50±0.30	±2%			<a href="#">CGA9Q1C0G3A103J280KC</a>
			±5%			<a href="#">CGA6P1C0G3A123G250AC</a>
15nF	3225	2.50±0.30	±2%			<a href="#">CGA6P1C0G3A123J250AC</a>
			±5%			<a href="#">CGA6P1C0G3A153G250AC</a>
18nF	3225	2.50±0.30	±2%			<a href="#">CGA6P1C0G3A153J250AC</a>
			±5%			<a href="#">CGA9Q1C0G3A153J280KC</a>
22nF	3225	2.50±0.30	±2%			<a href="#">CGA6P1C0G3A183G250AC</a>
			±5%			<a href="#">CGA6P1C0G3A183J250AC</a>
22nF	3225	2.50±0.30	±2%			<a href="#">CGA6P1C0G3A223G250AC</a>
			±5%			<a href="#">CGA6P1C0G3A223J250AC</a>
33nF	5750	2.80±0.30	±5%			<a href="#">CGA9Q1C0G3A223J280KC</a>
			±5%			<a href="#">CGA9Q1C0G3A333J280KC</a>


Click the part numbers for details.

## Capacitance range table

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

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number	
				Rated voltage Edc: 2,000V	Rated voltage Edc: 1,000V
470pF	4520	1.30±0.20	±10%	<a href="#">CGA7K1X7R3D471K130KA</a>	<a href="#">CGA7K1X7R3A471K130KA</a>
			±20%	<a href="#">CGA7K1X7R3D471M130KA</a>	<a href="#">CGA7K1X7R3A471M130KA</a>
1nF	4520	1.30±0.20	±10%	<a href="#">CGA7K1X7R3D102K130KA</a>	<a href="#">CGA7K1X7R3A102K130KA</a>
			±20%	<a href="#">CGA7K1X7R3D102M130KA</a>	<a href="#">CGA7K1X7R3A102M130KA</a>
2.2nF	4532	1.30±0.20	±10%	<a href="#">CGA8K1X7R3D222K130KA</a>	
			±20%	<a href="#">CGA8K1X7R3D222M130KA</a>	
4.7nF	4532	1.60±0.20	±10%		<a href="#">CGA8L1X7R3A472K160KA</a>
			±20%		<a href="#">CGA8L1X7R3A472M160KA</a>
10nF	4532	2.00±0.20	±10%		<a href="#">CGA8M1X7R3A103K200KA</a>
			±20%		<a href="#">CGA8M1X7R3A103M200KA</a>

Click the part numbers for details.

 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.

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