



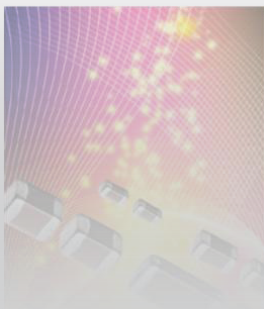
## MULTILAYER CERAMIC CHIP CAPACITORS



### **CGA Series Automotive Grade Mid Voltage (100 to 630V)**

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

**Issue date:  
Jan 2014**



## REMINDERS

Please read before using this product

### SAFETY REMINDERS



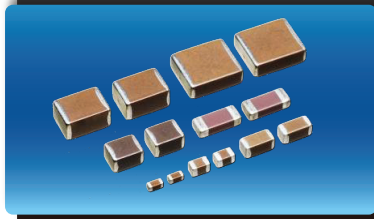
## REMINDERS

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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 Mid Voltage (100 to 630V)

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

### Features



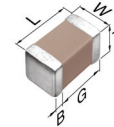
- Voltage rating of 100V to 630V with capacitance range up to 15 $\mu$ F.
- High capacitance has been achieved through precision technologies that enable the use of multiple thinner ceramic dielectric layers.
- Low residual inductance assures superior frequency characteristics.
- Excellent DC Bias properties.
- A lineup with wide-ranging rated voltages that enables selections that are suitable for needs.
- AEC-Q200 compliant.

### Applications



- Application in decoupling, smoothing, and snubber circuits of inverters or DC-DC converters of HEVs or EVs
- Countermeasure against voltage surge and noise in connectors

### Shape & Dimensions



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



### Catalog Number Construction

**CGA • 9 • P • 3 • X7S • 2A • 156 • M • 250 • K • 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
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

#### Voltage Condition for Life Test

Symbol	Condition	Symbol	Condition
1	1 × R.V.	3	1.5 × R.V.
2	2 × R.V.	4	1.2 × R.V.

#### 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

#### Rated Voltage (DC)

Code	Voltage (DC)
2A	100V
2E	250V
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 = 1,000nF = 1 $\mu$ F

#### Capacitance Tolerance

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

#### Nominal Thickness

Code	Thickness
050	0.50 mm
060	0.60 mm
125	1.25 mm
230	2.30 mm
280	2.80 mm
320	3.20 mm

\*See Thickness T Code for complete list

#### Packaging Style

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

#### Special Reserved Code

Code	Description
A, B, C	TDK Internal Code



## Capacitance Range Chart

## CGA2(1005) [EIA CC0402]

### Capacitance Range Chart

Temperature Characteristics: C0G ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X7S ( $\pm 22\%$ )

Rated Voltage: 100V (2A)

Capacitance (pF)	Code	Tolerance	C0G	X7S
			2A (100V)	2A (100V)
100	101	J: $\pm 5\%$ K: $\pm 10\%$ M: $\pm 20\%$	█	
120	121			
150	151			
180	181			
220	221			
270	271			
330	331			
390	391			
470	471			
1,000	102		█	
1,500	152			
2,200	222			
3,300	332			
4,700	472			
6,800	682			
10,000	103			

