

# SPECIFICATION

(Reference sheet)

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

- Samsung P/N : **CL21B224KOFNNNE**
- Description : **CAP, 220nF, 16V, ±10%, X7R, 0805**

## A. Samsung Part Number

**CL** **21** **B** **224** **K** **O** **F** **N** **N** **N** **E**  
 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: 2.00 ± 0.10 mm	W: 1.25 ± 0.10 mm
③ <b>Dielectric</b>	X7R	⑧ <b>Inner electrode</b>	Ni
④ <b>Capacitance</b>	220 nF	<b>Termination</b>	Cu
⑤ <b>Capacitance tolerance</b>	±10 %	<b>Plating</b>	Sn 100% (Pb Free)
⑥ <b>Rated Voltage</b>	16 V	⑨ <b>Product</b>	Normal
⑦ <b>Thickness</b>	1.25 ± 0.10 mm	⑩ <b>Special</b>	Reserved for future use
		⑪ <b>Packaging</b>	Embossed Type, 7" reel

## B. Structure & Dimension



Samsung P/N	Dimension(mm)			
	L	W	T	BW
CL21B224KOFNNNE	2.00 ± 0.10	1.25 ± 0.10	1.25 ± 0.10	0.50 +0.20/-0.30

### C. Samsung Reliability Test and Judgement Condition

	Judgement	Test condition
Capacitance	Within specified tolerance	1kHz $\pm 10\%$ / 1.0 $\pm 0.2$ Vrms
Tan $\delta$ (DF)	0.035 max.	*A capacitor prior to measuring the capacitance is heat treated at 150°C +0/-10°C for 1 hour and maintained in ambient air for 24 $\pm 2$ hours.
Insulation Resistance	10,000Mohm or 100Mohm $\times \mu F$ Whichever is smaller	Rated Voltage 60~120 sec.
Appearance	No abnormal exterior appearance	Microscope ( $\times 10$ )
Withstanding Voltage	No dielectric breakdown or mechanical breakdown	250% of the rated voltage
Temperature Characteristics	X7R (From -55°C to 125°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 $\pm 5$ °C, 3 $\pm 0.3$ sec. (preheating : 80~120°C for 10~30sec.)
Resistance to Soldering Heat	Capacitance change : within $\pm 7.5\%$ Tan $\delta$ , IR : initial spec.	Solder pot : 270 $\pm 5$ °C, 10 $\pm 1$ sec.
Vibration Test	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)
Moisture Resistance	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.05 max IR : 500Mohm or 25Mohm $\times \mu F$ Whichever is smaller	With rated voltage 40 $\pm 2$ °C, 90~95%RH, 500+12/-0hrs
High Temperature Resistance	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.05 max IR : 1,000Mohm or 50Mohm $\times \mu F$ Whichever is smaller	With 200% of the rated voltage Max. operating temperature 1000+48/-0hrs
Temperature Cycling	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

※ The reliability test condition can be replaced by the corresponding accelerated test condition.

### D. Recommended Soldering method :

Reflow ( Reflow Peak Temperature : 260+0/-5°C, 10sec. Max )

-  Product specifications included in the specifications are effective as of March 1, 2013.  
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