



## MULTILAYER CERAMIC CHIP CAPACITORS

### **C Series Commercial Grade High Temperature Application**

Type:

C1005 [EIA CC0402]  
C1608 [EIA CC0603]  
C2012 [EIA CC0805]  
C3216 [EIA CC1206]  
C3225 [EIA CC1210]  
C4532 [EIA CC1812]  
C5750 [EIA CC2220]

Issue date:  
Jun 2015



## 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



## C Series High Temperature Application

Type: C1005 [EIA CC0402], C1608 [EIA CC0603], C2012 [EIA CC0805], C3216 [EIA CC1206], C3225 [EIA CC1210], C4532 [EIA CC1812], C5750 [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.

Parameters	Specifications
Temperature	-55 to 150°C
Characteristics	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 • Rated Voltage or 3 • Rated Voltage for 1 to 5 seconds Charge/Discharge ≤ 50 mA

### Applications



- Automotive applications (engine rooms)
- Measurement instruments used at high temperature environments
- LCD display
- 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

**C • 3225 • X8R • 1C • 106 • K • 250 • A • B**

#### Series Name

#### Dimensions L x W (mm)

Code	Length	Width	Terminal
C1005	1.00 ± 0.05	0.50 ± 0.05	0.10 min.
C1608	1.60 ± 0.10	0.80 ± 0.10	0.20 min.
C2012	2.00 ± 0.20	1.25 ± 0.20	0.20 min.
C3216	3.20 ± 0.20	1.60 ± 0.20	0.20 min.
C3225	3.20 ± 0.40	2.50 ± 0.30	0.20 min.
C4532	4.50 ± 0.40	3.20 ± 0.40	0.20 min.
C5750	5.70 ± 0.40	5.00 ± 0.40	0.20 min.

\*Dimensional tolerances are typical values.

#### 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 = 1,000nF

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

## EIA CC0402 [C1005]

### Capacitance Range Chart

Temperature Characteristics: NP0 ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X8R ( $\pm 15\%$ )  
 Rated Voltage: 100V (2A), 50V (1H), 25V (1E), 16V (1C)

Capacitance (pF)	Code	Tolerance	NP0		X8R			
			2A (100V)	1H (50V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)
1	010	C: $\pm 0.25\text{pF}$						
1.5	1R5	D: $\pm 0.50\text{pF}$						
2	020	J: $\pm 5\%$						
2.2	2R2	K: $\pm 10\%$						
3	030	M: $\pm 20\%$						
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

## EIA CC0603 [C1608]

### Capacitance Range Chart

Temperature Characteristics: NPO ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X8R ( $\pm 15\%$ )  
 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: $\pm 0.25\text{pF}$ D: $\pm 0.50\text{pF}$ J: $\pm 5\%$			
2	1R5				
2	020				
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: $\pm 10\%$ M: $\pm 20\%$				
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