Standard Thickness

█ 0.50 mm



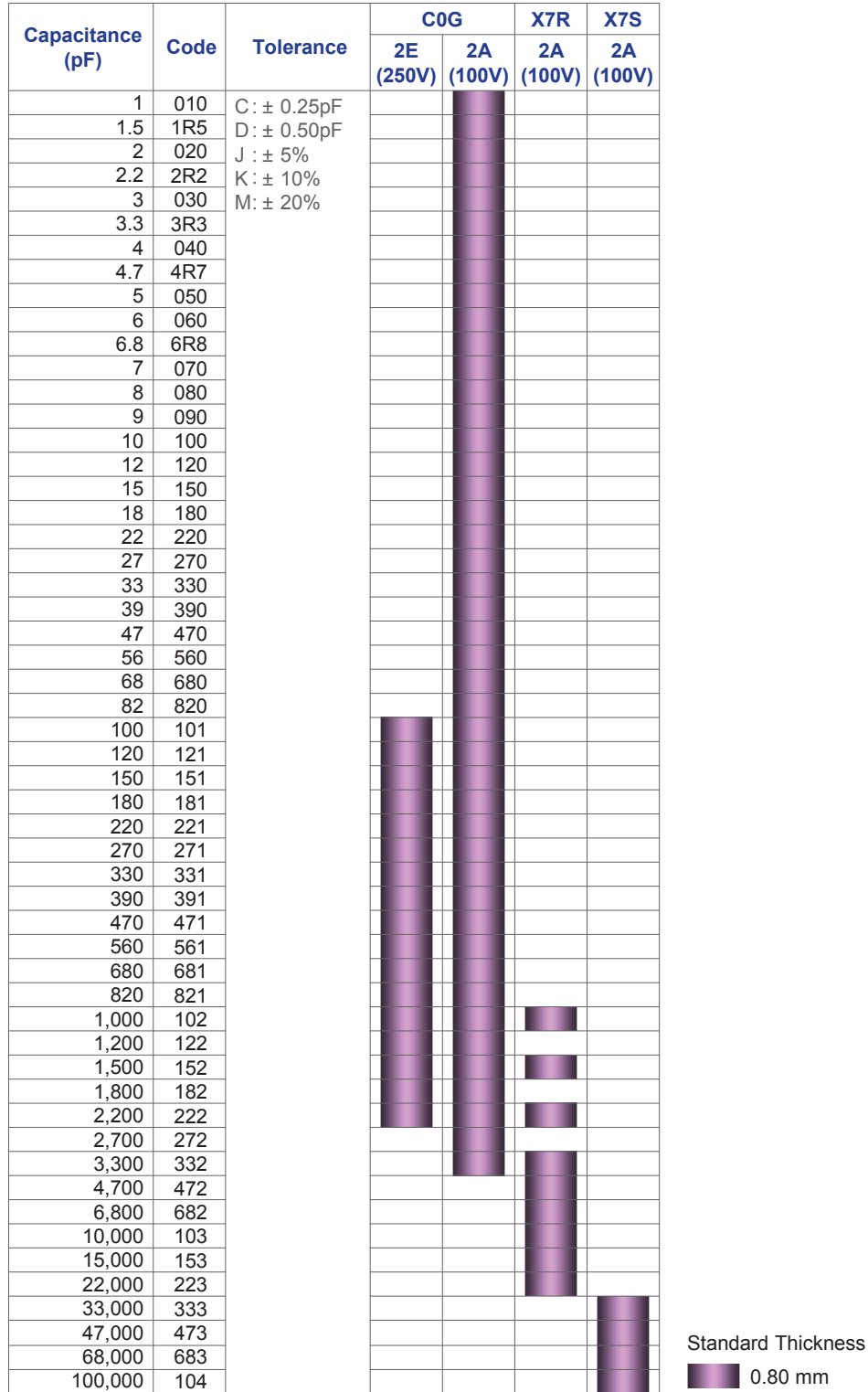
## Capacitance Range Chart

## CGA3(1608) [EIA CC0603]

### Capacitance Range Chart

Temperature Characteristics: C0G ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X7R ( $\pm 15\%$ ), X7S ( $\pm 22\%$ )

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





## Capacitance Range Chart

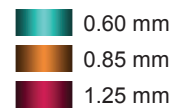
## CGA4(2012) [EIA CC0805]

### Capacitance Range Chart

Temperature Characteristics: C0G (0 ± 30ppm/°C), X7R (±15%), X7S (±22%), X7T (+22/-33%)  
 Rated Voltage: 450V (2W), 250V (2E), 100V (2A)

Capacitance (pF)	Code	Tolerance	C0G			X7R		X7S	X7T	
			2W (450V)	2E (250V)	2A (100V)	2E (250V)	2A (100V)	2A (100V)	2W (450V)	2E (250V)
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									
330,000	334									
470,000	474									
680,000	684									
1,000,000	105									

Standard Thickness





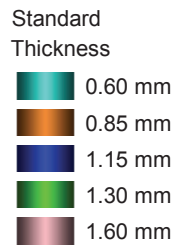
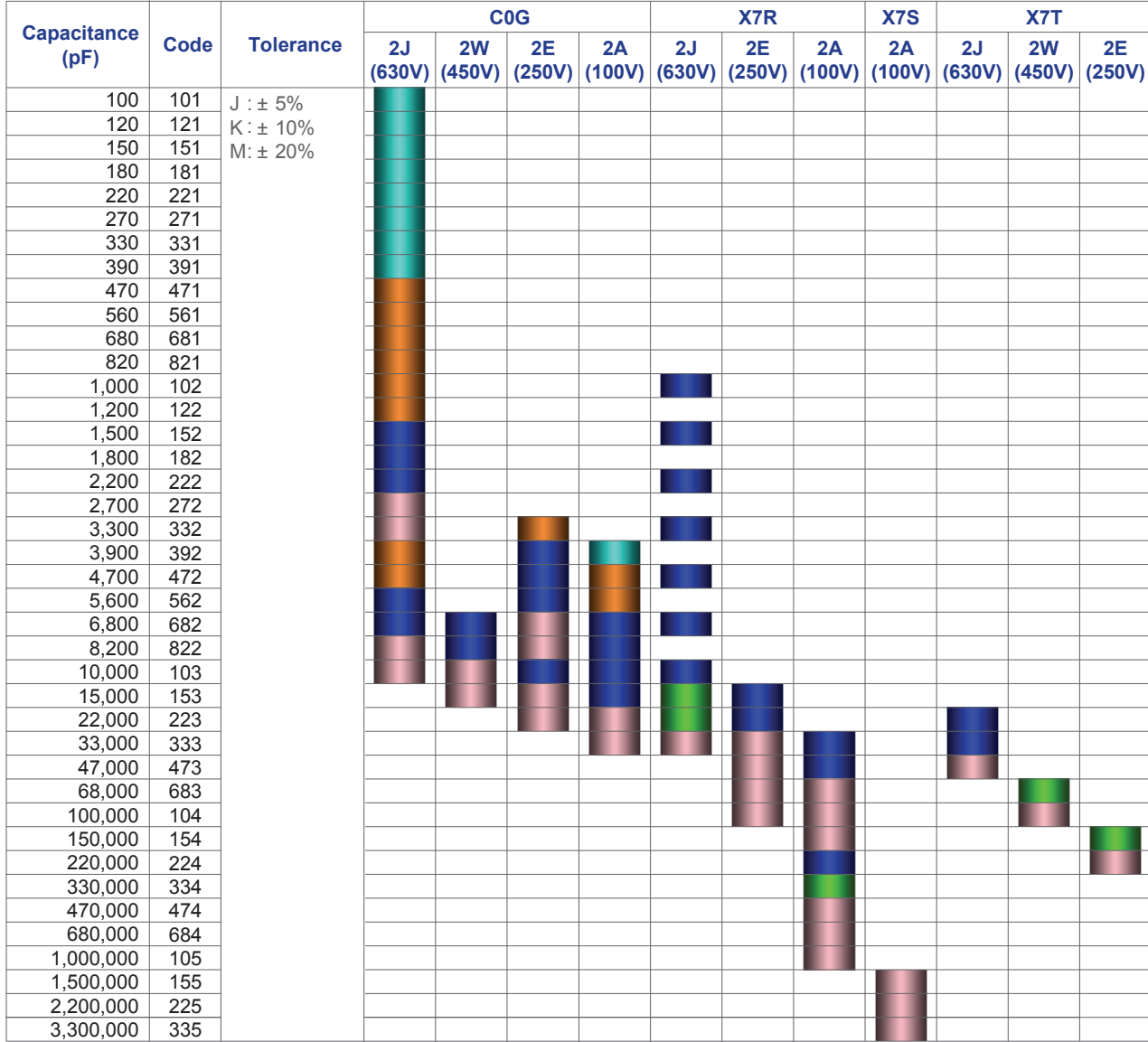
## Capacitance Range Chart

