



## MULTILAYER CERAMIC CHIP CAPACITORS



### **CGA Series Automotive Grade High Temperature Application**

Type:

CGA2 [EIA CC0402]  
CGA3 [EIA CC0603]  
CGA4 [EIA CC0805]  
CGA5 [EIA CC1206]  
CGA6 [EIA CC1210]  
CGA8 [EIA CC1812]  
CGA9 [EIA CC2220]

Issue date:  
Apr 2015



## REMINDERS

Please read before using this product

### SAFETY REMINDERS



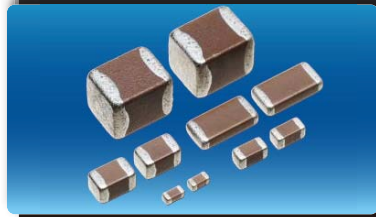
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Notice: Effective January 2013, TDK will use a new catalog number which adds product thickness and packaging specification detail. This new catalog number should be referenced on all catalog orders going forward, and is not applicable for OEM part 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	C1608C0G1E103JT000N
January 2013 and Later	C1608C0G1E103J080AA	C1608C0G1E103JT000N



## CGA Series

### High Temperature Application

Type: CGA2 [EIA CC0402], CGA3 [EIA CC0603], CGA4 [EIA CC0805], CGA5 [EIA CC1206], CGA6 [EIA CC1210], CGA8 [EIA CC1812], CGA9 [EIA CC2220]

#### Features



- With a maximum temperature of 150°C and a capacitance change within ±15%, the series is suited for devices that operate in high-temperature environments.
- Excellent DC bias properties.
- AEC-Q200 compliant.

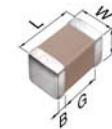
Parameters	Specifications
Temperature Characteristics	-55 to 150°C
	ΔC/C: ±15% or 0±30ppm
Operating Temperature	-55 to +150°C
Dissipation Factor	5% maximum
Insulation Resistance	10 GΩ or 500 MΩ • μF minimum
Voltage Proof	2.5 • RV or 3 • RV for 1–5s Charge/Discharge ≤50 mA

#### Applications



- Automotive applications (engine rooms)
- Peripheral circuits of IGBT, SiC, GaN used at high temperature environments
- Sensor Module
- Smoothing and decoupling applications for other devices that operate at high temperature

#### Shape & Dimensions



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



#### Catalog Number Construction

**CGA • 6 • P • 3 • X8R • 1C • 106 • K • 250 • A • B**

#### Series Name

#### Dimensions L x W (mm)

Code	Length	Width	Terminal
2	1.00 ± 0.05	0.50 ± 0.05	0.10 min.
3	1.60 ± 0.10	0.80 ± 0.10	0.20 min.
4	2.00 ± 0.20	1.25 ± 0.20	0.20 min.
5	3.20 ± 0.20	1.60 ± 0.20	0.20 min.
6	3.20 ± 0.40	2.50 ± 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.

\*Dimension tolerance are typical values

#### Thickness T Code (mm)

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
L	1.60 mm
M	2.00 mm
N	2.30 mm
P	2.50 mm
Q	2.80 mm
R	3.20 mm

#### Voltage Condition for Life Test

Symbol	Condition
2	2 × R.V.
3	1.5 × R.V.

#### Temperature Characteristics

Temperature Characteristics	Temperature Coefficient or Capacitance Change	Temperature Range
NP0	0±30ppm/°C	-55 to +150°C
X8R	±15%	-55 to +150°C

#### Rated Voltage (DC)

Code	Voltage (DC)	Code	Voltage (DC)
1C	16V	2A	100V
1E	25V	2E	250V
1H	50V	2W	450V
		2J	630V

#### 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 = 100nF = 1μF

#### Capacitance Tolerance

Code	Tolerance
C	± 0.25pF
D	± 0.50pF
J	± 5%
K	± 10%
M	± 20%

#### Nominal Thickness

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

#### Packaging Style

Code	Style
A	178 mm Reel, 4 mm Pitch
B	178 mm Reel, 2 mm Pitch
K	178 mm Reel, 8 mm Pitch

#### Special Reserved Code

Code	Description
A, B	TDK Internal Code



## Capacitance Range Chart

## CGA2(1005) [EIA CC0402]

### Capacitance Range Chart

Temperature Characteristics: NPO (0 ± 30ppm/°C), X8R (±15%)

Rated Voltage: 100V (2A), 50V (1H), 25V (1E), 16V (1C)