## EIA CC0805 [C2012]

### 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									█

Standard Thickness

- █ 0.60 mm
- █ 0.85 mm
- █ 1.25 mm

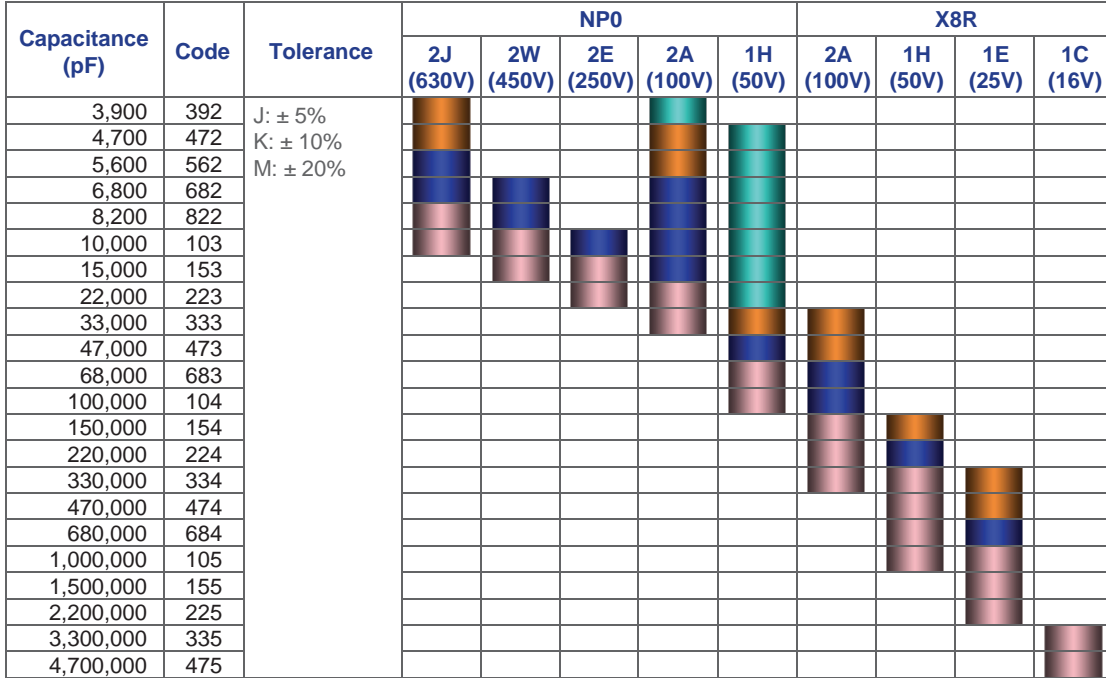


## Capacitance Range Chart

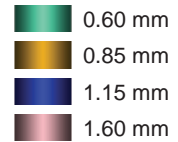
## EIA CC1206 [C3216]

### 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)



Standard Thickness

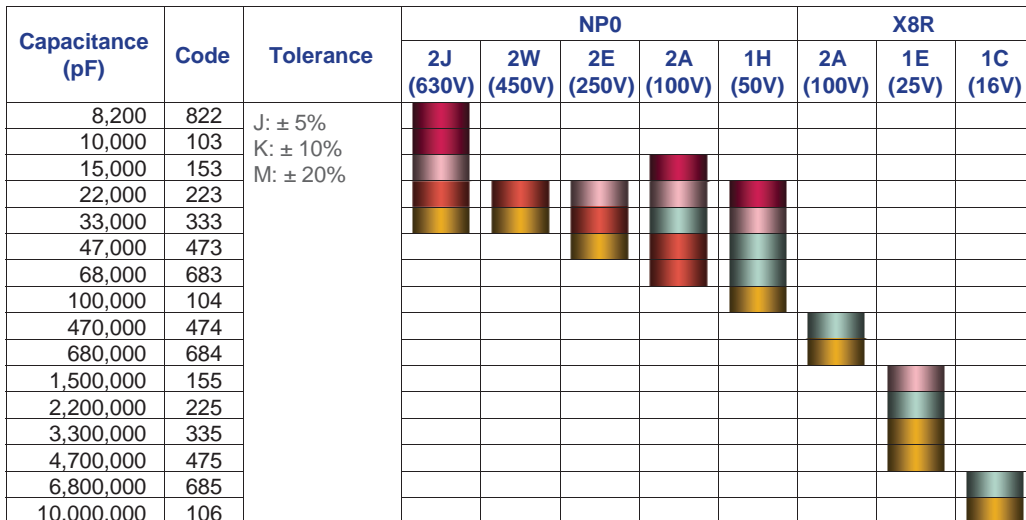


## Capacitance Range Chart

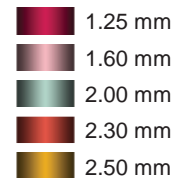
## EIA CC1210 [C3225]

### 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)



Standard Thickness





## Capacitance Range Chart

## EIA CC1812 [C4532]

### Capacitance Range Chart

Temperature Characteristics: NPO (0 ± 30ppm/°C)  
 Rated Voltage: 630V(2J), 450V(2W), 250V(2E), 100V (2A), 50V (1H)

Capacitance (pF)	Code	Tolerance	NPO				
			2J (630V)	2W (450V)	2E (250V)	2A (100V)	1H (50V)
33,000	333	J: ± 5%					
47,000	473						
68,000	683						
100,000	104						
150,000	154						
220,000	224						

Standard Thickness

- 1.60 mm
- 2.00 mm
- 2.30 mm
- 2.50 mm
- 3.20 mm



## Capacitance Range Chart

## EIA CC2220 [C5750]

### Capacitance Range Chart

Temperature Characteristics: NPO (0 ± 30ppm/°C)  
 Rated Voltage: 450V(2W), 250V(2E), 100V (2A)

Capacitance (pF)	Code	Tolerance	NPO		
			2W (450V)	2E (250V)	2A (100V)
100,000	104	J: ± 5%			
150,000	154				