# CGA5(3216) [EIA CC1206]

### Capacitance Range Chart

Temperature Characteristics: C0G ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X7R ( $\pm 15\%$ ), X7S ( $\pm 22\%$ ), X7T ( $+22/-33\%$ )

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





## Capacitance Range Chart

# CGA6(3225) [EIA CC1210]

### Capacitance Range Chart

Temperature Characteristics: C0G (0 ± 30ppm/°C), X7R (±15%), X7S (±22%), X7T (+22/-33%)  
 Rated Voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A)

Capacitance (pF)	Code	Tolerance	C0G				X7R			X7S	X7T		
			2J (630V)	2W (450V)	2E (250V)	2A (100V)	2J (630V)	2E (250V)	2A (100V)	2A (100V)	2J (630V)	2W (450V)	2E (250V)
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												





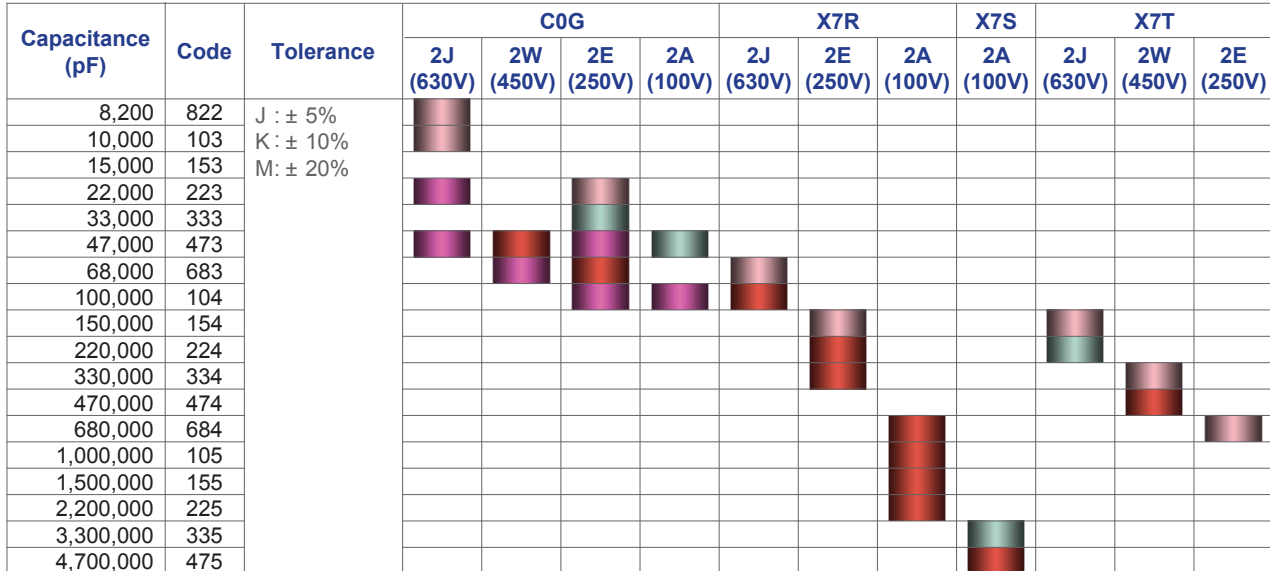


## Capacitance Range Chart

## CGA8(4532) [EIA CC1812]

### Capacitance Range Chart

Temperature Characteristics: C0G (0 ± 30ppm/°C), X7R (±15%), X7S (±22%), X7T (+22/-33%)  
 Rated Voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A)

