



MULTILAYER CERAMIC CHIP CAPACITORS



C Series Soft Termination Type

Type: C2012 [EIA CC0805]
C3216 [EIA CC1206]
C3225 [EIA CC1210]
C4532 [EIA CC1812]
C5750 [EIA CC2220]

Issue date: April 2011

**TDK MLCC
US Catalog**

Version B11

REMINDERS

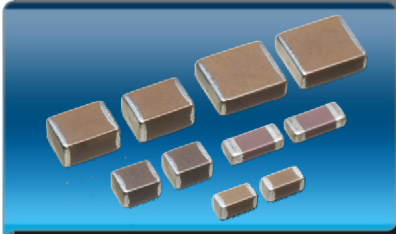
Please read before using this product

SAFETY REMINDERS



REMINDERS

1. If you intend to use a product listed in this catalog for a purpose that may cause loss of life or other damage, you must contact our company's sales window.
2. We may modify products or discontinue production of a product listed in this catalog without prior notification.
3. We provide "Delivery Specification" that explain precautions for the specifications and safety of each product listed in this catalog. We strongly recommend that you exchange these delivery specifications with customers that use one of these products.
4. If you plan to export a product listed in this catalog, keep in mind that it may be a restricted item according to the "Foreign Exchange and Foreign Trade Control Law". In such cases, it is necessary to acquire export permission in harmony with this law.
5. Any reproduction or transferring of the contents of this catalog is prohibited without prior permission from our company.
6. We are not responsible for problems that occur related to the intellectual property rights or other rights of our company or a third party when you use a product listed in this catalog. We do not grant license of these rights.
7. This catalog only applies to products purchased through our company or one of our company's official agencies. This catalog does not apply to products that are purchased through other third parties.



C Series Soft Termination Type

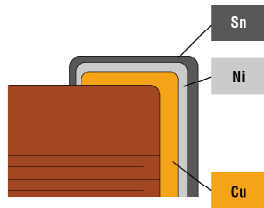
Type: C2012, C3216, C3225, C4532, C5750

Features

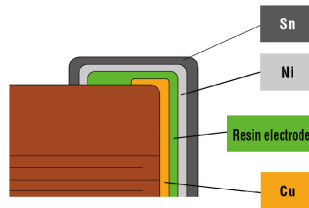


- Conductive resin layer inside the terminal electrode absorbs external stress from thermal or mechanical sources.
- Improved board bending resistance and drop resistance prevents crack occurrence within the ceramic component.
- Reduce risk of solder cracks due to thermal shock and temperature cycling as well as improved board adhesions.

Standard Product



Soft Termination



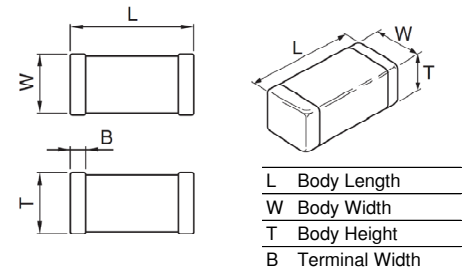
➤ A resin electrode layer between the copper base and the nickel plating of the terminal electrode absorbs bending stress from the board and suppresses the forming of solder cracks. Conductive resin is made of epoxy mixed with a filler of conductive particles.

Applications



- ECU / Sensor module / ABS units / HID and other automotive electronic equipment
- Switching power supply
- Telecom base station
- Electronic circuits mounted on alumina substrate
- SMT application which requires bending robustness
- Pb-free solder application in which solder joint reliability is problematic

Shape & Dimensions



Dimensions in mm



Part Number Construction

Series Name C 3225 X7S 1H 106 M /SOFT

Dimensions L x W (mm)

Case Code	Length	Width
C2012	2.00 ± 0.20	1.25 ± 0.20
C3216	3.20 ± 0.20	1.60 ± 0.20
C3225	3.20 ± 0.40	2.50 ± 0.30
C4532	4.50 ± 0.40	3.20 ± 0.40
C5750	5.70 ± 0.40	5.00 ± 0.40

Temperature Characteristic

Temperature Characteristics	Capacitance Change	Temperature Range
X7R	± 15%	-55 to +125°C
X7S	± 22%	-55 to +125°C
X7T	+22/-33%	-55 to +125°C

Rated Voltage (DC)

Voltage Code	Voltage (DC)
1C	16V
1E	25V
1V	35V
1H	50V
2A	100V
2E	250V
2W	450V
2J	630V

Termination Type

Termination Code	Style
/SOFT	Epoxy Termination

Capacitance Tolerance

Tolerance Code	Tolerance
M	± 20%

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.