Standard Thickness

- 2.30 mm
- 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					C1005NP01H010C050BA
	1608	0.80 ± 0.10	± 0.25pF				C1608NP02A010C080AA	C1608NP01H010C080AA
1.5 pF	1005	0.50 ± 0.05	± 0.25pF					C1005NP01H1R5C050BA
	1608	0.80 ± 0.10	± 0.25pF			C1608NP02A1R5C080AA	C1608NP01H1R5C080AA	
2 pF	1005	0.50 ± 0.05	± 0.25pF					C1005NP01H020C050BA
	1608	0.80 ± 0.10	± 0.25pF			C1608NP02A020C080AA	C1608NP01H020C080AA	
2.2 pF	1005	0.50 ± 0.05	± 0.25pF					C1005NP01H2R2C050BA
	1608	0.80 ± 0.10	± 0.25pF			C1608NP02A2R2C080AA	C1608NP01H2R2C080AA	
3 pF	1005	0.50 ± 0.05	± 0.25pF					C1005NP01H030C050BA
	1608	0.80 ± 0.10	± 0.25pF			C1608NP02A030C080AA	C1608NP01H030C080AA	
3.3 pF	1005	0.50 ± 0.05	± 0.25pF					C1005NP01H3R3C050BA
	1608	0.80 ± 0.10	± 0.25pF			C1608NP02A3R3C080AA	C1608NP01H3R3C080AA	
4 pF	1005	0.50 ± 0.05	± 0.25pF					C1005NP01H040C050BA
	1608	0.80 ± 0.10	± 0.25pF			C1608NP02A040C080AA	C1608NP01H040C080AA	
4.7 pF	1005	0.50 ± 0.05	± 0.25pF					C1005NP01H4R7C050BA
	1608	0.80 ± 0.10	± 0.25pF			C1608NP02A4R7C080AA	C1608NP01H4R7C080AA	
5 pF	1005	0.50 ± 0.05	± 0.25pF					C1005NP01H050C050BA
	1608	0.80 ± 0.10	± 0.25pF			C1608NP02A050C080AA	C1608NP01H050C080AA	
6 pF	1005	0.50 ± 0.05	± 0.50pF					C1005NP01H060D050BA
	1608	0.80 ± 0.10	± 0.50pF			C1608NP02A060D080AA	C1608NP01H060D080AA	
6.8 pF	1005	0.50 ± 0.05	± 0.50pF					C1005NP01H6R8D050BA
	1608	0.80 ± 0.10	± 0.50pF			C1608NP02A6R8D080AA	C1608NP01H6R8D080AA	
7 pF	1005	0.50 ± 0.05	± 0.50pF					C1005NP01H070D050BA
	1608	0.80 ± 0.10	± 0.50pF			C1608NP02A070D080AA	C1608NP01H070D080AA	
8 pF	1005	0.50 ± 0.05	± 0.50pF					C1005NP01H080D050BA
	1608	0.80 ± 0.10	± 0.50pF			C1608NP02A080D080AA	C1608NP01H080D080AA	
9 pF	1005	0.50 ± 0.05	± 0.50pF					C1005NP01H090D050BA
	1608	0.80 ± 0.10	± 0.50pF			C1608NP02A090D080AA	C1608NP01H090D080AA	
10 pF	1005	0.50 ± 0.05	± 0.50pF					C1005NP01H100D050BA
	1608	0.80 ± 0.10	± 0.50pF			C1608NP02A100D080AA	C1608NP01H100D080AA	
12 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H120J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A120J080AA	C1608NP01H120J080AA	
15 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H150J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A150J080AA	C1608NP01H150J080AA	
18 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H180J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A180J080AA	C1608NP01H180J080AA	
22 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H220J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A220J080AA	C1608NP01H220J080AA	
27 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H270J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A270J080AA	C1608NP01H270J080AA	
33 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H330J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A330J080AA	C1608NP01H330J080AA	
39 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H390J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A390J080AA	C1608NP01H390J080AA	
47 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H470J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A470J080AA	C1608NP01H470J080AA	
56 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H560J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A560J080AA	C1608NP01H560J080AA	
68 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H680J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A680J080AA	C1608NP01H680J080AA	
82 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H820J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A820J080AA	C1608NP01H820J080AA	
100 pF	1005	0.50 ± 0.05	± 5%					C1005NP02A101J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A101J080AA	C1608NP01H101J080AA	
	2012	0.60 ± 0.15	± 5%		C2012NP02W101J060AA			
120 pF	1005	0.50 ± 0.05	± 5%					C1005NP02A121J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A121J080AA	C1608NP01H121J080AA	
	2012	0.60 ± 0.15	± 5%		C2012NP02W121J060AA			
150 pF	1005	0.50 ± 0.05	± 5%					C1005NP02A151J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A151J080AA	C1608NP01H151J080AA	
	2012	0.60 ± 0.15	± 5%		C2012NP02W151J060AA			
180 pF	1005	0.50 ± 0.05	± 5%					C1005NP02A181J050BA
	1608	0.80 ± 0.10	± 5%			C1608NP02A181J080AA	C1608NP01H181J080AA	
	2012	0.60 ± 0.15	± 5%		C2012NP02W181J060AA			



