



## MULTILAYER CERAMIC CHIP CAPACITORS



### **CGA Series Automotive Grade Conductive Epoxy Application**

**Type:**

- CGA2 [EIA CC0402]**
- CGA3 [EIA CC0603]**
- CGA4 [EIA CC0805]**
- CGA5 [EIA CC1206]**
- CGA6 [EIA CC1210]**

**Issue date:**  
**Dec 2014**



## REMINDERS

Please read before using this product

### SAFETY REMINDERS



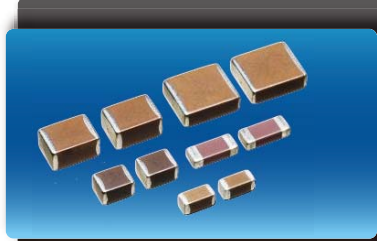
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(Example)

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



## CGA Series Conductive Epoxy Application

Type: CGA2 [EIA CC0402], CGA3 [EIA CC0603], CGA4 [EIA CC0402], CGA3 [EIA CC0603], CGA3 [EIA CC0603]

### Features



- AgPdCu termination for conductive glue mounting
- Reduce risk of silver migration
- Improved mechanical and thermal strength when use with conductive glue.
- AEC-Q200 compliant.
- Compliance with the RoHS Directive.

### Applications



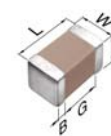
- Transmission control
- Engine sensor module
- Automotive power train
- Anti-Lock Breaking System
- Application requiring conductive glue mounting method

### Design Structure



No.	NAME	MATERIAL	
		Class 1	Class 2
(1)	Ceramic Dielectric	CaZrO <sub>3</sub>	BaTiO <sub>3</sub>
(2)	Internal Electrode	Nickel (Ni)	
(3)	Termination	Copper (Cu)	
(4)		AgPdCu	

### Shape & Dimensions



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



### Catalog Number Construction

**CGA • 5 • L • 1 • X7R • 1E • 106 • K • 160 • A • D**

#### Series Name

#### Dimensions L x W (mm)

Code	Length	Width	Terminal
2	1.00 ± 0.15	0.50 ± 0.10	0.10 min.
3	1.60 ± 0.15	0.80 ± 0.15	0.20 min.
4	2.00 ± 0.25	1.25 ± 0.25	0.20 min.
5	3.20 + 0.30/-0.10	1.60 + 0.30/-0.10	0.20 min.
6	3.20 ± 0.45	2.50 ± 0.30	0.20 min.

#### Thickness T Code (mm)

Code	Thickness	Code	Thickness
B	0.50 mm	J	1.25 mm
C	0.60 mm	L	1.60 mm
E	0.80 mm	M	2.00 mm
F	0.85 mm	P	2.50 mm
H	1.15 mm		

#### Voltage Condition for Life Test

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

#### Temperature Characteristics

Temperature Characteristics	Temperature Coefficient or Capacitance Change	Temperature Range
C0G	0 ± 30ppm/°C	-55 to +125°C
X7R	± 15%	-55 to +125°C
X8R	± 15%	-55 to +150°C

#### Rated Voltage (DC)

Code	Voltage (DC)
0J	6.3V
1C	16V
1E	25V
1V	35V
1H	50V
2A	100V

#### 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

#### 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	125	1.25 mm
060	0.60 mm	160	1.60 mm
080	0.80 mm	200	2.00 mm
085	0.85 mm	250	2.50 mm
115	1.15 mm		

#### Packaging Style

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

#### Special Reserved Code

Code	Description
D	Conductive Epoxy



## Capacitance Range Chart

## CGA2(1005) [EIA CC0402]

### Capacitance Range Chart

Temperature Characteristics: C0G ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X7R ( $\pm 15\%$ ), X8R ( $\pm 15\%$ )  
 Rated Voltage: 50V (1H), 25V (1E), 16V (1C)

Capacitance (pF)	Code	Tolerance	C0G	X7R			X8R		
			1H (50V)	1H (50V)	1E (25V)	1C (16V)	1H (50V)	1E (25V)	1C (16V)
1.0	010	C: $\pm 0.25\text{pF}$	█						
1.5	1R5	D: $\pm 0.50\text{pF}$	█						
2.0	020	J: $\pm 5\%$	█						
2.2	2R2	K: $\pm 10\%$	█						
3.0	030	M: $\pm 20\%$	█						
3.3	3R3		█						
4.0	040		█						
4.7	4R7		█						
5.0	050		█						
6.0	060		█						
6.8	6R8		█						
7.0	070		█						
8.0	080		█						
9.0	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		█	█	█	█	█	█	█
68,000	683		█	█	█	█	█	█	█
100,000	104		█	█	█	█	█	█	█

Standard Thickness

█ 0.50 mm



## Capacitance Range Chart

## CGA3(1608) [EIA CC0603]

### Capacitance Range Chart

Temperature Characteristics: C0G ( $0 \pm 30\text{ppm}/^\circ\text{C}$ )  
 Rated Voltage: 100V (2A), 50V (1H)

Capacitance (pF)	Code	Tolerance	C0G	
			2A (100V)	1H (50V)
1.0	010	C: $\pm 0.25\text{pF}$ D: $\pm 0.50\text{pF}$		
1.5	1R5			
2.0	020			
2.2	2R2			
3.0	030			
3.3	3R3			
4.0	040			
4.7	4R7			
5.0	050			
6.0	060			
6.8	6R8			
7.0	070			
8.0	080			
9.0	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			

