



## MULTILAYER CERAMIC CHIP CAPACITORS

### **C Series Commercial Grade High Voltage (1000V and over)**

Type:

C3216 [EIA CC1206]  
C3225 [EIA CC1210]  
C4520 [EIA CC1808]  
C4532 [EIA CC1812]  
C5750 [EIA CC2220]

Issue date:  
January 2013



## REMINDERS

Please read before using this product

### SAFETY REMINDERS



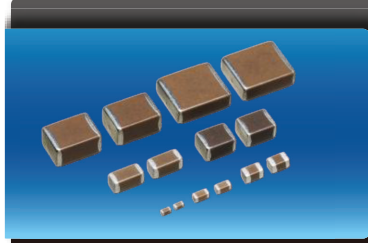
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Notice : Effective January 2013, TDK will use a new catalog part number which adds product thickness and packaging specification detail. This new part number should be referenced on all catalog orders going forward, and is not applicable for OEM part number orders. Please be aware the last five digits of the TDK catalog part number will differ from the TDK item description (internal control number) on the product label. Contact your local TDK Sales representative for more information.

(Example)

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



## C Series High Voltage (1000V and over)

Type: C3216 [EIA CC1206], C3225 [EIA CC1210], C4520 [EIA CC1808], C4532 [EIA CC1812], C5750 [EIA CC2220]



### Features



- Advanced design provides improved withstand voltage characteristics.
- TDK's proprietary internal electrode structure and the use of low-dielectric-strength material result in highly reliable performance in high-voltage applications.
- Complies with ISO8802-3 for LAN applications.
- Designed exclusively for reflow soldering (C3216 type also supports flow soldering).
- AEC-Q200 compliant.

### Applications



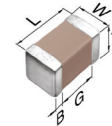
- Inverter circuits with a liquid crystal backlight
- LAN card
- General high voltage circuits
- Noise bypass for power supply
- Transceiver for LAN
- Hub, etc.

### Cautions



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

### Shape & Dimensions



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



### Part Number Construction

**C • 5750 • X7S • 3A • 473 • K • 250 • K • A**

#### Series Name

#### Dimensions L x W (mm)

Code	Length	Width	Terminal
C3216	3.20 ± 0.20	1.60 ± 0.20	0.20 min.
C3225	3.20 ± 0.40	2.50 ± 0.30	0.20 min.
C4520	4.50 ± 0.40	2.00 ± 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.

#### Temperature Characteristics

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

#### Rated Voltage (DC)

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

#### Nominal Capacitance (pF)

The capacitance is expressed in three digit codes and in units of pico Farads (pF). The first and second digits identify the first and second significant figures of the capacitance. The third digit identifies the multiplier. R designates a decimal point.

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

#### Capacitance Tolerance

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

#### Nominal Thickness

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

#### Packaging Style

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

#### Special Reserved Code

Code	Description
A	TDK Internal Code



## Capacitance Range Chart

## EIA CC1206 [C3216]

### Capacitance Range Chart

Temperature Characteristics: X7S ( $\pm 22\%$ )  
 Rated Voltage: 2KV (3D), 1KV (3A)

Capacitance (pF)	Code	Tolerance	X7S	
			3D (2KV)	3A (1KV)
100	101	K: $\pm 10\%$	0.85 mm	
220	221	M: $\pm 20\%$	0.85 mm	
470	471		1.30 mm	
1,000	102			0.85 mm
2,200	222			1.30 mm

Standard Thickness  
 0.85 mm  
 1.30 mm



## Capacitance Range Chart

## EIA CC1210 [C3225]

### Capacitance Range Chart

Temperature Characteristics: X7S ( $\pm 22\%$ )  
 Rated Voltage: 2KV (3D), 1KV (3A)

Capacitance (pF)	Code	Tolerance	X7S	
			3D (2KV)	3A (1KV)
1,000	102	K: $\pm 10\%$	1.60 mm	
2,200	222	M: $\pm 20\%$	2.00 mm	
4,700	472		2.50 mm	

Standard Thickness  
 1.60 mm  
 2.00 mm  
 2.50 mm



## Capacitance Range Chart

## EIA CC1808 [C4520]

### Capacitance Range Chart

Temperature Characteristics: C0G ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), CH ( $0 \pm 60\text{ppm}/^\circ\text{C}$ ), JB ( $\pm 10\%$ ), X7R ( $\pm 15\%$ ), X7S ( $\pm 22\%$ )  
 Rated Voltage: 3KV (3D), 2KV (3D), 1KV (3A)

Capacitance (pF)	Code	Tolerance	C0G		CH		JB		X7R		X7S
			3F (3KV)	3F (3KV)	3D (2KV)	3A (1KV)	3D (2KV)	3A (1KV)	3A (1KV)		
10	100	F: $\pm 1\text{pF}$	0.85 mm	0.85 mm							
12	120	K: $\pm 10\%$	0.85 mm	0.85 mm							
15	150		1.10 mm	1.10 mm							
18	180	M: $\pm 20\%$	1.10 mm	1.10 mm							
22	220		1.30 mm	1.30 mm							
27	270										
33	330										
39	390										
47	470										
56	560										
68	680										
82	820										
100	101		1.30 mm	1.30 mm							
470	471				1.30 mm	1.30 mm	1.30 mm	1.30 mm			
1,000	102										1.60 mm
2,200	222										2.00 mm
4,700	472										2.00 mm

