



MULTILAYER CERAMIC CHIP CAPACITORS

CGA Series Automotive Grade High Voltage (1000V and over)



Type:

**CGA5 [EIA CC1206]
CGA6 [EIA CC1210]
CGA7 [EIA CC1808]
CGA8 [EIA CC1812]
CGA9 [EIA CC2220]**

**Issue date:
Dec 2014**



REMINDERS

Please read before using this product

SAFETY REMINDERS



REMINDERS

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(Example)

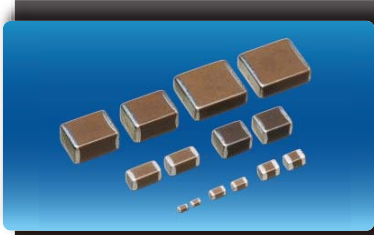
Catalog Issued date	Catalog Number	Item Description (On Delivery Label)
Prior to January 2013	C1608C0G1E103J	C1608C0G1E103JT000N
January 2013 and Later	C1608C0G1E103J080AA	C1608C0G1E103JT000N



CGA Series

High Voltage (1000V and over)

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Features



- Advanced design provides improved withstand voltage characteristics.
- TDK's proprietary internal electrode structure and the use of low-dielectric-strength material result in highly reliable performance in high-voltage applications.
- Complies with ISO8802-3 for LAN applications.
- Designed exclusively for reflow soldering (CGA5 type also supports flow soldering).
- AEC-Q200 compliant.

Applications



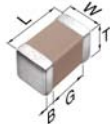
- Application in decoupling and snubber of high voltage circuits of EVs or HEVs
- General high voltage circuits.
- Noise bypass for power supply
- Transceiver for LAN
- Hub, etc

Cautions



- A slit of about 1mm on the circuit board is recommended to improve removal of the flux after soldering.
- Ensure that this product is completely dried following washing.
- Because this product will be subjected to high voltages, use only low-activity rosin flux (with 0.2% max. of chlorine).
- Using this product with aluminum circuit boards must be considered a special implementation because the high heat stress levels are involved. In case of using aluminum circuit boards, please contact TDK.

Shape & Dimensions



L Body Length
W Body Width
T Body Height
B Terminal Width
G Terminal Spacing



Catalog Number Construction

CGA • 9 • P • 1 • X7S • 3A • 473 • K • 250 • K • A

Series Name

Dimensions L x W (mm)

Code	Length	Width	Terminal
5	3.20 ± 0.20	1.60 ± 0.20	0.20 min.
6	3.20 ± 0.40	2.50 ± 0.30	0.20 min.
7	4.50 ± 0.40	2.00 ± 0.30	0.20 min.
8	4.50 ± 0.40	3.20 ± 0.40	0.20 min.
9	5.70 ± 0.40	5.00 ± 0.40	0.20 min.

Thickness T Code (mm)

Code	Thickness	Code	Thickness
F	0.85 mm	M	2.00 mm
G	1.10 mm	N	2.30 mm
K	1.30 mm	P	2.50 mm
L	1.60 mm		

Voltage Condition for Life Test

Symbol	Condition
1	1 × R.V.

Temperature Characteristics

Temperature Characteristics	Temperature Coefficient or Capacitance Change	Temperature Range
C0G	0±30 ppm/°C	-55 to +125°C
CH	0±60 ppm/°C	-25 to +85°C
JB	±10%	-25 to +85°C
X7R	±15%	-55 to +125°C
X7S	±22%	-55 to +125°C

Rated Voltage (DC)

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

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.

Ex. 0R2 = 0.2pF; 103 = 10,000pF; 105 = 1,000,000pF = 1,000nF = 1μF

Capacitance Tolerance

Code	Tolerance
F	± 1pF
K	± 10%
M	± 20%

Nominal Thickness

Code	Thickness	Code	Thickness	Code	Thickness
085	0.85 mm	160	1.60 mm	250	2.50 mm
110	1.10 mm	200	2.00 mm		
130	1.30 mm	230	2.30 mm		

Packaging Style

Code	Style
A	178 mm Reel, 4 mm Pitch
K	178 mm Reel, 8 mm Pitch

Special Reserved Code

Code	Description
A, B	TDK Internal Code



Capacitance Range Chart

CGA5(3216) [EIA CC1206]

Capacitance Range Chart

Temperature Characteristics: X7S ($\pm 22\%$)
 Rated Voltage: 2000V (3D), 1000V (3A)