## 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%				C1005NP02A221J050BA	C1005NP01H221J050BA
	1608	0.80 ± 0.10	± 5%				C1608NP02A221J080AA	C1608NP01H221J080AA
	2012	0.60 ± 0.15	± 5%	C2012NP02W221J060AA				
270 pF	1005	0.50 ± 0.05	± 5%				C1005NP02A271J050BA	C1005NP01H271J050BA
	1608	0.80 ± 0.10	± 5%				C1608NP02A271J080AA	C1608NP01H271J080AA
	2012	0.60 ± 0.15	± 5%	C2012NP02W271J060AA				
330 pF	1005	0.50 ± 0.05	± 5%				C1005NP02A331J050BA	C1005NP01H331J050BA
	1608	0.80 ± 0.10	± 5%				C1608NP02A331J080AA	C1608NP01H331J080AA
	2012	0.60 ± 0.15	± 5%	C2012NP02W331J060AA				
390 pF	1005	0.50 ± 0.05	± 5%				C1005NP02A391J050BA	C1005NP01H391J050BA
	1608	0.80 ± 0.10	± 5%				C1608NP02A391J080AA	C1608NP01H391J080AA
	2012	0.60 ± 0.15	± 5%	C2012NP02W391J060AA				
470 pF	1005	0.50 ± 0.05	± 5%				C1005NP02A471J050BA	C1005NP01H471J050BA
	1608	0.80 ± 0.10	± 5%				C1608NP02A471J080AA	C1608NP01H471J080AA
	2012	0.60 ± 0.15	± 5%	C2012NP02W471J060AA				
560 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H561J050BA
	1608	0.80 ± 0.10	± 5%				C1608NP02A561J080AA	C1608NP01H561J080AA
	2012	0.60 ± 0.15	± 5%	C2012NP02W561J060AA				
680 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H681J050BA
	1608	0.80 ± 0.10	± 5%				C1608NP02A681J080AA	C1608NP01H681J080AA
	2012	0.60 ± 0.15	± 5%	C2012NP02W681J060AA				
820 pF	1005	0.50 ± 0.05	± 5%					C1005NP01H821J050BA
	1608	0.80 ± 0.10	± 5%		C1608NP02E821J080AA	C1608NP02A821J080AA	C1608NP01H821J080AA	
	2012	0.60 ± 0.15	± 5%	C2012NP02W821J060AA				
1 nF	1005	0.50 ± 0.05	± 5%					C1005NP01H102J050BA
	1608	0.80 ± 0.10	± 5%		C1608NP02E102J080AA	C1608NP02A102J080AA	C1608NP01H102J080AA	
	2012	0.60 ± 0.15	± 5%	C2012NP02W102J060AA				
1.2 nF	1608	0.80 ± 0.10	± 5%		C1608NP02E122J080AA	C1608NP02A122J080AA	C1608NP01H122J080AA	
	2012	0.60 ± 0.15	± 5%	C2012NP02W122J060AA				
	1608	0.80 ± 0.10	± 5%		C1608NP02E152J080AA	C1608NP02A152J080AA	C1608NP01H152J080AA	
1.5 nF	2012	0.60 ± 0.15	± 5%	C2012NP02W152J060AA				
		0.85 ± 0.15	± 5%	C2012NP02W152J085AA				
	1608	0.80 ± 0.10	± 5%		C1608NP02E182J080AA	C1608NP02A182J080AA	C1608NP01H182J080AA	
1.8 nF	2012	0.85 ± 0.15	± 5%	C2012NP02W182J085AA				
	1608	0.80 ± 0.10	± 5%		C1608NP02E222J080AA	C1608NP02A222J080AA	C1608NP01H222J080AA	
	2012	0.85 ± 0.15	± 5%	C2012NP02W222J085AA				
2.7 nF	1608	0.80 ± 0.10	± 5%					C1608NP01H272J080AA
		0.80±0.15/-0.1	± 5%				C1608NP02A272J080AA	
	2012	0.60 ± 0.15	± 5%	C2012NP02W272J125AA				
3.3 nF		1.25 ± 0.20	± 5%	C2012NP02W272J125AA				
	1608	0.80 ± 0.10	± 5%					C1608NP01H332J080AA
		0.80 + 0.15/-0.1	± 5%				C1608NP02A332J080AA	
3.9 nF	2012	0.60 ± 0.15	± 5%	C2012NP01H332J060AA				
		0.85 ± 0.15	± 5%	C2012NP02E332J085AA				
	1608	0.80 ± 0.10	± 5%		C2012NP02W332J125AA	C2012NP02A332J125AA	C2012NP01H332J080AA	
3.9 nF	2012	0.60 ± 0.15	± 5%	C2012NP01H332J060AA				
		0.60 ± 0.15	± 5%		C2012NP02W392J125AA	C2012NP02E392J125AA	C2012NP02A392J125AA	
	3216	0.85 ± 0.15	± 5%	C3216NP02J392J085AA			C3216NP02A392J060AA	
4.7 nF	1608	0.80 ± 0.10	± 5%					C1608NP01H472J080AA
		0.60 ± 0.15	± 5%					C2012NP01H472J060AA
	2012	1.25 ± 0.20	± 5%	C2012NP02W472J125AA				
4.7 nF		0.60 ± 0.15	± 5%		C2012NP02E472J125AA	C2012NP02A472J125AA		
	3216	0.85 ± 0.15	± 5%	C3216NP02J472J085AA			C3216NP02A472J085AA	
	1608	0.80 ± 0.10	± 5%					C1608NP01H562J080AA
5.6 nF		0.60 ± 0.15	± 5%					C2012NP01H562J060AA
	2012	1.25 ± 0.20	± 5%	C2012NP02W562J125AA				
		0.60 ± 0.15	± 5%		C2012NP02E562J125AA	C2012NP02A562J125AA		
5.6 nF	3216	0.85 ± 0.15	± 5%					C3216NP01H562J060AA
		1.15 ± 0.15	± 5%	C3216NP02J562J115AA				
		0.85 ± 0.15	± 5%		C3216NP02A562J085AA			