Capacitance (pF)	Code	Tolerance	NPO		X8R			
			2A (100V)	1H (50V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)
1	010	C: ± 0.25pF						
1.5	1R5	D: ± 0.50pF						
2	020	J: ± 5%						
2.2	2R2	K: ± 10%						
3	030	M: ± 20%						
3.3	3R3							
4	040							
4.7	4R7							
5	050							
6	060							
6.8	6R8							
7	070							
8	080							
9	090							
10	100							
12	120							
15	150							
18	180							
22	220							
27	270							
33	330							
39	390							
47	470							
56	560							
68	680							
82	820							
100	101							
120	121							
150	151							
180	181							
220	221							
270	271							
330	331							
390	391							
470	471							
560	561							
680	681							
820	821							
1,000	102							
1,500	152							
2,200	222							
3,300	332							
4,700	472							
6,800	682							
10,000	103							
15,000	153							
22,000	223							
33,000	333							
47,000	473							

Standard Thickness  
 0.50 mm



## Capacitance Range Chart

## CGA3(1608) [EIA CC0603]

### Capacitance Range Chart

Temperature Characteristics: NPO (0 ± 30ppm/°C), X8R (±15%)

Rated Voltage: 250V (2E), 100V (2A), 50V(1H), 25V (1E), 16V (1C)

Capacitance (pF)	Code	Tolerance	NPO		
			2E (250V)	2A (100V)	1H (50V)
1	010	C: ± 0.25pF			
2	1R5	D: ± 0.50pF			
2	020	J: ± 5%			
2	2R2				
3	030				
3	3R3				
4	040				
5	4R7				
5	050				
6	060				
7	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				

Capacitance (pF)	Code	Tolerance	X8R			
			2A (100V)	1H (50V)	1E (25V)	1C (16V)
1,000	102	K: ± 10% M: ± 20%				
1,500	152					
2,200	222					
3,300	332					
4,700	472					
6,800	682					
10,000	103					
15,000	153					
22,000	223					
33,000	333					
47,000	473					
68,000	683					
100,000	104					
150,000	154					
220,000	224					
330,000	334					
470,000	474					

Standard Thickness

0.80 mm



## Capacitance Range Chart

## CGA4(2012) [EIA CC0805]

### Capacitance Range Chart

Temperature Characteristics: NP0 (0 ± 30ppm/°C), X8R (±15%)

Rated Voltage: 450V(2W), 250V(2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

Capacitance (pF)	Code	Tolerance	NP0				X8R			
			2W (450V)	2E (250V)	2A (100V)	1H (50V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)
100	101	J: ± 5%	█							
120	121	K: ± 10%	█							
150	151	M: ± 20%	█							
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		█	█	█					





## Capacitance Range Chart

# CGA5(3216) [EIA CC1206]

### Capacitance Range Chart

Temperature Characteristics: NP0 (0 ± 30ppm/°C), X8R (±15%)

Rated Voltage: 630V(2J), 450V(2W), 250V(2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

Capacitance (pF)	Code	Tolerance	NP0					X8R			
			2J (630V)	2W (450V)	2E (250V)	2A (100V)	1H (50V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)
3,900	392	J : ± 5%	■			■					
4,700	472	K : ± 10%	■			■					
5,600	562	M : ± 20%	■			■					
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

- 0.60 mm
- 0.85 mm
- 1.15 mm
- 1.60 mm



## Capacitance Range Chart

# CGA6(3225) [EIA CC1210]

### Capacitance Range Chart

Temperature Characteristics: NP0 (0 ± 30ppm/°C), X8R (±15%)

Rated Voltage: 630V(2J), 450V(2W), 250V(2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

Capacitance (pF)	Code	Tolerance	NP0					X8R		
			2J (630V)	2W (450V)	2E (250V)	2A (100V)	1H (50V)	2A (100V)	1E (25V)	1C (16V)
8,200	822	J : ± 5%	■							
10,000	103	K : ± 10%	■							
15,000	153	M : ± 20%	■							
22,000	223		■							
33,000	333		■							
47,000	473		■							
68,000	683									
100,000	104									
470,000	474									
680,000	684									
1,500,000	155									
2,200,000	225									
3,300,000	335									
4,700,000	475									
6,800,000	685									
10,000,000	106									

Standard Thickness

- 1.25 mm
- 1.60 mm
- 2.00 mm
- 2.30 mm
- 2.50 mm



## Capacitance Range Chart

# CGA8(4532) [EIA CC1812]

### Capacitance Range Chart

Temperature Characteristics: NPO ( $0 \pm 30\text{ppm}/^\circ\text{C}$ )

Rated Voltage: 630V(2J), 450V(2W), 250V(2E), 100V (2A), 50V (1H)

Capacitance (pF)	Code	Tolerance	NPO					Standard Thickness
			2J (630V)	2W (450V)	2E (250V)	2A (100V)	1H (50V)	
33,000	333	J: $\pm 5\%$						1.60 mm
47,000	473							2.00 mm
68,000	683							2.30 mm
100,000	104							2.50 mm
150,000	154							3.20 mm
220,000	224							3.20 mm



## Capacitance Range Chart

# CGA9(5750) [EIA CC2220]

### Capacitance Range Chart

Temperature Characteristics: NPO ( $0 \pm 30\text{ppm}/^\circ\text{C}$ )