Standard Thickness

 0.80 mm

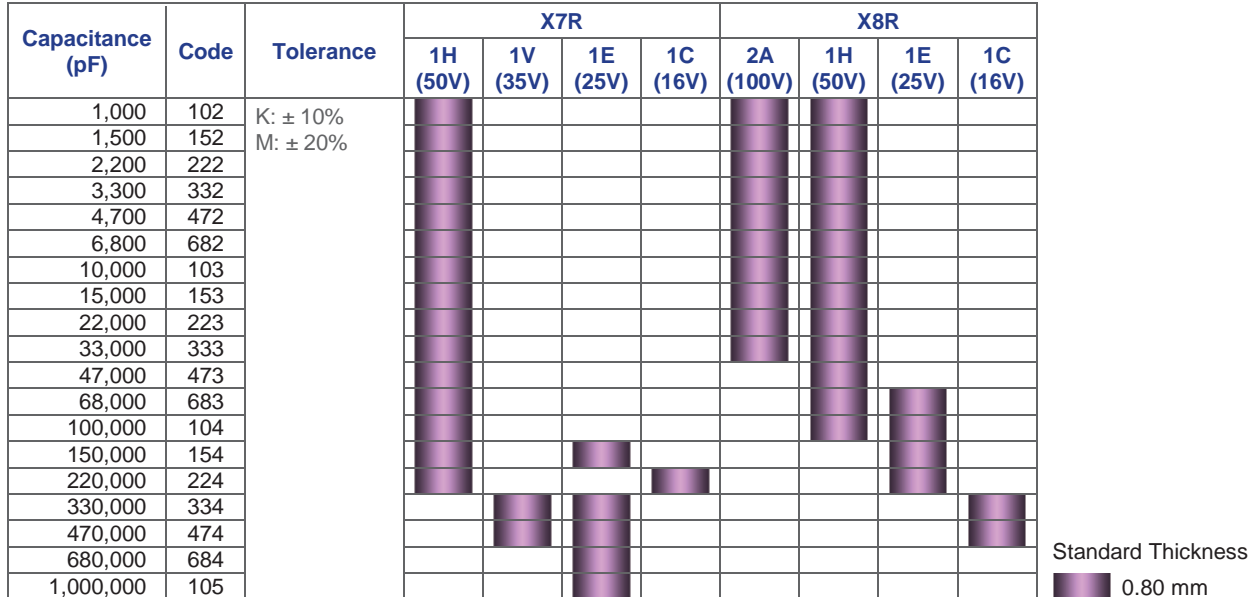


## Capacitance Range Chart

## CGA3(1608) [EIA CC0603]

### Capacitance Range Chart

Temperature Characteristics: X7R ( $\pm 15\%$ ), X8R ( $\pm 15\%$ )  
 Rated Voltage: 100V (2A), 50V (1H), 35V (1V), 25V (1E), 16V (1C)

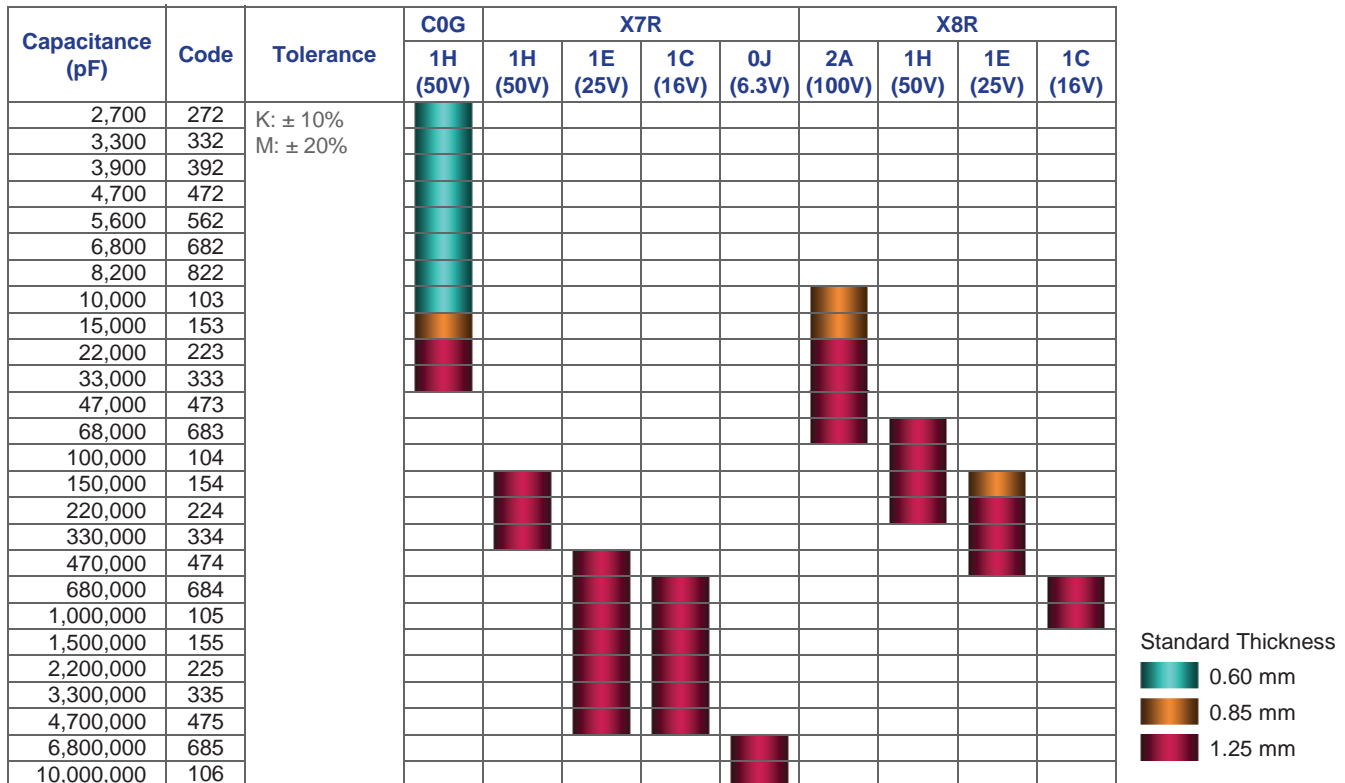


## Capacitance Range Chart

## CGA4(2012) [EIA CC0805]

### Capacitance Range Chart

Temperature Characteristics: X7R ( $\pm 15\%$ ), X8R ( $\pm 15\%$ )  
 Rated Voltage: 100V (2A), 50V (1H), 25V (1V), 25V (1E), 16V (1C)



