

SPECIFICATION

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

- Samsung P/N : **CL31B475KPHNNWE**
- Description : **CAP, 4.7 μ F, 10V, $\pm$ 10%, X7R, 1206**

A. Samsung Part Number

CL **31** **B** **475** **K** **P** **H** **N** **N** **W** **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 μF			Termination	Cu					
⑤ Capacitance tolerance	±10 %			Plating	Sn 100% (Pb Free)					
⑥ Rated Voltage	10 V			⑨ Product	Normal					
⑦ Thickness	1.6 ± 0.2 mm			⑩ Special	Product for Network application					
				⑪ Packaging	Embossed Type, 7" reel					

B. Samsung Reliability Test and Judgement condition

	Performance	Test condition
Capacitance	Within specified tolerance	1kHz $\pm$ 10% 1.0 $\pm$ 0.2Vrms
Tan δ (DF)	0.05 max.	
Insulation Resistance	10,000Mohm or 100Mohm $\cdot\mu$ 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 Characteristics	X7R (From -55 $^{\circ}$ C to 125 $^{\circ}$ 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	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.

	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 : 500Mohm or 25Mohm $\cdot \mu F$ Whichever is Smaller	With rated voltage 40 ± 2 °C, 90~95%RH, 500+12/-0hrs
High Temperature Resistance	Capacitance change : within $\pm 12.5\%$ Tan δ : 0.075 max IR : 1000Mohm or 50Mohm $\cdot \mu F$ Whichever is Smaller	With 200% of the rated voltage Max. operating temperature 1000+48/-0hrs
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 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.