

SPECIFICATION

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

- Samsung P/N : [CL21A475KPFNNNF](#)
- Description : [CAP, 4.7 \$\mu\$ F, 10V, \$\pm\$ 10%, X5R, 0805](#)

A. Samsung Part Number

CL 21 A 475 K P F N N N F
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① Series	Samsung Multi-layer Ceramic Capacitor					
② Size	0805 (inch code)	L: 2.0 ± 0.1	mm	W: 1.25 ± 0.1	mm	
③ Dielectric	X5R			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	1.25 ± 0.1	mm		⑩ Special	Reserved for future use	
				⑪ Packaging	Embossed Type, 13" reel (10,000ea)	

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)	0.1 max.	
Insulation Resistance	More than 100Mohm $\cdot\mu$ 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	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-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 : 0.125 max IR : More than 12.5M $\Omega \cdot \mu F$	With rated voltage 40 $\pm 2^{\circ}C$, 90~95%RH, 500+12/-0 hour
High Temperature Resistance	Capacitance change : within $\pm 12.5\%$ Tan δ : 0.125 max IR : More than 25M $\Omega \cdot \mu F$	With 150% of the rated voltage Max. operating temperature 1000+48/-0 hour
Temperature Cycling	Capacitance change : within $\pm 7.5\%$ Tan δ , IR : initial spec.	1 cycle condition Min. operating temperature $\rightarrow 25^{\circ}C$ $\rightarrow$ Max. operating temperature $\rightarrow 25^{\circ}C$ 5 cycles test

C. Recommended Soldering method :

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

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