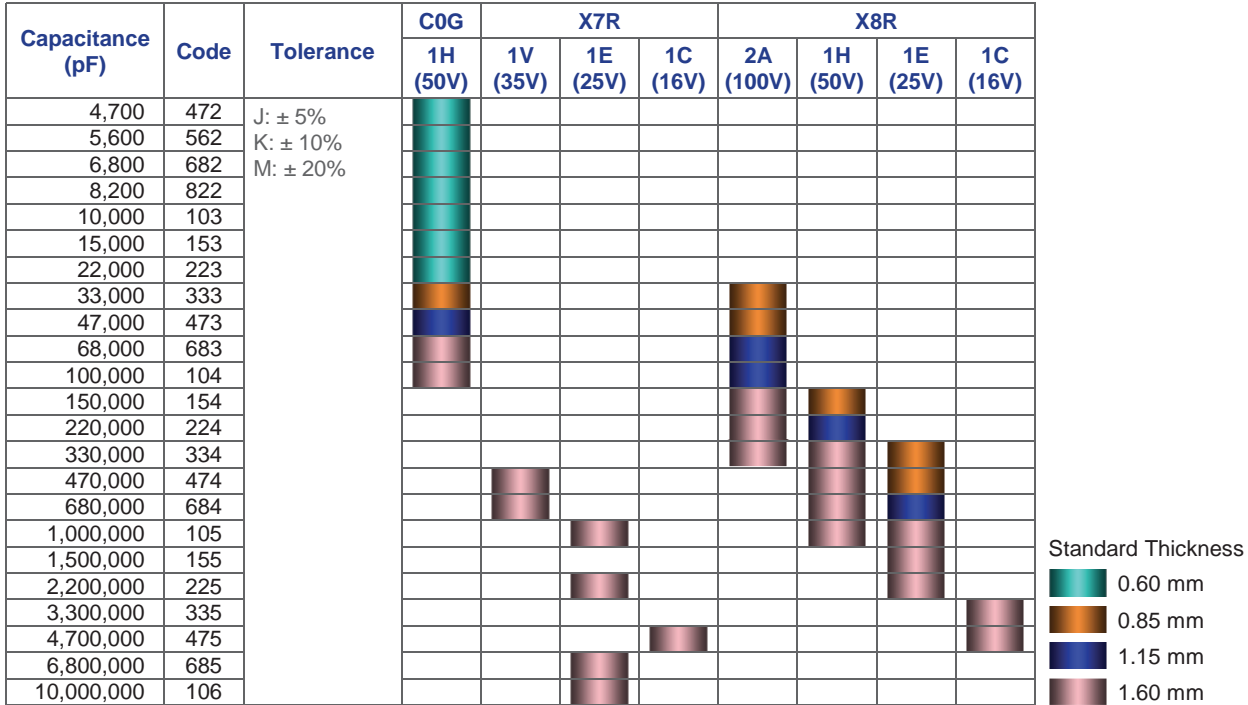


## Capacitance Range Chart

# CGA5(3216)[EIA CC1206]

### Capacitance Range Chart

Temperature Characteristics: C0G (0 ± 30ppm/°C), X7R (±15%), X8R (±15%)  
 Rated Voltage: 100V (2A), 50V (1H), 35V (1V), 25V (1E), 16V (1C)

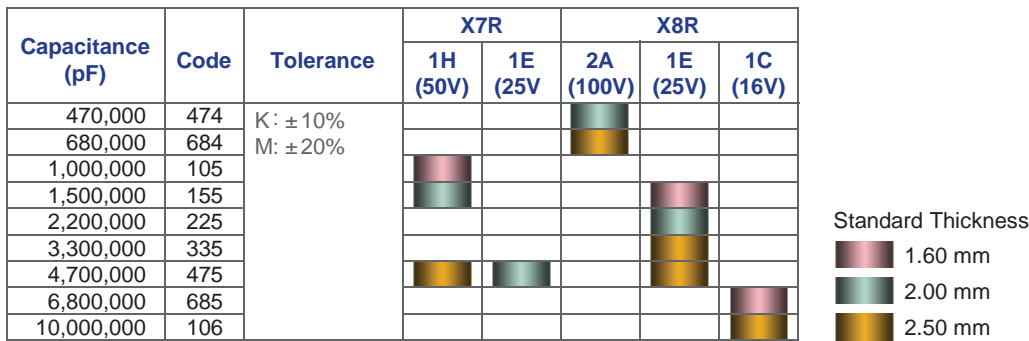


## Capacitance Range Chart

# CGA6(3225)[EIA CC1210]

### Capacitance Range Chart

Temperature Characteristics: X7R (±15%), X8R (±15%)  
 Rated Voltage: 100V (2A), 50V (1H), 25V (1E), 16V (1C)





