

SPECIFICATION

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor

- Samsung P/N: **CL05A475MR5NQNC**
- Description : **CAP, 4.7 μ F, 4V, \pm 20%, X5R, 0402**

A. Samsung Part Number

CL 05 A 475 M R 5 N Q N C
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① Series	Samsung Multi-layer Ceramic Capacitor		
② Size	0402 (inch code)	L: 1.0 \pm 0.1 mm	W: 0.5 \pm 0.1 mm
③ Dielectric	X5R	⑧ Inner electrode	Ni
④ Capacitance	4.7 μ F	Termination	Cu
⑤ Capacitance tolerance	\pm 20 %	Plating	Sn 100% (Pb Free)
⑥ Rated Voltage	4 V	⑨ Product	0402 Size dimension spec
⑦ Thickness	0.5 \pm 0.1 mm	⑩ Special	Reserved for future use
		⑪ Packaging	Cardboard Type, 7" reel

B. Samsung Reliability Test and Judgement condition

	Judgement	Test condition
Capacitance	Within specified tolerance	1kHz \pm 10% 0.5 \pm 0.1Vrms
Tan δ (DF)	0.125 max.	
Insulation Resistance	10,000Mohm or 50Mohm $\cdot\mu$ F Whichever is Smaller	Rated Voltage 60~120 sec.
Appearance	No abnormal exterior appearance	Microscope (\times 10)
Withstanding Voltage	No dielectric breakdown or mechanical breakdown	250% of the rated voltage
Temperature Characterisitcs	X5R (From -55 $^{\circ}$ C to 85 $^{\circ}$ C, Capacitance change should be within \pm 15%)	
Adhesive Strength of Termination	No peeling shall be occur on the terminal electrode	500g \cdot F, for 10 \pm 1 sec.
Bending Strength	Capacitance change : within \pm 12.5%	Bending to the limit (1mm) with 1.0mm/sec.
Solderability	More than 75% of terminal surface is to be soldered newly	1) Sn63Pb37 solder 235 \pm 5 $^{\circ}$ C, 5 \pm 0.5sec. 2) SnAg3.0Cu0.5 solder 245 \pm 5 $^{\circ}$ C, 3 \pm 0.3sec. (preheating : 80~120 $^{\circ}$ C for 10~30sec.)
Resistance to Soldering heat	Capacitance change : within \pm 7.5% Tan δ , IR : initial spec.	Solder pot : 270 \pm 5 $^{\circ}$ C, 10 \pm 1sec.

	Judgement	Test condition
Vibration Test	Capacitance change : within $\pm 5\%$ Tan δ , IR : initial spec.	Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours \times 3 direction (x, y, z)
Humidity	Capacitance change : within $\pm 12.5\%$ Tan δ 0.25 max IR : 17.7M $\Omega \cdot \mu F$ or Over	40 ± 2 °C, 90~95%RH, 500+12/-0hrs
Moisture Resistance	Capacitance change : within $\pm 12.5\%$ Tan δ 0.25 max IR : 8.9M $\Omega \cdot \mu F$ or Over	With rated voltage 40 ± 2 °C, 90~95%RH, 500+12/-0hrs
High Temperature Resistance	Capacitance change : within $\pm 12.5\%$ Tan δ 0.25 max IR : 17.7M $\Omega \cdot \mu F$ or Over	With 100% of the rated voltage Max. operating temperature 1000+48/-0hrs
Temperature Cycling	Capacitance change : within $\pm 10\%$ Tan δ , IR : initial spec.	1 cycle condition Min. operating temperature \rightarrow 25°C \rightarrow Max. operating temperature \rightarrow 25°C 5 cycle test

C. Recommended Soldering method :

Reflow (Reflow Peak Temperature : 260+0/-5°C, 10sec. Max)

* For the more detail Specification, Please refer to the Samsung MLCC catalogue.