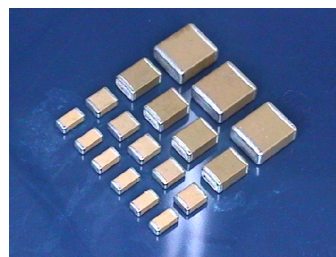


Multilayer Ceramic Chip Capacitors [Tip & Ring Capacitors]

SAC Series



In telephone lines the DC voltage is 48 volts and pass the subscriber's AC signal pulse(15 to 25Hz, 70 to 90Vrms).

These MLCC ringer capacitors replace bulk leaded film capacitors and offer excellent frequency response, low ESR, and improved temperature characteristics. Ideal for telecommunication/modem applications.

◆ Features

- Small Size & High Capacitance
- Suitable for Wave and Reflow Soldering
- Surface Mount
- Low ESR characteristics & improved temperature performance
- RoHS compliant

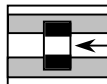
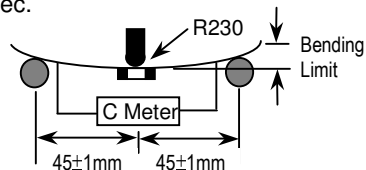
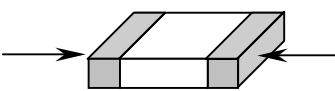
◆ Summary of Specification

Operation temperature	X7R : -55~+125 °C , Y5U : -30~+85 °C
Rated Voltage	250Vdc
Temperature Coefficient	Y5U : ≤ +22 /-56 % , -30~+85 °C (EIA Class II)
	X7R : ≤ ± 15% , -55~+125 °C (EIA Class II)
Capacitance Range	Y5U : 10nF ~ 1.0uF
	X7R : 180pF ~ 2.2uF
Dissipation Factor :	Y5U : D.F. ≤ 4.0% ; X7R : D.F. ≤ 2.5%
Insulation Resistance	10GΩ or 500/C Ω whichever is smaller
Dielectric Strength	200% Rated Voltage for 5 second @ 50mA max. current
Aging	Y5U: 4.0 % ; X7R: 2.5 % per decade hr , Typical

◆ How To Order

C	1812	X	474	M	251	T
Product Code	Chip Size	Dielectric	Capacitance Unit : pF	Tolerance	Rated Voltage	Packaging
C: MLCC (Multilayer Ceramic Chip of Capacitor)	Ex.: 0805 : 2.0×1.25 mm 1206 : 3.2×1.60 mm 1210 : 3.2×2.50 mm 1812 : 4.6×3.20 mm 2220 : 5.7×5.00 mm	Ex.: X : X7R E : Y5U	Ex.: 103:10×10 ³ 474:47×10 ⁴	Ex.: K: +/- 10% M: +/- 20%	Ex.: 251:250Vdc	T: Taping & Reel B: Bulk

SAC Series Specification & Test Condition

Item	Specification		Test Condition
Operation Temperature	Char. X7R(X) Y5U(E)	Operation Temp. -55°C ~ +125°C -30°C ~ +85°C	
Visual	No Abnormal Exterior Appearance		Visual Inspection
Capacitance	Within The Specified Tolerance		Frequency Voltage
Dissipation Factor	Char. X7R(X) Y5U(E)	D.F. (max.) 2.5% 4.0%	1KHz ±10% 1.0 ± 0.2Vrms
Insulation Resistance	10,000MΩ or 500/C Ω whichever is smaller. (C in Farad)		Applied Voltage : Rated Voltage Charge Time : 60±5 sec. Charge-Discharge current shall be less than 50mA current.
Withstanding Voltage	No dielectric breakdown or mechanical breakdown		200% of the rated voltage for 1~5 sec. Current is limited to less than 50mA.
Temperature Capacitance Coefficient	Char. X7R(X) Y5U(E)	Temp. Range -55°C ~ +125°C -30°C ~ +85°C	Cap. Change ± 15% +22/-56%
Adhesive Strength of Termination	No indication of peeling shall occur on the terminal electrode.		 <p>A 5N·f (≈ 0.5Kg·f) pull force shall be applied for 10±1 sec.</p>
Resistance to Flexure of Substrate	No mechanical damage or change capacitance more than the following table.		The board shall be bent 1.0mm with a rate of 1.0 mm/sec.
	Char. X7R(X) Y5U(E)	Capacitance Change ≤ ± 12.5% of initial value ≤ ± 30.0% of initial value	
Solderability	More than 90% of the terminal surface is to be soldered newly, so metal part does not come out or dissolve.		 <p>Solder Temperature : 245±5°C Dip Time : 5 ± 0.5 sec. Immersing Speed : 25±10% mm/s Solder : H63A Flux : Rosin Preheat : At 80~120 °C For 10~30sec.</p>
Resistance to Soldering Heat	Appearance	No mechanical damage shall occur	Capacitor shall be set for 48± 4 hours at room temperature after one hour heat treatment at 150 +0/-10°C before initial measurement.
	Capacitance	Char. Cap. change X7R(X) ≤ ±7.5% of initial value Y5U(E) ≤ ±20% of initial value	Preheat : at 150±10°C for 60~120sec. Dip : solder temperature of 260±5°C Dip Time : 10 ± 1sec. Immersing Speed : 25±10% mm/s Solder : H63A Flux : Rosin
	Tanδ	To satisfy the specified initial value	
	Insulation Resistance	To satisfy the specified initial value	Measure at room temperature after cooling for 48 ± 4 Hours

