



SPECIFICATION

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

- Samsung P/N : [CL21A225MPFNNNG](#)
- Description : CAP, 2.2 μ F, 10V, $\pm 20\%$, X5R, 0805

A. Samsung Part Number

CL	21	A	225	M	P	F	N	N	N	G
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 \pm 0.1 mm			W: 1.25 \pm 0.1 mm							
③ Dielectric	X5R				⑧ Inner electrode	Ni								
④ Capacitance	2.2 μ F				⑨ Termination	Cu								
⑤ Capacitance tolerance	$\pm 20\%$				⑩ Plating	Sn 100% (Pb Free)								
⑥ Rated Voltage	10 V				⑪ Product	Normal								
⑦ Thickness	1.25 \pm 0.1 mm				⑫ Special	Reserved for future use								
					⑬ Packaging	Embossed Type, 7" reel(3,000ea)								

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 $\cdot \mu$ 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°C to 85°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 ± 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 the more detail Specification, Please refer to the Samsung MLCC catalogue.