



SPECIFICATION

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

A. Samsung Part Number

CL 31 B 475 K P H N N N E
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① Series	Samsung Multi-layer Ceramic Capacitor		
② Size	1206 (inch code)	L: 3.2 ± 0.2 mm	W: 1.6 ± 0.2 mm
③ Dielectric	X7R	⑧ Inner electrode	Ni
④ Capacitance	$4.7 \mu\text{F}$	Termination	Cu
⑤ Capacitance tolerance	$\pm 10\%$	Plating	Sn 100% (Pb Free)
⑥ Rated Voltage	10 V	⑨ Product	Normal
⑦ Thickness	1.6 ± 0.2 mm	⑩ Special	Reserved for future use
		⑪ Packaging	Embossed Type, 13" reel(8,000ea)

B. Samsung Reliability Test and Judgement condition

	Performance	Test condition	
Capacitance	Within specified tolerance	1kHz $\pm 10\%$	1.0 ± 0.2 VRms
Tan δ (DF)	0.05 max.		
Insulation Resistance	More than 100Mohm $\cdot \mu\text{F}$	Rated Voltage	60~120 sec.
Appearance	No abnormal exterior appearance	Visual inspection	
Withstanding Voltage	No dielectric breakdown or mechanical breakdown	250% of the rated voltage	
Temperature Characteristics	X7R (From -55°C to 125°C, Capacitance change should be within $\pm 15\%$)		
Adhesive Strength of Termination	No peeling shall occur on the terminal electrode	500g·F, for 10 ± 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	SnAg3.0Cu0.5 solder 245 ± 5 °C, 3 ± 0.3 sec. (preheating : 80~120 °C for 10~30sec.)	
Resistance to Soldering heat	Capacitance change : within $\pm 7.5\%$ Tan δ , IR : initial spec.	Solder pot : 270 ± 5 °C, 10 ± 1 sec.	

	Performance	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)
Moisture Resistance	Capacitance change : within $\pm 12.5\%$ Tan δ : 0.075 max IR : More than $25\text{M}\Omega \cdot \mu\text{F}$	With rated voltage $40 \pm 2^\circ\text{C}$, 90~95%RH, 500+12/-0 hours
High Temperature Resistance	Capacitance change : within $\pm 12.5\%$ Tan δ : 0.075 max IR : More than $50\text{M}\Omega \cdot \mu\text{F}$	With 200% of the rated voltage Max. operating temperature 1000+48/-0 hours
Temperature Cycling	Capacitance change : within $\pm 7.5\%$ Tan δ , IR : initial spec.	1 cycle condition Min. operating temperature $\rightarrow 25^\circ\text{C}$ \rightarrow Max. operating temperature $\rightarrow 25^\circ\text{C}$ 5 cycles test

C. Recommended Soldering method :

Reflow (Reflow Peak Temperature : $260 \pm 0/-5^\circ\text{C}$, 10sec. Max)

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