SAC Series Specification & Test Condition

Item	Specification	Test Condition															
Temperature Cycle	Appearance	No mechanical damage shall occur															
	Capacitance	<table border="1"> <thead> <tr> <th>Char.</th> <th>Cap. change</th> </tr> </thead> <tbody> <tr> <td>X7R(X)</td> <td>$\leq \pm 7.5\%$ of initial value</td> </tr> <tr> <td>Y5U(E)</td> <td>$\leq \pm 20\%$ of initial value</td> </tr> </tbody> </table>	Char.	Cap. change	X7R(X)	$\leq \pm 7.5\%$ of initial value	Y5U(E)	$\leq \pm 20\%$ of initial value									
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		<p>Capacitor shall be set for 48\pm4 hours at room temperature after one hour heat treatment at 150 +0/-10 °C before initial measurement. Capacitor shall be subjected to five cycles of the temperature cycle as following:</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min Rated Temp.+0/-3</td> <td>30</td> </tr> <tr> <td>2</td> <td>25</td> <td>3</td> </tr> <tr> <td>3</td> <td>Max Rated Temp.+3/-0</td> <td>30</td> </tr> <tr> <td>4</td> <td>25</td> <td>3</td> </tr> </tbody> </table> <p>Measure at room temperature after cooling for 48 \pm 4 Hours</p>	Step	Temp.(°C)	Time(min)	1	Min Rated Temp.+0/-3	30	2	25	3	3	Max Rated Temp.+3/-0	30	4	25	3
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Humidity	Appearance	No mechanical damage shall occur															
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		<p>Capacitor shall be set for 48\pm4 hours at room temperature after one hour heat treatment at 150 +0/-10 °C before initial measurement.</p> <p>Temperature : 40\pm2 °C Relative Humidity : 90 ~95%RH Test Time : 500 +12/-0 hr</p> <p>Measure at room temperature after cooling for 48 \pm 4 Hours</p>															
High Temperature Load (Life Test)	Appearance	No mechanical damage shall occur															
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		<p>Capacitors applied DC voltage of 150% the rated voltage is applied for one hour at maximum operation temperature $\pm 3^\circ\text{C}$ then shall be set for 48\pm4 hours at room temperature and the initial measurement shall be conducted.</p> <p>Applied Voltage :150%Rated Voltage Temperature : max. operating temperature Test Time : 1000 +48/-0Hr Current Applied : 50 mA Max.</p> <p>Measure at room temperature after cooling for 48 \pm 4 Hours</p>															
Vibration	Appearance	No mechanical damage shall occur															
	Capacitance	Within the specified tolerance															
	Tan δ	To satisfy the specified initial value															
		<p>Solder the capacitor on P.C. board.</p> <p>Vibrate the capacitor with amplitude of 1.5mm P-P changing the frequencies from 10Hz to 55Hz and back to 10Hz in about 1 min.</p> <p>Repeat this for 2 hours each in 3 perpendicular directions.</p>															