## 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%					C1608NP01H682J080AA
		0.60 ± 0.15	± 5%					C2012NP01H682J060AA
	2012	1.25 ± 0.20	± 5%			C2012NP02E682J125AA	C2012NP02A682J125AA	
		0.60 ± 0.15	± 5%					C3216NP01H682J060AA
3216	1.15 ± 0.15	± 5%	C3216NP02J682J115AA	C3216NP02W682J115AA		C3216NP02A682J115AA		
	0.80 ± 0.10	± 5%					C1608NP01H822J080AA	
8.2 nF	1608	0.60 ± 0.15	± 5%					C2012NP01H822J060AA
		1.25 ± 0.20	± 5%			C2012NP02E822J125AA	C2012NP02A822J125AA	
	2012	0.60 ± 0.15	± 5%					C3216NP01H822J060AA
		1.15 ± 0.15	± 5%		C3216NP02W822J115AA		C3216NP02A822J115AA	
3216	1.60 ± 0.20	± 5%	C3216NP02J822J160AA					
	1.25 ± 0.20	± 5%	C3225NP02J822J125AA					
10 nF	1608	0.80 ± 0.10	± 5%					C1608NP01H103J080AA
		0.60 ± 0.15	± 5%					C2012NP01H103J060AA
	2012	1.25 ± 0.20	± 5%			C2012NP02E103J125AA	C2012NP02A103J125AA	
		0.60 ± 0.15	± 5%					C3216NP01H103J060AA
3216	1.15 ± 0.15	± 5%			C3216NP02E103J115AA	C3216NP02A103J115AA		
	1.60 ± 0.20	± 5%	C3216NP02J103J160AA	C3216NP02W103J160AA				
3225	1.25 ± 0.20	± 5%	C3225NP02J103J125AA					
	0.85 ± 0.15	± 5%					C2012NP01H153J085AA	
15 nF	2012	0.60 ± 0.15	± 5%					C3216NP01H153J060AA
		1.15 ± 0.15	± 5%				C3216NP02A153J115AA	
	3216	1.60 ± 0.20	± 5%		C3216NP02W153J160AA	C3216NP02E153J160AA		
		1.25 ± 0.20	± 5%				C3225NP02A153J125AA	
3225	1.60 ± 0.20	± 5%	C3225NP02J153J160AA					
	1.25 ± 0.20	± 5%					C2012NP01H223J125AA	
22 nF	2012	0.60 ± 0.15	± 5%					C3216NP01H223J060AA
		1.60 ± 0.20	± 5%			C3216NP02E223J160AA	C3216NP02A223J160AA	
	3216	1.25 ± 0.20	± 5%					C3225NP01H223J125AA
		1.60 ± 0.20	± 5%		C3225NP02E223J160AA	C3225NP02A223J160AA		
3225	2.30 ± 0.20	± 5%	C3225NP02J223J230AA	C3225NP02W223J230AA				
	1.25 ± 0.20	± 5%					C2012NP01H333J125AA	
33 nF	2012	0.85 ± 0.15	± 5%					C3216NP01H333J085AA
		1.60 ± 0.20	± 5%				C3216NP02A333J160AA	
	3216	1.60 ± 0.20	± 5%					C3225NP01H333J160AA
		2.00 ± 0.20	± 5%				C3225NP02A333J200AA	
3225	2.30 ± 0.20	± 5%			C3225NP02E333J230AA			
	2.50 ± 0.30	± 5%	C3225NP02J333J250AA	C3225NP02W333J250AA				
4532	2.00 ± 0.20	± 5%	C4532NP02J333J200KA					
	1.15 ± 0.15	± 5%					C3216NP01H473J115AA	
47 nF	3216	2.00 ± 0.20	± 5%					C3225NP01H473J200AA
		2.30 ± 0.20	± 5%				C3225NP02A473J230AA	
	3225	2.50 ± 0.30	± 5%			C3225NP02E473J250AA		
		1.60 ± 0.20	± 5%					C4532NP01H473J160KA
4532	2.00 ± 0.20	± 5%					C4532NP02A473J200KA	
	2.30 ± 0.20	± 5%		C4532NP02W473J230KA				
3216	3.20 ± 0.30	± 5%	C4532NP02J473J320KA					
	1.60 ± 0.20	± 5%					C3216NP01H683J160AA	
68 nF	3225	2.00 ± 0.20	± 5%					C3225NP01H683J200AA
		2.30 ± 0.20	± 5%				C3225NP02A683J230AA	
	4532	1.60 ± 0.20	± 5%					C4532NP01H683J160KA
		2.30 ± 0.20	± 5%		C4532NP02E683J230KN			
4532	2.50 ± 0.30	± 5%				C4532NP02A683J250KA		
	3.20 ± 0.30	± 5%		C4532NP02W683J320KA				
100 nF	3216	1.60 ± 0.20	± 5%					C3216NP01H104J160AA
		2.50 ± 0.30	± 5%					C3225NP01H104J250AA
	3225	2.00 ± 0.20	± 5%					C4532NP01H104J200KA
		3.20 ± 0.30	± 5%			C4532NP02E104J320KN	C4532NP02A104J320KA	
5750	2.80 ± 0.30	± 5%		C5750NP02W104J280KA				
	2.50 ± 0.30	± 5%					C4532NP01H154J250KA	
150 nF	5750	2.30 ± 0.20	± 5%			C5750NP02E154J230KN	C5750NP02A154J230KA	
		3.20 ± 0.30	± 5%					C4532NP01H224J320KA





