



# SPECIFICATION

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

- Samsung P/N : [CL21B225MOFNNNG](#)
- Description : CAP, 2.2 $\mu$ F, 16V,  $\pm 20\%$ , X7R, 0805

## A. Samsung Part Number

**CL 21 B 225 M O F N N N N G**  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① <b>Series</b>	Samsung Multi-layer Ceramic Capacitor		
② <b>Size</b>	0805 (inch code)	L: 2.0 $\pm 0.1$ mm	W: 1.25 $\pm 0.1$ mm
③ <b>Dielectric</b>	X7R	⑧ <b>Inner electrode</b>	Ni
④ <b>Capacitance</b>	2.2 $\mu$ F	⑨ <b>Termination</b>	Cu
⑤ <b>Capacitance tolerance</b>	$\pm 20\%$	⑩ <b>Plating</b>	Sn 100% (Pb Free)
⑥ <b>Rated Voltage</b>	16 V	⑪ <b>Product</b>	Normal
⑦ <b>Thickness</b>	1.25 $\pm 0.1$ mm	⑫ <b>Special</b>	Reserved for future use
		⑬ <b>Packaging</b>	Embossed Type, 7"reel(3,000ea)

## B. Samsung Reliability Test and Judgement condition

	Performance	Test condition	
<b>Capacitance</b>	Within specified tolerance	1kHz $\pm 10\%$	1.0 $\pm 0.2$ Vrms
<b>Tan <math>\delta</math> (DF)</b>	0.05 max.		
<b>Insulation Resistance</b>	More than 100Mohm $\cdot \mu$ F	Rated Voltage	60~120 sec.
<b>Appearance</b>	No abnormal exterior appearance	Visual inspection	
<b>Withstanding Voltage</b>	No dielectric breakdown or mechanical breakdown	250% of the rated voltage	
<b>Temperature characteristics</b>	X7R (From -55°C to 125°C, Capacitance change should be within $\pm 15\%$ )		
<b>Adhesive Strength of Termination</b>	No peeling shall be occur on the terminal electrode	500g·F, for 10 $\pm 1$ sec.	
<b>Bending Strength</b>	Capacitance change : within $\pm 12.5\%$	Bending to the limit (1mm) with 1.0mm/sec.	
<b>Solderability</b>	More than 75% of terminal surface is to be soldered newly	SnAg3.0Cu0.5 solder 245 $\pm 5$ °C, 3 $\pm 0.3$ sec. (preheating : 80~120 °C for 10~30sec.)	
<b>Resistance to Soldering heat</b>	Capacitance change : within $\pm 7.5\%$ Tan $\delta$ , IR : initial spec.	Solder pot : 270 $\pm 5$ °C, 10 $\pm 1$ sec.	

	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 hour
<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 hour
<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.