Rated Voltage: 450V(2W), 250V(2E), 100V (2A)

Capacitance (pF)	Code	Tolerance	NPO			Standard Thickness
			2W (450V)	2E (250V)	2A (100V)	
100,000	104	J: $\pm 5\%$				2.30 mm
150,000	154					2.80 mm







## Capacitance Range Table

### Class 1 (Temperature Compensating)

Temperature Characteristics: NP0 (-55 to +150°C, 0±30 ppm/°C)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number				
				Rated Voltage Edc: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V	Rated Voltage Edc: 50V
1 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H010C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A010C080AA	CGA3E2NP01H010C080AA
1.5 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H1R5C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A1R5C080AA	CGA3E2NP01H1R5C080AA
2 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H020C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A020C080AA	CGA3E2NP01H020C080AA
2.2 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H2R2C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A2R2C080AA	CGA3E2NP01H2R2C080AA
3 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H030C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A030C080AA	CGA3E2NP01H030C080AA
3.3 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H3R3C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A3R3C080AA	CGA3E2NP01H3R3C080AA
4 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H040C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A040C080AA	CGA3E2NP01H040C080AA
4.7 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H4R7C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A4R7C080AA	CGA3E2NP01H4R7C080AA
5 pF	1005	0.50 ± 0.05	± 0.25pF					CGA2B2NP01H050C050BA
	1608	0.80 ± 0.10	± 0.25pF				CGA3E2NP02A050C080AA	CGA3E2NP01H050C080AA
6 pF	1005	0.50 ± 0.05	± 0.50pF					CGA2B2NP01H060D050BA
	1608	0.80 ± 0.10	± 0.50pF				CGA3E2NP02A060D080AA	CGA3E2NP01H060D080AA
6.8 pF	1005	0.50 ± 0.05	± 0.50pF					CGA2B2NP01H6R8D050BA
	1608	0.80 ± 0.10	± 0.50pF				CGA3E2NP02A6R8D080AA	CGA3E2NP01H6R8D080AA
7 pF	1005	0.50 ± 0.05	± 0.50pF					CGA2B2NP01H070D050BA
	1608	0.80 ± 0.10	± 0.50pF				CGA3E2NP02A070D080AA	CGA3E2NP01H070D080AA
8 pF	1005	0.50 ± 0.05	± 0.50pF					CGA2B2NP01H080D050BA
	1608	0.80 ± 0.10	± 0.50pF				CGA3E2NP02A080D080AA	CGA3E2NP01H080D080AA
9 pF	1005	0.50 ± 0.05	± 0.50pF					CGA2B2NP01H090D050BA
	1608	0.80 ± 0.10	± 0.50pF				CGA3E2NP02A090D080AA	CGA3E2NP01H090D080AA
10 pF	1005	0.50 ± 0.05	± 0.50pF					CGA2B2NP01H100D050BA
	1608	0.80 ± 0.10	± 0.50pF				CGA3E2NP02A100D080AA	CGA3E2NP01H100D080AA
12 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H120J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A120J080AA	CGA3E2NP01H120J080AA
15 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H150J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A150J080AA	CGA3E2NP01H150J080AA
18 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H180J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A180J080AA	CGA3E2NP01H180J080AA
22 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H220J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A220J080AA	CGA3E2NP01H220J080AA
27 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H270J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A270J080AA	CGA3E2NP01H270J080AA
33 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H330J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A330J080AA	CGA3E2NP01H330J080AA
39 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H390J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A390J080AA	CGA3E2NP01H390J080AA
47 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H470J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A470J080AA	CGA3E2NP01H470J080AA
56 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H560J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A560J080AA	CGA3E2NP01H560J080AA
68 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H680J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A680J080AA	CGA3E2NP01H680J080AA
82 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H820J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A820J080AA	CGA3E2NP01H820J080AA
100 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP02A101J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A101J080AA	CGA3E2NP01H101J050BA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W101J060AA				CGA3E2NP01H101J080AA
120 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP02A121J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A121J080AA	CGA3E2NP01H121J050BA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W121J060AA				CGA3E2NP01H121J080AA
150 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP02A151J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A151J080AA	CGA3E2NP01H151J050BA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W151J060AA				CGA3E2NP01H151J080AA
180 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP02A181J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A181J080AA	CGA3E2NP01H181J050BA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W181J060AA				CGA3E2NP01H181J080AA



