

## Telecom Tip & Ring, X7R Dielectric, 250 VDC (Commercial Grade)

### Overview

The KEMET 250 VDC Tip and Ring MLCCs in X7R dielectric are designed and rated for telecommunication ringer circuits, where the capacitor is used to block -48 to -52 VDC of line voltage and pass a 16 - 25 Hz AC signal pulse of 70 Vrms to 90 Vrms. Serving as an excellent replacement for high voltage leaded film devices, these smaller surface mount technology footprints save valuable board space, which is critical when creating new designs.

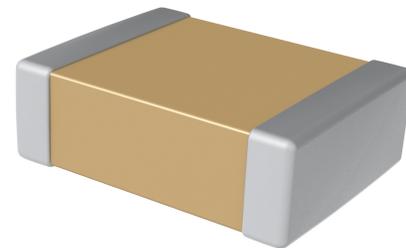
The KEMET Tip and Ring capacitors feature a 125°C maximum operating temperature and are considered temperature stable. The Electronics Industries Alliance (EIA) characterizes X7R dielectric as a Class II material.

Components of this classification are fixed, ceramic dielectric capacitors suited for bypass and decoupling applications or for frequency discriminating circuits, where Q and stability of capacitance characteristics are not critical. X7R dielectric exhibits a predictable change in capacitance with respect to time and voltage, and boasts a minimal change in capacitance with reference to ambient temperature. Capacitance change is limited to  $\pm 15\%$  from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

These devices are able to withstand today's higher lead-free reflow processing temperatures and offer superior high frequency filtering characteristics and low ESR.

### Benefits

- $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  operating temperature range
- Lead (Pb)-free, RoHS and REACH compliant
- EIA 0603, 0805, 1206, 1210, 1812, 1825, 2220 and 2225 case sizes
- DC voltage rating of 250 V
- Capacitance offerings ranging from 180 pF to .47  $\mu\text{F}$
- Available capacitance tolerances of  $\pm 5\%$ ,  $\pm 10\%$  and  $\pm 20\%$
- Non-polar device, minimizing installation concerns
- 100% pure matte tin-plated termination finish that allows for excellent solderability
- SnPb termination finish option available upon request (5% Pb minimum)
- Flexible termination option available upon request



### Applications

Typical applications include telecommunication ringing circuits, switch mode power supply snubber circuits, high voltage DC blocking and high voltage coupling. Markets include telephone lines, analog and digital modems, facsimile machines, wireless base stations, cable and digital video recording set-top boxes, satellite dishes, high voltage power supply, DC/DC converters, and Ethernet, POS and ATM hardware.





## Electrical Parameters/Characteristics

Item	Parameters/Characteristics
Operating Temperature Range	-55°C to +125°C
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC)	±15%
<sup>1</sup> Aging Rate (Maximum % Capacitance Loss/Decade Hour)	3.0%
<sup>2</sup> Dielectric Withstanding Voltage (DWV)	250% of rated voltage (5 ±1 seconds and charge/discharge not exceeding 50 mA)
<sup>3</sup> Dissipation Factor (DF) Maximum Limit at 25°C	5% (6.3 V and 10 V), 3.5% (16 V and 25 V) and 2.5% (50 V to 250 V)
<sup>4</sup> Insulation Resistance (IR) Minimum Limit at 25°C	See Insulation Resistance Limit Table (Rated voltage applied for 120 ±5 seconds at 25°C)

<sup>1</sup> Regarding Aging Rate: Capacitance measurements (including tolerance) are indexed to a referee time of 1,000 hours.

<sup>2</sup> DWV is the voltage a capacitor can withstand (survive) for a short period of time. It exceeds the nominal and continuous working voltage of the capacitor.

<sup>3</sup> Capacitance and dissipation factor (DF) measured under the following conditions:

1 kHz ±50 Hz and 1.0 ±0.2 V<sub>rms</sub> if capacitance ≤ 10 μF

120 Hz ±10 Hz and 0.5 ±0.1 V<sub>rms</sub> if capacitance > 10 μF

<sup>4</sup>To obtain IR limit, divide MΩ-μF value by the capacitance and compare to GΩ limit. Select the lower of the two limits.

Note: When measuring capacitance it is important to ensure the set voltage level is held constant. The HP4284 and Agilent E4980 have a feature known as Automatic Level Control (ALC). The ALC feature should be switched to "ON."







**Table 2B – Bulk Packaging Quantities**

Packaging Type		Loose Packaging	
		Bulk Bag (default)	
Packaging C-Spec <sup>1</sup>		N/A <sup>2</sup>	
Case Size		Packaging Quantities (pieces/unit packaging)	
EIA (in)	Metric (mm)	Minimum	Maximum
0402	1005	1	50,000
0603	1608		
0805	2012		
1206	3216		
1210	3225		
1808	4520		20,000
1812	4532		
1825	4564		
2220	5650		
2225	5664		

<sup>1</sup> The "Packaging C-Spec" is a 4 to 8 digit code which identifies the packaging type and/or product grade. When ordering, the proper code must be included in the 15th through 22nd character positions of the ordering code. See "Ordering Information" section of this document for further details. Commercial grade product ordered without a packaging C-Spec will default to our standard "Bulk Bag" packaging. Contact KEMET if you require a bulk bag packaging option for automotive grade products.