Capacitance Code	Capacitance
0R5	0.5pF
010	1pF
102	1,000pF (1nF)
105	1,000,000pF (1μF)



Capacitance Range Chart

C2012 [EIA CC0805]

Capacitance Range Chart

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$), X7T (+22/-33%)

Rated Voltage: 450V (2W), 250V (2E), 100V (2A), 50V (1H), 35V (1V), 16V (1C)

Capacitance (pF)	Cap Code	Tolerance	X7R				X7S	X7T	
			2E (250V)	1H (50V)	1V (35V)	1C (16V)	2A (100V)	2W (450V)	2E (250V)
10,000	103	M: $\pm 20\%$	■					■	
22,000	223							■	
47,000	473							■	■
100,000	104						■		
220,000	224						■		
470,000	474			■			■		
1,000,000	105				■				
2,200,000	225					■			
4,700,000	475					■			

Standard Thickness

0.85 \pm 0.15 mm
 1.25 \pm 0.20 mm



Capacitance Range Table

C2012 [EIA CC0805]

Class 2 (Temperature Stable)

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$), X7T (+22/-33%)

TDK Part Number (Ordering Code)	Temperature Characteristics	Rated Voltage	Capacitance (pF)	Capacitance Tolerance	Thickness (mm)
C2012X7R1C475M/SOFT	X7R	16V	4,700,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7R1V225M/SOFT	X7R	35V	2,200,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7R1H474M/SOFT	X7R	50V	470,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7R1H105M/SOFT	X7R	50V	1,000,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7R2E103M/SOFT	X7R	250V	10,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7R2E223M/SOFT	X7R	250V	22,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7S2A224M/SOFT	X7S	100V	220,000	$\pm 20\%$	0.85 \pm 0.15
C2012X7S2A474M/SOFT	X7S	100V	470,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7S2A105M/SOFT	X7S	100V	1,000,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7T2E473M/SOFT	X7T	250V	47,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7T2E104M/SOFT	X7T	250V	100,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7T2W103M/SOFT	X7T	450V	10,000	$\pm 20\%$	0.85 \pm 0.15
C2012X7T2W223M/SOFT	X7T	450V	22,000	$\pm 20\%$	1.25 \pm 0.20
C2012X7T2W473M/SOFT	X7T	450V	47,000	$\pm 20\%$	1.25 \pm 0.20



Capacitance Range Chart

C3216 [EIA CC1206]

Capacitance Range Chart

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$), X7T ($+22/-33\%$)

Rated Voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A), 50V (1H), 35V (1V), 25V (1E)

Capacitance (pF)	Cap Code	Tolerance	X7R					X7S	X7T			
			2J (630V)	2E (250V)	2A (100V)	1H (50V)	1V (35V)	1E (25V)	2A (100V)	2J (630V)	2W (450V)	2E (250V)
10,000	103	M: $\pm 20\%$										
22,000	223											
47,000	473											
100,000	104											
220,000	224											
470,000	474											
1,000,000	105											
2,200,000	225											
4,700,000	475											
10,000,000	106											

Standard Thickness

1.15 \pm 0.15 mm
 1.30 \pm 0.20 mm
 1.60 \pm 0.20 mm



Capacitance Range Table

C3216 [EIA CC1206]

Class 2 (Temperature Stable)

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$), X7T ($+22/-33\%$)

TDK Part Number (Ordering Code)	Temperature Characteristics	Rated Voltage	Capacitance (pF)	Capacitance Tolerance	Thickness (mm)
C3216X7R1E106M/SOFT	X7R	25V	10,000,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7R1V475M/SOFT	X7R	35V	4,700,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7R1H105M/SOFT	X7R	50V	1,000,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7R1H225M/SOFT	X7R	50V	2,200,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7R2A474M/SOFT	X7R	100V	470,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7R2A105M/SOFT	X7R	100V	1,000,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7R2E104M/SOFT	X7R	250V	100,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7R2J103M/SOFT	X7R	630V	10,000	$\pm 20\%$	1.15 \pm 0.15
C3216X7R2J223M/SOFT	X7R	630V	22,000	$\pm 20\%$	1.30 \pm 0.20
C3216X7S2A225M/SOFT	X7S	100V	2,200,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7T2E224M/SOFT	X7T	250V	220,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7T2W104M/SOFT	X7T	450V	100,000	$\pm 20\%$	1.60 \pm 0.20
C3216X7T2J473M/SOFT	X7T	630V	47,000	$\pm 20\%$	1.60 \pm 0.20



Capacitance Range Chart

C3225 [EIA CC1210]

Capacitance Range Chart

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$), X7T (+22/-33%)
 Rated Voltage: 630V (2J), 450V (2W), 250V (2E), 100V (2A), 50V (1H)

Capacitance (pF)	Cap Code	Tolerance	X7R			X7S		X7T	
			2J (630V)	2E (250V)	2A (100V)	2A (100V)	1H (50V)	2J (630V)	2W (450V)
47,000	473	M: $\pm 20\%$	■						
100,000	104			■				■	
220,000	224				■				■
470,000	474								
1,000,000	105								
2,200,000	225					■	■		
4,700,000	475							■	
10,000,000	106							■	