## Capacitance Range Table

### Class 1 (Temperature Compensating)

Temperature Characteristics: NP0 (-55 to +150°C, 0±30 ppm/°C)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number				
				Rated Voltage Edc: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V	Rated Voltage Edc: 50V
220 pF	1005	0.50 ± 0.05	± 5%				CGA2B2NP02A221J050BA	CGA2B2NP01H221J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A221J080AA	CGA3E2NP01H221J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W221J060AA				
270 pF	1005	0.50 ± 0.05	± 5%				CGA2B2NP02A271J050BA	CGA2B2NP01H271J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A271J080AA	CGA3E2NP01H271J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W271J060AA				
330 pF	1005	0.50 ± 0.05	± 5%				CGA2B2NP02A331J050BA	CGA2B2NP01H331J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A331J080AA	CGA3E2NP01H331J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W331J060AA				
390 pF	1005	0.50 ± 0.05	± 5%				CGA2B2NP02A391J050BA	CGA2B2NP01H391J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A391J080AA	CGA3E2NP01H391J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W391J060AA				
470 pF	1005	0.50 ± 0.05	± 5%				CGA2B2NP02A471J050BA	CGA2B2NP01H471J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A471J080AA	CGA3E2NP01H471J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W471J060AA				
560 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H561J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A561J080AA	CGA3E2NP01H561J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W561J060AA				
680 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H681J050BA
	1608	0.80 ± 0.10	± 5%				CGA3E2NP02A681J080AA	CGA3E2NP01H681J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W681J060AA				
820 pF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H821J050BA
	1608	0.80 ± 0.10	± 5%			CGA3E3NP02E821J080AA	CGA3E2NP02A821J080AA	CGA3E2NP01H821J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W821J060AA				
1 nF	1005	0.50 ± 0.05	± 5%					CGA2B2NP01H102J050BA
	1608	0.80 ± 0.10	± 5%			CGA3E3NP02E102J080AA	CGA3E2NP02A102J080AA	CGA3E2NP01H102J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W102J060AA				
1.2 nF	1608	0.80 ± 0.10	± 5%			CGA3E3NP02E122J080AA	CGA3E2NP02A122J080AA	CGA3E2NP01H122J080AA
	2012	0.60 ± 0.15	± 5%	CGA4C4NP02W122J060AA				
	1608	0.80 ± 0.10	± 5%			CGA3E3NP02E152J080AA	CGA3E2NP02A152J080AA	CGA3E2NP01H152J080AA
1.5 nF	2012	0.60 ± 0.15	± 5%			CGA3E3NP02E152J080AA	CGA3E2NP02A152J080AA	CGA3E2NP01H152J080AA
		0.85 ± 0.15	± 5%	CGA4F4NP02W152J085AA				
1.8 nF	1608	0.80 ± 0.10	± 5%			CGA3E3NP02E182J080AA	CGA3E2NP02A182J080AA	CGA3E2NP01H182J080AA
	2012	0.85 ± 0.15	± 5%	CGA4F4NP02W182J085AA				
2.2 nF	1608	0.80 ± 0.10	± 5%			CGA3E3NP02E222J080AA	CGA3E2NP02A222J080AA	CGA3E2NP01H222J080AA
	2012	0.85 ± 0.15	± 5%	CGA4F4NP02W222J085AA				
2.7 nF	1608	0.80 ± 0.10	± 5%					CGA3E2NP01H272J080AA
		0.80 + 0.15/-0.1	± 5%				CGA3E2NP02A272J080AA	
	2012	0.60 ± 0.15	± 5%	CGA4J4NP02W272J125AA				
3.3 nF	1608	0.80 ± 0.10	± 5%					CGA3E2NP01H332J080AA
		0.80 + 0.15/-0.1	± 5%				CGA3E2NP02A332J080AA	
	2012	0.60 ± 0.15	± 5%	CGA4J4NP02W332J125AA				
3.9 nF	1608	0.80 ± 0.10	± 5%					CGA3E2NP01H392J080AA
		0.60 ± 0.15	± 5%					CGA4C2NP01H392J060AA
	2012	1.25 ± 0.20	± 5%	CGA4J4NP02W392J125AA				
4.7 nF	1608	0.80 ± 0.10	± 5%					CGA3E2NP01H472J080AA
		0.60 ± 0.15	± 5%					CGA4C2NP01H472J060AA
	2012	1.25 ± 0.20	± 5%	CGA4J4NP02W472J125AA				
5.6 nF	1608	0.80 ± 0.10	± 5%					CGA3E2NP01H562J080AA
		0.60 ± 0.15	± 5%					CGA4C2NP01H562J060AA
	2012	1.25 ± 0.20	± 5%	CGA4J4NP02W562J125AA				
3216	1608	0.80 ± 0.10	± 5%					CGA3E2NP01H562J080AA
		0.60 ± 0.15	± 5%					CGA4C2NP01H562J060AA
	3216	0.85 ± 0.15	± 5%	CGA5F4NP02J562J115AA				
	1.15 ± 0.15	± 5%	CGA5H4NP02J562J115AA					