Capacitance (pF)	Code	Tolerance	X7S	
			3D (2KV)	3A (1KV)
470	471	K: $\pm 10\%$		
2,200	222	M: $\pm 20\%$		

Standard Thickness 1.30 mm



Capacitance Range Chart

CGA6(3225) [EIA CC1210]

Capacitance Range Chart

Temperature Characteristics: X7S ($\pm 22\%$)
 Rated Voltage: 2000V (3D), 1000V (3A)

Capacitance (pF)	Code	Tolerance	X7S	
			3D (2KV)	3A (1KV)
1,000	102	K: $\pm 10\%$		
2,200	222	M: $\pm 20\%$		
4,700	472			

Standard Thickness
 1.60 mm
 2.00 mm
 2.50 mm



Capacitance Range Chart

CGA7(4520) [EIA CC1808]

Capacitance Range Chart

Temperature Characteristics: C0G ($0 \pm 30\text{ppm}/^\circ\text{C}$), X7R ($\pm 15\%$), X7S ($\pm 22\%$)
 Rated Voltage: 3000V (3F), 2000V (3D), 1000V (3A)

Capacitance (pF)	Code	Tolerance	C0G	X7R		X7S
			3F (3KV)	3D (2KV)	3A (1KV)	3A (1KV)
10	100	F: $\pm 1\text{pF}$				
12	120	K: $\pm 10\%$				
15	150	M: $\pm 20\%$				
18	180					
22	220					
27	270					
33	330					
39	390					
47	470					
56	560					
68	680					
82	820					
100	101					
470	471					
1,000	102					
2,200	222					
4,700	472					

Standard Thickness
 0.85 mm
 1.10 mm
 1.30 mm
 1.60 mm
 2.00 mm



Capacitance Range Chart

CGA8(4532) [EIA CC1812]

Capacitance Range Chart

Temperature Characteristics: C0G ($0 \pm 30\text{ppm}/^\circ\text{C}$), X7R ($\pm 15\%$), X7S ($\pm 22\%$)
 Rated Voltage: 3000V (3F), 2000V (3D), 1000V (3A)

Capacitance (pF)	Code	Tolerance	C0G		X7R		X7S	
			3F (3KV)	3D (2KV)	3A (1KV)	3D (2KV)	3A (1KV)	
100	101	K: $\pm 10\%$ M: $\pm 20\%$	█					
120	121							
150	151							
180	181							
220	221							
270	271							
330	331		█					
2,200	222			█		█		
4,700	472				█			
10,000	103						█	

Standard Thickness

- █ 1.30 mm
- █ 1.60 mm
- █ 2.00 mm
- █ 2.30 mm
- █ 2.50 mm



Capacitance Range Chart

CGA9(5750) [EIA CC2220]

Capacitance Range Chart

Temperature Characteristics: X7S ($\pm 22\%$)
 Rated Voltage: 2000V (3D), 1000V (3A)

Capacitance (pF)	Code	Tolerance	X7S	
			3D (2KV)	3A (1KV)
4,700	472	K: $\pm 10\%$ M: $\pm 20\%$	█	
10,000	103		█	
22,000	223			█
47,000	473			█

Standard Thickness

- █ 1.60 mm
- █ 2.00 mm
- █ 2.50 mm



Capacitance Range Table

Class 1 (Temperature Compensating)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number		
				Rated Voltage Edc: 3KV	Rated Voltage Edc: 2KV	Rated Voltage Edc: 1KV
10 pF	4520	0.85 ± 0.15	± 1pF	CGA7F1C0G3F100F085KA		
12 pF	4520	0.85 ± 0.15	± 10%	CGA7F1C0G3F120K085KA		
15 pF	4520	1.10 ± 0.20	± 10%	CGA7G1C0G3F150K110KA		
18 pF	4520	1.10 ± 0.20	± 10%	CGA7G1C0G3F180K110KA		
22 pF	4520	1.10 ± 0.20	± 10%	CGA7G1C0G3F220K110KA		
27 pF	4520	1.60 ± 0.20	± 10%	CGA7L1C0G3F270K160KA		
33 pF	4520	1.60 ± 0.20	± 10%	CGA7L1C0G3F330K160KA		
39 pF	4520	1.60 ± 0.20	± 10%	CGA7L1C0G3F390K160KA		
47 pF	4520	1.60 ± 0.20	± 10%	CGA7L1C0G3F470K160KA		
56 pF	4520	2.00 ± 0.20	± 10%	CGA7M1C0G3F560K200KA		
68 pF	4520	2.00 ± 0.20	± 10%	CGA7M1C0G3F680K200KA		
82 pF	4520	2.00 ± 0.20	± 10%	CGA7M1C0G3F820K200KA		
100 pF	4520	2.00 ± 0.20	± 10%	CGA7M1C0G3F101K200KA		
	4532	1.60 ± 0.20	± 10%	CGA8L1C0G3F101K160KA		
120 pF	4532	1.60 ± 0.20	± 10%	CGA8L1C0G3F121K160KA		
150 pF	4532	1.60 ± 0.20	± 10%	CGA8L1C0G3F151K160KA		
180 pF	4532	1.60 ± 0.20	± 10%	CGA8L1C0G3F181K160KA		
220 pF	4532	2.00 ± 0.20	± 10%	CGA8M1C0G3F221K200KA		
270 pF	4532	2.30 ± 0.20	± 10%	CGA8N1C0G3F271K230KA		
330 pF	4532	2.50 ± 0.30	± 10%	CGA8P1C0G3F331K250KA		