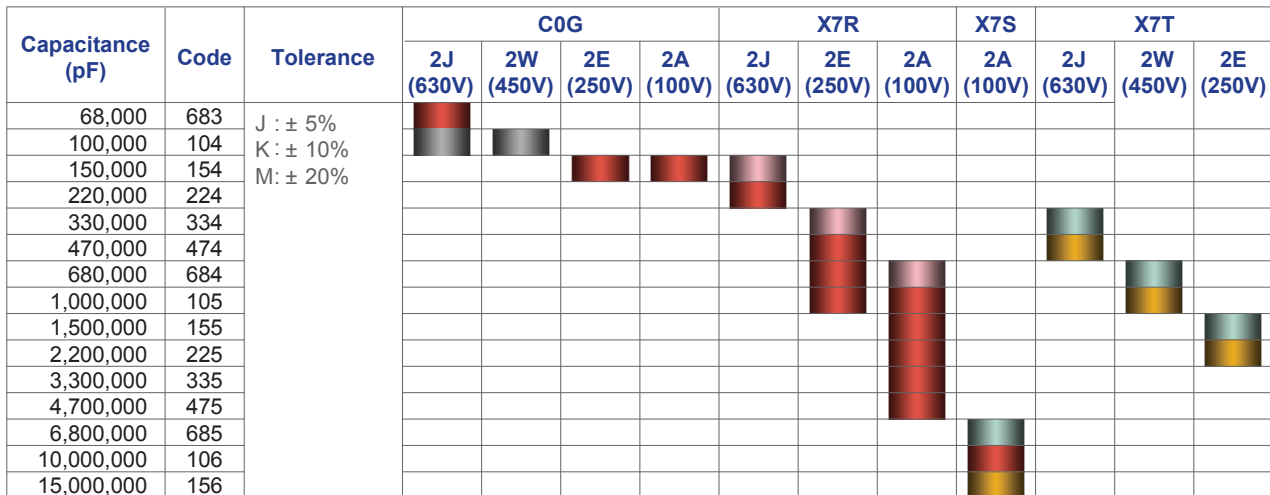


## Capacitance Range Chart

## CGA9(5750) [EIA CC2220]

### Capacitance Range Chart

Temperature Characteristics: C0G (0 ± 30ppm/°C), X7R (±15%), X7S (±22%), X7T (+22/-33%)  
 Rated Voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A)





## 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: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V
1 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A010C080AA
1.5 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A1R5C080AA
2 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A020C080AA
2.2 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A2R2C080AA
3 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A030C080AA
3.3 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A3R3C080AA
4 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A040C080AA
4.7 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A4R7C080AA
5 pF	1608	0.80 ± 0.10	± 0.25pF				CGA3E2C0G2A050C080AA
6 pF	1608	0.80 ± 0.10	± 0.50pF				CGA3E2C0G2A060D080AA
6.8 pF	1608	0.80 ± 0.10	± 0.50pF				CGA3E2C0G2A6R8D080AA
7 pF	1608	0.80 ± 0.10	± 0.50pF				CGA3E2C0G2A070D080AA
8 pF	1608	0.80 ± 0.10	± 0.50pF				CGA3E2C0G2A080D080AA
9 pF	1608	0.80 ± 0.10	± 0.50pF				CGA3E2C0G2A090D080AA
10 pF	1608	0.80 ± 0.10	± 0.50pF				CGA3E2C0G2A100D080AA
12 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A120J080AA
15 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A150J080AA
18 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A180J080AA
22 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A220J080AA
27 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A270J080AA
33 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A330J080AA
39 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A390J080AA
47 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A470J080AA
56 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A560J080AA
68 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A680J080AA
82 pF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A820J080AA
100 pF	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			
120 pF	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			
150 pF	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			
180 pF	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			
220 pF	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			
270 pF	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			
330 pF	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			
390 pF	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			
470 pF	1005	0.50 ± 0.05	± 5%				CGA2B2C0G2A471J050BA
	1608	0.80 ± 0.10	± 5%			CGA3E3C0G2E471J080AA	CGA3E2C0G2A471J080AA