## Capacitance Range Table

### Class 1 (Temperature Compensating)

Temperature Characteristics: NP0 (-55 to +150°C, 0±30 ppm/°C)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number				
				Rated Voltage Edc: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V	Rated Voltage Edc: 50V
6.8 nF	1608	0.80 ± 0.10	± 5%					CGA3E2NP01H682J080AA
		0.60 ± 0.15	± 5%					CGA4C2NP01H682J060AA
	2012	1.25 ± 0.20	± 5%			CGA4J3NP02E682J125AA	CGA4J2NP02A682J125AA	
		0.60 ± 0.15	± 5%					CGA5C2NP01H682J060AA
3216	1.15 ± 0.15	± 5%	CGA5H4NP02J682J115AA	CGA5H4NP02W682J115AA		CGA5H2NP02A682J115AA		
	1.60 ± 0.10	± 5%						
8.2 nF	1608	0.80 ± 0.10	± 5%					CGA3E2NP01H822J080AA
		0.60 ± 0.15	± 5%					CGA4C2NP01H822J060AA
	2012	1.25 ± 0.20	± 5%			CGA4J3NP02E822J125AA	CGA4J2NP02A822J125AA	
		0.60 ± 0.15	± 5%					CGA5C2NP01H822J060AA
3216	1.15 ± 0.15	± 5%		CGA5H4NP02W822J115AA		CGA5H2NP02A822J115AA		
	1.60 ± 0.20	± 5%	CGA5L4NP02J822J160AA					
3225	1.25 ± 0.20	± 5%	CGA6J4NP02J822J125AA					
	1.60 ± 0.10	± 5%					CGA3E2NP01H103J080AA	
10 nF	2012	0.60 ± 0.15	± 5%					CGA4C2NP01H103J060AA
		0.60 ± 0.15	± 5%			CGA4J3NP02E103J125AA	CGA4J2NP02A103J125AA	
	3216	1.15 ± 0.15	± 5%			CGA5H3NP02E103J115AA	CGA5H2NP02A103J115AA	
		1.60 ± 0.20	± 5%	CGA5L4NP02J103J160AA	CGA5L4NP02W103J160AA			
3225	1.25 ± 0.20	± 5%	CGA6J4NP02J103J125AA					
	0.85 ± 0.15	± 5%					CGA4F2NP01H153J085AA	
15 nF	2012	0.60 ± 0.15	± 5%					CGA5C2NP01H153J060AA
		0.60 ± 0.15	± 5%					
	3216	1.15 ± 0.15	± 5%				CGA5H2NP02A153J115AA	
		1.60 ± 0.20	± 5%		CGA5L4NP02W153J160AA	CGA5L3NP02E153J160AA		
3225	1.25 ± 0.20	± 5%				CGA6J2NP02A153J125AA		
	1.60 ± 0.20	± 5%	CGA6L4NP02J153J160AA					
22 nF	2012	1.25 ± 0.20	± 5%					CGA4J2NP01H223J125AA
		0.60 ± 0.15	± 5%					CGA5C2NP01H223J060AA
	3216	1.60 ± 0.20	± 5%			CGA5L3NP02E223J160AA	CGA5L2NP02A223J160AA	
		1.25 ± 0.20	± 5%					CGA6J2NP01H223J125AA
3225	1.60 ± 0.20	± 5%			CGA6L3NP02E223J160AA	CGA6L2NP02A223J160AA		
	2.30 ± 0.20	± 5%	CGA6N4NP02J223J230AA	CGA6N4NP02W223J230AA				
33 nF	2012	1.25 ± 0.20	± 5%					CGA4J2NP01H333J125AA
		0.85 ± 0.15	± 5%					CGA5F2NP01H333J085AA
	3216	1.60 ± 0.3/-0.1	± 5%				CGA5L2NP02A333J160AA	
		1.60 ± 0.20	± 5%					CGA6L2NP01H333J160AA
3225	2.00 ± 0.20	± 5%				CGA6M2NP02A333J200AA		
	2.30 ± 0.20	± 5%			CGA6N3NP02E333J230AA			
4532	2.50 ± 0.30	± 5%	CGA6P4NP02J333J250AA	CGA6P4NP02W333J250AA				
	2.00 ± 0.20	± 5%	CGA8M4NP02J333J200KA					
47 nF	3216	1.15 ± 0.15	± 5%					CGA5H2NP01H473J115AA
		2.00 ± 0.20	± 5%					CGA6M2NP01H473J200AA
	3225	2.30 ± 0.20	± 5%				CGA6N2NP02A473J230AA	
		2.50 ± 0.30	± 5%			CGA6P3NP02E473J250AA		
4532	1.60 ± 0.20	± 5%					CGA8L2NP01H473J160KA	
	2.00 ± 0.20	± 5%				CGA8M2NP02A473J200KA		
4532	2.30 ± 0.20	± 5%		CGA8N4NP02W473J230KA				
	3.20 ± 0.30	± 5%	CGA8R4NP02J473J320KA					
68 nF	3216	1.60 ± 0.20	± 5%					CGA5L2NP01H683J160AA
		2.00 ± 0.20	± 5%					CGA6M2NP01H683J200AA
	3225	2.30 ± 0.20	± 5%				CGA6N2NP02A683J230AA	
		1.60 ± 0.20	± 5%					CGA8L2NP01H683J160KA
4532	2.30 ± 0.20	± 5%			CGA8N4NP02E683J230KN			
	2.50 ± 0.30	± 5%				CGA8P2NP02A683J250KA		
4532	3.20 ± 0.30	± 5%		CGA8R4NP02W683J320KA				
	1.60 ± 0.20	± 5%					CGA5L2NP01H104J160AA	
100 nF	3225	2.50 ± 0.30	± 5%					CGA6P2NP01H104J250AA
		2.00 ± 0.20	± 5%					CGA8M2NP01H104J200KA
	4532	3.20 ± 0.30	± 5%			CGA8R4NP02E104J320KN	CGA8R2NP02A104J320KA	
		2.80 ± 0.30	± 5%		CGA9Q4NP02W104J280KA			
150 nF	4532	2.50 ± 0.30	± 5%					CGA8P2NP01H154J250KA
	5750	2.30 ± 0.20	± 5%			CGA9N4NP02E154J230KN	CGA9N2NP02A154J230KA	
220 nF	4532	3.20 ± 0.30	± 5%					CGA8R2NP01H224J320KA



## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X8R (-55 to +150°C, ±15%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number			
				Rated Voltage Edc: 100V	Rated Voltage Edc: 50V	Rated Voltage Edc: 25V	Rated Voltage Edc: 16V
150 pF	1005	0.50 ± 0.05	± 10%	CGA2B2X8R2A151K050BA	CGA2B2X8R1H151K050BA		
			± 20%	CGA2B2X8R2A151M050BA	CGA2B2X8R1H151M050BA		
220 pF	1005	0.50 ± 0.05	± 10%	CGA2B2X8R2A221K050BA	CGA2B2X8R1H221K050BA		
			± 20%	CGA2B2X8R2A221M050BA	CGA2B2X8R1H221M050BA		
330 pF	1005	0.50 ± 0.05	± 10%	CGA2B2X8R2A331K050BA	CGA2B2X8R1H331K050BA		
			± 20%	CGA2B2X8R2A331M050BA	CGA2B2X8R1H331M050BA		
470 pF	1005	0.50 ± 0.05	± 10%	CGA2B2X8R2A471K050BA	CGA2B2X8R1H471K050BA		
			± 20%	CGA2B2X8R2A471M050BA	CGA2B2X8R1H471M050BA		
680 pF	1005	0.50 ± 0.05	± 10%	CGA2B2X8R2A681K050BA	CGA2B2X8R1H681K050BA		
			± 20%	CGA2B2X8R2A681M050BA	CGA2B2X8R1H681M050BA		
1 nF	1005	0.50 ± 0.05	± 10%	CGA2B2X8R2A102K050BA	CGA2B2X8R1H102K050BA		
			± 20%	CGA2B2X8R2A102M050BA	CGA2B2X8R1H102M050BA		
	1608	0.80 ± 0.10	± 10%	CGA3E2X8R2A102K080AA	CGA3E2X8R1H102K080AA		
			± 20%	CGA3E2X8R2A102M080AA	CGA3E2X8R1H102M080AA		
1.5 nF	1005	0.50 ± 0.05	± 10%	CGA2B2X8R2A152K050BA	CGA2B2X8R1H152K050BA		
			± 20%	CGA2B2X8R2A152M050BA	CGA2B2X8R1H152M050BA		
	1608	0.80 ± 0.10	± 10%	CGA3E2X8R2A152K080AA	CGA3E2X8R1H152K080AA		
			± 20%	CGA3E2X8R2A152M080AA	CGA3E2X8R1H152M080AA		
2.2 nF	1005	0.50 ± 0.05	± 10%	CGA2B2X8R2A222K050BA	CGA2B2X8R1H222K050BA		
			± 20%	CGA2B2X8R2A222M050BA	CGA2B2X8R1H222M050BA		
	1608	0.80 ± 0.10	± 10%	CGA3E2X8R2A222K080AA	CGA3E2X8R1H222K080AA		
			± 20%	CGA3E2X8R2A222M080AA	CGA3E2X8R1H222M080AA		
3.3 nF	1005	0.50 ± 0.05	± 10%	CGA2B3X8R2A332K050BB	CGA2B2X8R1H332K050BA		
			± 20%	CGA2B3X8R2A332M050BB	CGA2B2X8R1H332M050BA		
	1608	0.80 ± 0.10	± 10%	CGA3E2X8R2A332K080AA	CGA3E2X8R1H332K080AA		
			± 20%	CGA3E2X8R2A332M080AA	CGA3E2X8R1H332M080AA		
4.7 nF	1005	0.50 ± 0.05	± 10%		CGA2B2X8R1H472K050BA		
			± 20%		CGA2B2X8R1H472M050BA		
	1608	0.80 ± 0.10	± 10%	CGA3E2X8R2A472K080AA	CGA3E2X8R1H472K080AA		
			± 20%	CGA3E2X8R2A472M080AA	CGA3E2X8R1H472M080AA		
6.8 nF	1005	0.50 ± 0.05	± 10%		CGA2B3X8R1H682K050BB	CGA2B2X8R1E682K050BA	
			± 20%		CGA2B3X8R1H682M050BB	CGA2B2X8R1E682M050BA	
	1608	0.80 ± 0.10	± 10%	CGA3E2X8R2A682K080AA	CGA3E2X8R1H682K080AA		
			± 20%	CGA3E2X8R2A682M080AA	CGA3E2X8R1H682M080AA		
10 nF	1005	0.50 ± 0.05	± 10%		CGA2B3X8R1H103K050BB	CGA2B2X8R1E103K050BA	
			± 20%		CGA2B3X8R1H103M050BB	CGA2B2X8R1E103M050BA	
	1608	0.80 ± 0.10	± 10%	CGA3E2X8R2A103K080AA	CGA3E2X8R1H103K080AA		
			± 20%	CGA3E2X8R2A103M080AA	CGA3E2X8R1H103M080AA		
15 nF	1005	0.50 ± 0.05	± 10%			CGA2B3X8R1E153K050BB	
			± 20%			CGA2B3X8R1E153M050BB	
	1608	0.80 ± 0.10	± 10%	CGA3E2X8R2A153K080AA	CGA3E2X8R1H153K080AA		
			± 20%	CGA3E2X8R2A153M080AA	CGA3E2X8R1H153M080AA		
22 nF	1005	0.50 ± 0.05	± 10%			CGA2B3X8R1E223K050BB	
			± 20%			CGA2B3X8R1E223M050BB	
	1608	0.80 ± 0.10	± 10%	CGA3E3X8R2A223K080AB	CGA3E2X8R1H223K080AA		
			± 20%	CGA3E3X8R2A223M080AB	CGA3E2X8R1H223M080AA		
2012	1.25 ± 0.20	± 10%	CGA4J2X8R2A223K125AA				
		± 20%	CGA4J2X8R2A223M125AA				
33 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X8R1C333K050BB
			± 20%				CGA2B3X8R1C333M050BB
	1608	0.80 ± 0.10	± 10%	CGA3E3X8R2A333K080AB	CGA3E2X8R1H333K080AA		
			± 20%	CGA3E3X8R2A333M080AB	CGA3E2X8R1H333M080AA		
2012	1.25 ± 0.20	± 10%	CGA4J3X8R2A333K125AB				
		± 20%	CGA4J3X8R2A333M125AB				
47 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X8R1C473K050BB
			± 20%				CGA2B3X8R1C473M050BB
	1608	0.80 ± 0.10	± 10%		CGA3E2X8R1H473K080AA		
			± 20%		CGA3E2X8R1H473M080AA		
2012	1.25 ± 0.20	± 10%	CGA4J3X8R2A473K125AB				
		± 20%	CGA4J3X8R2A473M125AB				



## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X8R (-55 to +150°C, ±15%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number		
				Rated Voltage Edc: 100V	Rated Voltage Edc: 50V	Rated Voltage Edc: 25V
68 nF	1608	0.80 ± 0.10	± 10%	CGA3E3X8R1H683K080AB	CGA3E2X8R1E683K080AA	
			± 20%	CGA3E3X8R1H683M080AB	CGA3E2X8R1E683M080AA	
	2012	1.25 ± 0.20	± 10%	CGA4J3X8R2A683K125AB	CGA4J2X8R1H683K125AA	
			± 20%	CGA4J3X8R2A683M125AB	CGA4J2X8R1H683M125AA	
	3216	1.15 ± 0.15	± 10%	CGA5H2X8R2A683K115AA		
			± 20%	CGA5H2X8R2A683M115AA		
100 nF	1608	0.80 ± 0.10	± 10%	CGA3E3X8R1H104K080AB	CGA3E2X8R1E104K080AA	
			± 20%	CGA3E3X8R1H104M080AB	CGA3E2X8R1E104M080AA	
	2012	1.25 ± 0.20	± 10%	CGA4J2X8R1H104K125AA		
			± 20%	CGA4J2X8R1H104M125AA		
	3216	1.15 ± 0.15	± 10%	CGA5H2X8R2A104K115AA		
			± 20%	CGA5H2X8R2A104M115AA		
150 nF	1608	0.80 ± 0.10	± 10%		CGA3E3X8R1E154K080AB	
			± 20%		CGA3E3X8R1E154M080AB	
	2012	1.25 ± 0.20	± 10%	CGA4J3X8R1H154K125AB		
			± 20%	CGA4J3X8R1H154M125AB		
	3216	1.60 ± 0.20	± 10%	CGA5L2X8R2A154K160AA		
			± 20%	CGA5L2X8R2A154M160AA		
220 nF	1608	0.80 ± 0.10	± 10%		CGA3E3X8R1E224K080AB	
			± 20%		CGA3E3X8R1E224M080AB	
	2012	1.25 ± 0.20	± 10%	CGA4J3X8R1H224K125AB	CGA4J2X8R1E224K125AA	
			± 20%	CGA4J3X8R1H224M125AB	CGA4J2X8R1E224M125AA	
	3216	1.15 ± 0.15	± 10%	CGA5H2X8R1H224K115AA		
			± 20%	CGA5H2X8R1H224M115AA		
330 nF	1608	0.80 ± 0.10	± 10%			CGA3E3X8R1C334K080AB
			± 20%			CGA3E3X8R1C334M080AB
	2012	1.25 ± 0.20	± 10%		CGA4J2X8R1E334K125AA	
			± 20%		CGA4J2X8R1E334M125AA	
	3216	1.60 ± 0.20	± 10%	CGA5L3X8R2A334K160AB	CGA5L2X8R1H334K160AA	
			± 20%	CGA5L3X8R2A334M160AB	CGA5L2X8R1H334M160AA	
470 nF	1608	0.80 + 0.15/-0.10	± 10%			CGA3E3X8R1C474K080AB
			± 20%			CGA3E3X8R1C474M080AB
	2012	1.25 ± 0.20	± 10%		CGA4J3X8R1E474K125AB	
			± 20%		CGA4J3X8R1E474M125AB	
	3216	1.60 ± 0.20	± 10%	CGA5L2X8R1H474K160AA		
			± 20%	CGA5L2X8R1H474M160AA		
3225	2.00 ± 0.20	± 10%	CGA6M3X8R2A474K200AB			
		± 20%	CGA6M3X8R2A474M200AB			
680 nF	2012	1.25 ± 0.20	± 10%			CGA4J3X8R1C684K125AB
			± 20%			CGA4J3X8R1C684M125AB
	3216	1.15 ± 0.15	± 10%		CGA5H2X8R1E684K115AA	
			± 20%		CGA5H2X8R1E684M115AA	
	3216	1.60 ± 0.20	± 10%	CGA5L3X8R1H684K160AB		
			± 20%	CGA5L3X8R1H684M160AB		
3225	2.50 ± 0.30	± 10%	CGA6P3X8R2A684K250AB			
		± 20%	CGA6P3X8R2A684M250AB			
1 µF	2012	1.25 ± 0.20	± 10%			CGA4J3X8R1C105K125AB
			± 20%			CGA4J3X8R1C105M125AB
	3216	1.60 ± 0.20	± 10%	CGA5L3X8R1H105K160AB	CGA5L2X8R1E105K160AA	
			± 20%	CGA5L3X8R1H105M160AB	CGA5L2X8R1E105M160AA	
3216	1.60 ± 0.20	± 10%		CGA5L3X8R1E155K160AB		
		± 20%		CGA5L3X8R1E155M160AB		
1.5 µF	3225	1.60 ± 0.20	± 10%		CGA6L2X8R1E155K160AA	
			± 20%		CGA6L2X8R1E155M160AA	
	3216	1.60 ± 0.20	± 10%		CGA5L3X8R1E225K160AB	
			± 20%		CGA5L3X8R1E225M160AB	
3225	2.00 ± 0.20	± 10%		CGA6M2X8R1E225K200AA		
		± 20%		CGA6M2X8R1E225M200AA		



## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X8R (-55 to +150°C, ±15%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number			
				Rated Voltage Edc: 100V	Rated Voltage Edc: 50V	Rated Voltage Edc: 25V	Rated Voltage Edc: 16V
3.3 $\mu$ F	3216	1.60 $\pm$ 0.20	$\pm$ 10%				CGA5L3X8R1C335K160AB
			$\pm$ 20%				CGA5L3X8R1C335M160AB
	3225	2.50 $\pm$ 0.30	$\pm$ 10%			CGA6P2X8R1E335K250AA	
			$\pm$ 20%			CGA6P2X8R1E335M250AA	
4.7 $\mu$ F	3216	1.60 $\pm$ 0.20	$\pm$ 10%				CGA5L3X8R1C475K160AB
			$\pm$ 20%				CGA5L3X8R1C475M160AB
	3225	2.50 $\pm$ 0.30	$\pm$ 10%			CGA6P3X8R1E475K250AB	
			$\pm$ 20%			CGA6P3X8R1E475M250AB	
6.8 $\mu$ F	3225	2.00 $\pm$ 0.20	$\pm$ 10%				CGA6M3X8R1C685K200AB
			$\pm$ 20%				CGA6M3X8R1C685M200AB
10 $\mu$ F	3225	2.50 $\pm$ 0.30	$\pm$ 10%				CGA6P3X8R1C106K250AB
			$\pm$ 20%				CGA6P3X8R1C106M250AB