Class 2 (Temperature Stable)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number		
				Rated Voltage Edc: 3KV	Rated Voltage Edc: 2KV	Rated Voltage Edc: 1KV
470 pF	4520	1.30 ± 0.20	± 10%	CGA7K1X7R3D471K130KA	CGA7K1X7R3A471K130KA	
			± 20%	CGA7K1X7R3D471M130KA	CGA7K1X7R3A471M130KA	
1 nF	4520	1.30 ± 0.20	± 10%	CGA7K1X7R3D102K130KA	CGA7K1X7R3A102K130KA	
			± 20%	CGA7K1X7R3D102M130KA	CGA7K1X7R3A102M130KA	
2.2 nF	4532	1.30 ± 0.20	± 10%	CGA8K1X7R3D222K130KA		
			± 20%	CGA8K1X7R3D222M130KA		
4.7 nF	4532	1.60 ± 0.20	± 10%		CGA8L1X7R3A472K160KA	
			± 20%		CGA8L1X7R3A472M160KA	
10 nF	4532	2.00 ± 0.20	± 10%		CGA8M1X7R3A103K200KA	
			± 20%		CGA8M1X7R3A103M200KA	



Capacitance Range Table

Class 2 (Temperature Stable)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number	
				Rated Voltage Edc: 3KV	Rated Voltage Edc: 1KV
470 pF	3216	1.30 ± 0.20	± 10%	CGA5K1X7S3D471K130AA	
			± 20%	CGA5K1X7S3D471M130AA	
1 nF	3225	2.00 ± 0.20	± 10%	CGA6M1X7S3D102K200AA	
			± 20%	CGA6M1X7S3D102M200AA	
2.2 nF	4520	1.60 ± 0.20	± 10%	CGA7L1X7S3A222K160KA	
			± 20%	CGA7L1X7S3A222M160KA	
	3216	1.30 ± 0.20	± 10%	CGA5K1X7S3A222K130AA	
			± 20%	CGA5K1X7S3A222M130AA	
	3225	2.50 ± 0.30	± 10%	CGA6P1X7S3D222K250AA	
			± 20%	CGA6P1X7S3D222M250AA	
4532	1.60 ± 0.20	± 10%	CGA8L1X7S3D222K160KA		
± 20%	CGA8L1X7S3D222M160KA				
4.7 nF	4520	1.60 ± 0.20	± 10%	CGA7L1X7S3A472K160KA	
			± 20%	CGA7L1X7S3A472M160KA	
	3225	1.60 ± 0.20	± 10%	CGA6L1X7S3A472K160AA	
			± 20%	CGA6L1X7S3A472M160AA	
5750	2.00 ± 0.20	± 10%	CGA9M1X7S3D472K200KA		
		± 20%	CGA9M1X7S3D472M200KA		
10 nF	4532	1.60 ± 0.20	± 10%	CGA8L1X7S3A103K160KA	
			± 20%	CGA8L1X7S3A103M160KA	
	5750	2.50 ± 0.30	± 10%	CGA9P1X7S3D103K250KA	
± 20%	CGA9P1X7S3D103M250KA				
22 nF	5750	1.60 ± 0.20	± 10%	CGA9L1X7S3A223K160KA	
			± 20%	CGA9L1X7S3A223M160KA	
47 nF	5750	2.50 ± 0.30	± 10%	CGA9P1X7S3A473K250KA	
			± 20%	CGA9P1X7S3A473M250KA	

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