

# SPECIFICATION

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

- Samsung P/N : **CL21A225MPFNNG**
- Description : **CAP, 2.2 $\mu$ 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 $\mu$ F			Termination	Cu					
⑤ Capacitance tolerance	$\pm$ 20 %			Plating	Sn 100% (Pb Free)					
⑥ Rated Voltage	10 V			⑨ Product	Normal					
⑦ Thickness	1.25 $\pm$ 0.1 mm			⑩ Special	Reserved for future use					
				⑪ 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 $\pm$ 0.2Vrms
Tan $\delta$ (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 $^{\circ}$ 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 $\delta$ , IR : initial spec.	Solder pot : 270 $\pm$ 5 $^{\circ}$ C, 10 $\pm$ 1sec.

	Performance	Test condition
<b>Vibration Test</b>	Capacitance change : within $\pm 5\%$ Tan $\delta$ , IR : initial spec.	Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours $\times$ 3 direction (x, y, z)
<b>Moisture Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 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
<b>High Temperature Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 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
<b>Temperature Cycling</b>	Capacitance change : within $\pm 7.5\%$ Tan $\delta$ , 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.