## 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: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V
470 pF	2012	0.60 ± 0.15	± 5%		CGA4C4C0G2W471J060AA		CGA4C2C0G2A471J060AA
	3216	0.85 ± 0.15	± 5%	CGA5F4C0G2J471J085AA			
560 pF	1608	0.80 ± 0.10	± 5%			CGA3E3C0G2E561J080AA	CGA3E2C0G2A561J080AA
	2012	0.60 ± 0.15	± 5%		CGA4C4C0G2W561J060AA		
	3216	0.85 ± 0.15	± 5%	CGA5F4C0G2J561J085AA			
680 pF	1608	0.80 ± 0.10	± 5%			CGA3E3C0G2E681J080AA	CGA3E2C0G2A681J080AA
	2012	0.60 ± 0.15	± 5%		CGA4C4C0G2W681J060AA		
	3216	0.85 ± 0.15	± 5%	CGA5F4C0G2J681J085AA			
820 pF	1608	0.80 ± 0.10	± 5%			CGA3E3C0G2E821J080AA	CGA3E2C0G2A821J080AA
	2012	0.60 ± 0.15	± 5%		CGA4C4C0G2W821J060AA	CGA4C3C0G2E821J060AA	
	3216	0.85 ± 0.15	± 5%	CGA5F4C0G2J821J085AA			
1 nF	1608	0.80 ± 0.10	± 5%			CGA3E3C0G2E102J080AA	CGA3E2C0G2A102J080AA
	2012	0.60 ± 0.15	± 5%		CGA4C4C0G2W102J060AA		CGA4C2C0G2A102J060AA
		0.85 ± 0.15	± 5%			CGA4F3C0G2E102J085AA	
	3216	0.85 ± 0.15	± 5%	CGA5F4C0G2J102J085AA			
1.2 nF	1608	0.80 ± 0.10	± 5%			CGA3E3C0G2E122J080AA	CGA3E2C0G2A122J080AA
	2012	0.60 ± 0.15	± 5%		CGA4C4C0G2W122J060AA		CGA4C2C0G2A122J060AA
		0.85 ± 0.15	± 5%			CGA4F3C0G2E122J085AA	
	3216	0.85 ± 0.15	± 5%	CGA5F4C0G2J122J085AA			
1.5 nF	1608	0.80 ± 0.10	± 5%			CGA3E3C0G2E152J080AA	CGA3E2C0G2A152J080AA
	2012	0.60 ± 0.15	± 5%				CGA4C2C0G2A152J060AA
		0.85 ± 0.15	± 5%		CGA4F4C0G2W152J085AA	CGA4F3C0G2E152J085AA	
	3216	1.15 ± 0.15	± 5%	CGA5H4C0G2J152J115AA			
1.8 nF	1608	0.80 ± 0.10	± 5%			CGA3E3C0G2E182J080AA	CGA3E2C0G2A182J080AA
	2012	0.85 ± 0.15	± 5%		CGA4F4C0G2W182J085AA		CGA4F2C0G2A182J085AA
		1.25 ± 0.20	± 5%			CGA4J3C0G2E182J125AA	
	3216	1.15 ± 0.15	± 5%	CGA5H4C0G2J182J115AA			
2.2 nF	1608	0.80 ± 0.10	± 5%				CGA3E2C0G2A222J080AA
		0.80 +0.15/-0.1	± 5%			CGA3E3C0G2E222J080AA	
	2012	0.85 ± 0.15	± 5%		CGA4F4C0G2W222J085AA		CGA4F2C0G2A222J085AA
		1.25 ± 0.20	± 5%			CGA4J3C0G2E222J125AA	
2.7 nF	3216	1.15 ± 0.15	± 5%	CGA5H4C0G2J222J115AA			
	1608	0.80 +0.15/-0.1	± 5%				CGA3E2C0G2A272J080AA
	2012	1.25 ± 0.20	± 5%		CGA4J4C0G2W272J125AA	CGA4J3C0G2E272J125AA	CGA4J2C0G2A272J125AA
	3216	1.60 ± 0.20	± 5%	CGA5L4C0G2J272J160AA			
3.3 nF	1608	0.80 +0.15/-0.1	± 5%				CGA3E2C0G2A332J080AA
	2012	0.85 ± 0.15	± 5%			CGA4F3C0G2E332J085AA	
		1.25 ± 0.20	± 5%		CGA4J4C0G2W332J125AA		CGA4J2C0G2A332J125AA
	3216	0.85 ± 0.15	± 5%			CGA5F3C0G2E332J085AA	
3.9 nF	2012	1.60 ± 0.20	± 5%	CGA5L4C0G2J332J160AA			
	2012	1.25 ± 0.20	± 5%		CGA4J4C0G2W392J125AA	CGA4J3C0G2E392J125AA	CGA4J2C0G2A392J125AA
		0.60 ± 0.15	± 5%				CGA5C2C0G2A392J060AA
	3216	0.85 ± 0.15	± 5%	CGA5F4C0G2J392J085AA			
4.7 nF	3216	1.15 ± 0.15	± 5%			CGA5H3C0G2E392J115AA	
	3225	1.25 ± 0.20	± 5%	CGA6J4C0G2J392J125AA			
	2012	1.25 ± 0.20	± 5%		CGA4J4C0G2W472J125AA	CGA4J3C0G2E472J125AA	CGA4J2C0G2A472J125AA
	3216	0.85 ± 0.15	± 5%	CGA5F4C0G2J472J085AA			CGA5F2C0G2A472J085AA
5.6 nF	3216	1.15 ± 0.15	± 5%			CGA5H3C0G2E472J115AA	
	3225	1.60 ± 0.20	± 5%	CGA6L4C0G2J472J160AA			
	2012	1.25 ± 0.20	± 5%		CGA4J4C0G2W562J125AA	CGA4J3C0G2E562J125AA	CGA4J2C0G2A562J125AA
	3216	0.85 ± 0.15	± 5%	CGA5H4C0G2J562J115AA		CGA5H3C0G2E562J115AA	CGA5F2C0G2A562J085AA
6.8 nF	3216	1.15 ± 0.15	± 5%	CGA5H4C0G2J562J115AA	CGA5H4C0G2W682J115AA		CGA5H2C0G2A682J115AA
		1.60 ± 0.20	± 5%			CGA5L3C0G2E682J160AA	
	3225	2.00 ± 0.20	± 5%	CGA6M4C0G2J682J200AA			
	2012	1.25 ± 0.20	± 5%		CGA4J4C0G2W822J125AA	CGA4J3C0G2E822J125AA	CGA4J2C0G2A822J125AA
8.2 nF	3216	1.15 ± 0.15	± 5%		CGA5H4C0G2W822J115AA		CGA5H2C0G2A822J115AA
		1.60 ± 0.20	± 5%	CGA5L4C0G2J822J160AA		CGA5L3C0G2E822J160AA	