## 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%	C1005X8R2A151K050BA	C1005X8R1H151K050BA		
			± 20%	C1005X8R2A151M050BA	C1005X8R1H151M050BA		
220 pF	1005	0.50 ± 0.05	± 10%	C1005X8R2A221K050BA	C1005X8R1H221K050BA		
			± 20%	C1005X8R2A221M050BA	C1005X8R1H221M050BA		
330 pF	1005	0.50 ± 0.05	± 10%	C1005X8R2A331K050BA	C1005X8R1H331K050BA		
			± 20%	C1005X8R2A331M050BA	C1005X8R1H331M050BA		
470 pF	1005	0.50 ± 0.05	± 10%	C1005X8R2A471K050BA	C1005X8R1H471K050BA		
			± 20%	C1005X8R2A471M050BA	C1005X8R1H471M050BA		
680 pF	1005	0.50 ± 0.05	± 10%	C1005X8R2A681K050BA	C1005X8R1H681K050BA		
			± 20%	C1005X8R2A681M050BA	C1005X8R1H681M050BA		
1 nF	1005	0.50 ± 0.05	± 10%	C1005X8R2A102K050BA	C1005X8R1H102K050BA		
			± 20%	C1005X8R2A102M050BA	C1005X8R1H102M050BA		
	1608	0.80 ± 0.10	± 10%	C1608X8R2A102K080AA	C1608X8R1H102K080AA		
			± 20%	C1608X8R2A102M080AA	C1608X8R1H102M080AA		
1.5 nF	1005	0.50 ± 0.05	± 10%	C1005X8R2A152K050BA	C1005X8R1H152K050BA		
			± 20%	C1005X8R2A152M050BA	C1005X8R1H152M050BA		
	1608	0.80 ± 0.10	± 10%	C1608X8R2A152K080AA	C1608X8R1H152K080AA		
			± 20%	C1608X8R2A152M080AA	C1608X8R1H152M080AA		
2.2 nF	1005	0.50 ± 0.05	± 10%	C1005X8R2A222K050BA	C1005X8R1H222K050BA		
			± 20%	C1005X8R2A222M050BA	C1005X8R1H222M050BA		
	1608	0.80 ± 0.10	± 10%	C1608X8R2A222K080AA	C1608X8R1H222K080AA		
			± 20%	C1608X8R2A222M080AA	C1608X8R1H222M080AA		
3.3 nF	1005	0.50 ± 0.05	± 10%	C1005X8R2A332K050BB	C1005X8R1H332K050BA		
			± 20%	C1005X8R2A332M050BB	C1005X8R1H332M050BA		
	1608	0.80 ± 0.10	± 10%	C1608X8R2A332K080AA	C1608X8R1H332K080AA		
			± 20%	C1608X8R2A332M080AA	C1608X8R1H332M080AA		
4.7 nF	1005	0.50 ± 0.05	± 10%		C1005X8R1H472K050BA		
			± 20%		C1005X8R1H472M050BA		
	1608	0.80 ± 0.10	± 10%	C1608X8R2A472K080AA	C1608X8R1H472K080AA		
			± 20%	C1608X8R2A472M080AA	C1608X8R1H472M080AA		
6.8 nF	1005	0.50 ± 0.05	± 10%		C1005X8R1H682K050BB	C1005X8R1E682K050BA	
			± 20%		C1005X8R1H682M050BB	C1005X8R1E682M050BA	
	1608	0.80 ± 0.10	± 10%	C1608X8R2A682K080AA	C1608X8R1H682K080AA		
			± 20%	C1608X8R2A682M080AA	C1608X8R1H682M080AA		
10 nF	1005	0.50 ± 0.05	± 10%		C1005X8R1H103K050BB	C1005X8R1E103K050BA	
			± 20%		C1005X8R1H103M050BB	C1005X8R1E103M050BA	
	1608	0.80 ± 0.10	± 10%	C1608X8R2A103K080AA	C1608X8R1H103K080AA		
			± 20%	C1608X8R2A103M080AA	C1608X8R1H103M080AA		
15 nF	1005	0.50 ± 0.05	± 10%			C1005X8R1E153K050BB	
			± 20%			C1005X8R1E153M050BB	
	1608	0.80 ± 0.10	± 10%	C1608X8R2A153K080AA	C1608X8R1H153K080AA		
			± 20%	C1608X8R2A153M080AA	C1608X8R1H153M080AA		
22 nF	1005	0.50 ± 0.05	± 10%			C1005X8R1E223K050BB	
			± 20%			C1005X8R1E223M050BB	
	1608	0.80 ± 0.10	± 10%	C1608X8R2A223K080AB	C1608X8R1H223K080AA		
			± 20%	C1608X8R2A223M080AB	C1608X8R1H223M080AA		
	2012	1.25 ± 0.20	± 10%	C2012X8R2A223K125AA			
			± 20%	C2012X8R2A223M125AA			
33 nF	1005	0.50 ± 0.05	± 10%				C1005X8R1C333K050BB
			± 20%				C1005X8R1C333M050BB
	1608	0.80 ± 0.10	± 10%	C1608X8R2A333K080AB	C1608X8R1H333K080AA		
			± 20%	C1608X8R2A333M080AB	C1608X8R1H333M080AA		
	2012	1.25 ± 0.20	± 10%	C2012X8R2A333K125AB			
			± 20%	C2012X8R2A333M125AB			
	3216	0.85 ± 0.15	± 10%	C3216X8R2A333K085AA			
			± 20%	C3216X8R2A333M085AA			