<sup>2</sup> A packaging C-Spec (see note 1 above) is not required for "Bulk Bag" packaging (excluding Anti-Static Bulk Bag and automotive grade products). The 15th through 22nd character positions of the ordering code should be left blank. All product ordered without a packaging C-Spec will default to our standard "Bulk Bag" packaging.

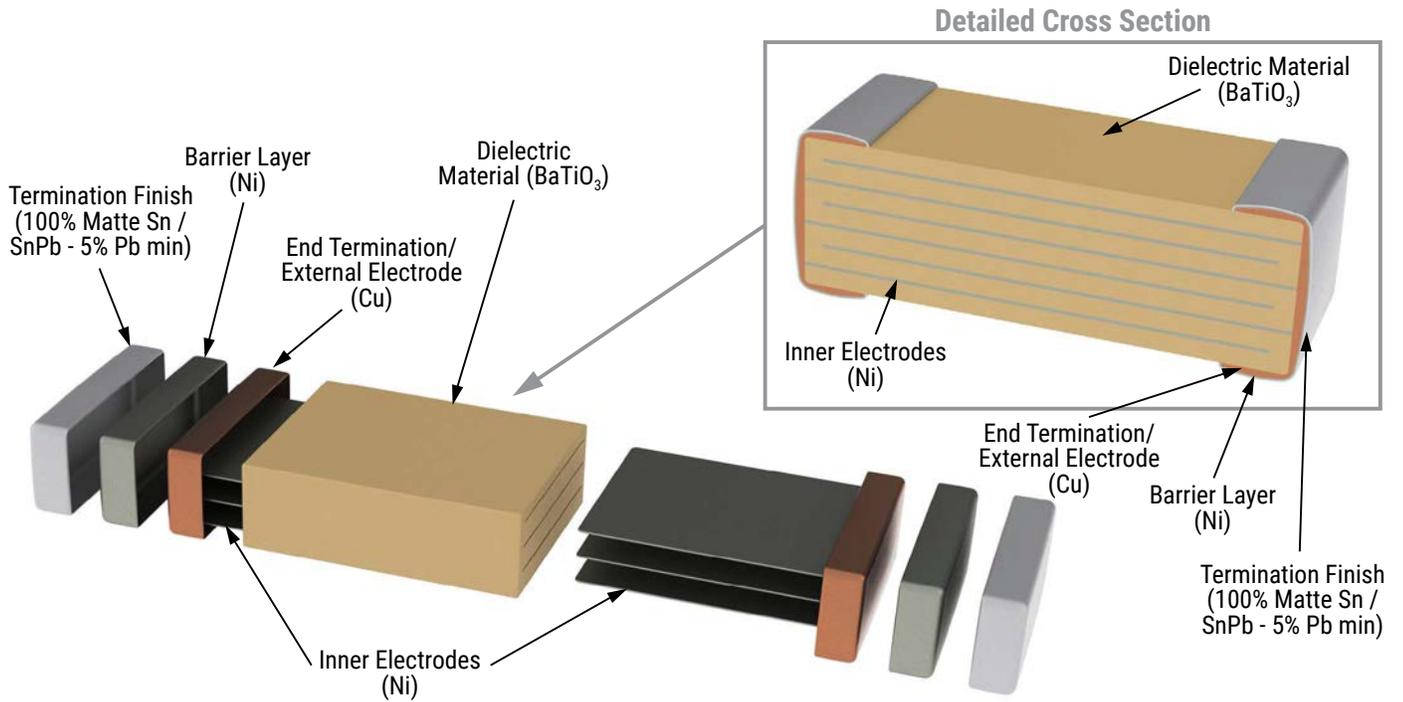




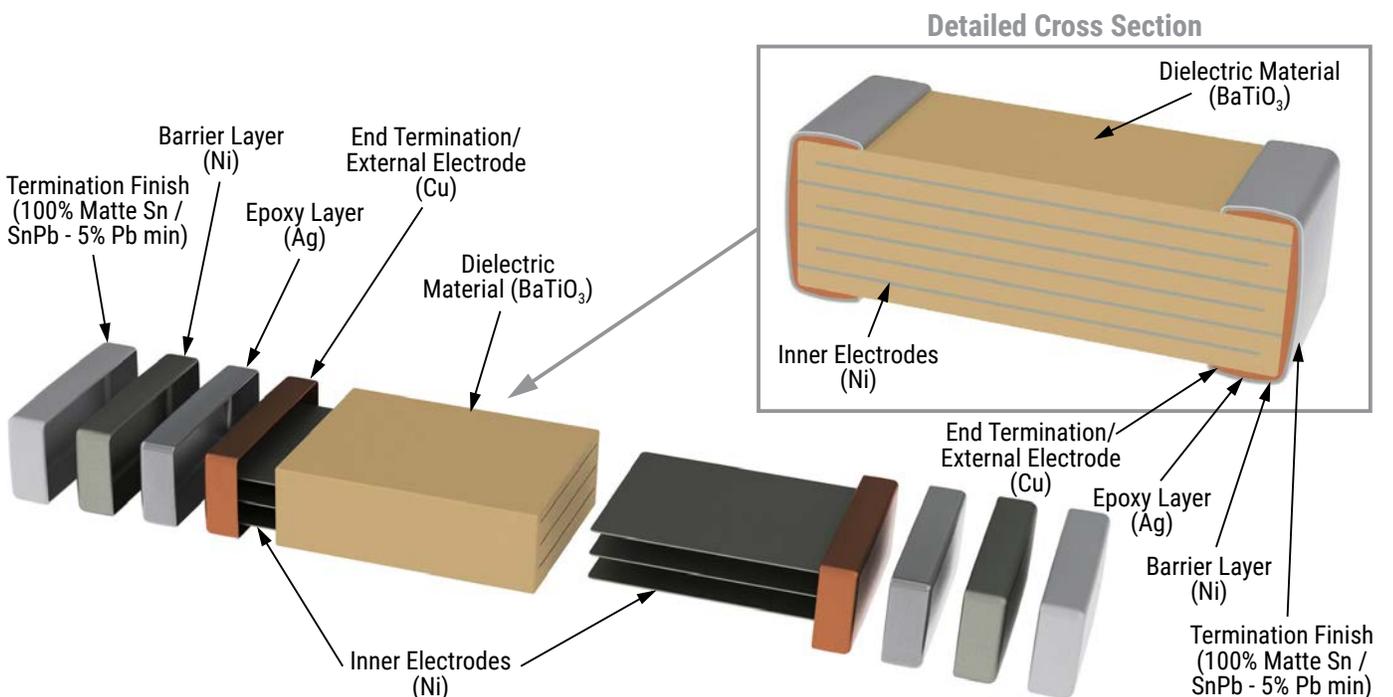




