

SPECIFICATION

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- Samsung P/N : **CL05B223KO5NNND**
- Description : **CAP, 22nF, 16V, ±10%, X7R, 0402**

A. Samsung Part Number

CL 05 B 223 K O 5 N N N D
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① Series	Samsung Multi-layer Ceramic Capacitor		
② Size	0402 (inch code)	L: 1.0 ± 0.05 mm	W: 0.5 ± 0.05 mm
③ Dielectric	X7R	⑧ Inner electrode	Ni
④ Capacitance	22 nF	Termination	Cu
⑤ Capacitance tolerance	±10 %	Plating	Sn 100% (Pb Free)
⑥ Rated Voltage	16 V	⑨ Product	Normal
⑦ Thickness	0.5 ± 0.05 mm	⑩ Special	Reserved for future use
		⑪ Packaging	Cardboard Type, 13" reel

B. Samsung Reliability Test and Judgement condition

	Performance	Test condition
Capacitance	Within specified tolerance	1kHz±10% 1.0±0.2Vrms
Tan δ (DF)	0.035 max.	
Insulation Resistance	10,000Mohm or 100Mohm·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	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.

	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 : 0.05 max IR : 500Mohm or 25Mohm $\cdot \mu F$ Whichever is Smaller	With rated voltage 40 \pm 2 $^{\circ}$ C, 90~95%RH, 500+12/-0hrs
High Temperature Resistance	Capacitance change : within $\pm 12.5\%$ Tan δ : 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
Temperature Cycling	Capacitance change : within $\pm 7.5\%$ Tan δ , IR : initial spec.	1 cycle condition Min. operating temperature \rightarrow 25 $^{\circ}$ C \rightarrow Max. operating temperature \rightarrow 25 $^{\circ}$ C 5 cycle test

C. Recommended Soldering method :

Reflow (Reflow Peak Temperature : 260+0/-5 $^{\circ}$ C, 10sec. Max)

* For the more detail Specification, Please refer to the Samsung MLCC catalogue.