## 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: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V
8.2 nF	3225	1.25 ± 0.20	± 5%	CGA6J4C0G2J822J125AA			
	4532	1.60 ± 0.20	± 5%	CGA8L4C0G2J822J160KA			
10 nF	2012	1.25 ± 0.20	± 5%			CGA4J3C0G2E103J125AA	CGA4J2C0G2A103J125AA
		1.15 ± 0.15	± 5%			CGA5H3C0G2E103J115AA	CGA5H2C0G2A103J115AA
	3216	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			
15 nF	3216	1.15 ± 0.15	± 5%				CGA5H2C0G2A153J115AA
		1.60 ± 0.20	± 5%			CGA5L3C0G2E153J160AA	
	1.60 +0.3/-0.1	± 5%		CGA5L4C0G2W153J160AA			
	3225	1.25 ± 0.20	± 5%				CGA6J2C0G2A153J125AA
		1.60 ± 0.20	± 5%	CGA6L4C0G2J153J160AA			
	4532	2.00 ± 0.20	± 5%			CGA6M3C0G2E153J200AA	
22 nF	3216	1.60 ± 0.20	± 5%				CGA5L2C0G2A223J160AA
		1.60 +0.3/-0.1	± 5%			CGA5L3C0G2E223J160AA	
	3225	1.60 ± 0.20	± 5%			CGA6L3C0G2E223J160AA	CGA6L2C0G2A223J160AA
		2.30 ± 0.20	± 5%	CGA6N4C0G2J223J230AA	CGA6N4C0G2W223J230AA		
0453	1.60 ± 0.20	± 5%			CGA8L3C0G2E223J160KA		
	3.20 ± 0.30	± 5%	CGA8R4C0G2J223J320KA				
33 nF	3216	1.60 +0.3/-0.1	± 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%			CGA8M3C0G2E333J200KA		
	2.30 ± 0.20	± 5%				CGA6N2C0G2A473J230AA	
47 nF	3225	2.50 ± 0.30	± 5%			CGA6P3C0G2E473J250AA	
		2.00 ± 0.20	± 5%				CGA8M2C0G2A473J200KA
	4532	2.30 ± 0.20	± 5%		CGA8N4C0G2W473J230KA		
		3.20 ± 0.30	± 5%	CGA8R4C0G2J473J320KA	CGA8R3C0G2E473J320KA		
68 nF	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				
100 nF	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



## Capacitance Range Table

### Class 2 (Temperature Stable)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number			
				Rated Voltage Edc: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V
1 nF	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A102K080AA
			± 20%				CGA3E2X7R2A102M080AA
	3216	1.15 ± 0.15	± 10%	CGA5H4X7R2J102K115AA			
			± 20%	CGA5H4X7R2J102M115AA			
1.5 nF	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A152K080AA
			± 20%				CGA3E2X7R2A152M080AA
	3216	1.15 ± 0.15	± 10%	CGA5H4X7R2J152K115AA			
			± 20%	CGA5H4X7R2J152M115AA			
2.2 nF	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A222K080AA
			± 20%				CGA3E2X7R2A222M080AA
	3216	1.15 ± 0.15	± 10%	CGA5H4X7R2J222K115AA			
			± 20%	CGA5H4X7R2J222M115AA			
3.3 nF	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A332K080AA
			± 20%				CGA3E2X7R2A332M080AA
	3216	1.15 ± 0.15	± 10%	CGA5H4X7R2J332K115AA			
			± 20%	CGA5H4X7R2J332M115AA			
4.7 nF	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A472K080AA
			± 20%				CGA3E2X7R2A472M080AA
	3216	1.15 ± 0.15	± 10%	CGA5H4X7R2J472K115AA			
			± 20%	CGA5H4X7R2J472M115AA			
6.8 nF	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A682K080AA
			± 20%				CGA3E2X7R2A682M080AA
	2012	1.25 ± 0.20	± 10%		CGA4J3X7R2E682K125AA		
			± 20%		CGA4J3X7R2E682M125AA		
10 nF	3216	1.15 ± 0.15	± 10%	CGA5H4X7R2J682K115AA			
			± 20%	CGA5H4X7R2J682M115AA			
	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A103K080AA
			± 20%				CGA3E2X7R2A103M080AA
15 nF	2012	1.25 ± 0.20	± 10%		CGA4J3X7R2E103K125AA		
			± 20%		CGA4J3X7R2E103M125AA		
	3216	1.15 ± 0.15	± 10%	CGA5H4X7R2J103K115AA			
			± 20%	CGA5H4X7R2J103M115AA			
22 nF	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A153K080AA
			± 20%				CGA3E2X7R2A153M080AA
	2012	1.25 ± 0.20	± 10%		CGA4J3X7R2E153K125AA	CGA4J2X7R2A153K125AA	
			± 20%		CGA4J3X7R2E153M125AA	CGA4J2X7R2A153M125AA	
3216	1.15 ± 0.15	± 10%		CGA5H3X7R2E153K115AA			
		± 20%		CGA5H3X7R2E153M115AA			
33 nF	3216	1.30 ± 0.20	± 10%	CGA5K4X7R2J153K130AA			
			± 20%	CGA5K4X7R2J153M130AA			
	1608	0.80 ± 0.10	± 10%				CGA3E2X7R2A223K080AA
			± 20%				CGA3E2X7R2A223M080AA
33 nF	2012	1.25 ± 0.20	± 10%		CGA4J3X7R2E223K125AA	CGA4J2X7R2A223K125AA	
			± 20%		CGA4J3X7R2E223M125AA	CGA4J2X7R2A223M125AA	
	3216	1.15 ± 0.15	± 10%		CGA5H3X7R2E223K115AA		
			± 20%		CGA5H3X7R2E223M115AA		
33 nF	3216	1.15 ± 0.15	± 10%	CGA5K4X7R2J223K130AA			
			± 20%	CGA5K4X7R2J223M130AA			
	2012	1.25 ± 0.20	± 10%				CGA4J2X7R2A333K125AA
			± 20%				CGA4J2X7R2A333M125AA
3216	1.60 ± 0.20	± 10%	CGA5L4X7R2J333K160AA		CGA5L3X7R2E333K160AA		
		± 20%	CGA5L4X7R2J333M160AA		CGA5L3X7R2E333M160AA		