## Construction – Standard Termination



## Construction – Flexible Termination









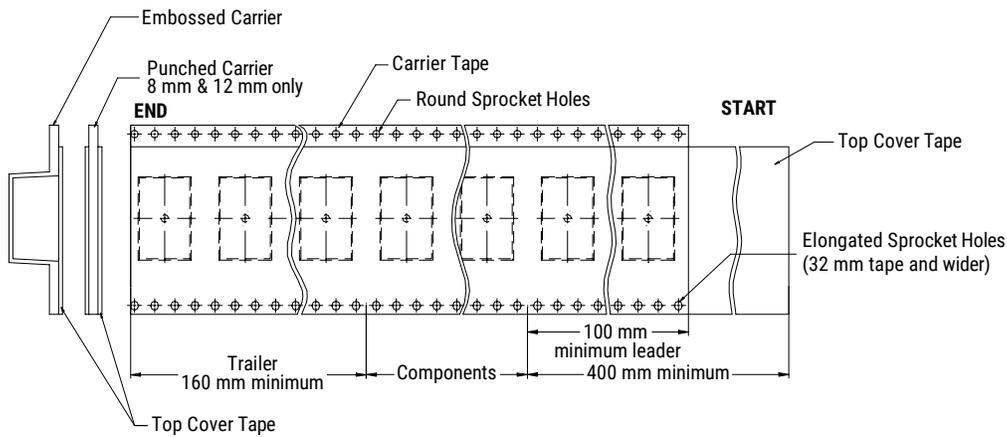




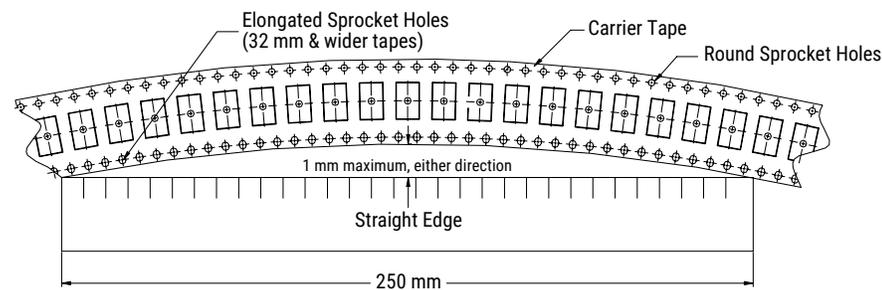




**Figure 7 – Tape Leader & Trailer Dimensions**



**Figure 8 – Maximum Camber**



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Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.

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