## 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: 100V	Rated Voltage Edc: 50V	Rated Voltage Edc: 25V	Rated Voltage Edc: 16V
1 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H010C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A010C080AD	CGA3E2C0G1H010C080AD		
1.5 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H1R5C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A1R5C080AD	CGA3E2C0G1H1R5C080AD		
2 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H020C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A020C080AD	CGA3E2C0G1H020C080AD		
2.2 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H2R2C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A2R2C080AD	CGA3E2C0G1H2R2C080AD		
3 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H030C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A030C080AD	CGA3E2C0G1H030C080AD		
3.3 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H3R3C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A3R3C080AD	CGA3E2C0G1H3R3C080AD		
4 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H040C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A040C080AD	CGA3E2C0G1H040C080AD		
4.7 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H4R7C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A4R7C080AD	CGA3E2C0G1H4R7C080AD		
5 pF	1005	0.50 ± 0.10	± 0.25pF		CGA2B2C0G1H050C050BD		
	1608	0.80 ± 0.15	± 0.25pF	CGA3E2C0G2A050C080AD	CGA3E2C0G1H050C080AD		
6 pF	1005	0.50 ± 0.10	± 0.50pF		CGA2B2C0G1H060D050BD		
	1608	0.80 ± 0.15	± 0.50pF	CGA3E2C0G2A060D080AD	CGA3E2C0G1H060D080AD		
6.8 pF	1005	0.50 ± 0.10	± 0.50pF		CGA2B2C0G1H6R8D050BD		
	1608	0.80 ± 0.15	± 0.50pF	CGA3E2C0G2A6R8D080AD	CGA3E2C0G1H6R8D080AD		
7 pF	1005	0.50 ± 0.10	± 0.50pF		CGA2B2C0G1H070D050BD		
	1608	0.80 ± 0.15	± 0.50pF	CGA3E2C0G2A070D080AD	CGA3E2C0G1H070D080AD		
8 pF	1005	0.50 ± 0.10	± 0.50pF		CGA2B2C0G1H080D050BD		
	1608	0.80 ± 0.15	± 0.50pF	CGA3E2C0G2A080D080AD	CGA3E2C0G1H080D080AD		
9 pF	1005	0.50 ± 0.10	± 0.50pF		CGA2B2C0G1H090D050BD		
	1608	0.80 ± 0.15	± 0.50pF	CGA3E2C0G2A090D080AD	CGA3E2C0G1H090D080AD		
10 pF	1005	0.50 ± 0.10	± 0.50pF		CGA2B2C0G1H100D050BD		
	1608	0.80 ± 0.15	± 0.50pF	CGA3E2C0G2A100D080AD	CGA3E2C0G1H100D080AD		
12 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H120J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A120J080AD	CGA3E2C0G1H120J080AD		
15 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H150J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A150J080AD	CGA3E2C0G1H150J080AD		
18 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H180J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A180J080AD	CGA3E2C0G1H180J080AD		
22 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H220J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A220J080AD	CGA3E2C0G1H220J080AD		
27 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H270J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A270J080AD	CGA3E2C0G1H270J080AD		
33 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H330J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A330J080AD	CGA3E2C0G1H330J080AD		
39 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H390J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A390J080AD	CGA3E2C0G1H390J080AD		
47 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H470J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A470J080AD	CGA3E2C0G1H470J080AD		
56 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H560J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A560J080AD	CGA3E2C0G1H560J080AD		
68 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H680J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A680J080AD	CGA3E2C0G1H680J080AD		
82 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H820J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A820J080AD	CGA3E2C0G1H820J080AD		
100 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H101J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A101J080AD	CGA3E2C0G1H101J080AD		
120 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H121J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A121J080AD	CGA3E2C0G1H121J080AD		
150 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H151J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A151J080AD	CGA3E2C0G1H151J080AD		
180 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H181J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A181J080AD	CGA3E2C0G1H181J080AD		





## 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: 100V	Rated Voltage Edc: 50V	Rated Voltage Edc: 25V	Rated Voltage Edc: 16V
220 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H221J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A221J080AD	CGA3E2C0G1H221J080AD		
270 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H271J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A271J080AD	CGA3E2C0G1H271J080AD		
330 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H331J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A331J080AD	CGA3E2C0G1H331J080AD		
390 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H391J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A391J080AD	CGA3E2C0G1H391J080AD		
470 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H471J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A471J080AD	CGA3E2C0G1H471J080AD		
560 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H561J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A561J080AD	CGA3E2C0G1H561J080AD		
680 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H681J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A681J080AD	CGA3E2C0G1H681J080AD		
820 pF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H821J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A821J080AD	CGA3E2C0G1H821J080AD		
1 nF	1005	0.50 ± 0.10	± 5%		CGA2B2C0G1H102J050BD		
	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A102J080AD	CGA3E2C0G1H102J080AD		
1.2 nF	1608	0.80 ± 0.15	± 5%	CGA3E2C0G2A122J080AD	CGA3E2C0G1H122J080AD		
	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H152J080AD		
1.5 nF	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H182J080AD		
	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H222J080AD		
2.2 nF	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H272J080AD		
	1608	0.80 ± 0.15	± 5%		CGA4C2C0G1H272J060AD		
2.7 nF	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H332J080AD		
	2012	0.60 ± 0.15	± 5%		CGA4C2C0G1H332J060AD		
3.3 nF	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H392J080AD		
	2012	0.60 ± 0.15	± 5%		CGA4C2C0G1H392J060AD		
3.9 nF	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H472J080AD		
	2012	0.60 ± 0.15	± 5%		CGA4C2C0G1H472J060AD		
4.7 nF	3216	0.60 ± 0.15	± 5%		CGA5C2C0G1H472J060AD		
	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H562J080AD		
5.6 nF	2012	0.60 ± 0.15	± 5%		CGA4C2C0G1H562J060AD		
	3216	0.60 ± 0.15	± 5%		CGA5C2C0G1H562J060AD		
6.8 nF	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H682J080AD		
	2012	0.60 ± 0.15	± 5%		CGA4C2C0G1H682J060AD		
8.2 nF	3216	0.60 ± 0.15	± 5%		CGA5C2C0G1H682J060AD		
	1608	0.80 ± 0.15	± 5%		CGA3E2C0G1H822J080AD		
10 nF	2012	0.60 ± 0.15	± 5%		CGA4C2C0G1H822J060AD		
	3216	0.60 ± 0.15	± 5%		CGA5C2C0G1H822J060AD		
15 nF	2012	0.85 ± 0.15	± 5%		CGA4F2C0G1H103J085AD		
	3216	0.60 ± 0.15	± 5%		CGA5C2C0G1H153J060AD		
22 nF	2012	1.25 ± 0.25	± 5%		CGA4J2C0G1H223J125AD		
	3216	0.60 ± 0.15	± 5%		CGA5C2C0G1H223J060AD		
33 nF	2012	1.25 ± 0.25	± 5%		CGA4J2C0G1H333J125AD		
	3216	0.85 ± 0.15	± 5%		CGA5F2C0G1H333J085AD		
47 nF	3216	1.15 ± 0.15	± 5%		CGA5H2C0G1H473J115AD		
68 nF	3216	1.60 +0.30/-0.10	± 5%		CGA5L2C0G1H683J160AD		
100 nF	3216	1.60 +0.30/-0.10	± 5%		CGA5L2C0G1H104J160AD		