## Capacitance Range Table

### Class 2 (Temperature Stable)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number			
				Rated Voltage Edc: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V
47 nF	2012	1.25 ± 0.20	± 10%				CGA4J2X7R2A473K125AA
			± 20%				CGA4J2X7R2A473M125AA
	3216	1.15 ± 0.15	± 10%				CGA5H2X7R2A473K115AA
			± 20%				CGA5H2X7R2A473M115AA
		1.60 ± 0.20	± 10%			CGA5L3X7R2E473K160AA	
			± 20%			CGA5L3X7R2E473M160AA	
3225	2.00 ± 0.20	± 10%	CGA6M4X7R2J473K200AA				
		± 20%	CGA6M4X7R2J473M200AA				
68 nF	3216	1.60 ± 0.20	± 10%			CGA5L3X7R2E683K160AA	CGA5L2X7R2A683K160AA
			± 20%			CGA5L3X7R2E683M160AA	CGA5L2X7R2A683M160AA
	3225	2.00 ± 0.20	± 10%	CGA6M4X7R2J683K200AA			
			± 20%	CGA6M4X7R2J683M200AA			
4532	1.60 ± 0.20	± 10%	CGA8L4X7R2J683K160KA				
		± 20%	CGA8L4X7R2J683M160KA				
100 nF	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	
			± 20%			CGA6M3X7R2E104M200AA	
4532	2.30 ± 0.20	± 10%	CGA8N4X7R2J104K230KA				
		± 20%	CGA8N4X7R2J104M230KA				
150 nF	3216	1.60 ± 0.20	± 10%				CGA5L2X7R2A154K160AA
			± 20%				CGA5L2X7R2A154M160AA
	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				
		± 20%	CGA9L4X7R2J154M160KA				
220 nF	3216	1.15 ± 0.15	± 10%				CGA5H2X7R2A224K115AA
			± 20%				CGA5H2X7R2A224M115AA
	3225	2.00 ± 0.20	± 10%			CGA6M3X7R2E224K200AA	
			± 20%			CGA6M3X7R2E224M200AA	
	4532	2.30 ± 0.20	± 10%			CGA8N3X7R2E224K230KA	
			± 20%			CGA8N3X7R2E224M230KA	
5750	2.30 ± 0.20	± 10%	CGA9N4X7R2J224K230KA				
		± 20%	CGA9N4X7R2J224M230KA				
330 nF	3216	1.30 ± 0.20	± 10%				CGA5K2X7R2A334K130AA
			± 20%				CGA5K2X7R2A334M130AA
	3225	2.00 ± 0.20	± 10%				CGA6M2X7R2A334K200AA
			± 20%				CGA6M2X7R2A334M200AA
	4532	2.30 ± 0.20	± 10%			CGA8N3X7R2E334K230KA	
			± 20%			CGA8N3X7R2E334M230KA	
5750	1.60 ± 0.20	± 10%			CGA9L3X7R2E334K160KA		
		± 20%			CGA9L3X7R2E334M160KA		
470 nF	3216	1.60 ± 0.20	± 10%				CGA5L2X7R2A474K160AA
			± 20%				CGA5L2X7R2A474M160AA
	3225	2.00 ± 0.20	± 10%				CGA6M2X7R2A474K200AA
			± 20%				CGA6M2X7R2A474M200AA
	4532	2.30 ± 0.20	± 10%			CGA8N3X7R2E474K230KA	
			± 20%			CGA8N3X7R2E474M230KA	
5750	2.30 ± 0.20	± 10%			CGA9N3X7R2E474K230KA		
		± 20%			CGA9N3X7R2E474M230KA		