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



## Capacitance Range Chart

## EIA CC1812 [C4532]

### Capacitance Range Chart

Temperature Characteristics: C0G ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), CH ( $0 \pm 60\text{ppm}/^\circ\text{C}$ ), JB ( $\pm 10\%$ ), X7R ( $\pm 15\%$ ), X7S ( $\pm 22\%$ )  
 Rated Voltage: 3KV (3D), 2KV (3D), 1KV (3A)

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

Standard Thickness

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



## Capacitance Range Chart

## EIA CC2220 [C5750]

### Capacitance Range Chart

Temperature Characteristics: X7S ( $\pm 22\%$ )  
 Rated Voltage: 2KV (3D), 1KV (3A)

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

Standard Thickness

- 1.60 mm
- 2.00 mm
- 2.50 mm



## Capacitance Range Table

### Class 1 (Temperature Compensating)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	TDK Part Number		
				Rated Voltage Edc: 3KV	Rated Voltage Edc: 2KV	Rated Voltage Edc: 1KV
10 pF	4520	0.85 ± 0.15	± 1pF	C4520C0G3F100F085KA		
12 pF	4520	0.85 ± 0.15	± 10%	C4520C0G3F120K085KA		
15 pF	4520	1.10 ± 0.20	± 10%	C4520C0G3F150K110KA		
18 pF	4520	1.10 ± 0.20	± 10%	C4520C0G3F180K110KA		
22 pF	4520	1.10 ± 0.20	± 10%	C4520C0G3F220K110KA		
27 pF	4520	1.60 ± 0.20	± 10%	C4520C0G3F270K160KA		
33 pF	4520	1.60 ± 0.20	± 10%	C4520C0G3F330K160KA		
39 pF	4520	1.60 ± 0.20	± 10%	C4520C0G3F390K160KA		
47 pF	4520	1.60 ± 0.20	± 10%	C4520C0G3F470K160KA		
56 pF	4520	2.00 ± 0.20	± 10%	C4520C0G3F560K200KA		
68 pF	4520	2.00 ± 0.20	± 10%	C4520C0G3F680K200KA		
82 pF	4520	2.00 ± 0.20	± 10%	C4520C0G3F820K200KA		
100 pF	4520	2.00 ± 0.20	± 10%	C4520C0G3F101K200KA		
	4532	1.60 ± 0.20	± 10%	C4532C0G3F101K160KA		
120 pF	4532	1.60 ± 0.20	± 10%	C4532C0G3F121K160KA		
150 pF	4532	1.60 ± 0.20	± 10%	C4532C0G3F151K160KA		
180 pF	4532	1.60 ± 0.20	± 10%	C4532C0G3F181K160KA		
220 pF	4532	2.00 ± 0.20	± 10%	C4532C0G3F221K200KA		
270 pF	4532	2.30 ± 0.20	± 10%	C4532C0G3F271K230KA		
330 pF	4532	2.50 ± 0.30	± 10%	C4532C0G3F331K250KA		

### Class 1 (Temperature Compensating)

Temperature Characteristics: CH(-25 to +85°C, 0 ± 60 ppm/°C)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	TDK Part Number		
				Rated Voltage Edc: 3KV	Rated Voltage Edc: 2KV	Rated Voltage Edc: 1KV
10 pF	4520	0.85 ± 0.15	± 1pF	C4520CH3F100F085KA		
12 pF	4520	0.85 ± 0.15	± 10%	C4520CH3F120K085KA		
15 pF	4520	1.10 ± 0.20	± 10%	C4520CH3F150K110KA		
18 pF	4520	1.10 ± 0.20	± 10%	C4520CH3F180K110KA		
22 pF	4520	1.10 ± 0.20	± 10%	C4520CH3F220K110KA		
27 pF	4520	1.60 ± 0.20	± 10%	C4520CH3F270K160KA		
33 pF	4520	1.60 ± 0.20	± 10%	C4520CH3F330K160KA		
39 pF	4520	1.60 ± 0.20	± 10%	C4520CH3F390K160KA		
47 pF	4520	1.60 ± 0.20	± 10%	C4520CH3F470K160KA		
56 pF	4520	2.00 ± 0.20	± 10%	C4520CH3F560K200KA		
68 pF	4520	2.00 ± 0.20	± 10%	C4520CH3F680K200KA		
82 pF	4520	2.00 ± 0.20	± 10%	C4520CH3F820K200KA		
100 pF	4520	2.00 ± 0.20	± 10%	C4520CH3F101K200KA		
	4532	1.60 ± 0.20	± 10%	C4532CH3F101K160KA		
120 pF	4532	1.60 ± 0.20	± 10%	C4532CH3F121K160KA		
150 pF	4532	1.60 ± 0.20	± 10%	C4532CH3F151K160KA		
180 pF	4532	1.60 ± 0.20	± 10%	C4532CH3F181K160KA		
220 pF	4532	2.00 ± 0.20	± 10%	C4532CH3F221K200KA		
270 pF	4532	2.30 ± 0.20	± 10%	C4532CH3F271K230KA		
330 pF	4532	2.50 ± 0.30	± 10%	C4532CH3F331K250KA		