## 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: 50V	Rated Voltage Edc: 35V	Rated Voltage Edc: 25V	Rated Voltage Edc: 16V
1 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H102K080AD			
			± 20%	CGA3E2X7R1H102M080AD			
1.5 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H152K080AD			
			± 20%	CGA3E2X7R1H152M080AD			
2.2 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H222K080AD			
			± 20%	CGA3E2X7R1H222M080AD			
3.3 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H332K080AD			
			± 20%	CGA3E2X7R1H332M080AD			
4.7 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H472K080AD			
			± 20%	CGA3E2X7R1H472M080AD			
6.8 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H682K080AD			
			± 20%	CGA3E2X7R1H682M080AD			
10 nF	1005	0.50 ± 0.10	± 10%	CGA2B3X7R1H103K050BD			
			± 20%	CGA2B3X7R1H103M050BD			
10 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H103K080AD			
			± 20%	CGA3E2X7R1H103M080AD			
15 nF	1005	0.50 ± 0.10	± 10%	CGA2B3X7R1H153K050BD		CGA2B2X7R1E153K050BD	
			± 20%	CGA2B3X7R1H153M050BD		CGA2B2X7R1E153M050BD	
15 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H153K080AD			
			± 20%	CGA3E2X7R1H153M080AD			
22 nF	1005	0.50 ± 0.10	± 10%	CGA2B3X7R1H223K050BD		CGA2B2X7R1E223K050BD	
			± 20%	CGA2B3X7R1H223M050BD		CGA2B2X7R1E223M050BD	
22 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H223K080AD			
			± 20%	CGA3E2X7R1H223M080AD			
33 nF	1005	0.50 ± 0.10	± 10%	CGA2B3X7R1H333K050BD			CGA2B2X7R1C333K050BD
			± 20%	CGA2B3X7R1H333M050BD			CGA2B2X7R1C333M050BD
33 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H333K080AD			
			± 20%	CGA3E2X7R1H333M080AD			
47 nF	1005	0.50 ± 0.10	± 10%	CGA2B3X7R1H473K050BD			
			± 20%	CGA2B3X7R1H473M050BD			
47 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H473K080AD			
			± 20%	CGA3E2X7R1H473M080AD			
68 nF	1005	0.50 ± 0.10	± 10%	CGA2B3X7R1H683K050BD			
			± 20%	CGA2B3X7R1H683M050BD			
68 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H683K080AD			
			± 20%	CGA3E2X7R1H683M080AD			
100 nF	1005	0.50 ± 0.10	± 10%	CGA2B3X7R1H104K050BD			
			± 20%	CGA2B3X7R1H104M050BD			
100 nF	1608	0.80 ±0.15	± 10%	CGA3E2X7R1H104K080AD			
			± 20%	CGA3E2X7R1H104M080AD			
150 nF	1608	0.80 ±0.15	± 10%	CGA3E3X7R1H154K080AD		CGA3E2X7R1E154K080AD	
			± 20%	CGA3E3X7R1H154M080AD		CGA3E2X7R1E154M080AD	
150 nF	2012	1.25 ±0.25	± 10%	CGA4J2X7R1H154K125AD			
			± 20%	CGA4J2X7R1H154M125AD			
220 nF	1608	0.80 ±0.15	± 10%	CGA3E3X7R1H224K080AD			CGA3E2X7R1C224K080AD
			± 20%	CGA3E3X7R1H224M080AD			CGA3E2X7R1C224M080AD
220 nF	2012	1.25 ±0.25	± 10%	CGA4J2X7R1H224K125AD			
			± 20%	CGA4J2X7R1H224M125AD			
330 nF	1608	0.80 ±0.15	± 10%		CGA3E1X7R1V334K080AD	CGA3E3X7R1E334K080AD	
			± 20%		CGA3E1X7R1V334M080AD	CGA3E3X7R1E334M080AD	
330 nF	2012	1.25 ±0.25	± 10%	CGA4J2X7R1H334K125AD			
			± 20%	CGA4J2X7R1H334M125AD			
470 nF	1608	0.80 ±0.15	± 10%		CGA3E1X7R1V474K080AD	CGA3E3X7R1E474K080AD	
			± 20%		CGA3E1X7R1V474M080AD	CGA3E3X7R1E474M080AD	
470 nF	2012	1.25 ±0.25	± 10%			CGA4J2X7R1E474K125AD	
			± 20%			CGA4J2X7R1E474M125AD	
470 nF	3216	1.60 +0.30/-0.10	± 10%	CGA5L2X7R1H474K160AD			
			± 20%	CGA5L2X7R1H474M160AD			