## Capacitance Range Table

### Class 2 (Temperature Stable)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number			
				Rated Voltage Edc: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V
680 nF	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
			± 20%				CGA8N2X7R2A684M230KA
5750	2.30 ± 0.20	± 10%			CGA9N3X7R2E684K230KA	CGA9L2X7R2A684K160KA	
		± 20%			CGA9N3X7R2E684M230KA	CGA9L2X7R2A684M160KA	
1 µF	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
			± 20%				CGA8N2X7R2A105M230KA
5750	2.30 ± 0.20	± 10%			CGA9N3X7R2E105K230KA	CGA9N2X7R2A105K230KA	
		± 20%			CGA9N3X7R2E105M230KA	CGA9N2X7R2A105M230KA	
1.5 µF	3225	2.00 ± 0.20	± 10%				CGA6M3X7R2A155K200AB
			± 20%				CGA6M3X7R2A155M200AB
	4532	2.30 ± 0.20	± 10%				CGA8N2X7R2A155K230KA
			± 20%				CGA8N2X7R2A155M230KA
5750	2.30 ± 0.20	± 10%				CGA9N2X7R2A155K230KA	
		± 20%				CGA9N2X7R2A155M230KA	
2.2 µF	3225	2.30 ± 0.20	± 10%				CGA6N3X7R2A225K230AB
			± 20%				CGA6N3X7R2A225M230AB
	4532	2.30 ± 0.20	± 10%				CGA8N2X7R2A225K230KA
			± 20%				CGA8N2X7R2A225M230KA
5750	2.30 ± 0.20	± 10%				CGA9N2X7R2A225K230KA	
		± 20%				CGA9N2X7R2A225M230KA	
3.3 µF	5750	2.30 ± 0.20	± 10%				CGA9N2X7R2A335K230KA
4.7 µF	5750	2.30 ± 0.20	± 10%				CGA9N2X7R2A475K230KA
			± 20%				CGA9N2X7R2A475M230KA





## 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: 630V	Rated Voltage Edc: 450V	Rated Voltage Edc: 250V	Rated Voltage Edc: 100V
1 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X7S2A102K050BB
			± 20%				CGA2B3X7S2A102M050BB
1.5 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X7S2A152K050BB
			± 20%				CGA2B3X7S2A152M050BB
2.2 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X7S2A222K050BB
			± 20%				CGA2B3X7S2A222M050BB
3.3 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X7S2A332K050BB
			± 20%				CGA2B3X7S2A332M050BB
4.7 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X7S2A472K050BB
			± 20%				CGA2B3X7S2A472M050BB
6.8 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X7S2A682K050BB
			± 20%				CGA2B3X7S2A682M050BB
10 nF	1005	0.50 ± 0.05	± 10%				CGA2B3X7S2A103K050BB
			± 20%				CGA2B3X7S2A103M050BB
33 nF	1608	0.80 ± 0.10	± 10%				CGA3E3X7S2A333K080AB
			± 20%				CGA3E3X7S2A333M080AB
47 nF	1608	0.80 ± 0.10	± 10%				CGA3E3X7S2A473K080AB
			± 20%				CGA3E3X7S2A473M080AB
68 nF	1608	0.80 ± 0.10	± 10%				CGA3E3X7S2A683K080AB
			± 20%				CGA3E3X7S2A683M080AB
100 nF	1608	0.80 ± 0.10	± 10%				CGA3E3X7S2A104K080AB
			± 20%				CGA3E3X7S2A104M080AB
330 nF	2012	1.25 ± 0.20	± 10%				CGA4J3X7S2A334K125AB
			± 20%				CGA4J3X7S2A334M125AB
470 nF	2012	1.25 ± 0.20	± 10%				CGA4J3X7S2A474K125AB
			± 20%				CGA4J3X7S2A474M125AB
680 nF	2012	1.25 ± 0.20	± 10%				CGA4J3X7S2A684K125AB
			± 20%				CGA4J3X7S2A684M125AB
1 µF	2012	1.25 ± 0.20	± 10%				CGA4J3X7S2A105K125AB
			± 20%				CGA4J3X7S2A105M125AB
1.5 µF	3216	1.60 ± 0.20	± 10%				CGA5L3X7S2A155K160AB
			± 20%				CGA5L3X7S2A155M160AB
2.2 µF	3216	1.60 ± 0.20	± 10%				CGA5L3X7S2A225K160AB
			± 20%				CGA5L3X7S2A225M160AB
3.3 µF	3216	1.60 ± 0.20	± 10%				CGA5L3X7S2A335K160AB
			± 20%				CGA5L3X7S2A335M160AB
3.3 µF	3225	2.00 ± 0.20	± 10%				CGA6M3X7S2A335K200AB
			± 20%				CGA6M3X7S2A335M200AB
4.7 µF	4532	2.00 ± 0.20	± 10%				CGA8M3X7S2A335K200KB
			± 20%				CGA8M3X7S2A335M200KB
4.7 µF	3225	2.00 ± 0.20	± 10%				CGA6M3X7S2A475K200AB
			± 20%				CGA6M3X7S2A475M200AB
6.8 µF	4532	2.30 ± 0.20	± 10%				CGA8N3X7S2A475K230KB
			± 20%				CGA8N3X7S2A475M230KB
6.8 µF	5750	2.00 ± 0.20	± 10%				CGA9M3X7S2A685K200KB
			± 20%				CGA9M3X7S2A685M200KB
10 µF	5750	2.30 ± 0.20	± 10%				CGA9N3X7S2A106K230KB
			± 20%				CGA9N3X7S2A106M230KB
15 µF	5750	2.50 ± 0.30	± 20%				CGA9P3X7S2A156M250KB





## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X7T (-55 to +125°C, +22/-33%)

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