## 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
47 nF	1005	0.50 ± 0.05	± 10%				C1005X8R1C473K050BB
			± 20%				C1005X8R1C473M050BB
	1608	0.80 ± 0.10	± 10%		C1608X8R1H473K080AA		
			± 20%		C1608X8R1H473M080AA		
2012	1.25 ± 0.20	± 10%	C2012X8R2A473K125AB				
		± 20%	C2012X8R2A473M125AB				
3216	0.85 ± 0.15	± 10%	C3216X8R2A473K085AA				
		± 20%	C3216X8R2A473M085AA				
68 nF	1608	0.80 ± 0.10	± 10%		C1608X8R1H683K080AB	C1608X8R1E683K080AA	
			± 20%		C1608X8R1H683M080AB	C1608X8R1E683M080AA	
	2012	1.25 ± 0.20	± 10%	C2012X8R2A683K125AB	C2012X8R1H683K125AA		
			± 20%	C2012X8R2A683M125AB	C2012X8R1H683M125AA		
3216	1.15 ± 0.15	± 10%	C3216X8R2A683K115AA				
		± 20%	C3216X8R2A683M115AA				
100 nF	1608	0.80 ± 0.10	± 10%		C1608X8R1H104K080AB	C1608X8R1E104K080AA	
			± 20%		C1608X8R1H104M080AB	C1608X8R1E104M080AA	
	2012	1.25 ± 0.20	± 10%		C2012X8R1H104K125AA		
			± 20%		C2012X8R1H104M125AA		
3216	1.15 ± 0.15	± 10%	C3216X8R2A104K115AA				
		± 20%	C3216X8R2A104M115AA				
150 nF	1608	0.80 ± 0.10	± 10%			C1608X8R1E154K080AB	
			± 20%			C1608X8R1E154M080AB	
	2012	0.85 ± 0.15	± 10%			C2012X8R1E154K085AA	
			± 20%			C2012X8R1E154M085AA	
	3216	0.85 ± 0.15	± 10%		C3216X8R1H154K125AB		
			± 20%		C3216X8R1H154M125AB		
3216	1.60 ± 0.20	± 10%	C3216X8R2A154K160AA				
		± 20%	C3216X8R2A154M160AA				
220 nF	1608	0.80 ± 0.10	± 10%			C1608X8R1E224K080AB	
			± 20%			C1608X8R1E224M080AB	
	2012	1.25 ± 0.20	± 10%		C2012X8R1H224K125AB	C2012X8R1E224K125AA	
			± 20%		C2012X8R1H224M125AB	C2012X8R1E224M125AA	
	3216	1.15 ± 0.15	± 10%		C3216X8R1H224K115AA		
			± 20%		C3216X8R1H224M115AA		
3216	1.60 ± 0.20	± 10%	C3216X8R2A224K160AB				
		± 20%	C3216X8R2A224M160AB				
330 nF	1608	0.80 ± 0.10	± 10%				C1608X8R1C334K080AB
			± 20%				C1608X8R1C334M080AB
	2012	1.25 ± 0.20	± 10%			C2012X8R1E334K125AA	
			± 20%			C2012X8R1E334M125AA	
3216	0.85 ± 0.15	± 10%			C3216X8R1E334K085AA		
		± 20%			C3216X8R1E334M085AA		
470 nF	1608	0.80 ± 0.10	± 10%				C1608X8R1C474K080AB
			± 20%				C1608X8R1C474M080AB
	2012	1.25 ± 0.20	± 10%			C2012X8R1E474K125AB	
			± 20%			C2012X8R1E474M125AB	
	3216	0.85 ± 0.15	± 10%			C3216X8R1E474K085AA	
			± 20%			C3216X8R1E474M085AA	
3216	1.60 ± 0.20	± 10%		C3216X8R1H474K160AA			
		± 20%		C3216X8R1H474M160AA			
3225	2.00 ± 0.20	± 10%	C3225X8R2A474K200AB				
		± 20%	C3225X8R2A474M200AB				