## 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: 50V	Rated Voltage Edc: 25V	Rated Voltage Edc: 16V
680 nF	1608	0.80 ±0.15	± 10%	CGA3E1X7R1E684K080AD		
			± 20%	CGA3E1X7R1E684M080AD		
	2012	1.25 ±0.25	± 10%	CGA4J3X7R1E684K125AD	CGA4J2X7R1C684K125AD	
			± 20%	CGA4J3X7R1E684M125AD	CGA4J2X7R1C684M125AD	
	3216	1.60 +0.30/-0.10	± 10%	CGA5L2X7R1H684K160AD		
			± 20%	CGA5L2X7R1H684M160AD		
1 µF	1608	0.80 ±0.15	± 10%	CGA3E1X7R1E105K080AD		
			± 20%	CGA3E1X7R1E105M080AD		
	2012	1.25 ±0.25	± 10%	CGA4J3X7R1E105K125AD	CGA4J2X7R1C105K125AD	
			± 20%	CGA4J3X7R1E105M125AD	CGA4J2X7R1C105M125AD	
	3216	1.60 +0.30/-0.10	± 10%	CGA5L2X7R1E105K160AD		
			± 20%	CGA5L2X7R1E105M160AD		
3225	1.60 ± 0.20	± 10%	CGA6L2X7R1H105K160AD			
		± 20%	CGA6L2X7R1H105M160AD			
1.5 µF	2012	1.25 ±0.25	± 10%	CGA4J1X7R1E155K125AD		
			± 20%	CGA4J1X7R1E155M125AD		
	3225	2.00 ± 0.20	± 10%	CGA6M2X7R1H155K200AD		
			± 20%	CGA6M2X7R1H155M200AD		
2.2 µF	2012	1.25 ±0.25	± 10%	CGA4J3X7R1E225K125AD		
			± 20%	CGA4J3X7R1E225M125AD		
	3216	1.60 +0.30/-0.10	± 10%	CGA5L2X7R1E225K160AD		
± 20%			CGA5L2X7R1E225M160AD			
3.3 µF	2012	1.25 ±0.25	± 10%	CGA4J1X7R1E335K125AD	CGA4J3X7R1C335K125AD	
			± 20%	CGA4J1X7R1E335M125AD	CGA4J3X7R1C335M125AD	
	4.7 µF	2012	1.25 +0.30/-0.25	± 10%	CGA4J1X7R1E475K125AD	CGA4J3X7R1C475K125AD
± 20%				CGA4J1X7R1E475M125AD	CGA4J3X7R1C475M125AD	
3216		1.60 +0.30/-0.10	± 10%	CGA5L3X7R1C475K160AD		
	± 20%		CGA5L3X7R1C475M160AD			
6.8 µF	2012	1.25 ±0.25	± 10%	CGA6M2X7R1E475K200AD		
			± 20%	CGA6M2X7R1E475M200AD		
	3225	2.50 ± 0.30	± 10%	CGA6P3X7R1H475K250AD		
± 20%			CGA6P3X7R1H475M250AD			
10 µF	2012	1.25 ±0.25	± 10%	CGA4J1X7R0J685K125AD		
			± 20%	CGA4J1X7R0J685M125AD		
	3216	1.60 +0.30/-0.10	± 10%	CGA5L1X7R1E685K160AD		
± 20%			CGA5L1X7R1E685M160AD			
10 µF	2012	1.25 ±0.25	± 10%	CGA4J1X7R0J106K125AD		
			± 20%	CGA4J1X7R0J106M125AD		
	3216	1.60 +0.30/-0.10	± 10%	CGA5L1X7R1E106K160AD		
± 20%			CGA5L1X7R1E106M160AD			

### 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: 25V	Rated Voltage Edc: 16V
150 pF	1005	0.50 ± 0.10	± 10%	CGA2B2X8R1H151K050BD		
			± 20%	CGA2B2X8R1H151M050BD		
220 pF	1005	0.50 ± 0.10	± 10%	CGA2B2X8R1H221K050BD		
			± 20%	CGA2B2X8R1H221M050BD		
330 pF	1005	0.50 ± 0.10	± 10%	CGA2B2X8R1H331K050BD		
			± 20%	CGA2B2X8R1H331M050BD		
470 pF	1005	0.50 ± 0.10	± 10%	CGA2B2X8R1H471K050BD		
			± 20%	CGA2B2X8R1H471M050BD		
680 pF	1005	0.50 ± 0.10	± 10%	CGA2B2X8R1H681K050BD		
			± 20%	CGA2B2X8R1H681M050BD		
1 nF	1005	0.50 ± 0.10	± 10%	CGA2B2X8R1H102K050BD		
			± 20%	CGA2B2X8R1H102M050BD		
	1608	0.80 ±0.15	± 10%	CGA3E2X8R2A102K080AD	CGA3E2X8R1H102K080AD	
± 20%			CGA3E2X8R2A102M080AD	CGA3E2X8R1H102M080AD		



