

# SPECIFICATION

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

- Samsung P/N : **CL32B224KBFNNNE**
- Description : **CAP, 220nF, 50V, ±10%, X7R, 1210**

## A. Samsung Part Number

CL   32   B   224   K   B   F   N   N   N   E  
①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧   ⑨   ⑩   ⑪

① Series	Samsung Multi-layer Ceramic Capacitor									
② Size	1210 (inch code)	L: 3.2 ± 0.3	mm	W: 2.5 ± 0.2	mm					
③ Dielectric	X7R	⑧ Inner electrode			Ni					
④ Capacitance	220 nF	Termination			Cu					
⑤ Capacitance tolerance	±10 %	Plating			Sn 100% (Pb Free)					
⑥ Rated Voltage	50 V	⑨ Product			Normal					
⑦ Thickness	1.25 ± 0.2 mm	⑩ Special			Reserved for future use					
		⑪ Packaging			Embossed Type, 7" reel					

## B. Samsung Reliability Test and Judgement condition

	Performance	Test condition
Capacitance	Within specified tolerance	1kHz±10%      1.0±0.2Vrms
Tan δ (DF)	0.025 max.	
Insulation Resistance	10,000Mohm or 500Mohm·μF Whichever is Smaller	Rated Voltage      60~120 sec.
Appearance	No abnormal exterior appearance	Microscope (×10)
Withstanding Voltage	No dielectric breakdown or mechanical breakdown	250% of the rated voltage
Temperature Characterisitcs	X7R (From -55℃ to 125℃, Capacitance change should be within ±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 ±12.5%	Bending to the limit (1mm) with 1.0mm/sec.
Solderability	More than 75% of terminal surface is to be soldered newly	1) Sn63Pb37 solder 235±5℃, 5±0.5sec. 2) SnAg3.0Cu0.5 solder 245±5℃, 3±0.3sec. (preheating : 80~120℃ for 10~30sec.)
Resistance to Soldering heat	Capacitance change :    within ±7.5% Tan δ, IR : initial spec.	Solder pot : 270±5℃, 10±1sec.

	<b>Performance</b>	<b>Test condition</b>
<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>Humidity</b>	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.05 max IR : 1000Mohm or 50Mohm $\cdot \mu F$ Whichever is Smaller	40 $\pm 2$ °C, 90~95%RH, 500+12/-0hrs
<b>Moisture Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.05 max IR : 500Mohm or 25Mohm $\cdot \mu F$ Whichever is Smaller	With rated voltage 40 $\pm 2$ °C, 90~95%RH, 500+12/-0hrs
<b>High Temperature Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.05 max IR : 1000Mohm or 50Mohm $\cdot \mu F$ Whichever is Smaller	With 200% of the rated voltage Max. operating temperature 1000+48/-0hrs
<b>Temperature Cycling</b>	Capacitance change : within $\pm 7.5\%$ Tan $\delta$ , IR : initial spec.	1 cycle condition Min. operating temperature $\rightarrow$ 25°C $\rightarrow$ Max. operating temperature $\rightarrow$ 25°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.