Standard Thickness

1.60 \pm 0.20 mm
 2.00 \pm 0.20 mm
 2.30 \pm 0.20 mm
 2.50 \pm 0.30 mm



Capacitance Range Table

C3225 [EIA CC1210]

Class 2 (Temperature Stable)

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$), X7T (+22/-33%)

TDK Part Number (Ordering Code)	Temperature Characteristics	Rated Voltage	Capacitance (pF)	Capacitance Tolerance	Thickness (mm)
C3225X7R2A225M/SOFT	X7R	100V	2,200,000	$\pm 20\%$	2.30 \pm 0.20
C3225X7R2E104M/SOFT	X7R	250V	100,000	$\pm 20\%$	2.00 \pm 0.20
C3225X7R2E224M/SOFT	X7R	250V	220,000	$\pm 20\%$	2.00 \pm 0.20
C3225X7R2J473M/SOFT	X7R	630V	47,000	$\pm 20\%$	2.00 \pm 0.20
C3225X7S1H475M/SOFT	X7S	50V	4,700,000	$\pm 20\%$	2.30 \pm 0.20
C3225X7S1H106M/SOFT	X7S	50V	10,000,000	$\pm 20\%$	2.50 \pm 0.30
C3225X7S2A475M/SOFT	X7S	100V	4,700,000	$\pm 20\%$	2.00 \pm 0.20
C3225X7T2W224M/SOFT	X7T	450V	220,000	$\pm 20\%$	2.00 \pm 0.20
C3225X7T2J104M/SOFT	X7T	630V	100,000	$\pm 20\%$	1.60 \pm 0.20



Capacitance Range Chart

C4532 [EIA CC1812]




Capacitance Range Chart

Temperature Characteristics: X7R ($\pm 15\%$), X7T (+22/-33%)

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

Capacitance (pF)	Cap Code	Tolerance	X7R	X7T		
			2E (250V)	2J (630V)	2W (450V)	2E (250V)
100,000	104	M: $\pm 20\%$				
220,000	224					
470,000	474					
1,000,000	105					
2,200,000	225					
4,700,000	475					
10,000,000	106					

Standard Thickness

 2.00 \pm 0.20 mm
  2.30 \pm 0.20 mm
  2.50 \pm 0.30 mm



Capacitance Range Table

C4532 [EIA CC1812]

Class 2 (Temperature Stable)

Temperature Characteristics: X7R ($\pm 15\%$), X7T (+22/-33%)

TDK Part Number (Ordering Code)	Temperature Characteristics	Rated Voltage	Capacitance (pF)	Capacitance Tolerance	Thickness (mm)
C4532X7R2E474M/SOFT	X7R	250V	470,000	$\pm 20\%$	2.30 \pm 0.20
C4532X7T2E105M/SOFT	X7T	250V	1,000,000	$\pm 20\%$	2.50 \pm 0.30
C4532X7T2W474M/SOFT	X7T	450V	470,000	$\pm 20\%$	2.30 \pm 0.20
C4532X7T2J224M/SOFT	X7T	630V	220,000	$\pm 20\%$	2.00 \pm 0.20



Capacitance Range Chart

C5750 [EIA CC2220]

Capacitance Range Chart

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$), X7T (+22/-33%)

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

Capacitance (pF)	Cap Code	Tolerance	X7R	X7S	X7T		
			2E (250V)	2A (100V)	2J (630V)	2W (450V)	2E (250V)
100,000	104	M: $\pm 20\%$					
220,000	224						
470,000	474						
1,000,000	105						
2,200,000	225						
4,700,000	475						
10,000,000	106						

Standard Thickness

2.30 \pm 0.20 mm 2.50 \pm 0.30 mm



Capacitance Range Table

C5750 [EIA CC2220]

Class 2 (Temperature Stable)

Temperature Characteristics: X7R ($\pm 15\%$), X7S ($\pm 22\%$), X7T (+22/-33%)

TDK Part Number (Ordering Code)	Temperature Characteristics	Rated Voltage	Capacitance (pF)	Capacitance Tolerance	Thickness (mm)
C5750X7R2E105M/SOFT	X7R	250V	1,000,000	$\pm 20\%$	2.30 \pm 0.20
C5750X7S2A106M/SOFT	X7S	100V	10,000,000	$\pm 20\%$	2.30 \pm 0.20
C5750X7T2E225M/SOFT	X7T	250V	2,200,000	$\pm 20\%$	2.50 \pm 0.30
C5750X7T2W105M/SOFT	X7T	450V	1,000,000	$\pm 20\%$	2.50 \pm 0.30
C5750X7T2J474M/SOFT	X7T	630V	470,000	$\pm 20\%$	2.50 \pm 0.30