## 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
1.5 nF	1005	0.50 ± 0.10	± 10%		CGA2B2X8R1H152K050BD	
			± 20%		CGA2B2X8R1H152M050BD	
	1608	0.80 ± 0.15	± 10%	CGA3E2X8R2A152K080AD	CGA3E2X8R1H152K080AD	
			± 20%	CGA3E2X8R2A152M080AD	CGA3E2X8R1H152M080AD	
2.2 nF	1005	0.50 ± 0.10	± 10%		CGA2B2X8R1H222K050BD	
			± 20%		CGA2B2X8R1H222M050BD	
	1608	0.80 ± 0.15	± 10%	CGA3E2X8R2A222K080AD	CGA3E2X8R1H222K080AD	
			± 20%	CGA3E2X8R2A222M080AD	CGA3E2X8R1H222M080AD	
3.3 nF	1005	0.50 ± 0.10	± 10%		CGA2B2X8R1H332K050BD	
			± 20%		CGA2B2X8R1H332M050BD	
	1608	0.80 ± 0.15	± 10%	CGA3E2X8R2A332K080AD	CGA3E2X8R1H332K080AD	
			± 20%	CGA3E2X8R2A332M080AD	CGA3E2X8R1H332M080AD	
4.7 nF	1005	0.50 ± 0.10	± 10%		CGA2B2X8R1H472K050BD	
			± 20%		CGA2B2X8R1H472M050BD	
	1608	0.80 ± 0.15	± 10%	CGA3E2X8R2A472K080AD	CGA3E2X8R1H472K080AD	
			± 20%	CGA3E2X8R2A472M080AD	CGA3E2X8R1H472M080AD	
6.8 nF	1005	0.50 ± 0.10	± 10%		CGA2B3X8R1H682K050BD	CGA2B2X8R1E682K050BD
			± 20%		CGA2B3X8R1H682M050BD	CGA2B2X8R1E682M050BD
	1608	0.80 ± 0.15	± 10%	CGA3E2X8R2A682K080AD	CGA3E2X8R1H682K080AD	
			± 20%	CGA3E2X8R2A682M080AD	CGA3E2X8R1H682M080AD	
10 nF	1005	0.50 ± 0.10	± 10%		CGA2B3X8R1H103K050BD	CGA2B2X8R1E103K050BD
			± 20%		CGA2B3X8R1H103M050BD	CGA2B2X8R1E103M050BD
	1608	0.80 ± 0.15	± 10%	CGA3E2X8R2A103K080AD	CGA3E2X8R1H103K080AD	
			± 20%	CGA3E2X8R2A103M080AD	CGA3E2X8R1H103M080AD	
15 nF	2012	0.85 ± 0.15	± 10%	CGA4F2X8R2A103K085AD		
			± 20%	CGA4F2X8R2A103M085AD		
	1005	0.50 ± 0.10	± 10%			CGA2B3X8R1E153K050BD
			± 20%			CGA2B3X8R1E153M050BD
1608	0.80 ± 0.15	± 10%	CGA3E2X8R2A153K080AD	CGA3E2X8R1H153K080AD		
		± 20%	CGA3E2X8R2A153M080AD	CGA3E2X8R1H153M080AD		
22 nF	2012	0.85 ± 0.15	± 10%	CGA4F2X8R2A153K085AD		
			± 20%	CGA4F2X8R2A153M085AD		
	1005	0.50 ± 0.10	± 10%			CGA2B3X8R1E223K050BD
			± 20%			CGA2B3X8R1E223M050BD
1608	0.80 ± 0.15	± 10%	CGA3E3X8R2A223K080AD	CGA3E2X8R1H223K080AD		
		± 20%	CGA3E3X8R2A223M080AD	CGA3E2X8R1H223M080AD		
33 nF	2012	1.25 ± 0.25	± 10%	CGA4J2X8R2A223K125AD		
			± 20%	CGA4J2X8R2A223M125AD		
	1005	0.50 ± 0.10	± 10%			CGA2B3X8R1C333K050BD
			± 20%			CGA2B3X8R1C333M050BD
1608	0.80 ± 0.15	± 10%	CGA3E3X8R2A333K080AD	CGA3E2X8R1H333K080AD		
		± 20%	CGA3E3X8R2A333M080AD	CGA3E2X8R1H333M080AD		
47 nF	2012	1.25 ± 0.25	± 10%	CGA4J3X8R2A333K125AD		
			± 20%	CGA4J3X8R2A333M125AD		
	3216	0.85 ± 0.15	± 10%	CGA5F2X8R2A333K085AD		
			± 20%	CGA5F2X8R2A333M085AD		
1005	0.50 ± 0.10	± 10%			CGA2B3X8R1C473K050BD	
		± 20%			CGA2B3X8R1C473M050BD	
1608	0.80 ± 0.15	± 10%		CGA3E2X8R1H473K080AD		
		± 20%		CGA3E2X8R1H473M080AD		
68 nF	2012	1.25 ± 0.25	± 10%	CGA4J3X8R2A473K125AD		
			± 20%	CGA4J3X8R2A473M125AD		
	3216	0.85 ± 0.15	± 10%	CGA5F2X8R2A473K085AD		
			± 20%	CGA5F2X8R2A473M085AD		
1608	0.80 ± 0.15	± 10%		CGA3E3X8R1H683K080AD	CGA3E2X8R1E683K080AD	
		± 20%		CGA3E3X8R1H683M080AD	CGA3E2X8R1E683M080AD	
3216	1.15 ± 0.15	± 10%	± 10%	CGA4J3X8R2A683K125AD	CGA4J2X8R1H683K125AD	
			± 20%	CGA4J3X8R2A683M125AD	CGA4J2X8R1H683M125AD	
	± 10%	± 10%	CGA5H2X8R2A683K115AD			
		± 20%	CGA5H2X8R2A683M115AD			