## 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
680 nF	2012	1.25 ± 0.20	± 10%				C2012X8R1C684K125AB
			± 20%				C2012X8R1C684M125AB
	3216	1.15 ± 0.15	± 10%			C3216X8R1E684K115AA	
			± 20%			C3216X8R1E684M115AA	
	3216	1.60 ± 0.20	± 10%		C3216X8R1H684K160AB		
			± 20%		C3216X8R1H684M160AB		
3225	2.50 ± 0.30	± 10%	C3225X8R2A684K250AB				
		± 20%	C3225X8R2A684M250AB				
1 µF	2012	1.25 ± 0.20	± 10%				C2012X8R1C105K125AB
			± 20%				C2012X8R1C105M125AB
3216	1.60 ± 0.20	± 10%		C3216X8R1H105K160AB	C3216X8R1E105K160AA		
		± 20%		C3216X8R1H105M160AB	C3216X8R1E105M160AA		
1.5 µF	3216	1.60 ± 0.20	± 10%			C3216X8R1E155K160AB	
			± 20%			C3216X8R1E155M160AB	
3225	1.60 ± 0.20	± 10%			C3225X8R1E155K160AA		
		± 20%			C3225X8R1E155M160AA		
2.2 µF	3216	1.60 ± 0.20	± 10%			C3216X8R1E225K160AB	
			± 20%			C3216X8R1E225M160AB	
3225	2.00 ± 0.20	± 10%			C3225X8R1E225K200AA		
		± 20%			C3225X8R1E225M200AA		
3.3 µF	3216	1.60 ± 0.20	± 10%				C3216X8R1C335K160AB
			± 20%				C3216X8R1C335M160AB
3225	2.50 ± 0.30	± 10%			C3225X8R1E335K250AA		
		± 20%			C3225X8R1E335M250AA		
4.7 µF	3216	1.60 ± 0.20	± 10%				C3216X8R1C475K160AB
			± 20%				C3216X8R1C475M160AB
3225	2.50 ± 0.30	± 10%			C3225X8R1E475K250AB		
		± 20%			C3225X8R1E475M250AB		
6.8 µF	3225	2.00 ± 0.20	± 10%				C3225X8R1C685K200AB
			± 20%				C3225X8R1C685M200AB
10 µF	3225	2.50 ± 0.30	± 10%				C3225X8R1C106K250AB
			± 20%				C3225X8R1C106M250AB