### Class 2 (Temperature Stable)

Temperature Characteristics: JB (-25 to +85°C, ±10%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	TDK Part Number		
				Rated Voltage Edc: 3KV	Rated Voltage Edc: 2KV	Rated Voltage Edc: 1KV
470 pF	4520	1.30 ± 0.20	± 10%		C4520JB3D471K130KA	C4520JB3A471K130KA
			± 20%		C4520JB3D471M130KA	C4520JB3A471M130KA
1 nF	4520	1.30 ± 0.20	± 10%		C4520JB3D102K130KA	C4520JB3A102K130KA
			± 20%		C4520JB3D102M130KA	C4520JB3A102M130KA
2.2 nF	4532	1.30 ± 0.20	± 10%		C4532JB3D222K130KA	
			± 20%		C4532JB3D222M130KA	
4.7 nF	4532	1.60 ± 0.20	± 10%			C4532JB3A472K160KA
			± 20%			C4532JB3A472M160KA
10 nF	4532	2.00 ± 0.20	± 10%			C4532JB3A103K200KA
			± 20%			C4532JB3A103M200KA



## Capacitance Range Table

### Class 2 (Temperature Stable)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	TDK Part Number		
				Rated Voltage Edc: 3KV	Rated Voltage Edc: 2KV	Rated Voltage Edc: 1KV
470 pF	4520	1.30 ± 0.20	± 10%		C4520X7R3D471K130KA	C4520X7R3A471K130KA
			± 20%		C4520X7R3D471M130KA	C4520X7R3A471M130KA
1 nF	4520	1.30 ± 0.20	± 10%		C4520X7R3D102K130KA	C4520X7R3A102K130KA
			± 20%		C4520X7R3D102M130KA	C4520X7R3A102M130KA
2.2 nF	4532	1.30 ± 0.20	± 10%		C4532X7R3D222K130KA	
			± 20%		C4532X7R3D222M130KA	
4.7 nF	4532	1.60 ± 0.20	± 10%			C4532X7R3A472K160KA
			± 20%			C4532X7R3A472M160KA
10 nF	4532	2.00 ± 0.20	± 10%			C4532X7R3A103K200KA
			± 20%			C4532X7R3A103M200KA

### Class 2 (Temperature Stable)

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

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	TDK Part Number		
				Rated Voltage Edc: 3KV	Rated Voltage Edc: 2KV	Rated Voltage Edc: 1KV
100 pF	3216	0.85 ± 0.10	± 10%		C3216X7S3D101K085AA	
			± 20%		C3216X7S3D101M085AA	
220 pF	3216	0.85 ± 0.10	± 10%		C3216X7S3D221K085AA	
			± 20%		C3216X7S3D221M085AA	
470 pF	3216	1.30 ± 0.10	± 10%		C3216X7S3D471K130AA	
			± 20%		C3216X7S3D471M130AA	
1 nF	3216	0.85 ± 0.10	± 10%			C3216X7S3A102K085AA
			± 20%			C3216X7S3A102M085AA
	3225	2.00 ± 0.20	± 10%		C3225X7S3D102K200AA	
2.2 nF	3216	1.30 ± 0.10	± 10%			C3216X7S3A222K130AA
			± 20%			C3216X7S3A222M130AA
	3225	2.50 ± 0.30	± 10%		C3225X7S3D222K250AA	
			± 20%		C3225X7S3D222M250AA	
	4520	1.60 ± 0.20	± 10%			C4520X7S3A222K160KA
			± 20%			C4520X7S3A222M160KA
4532	1.60 ± 0.20	± 10%		C4532X7S3D222K160KA		
		± 20%		C4532X7S3D222M160KA		
4.7 nF	3225	1.60 ± 0.20	± 10%			C3225X7S3A472K160AA
			± 20%			C3225X7S3A472M160AA
	4520	1.60 ± 0.20	± 10%		C4520X7S3A472K160KA	
10 nF	5750	2.00 ± 0.20	± 10%		C5750X7S3D472K200KA	
			± 20%		C5750X7S3D472M200KA	
	4532	1.60 ± 0.20	± 10%			C4532X7S3A103K160KA
22 nF	5750	1.60 ± 0.20	± 10%		C5750X7S3D103K250KA	
			± 20%		C5750X7S3D103M250KA	
	5750	2.50 ± 0.30	± 10%			C5750X7S3A223K160KA
47 nF	5750	1.60 ± 0.20	± 10%			C5750X7S3A223M160KA
			± 20%			C5750X7S3A473K250KA
	5750	2.50 ± 0.30	± 10%			C5750X7S3A473M250KA