## 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
100 nF	1608	0.80 ± 0.15	± 10%	CGA3E3X8R1H104K080AD	CGA3E2X8R1E104K080AD	
			± 20%	CGA3E3X8R1H104M080AD	CGA3E2X8R1E104M080AD	
	2012	1.25 ± 0.25	± 10%	CGA4J2X8R1H104K125AD		
			± 20%	CGA4J2X8R1H104M125AD		
	3216	1.15 ± 0.15	± 10%	CGA5H2X8R2A104K115AD		
			± 20%	CGA5H2X8R2A104M115AD		
150 nF	1608	0.80 ± 0.15	± 10%		CGA3E3X8R1E154K080AD	
			± 20%		CGA3E3X8R1E154M080AD	
	2012	1.25 ± 0.25	± 10%	CGA4J3X8R1H154K125AD		
			± 20%	CGA4J3X8R1H154M125AD		
	3216	0.85 ± 0.15	± 10%		CGA4F2X8R1E154K085AD	
			± 20%		CGA4F2X8R1E154M085AD	
3216	0.85 ± 0.15	± 10%	CGA5F2X8R1H154K085AD			
		± 20%	CGA5F2X8R1H154M085AD			
220 nF	1608	0.80 ± 0.15	± 10%		CGA3E3X8R1E224K080AD	
			± 20%		CGA3E3X8R1E224M080AD	
	2012	1.25 ± 0.25	± 10%	CGA4J3X8R1H224K125AD	CGA4J2X8R1E224K125AD	
			± 20%	CGA4J3X8R1H224M125AD	CGA4J2X8R1E224M125AD	
	3216	1.15 ± 0.15	± 10%	CGA5H2X8R1H224K115AD		
			± 20%	CGA5H2X8R1H224M115AD		
3216	1.60 + 0.30/-0.10	± 10%	CGA5L2X8R2A154K160AD			
		± 20%	CGA5L2X8R2A154M160AD			
330 nF	1608	0.80 ± 0.15	± 10%		CGA3E3X8R1C334K080AD	
			± 20%		CGA3E3X8R1C334M080AD	
	2012	1.25 ± 0.25	± 10%		CGA4J2X8R1E334K125AD	
			± 20%		CGA4J2X8R1E334M125AD	
	3216	0.85 ± 0.15	± 10%		CGA5F2X8R1E334K085AD	
			± 20%		CGA5F2X8R1E334M085AD	
3216	1.60 + 0.30/-0.10	± 10%	CGA5L3X8R2A334K160AD	CGA5L2X8R1H334K160AD		
		± 20%	CGA5L3X8R2A334M160AD	CGA5L2X8R1H334M160AD		
470 nF	1608	0.80 ± 0.15	± 10%		CGA3E3X8R1C474K080AD	
			± 20%		CGA3E3X8R1C474M080AD	
	2012	1.25 ± 0.25	± 10%		CGA4J3X8R1E474K125AD	
			± 20%		CGA4J3X8R1E474M125AD	
	3216	0.85 ± 0.15	± 10%		CGA5F2X8R1E474K085AD	
			± 20%		CGA5F2X8R1E474M085AD	
3216	1.60 + 0.30/-0.10	± 10%	CGA5L2X8R1H474K160AD			
		± 20%	CGA5L2X8R1H474M160AD			
3225	2.00 ± 0.20	± 10%	CGA6M3X8R2A474K200AD			
		± 20%	CGA6M3X8R2A474M200AD			
680 nF	2012	1.25 ± 0.25	± 10%		CGA4J3X8R1C684K125AD	
			± 20%		CGA4J3X8R1C684M125AD	
	3216	1.15 ± 0.15	± 10%		CGA5H2X8R1E684K115AD	
			± 20%		CGA5H2X8R1E684M115AD	
	3216	1.60 + 0.30/-0.10	± 10%	CGA5L3X8R1H684K160AD		
			± 20%	CGA5L3X8R1H684M160AD		
3225	2.50 ± 0.30	± 10%	CGA6P3X8R2A684K250AD			
		± 20%	CGA6P3X8R2A684M250AD			
1 µF	2012	1.25 ± 0.25	± 10%		CGA4J3X8R1C105K125AD	
			± 20%		CGA4J3X8R1C105M125AD	
3216	1.60 + 0.30/-0.10	± 10%	CGA5L3X8R1H105K160AD	CGA5L2X8R1E105K160AD		
		± 20%	CGA5L3X8R1H105M160AD	CGA5L2X8R1E105M160AD		
1.5 µF	3216	1.60 + 0.30/-0.10	± 10%		CGA5L3X8R1E155K160AD	
			± 20%		CGA5L3X8R1E155M160AD	
3225	1.60 ± 0.20	± 10%	CGA6L2X8R1E155K160AD			
		± 20%	CGA6L2X8R1E155M160AD			
2.2 µF	3216	1.60 + 0.30/-0.10	± 10%	CGA5L3X8R1E225K160AD		
			± 20%	CGA5L3X8R1E225M160AD		



## 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
2.2 μF	3225	2.00 ± 0.20	± 10%			CGA6M2X8R1E225K200AD	
			± 20%			CGA6M2X8R1E225M200AD	
3.3 μF	3216	1.60 +0.30/-0.10	± 10%				CGA5L3X8R1C335K160AD
			± 20%				CGA5L3X8R1C335M160AD
	3225	2.50 ± 0.30	± 10%			CGA6P2X8R1E335K250AD	
			± 20%			CGA6P2X8R1E335M250AD	
4.7 μF	3216	1.60 +0.30/-0.10	± 10%				CGA5L3X8R1C475K160AD
			± 20%				CGA5L3X8R1C475M160AD
6.8 μF	3225	2.50 ± 0.30	± 10%			CGA6P3X8R1E475K250AD	
			± 20%			CGA6P3X8R1E475M250AD	
10 μF	3225	2.50 ± 0.30	± 10%				CGA6M3X8R1C685K200AD
			± 20%				CGA6M3X8R1C685M200AD
10 μF	3225	2.50 ± 0.30	± 10%				CGA6P3X8R1C106K250AD
			± 20%				CGA6P3X8R1C106M250AD