



# SPECIFICATION

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

## A. Samsung Part Number

CL 21 A 226 K Q Q N N N E  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① Series	Samsung Multi-layer Ceramic Capacitor		
② Size	0805 (inch code)	L: $2.0 \pm 0.15$ mm	W: $1.25 \pm 0.15$ mm
③ Dielectric	X5R	⑧ Inner electrode	Ni
④ Capacitance	$22 \mu\text{F}$	Termination	Cu
⑤ Capacitance tolerance	$\pm 10\%$	Plating	Sn 100% (Pb Free)
⑥ Rated Voltage	6.3 V	⑨ Product	Normal
⑦ Thickness	$1.25 \pm 0.15$ mm	⑩ Special	Reserved for future use
		⑪ Packaging	Embossed Type, 13" reel

## B. Samsung Reliability Test and Judgement condition

	Performance	Test condition	
Capacitance	Within specified tolerance	120Hz $\pm 20\%$	0.5 $\pm 0.1$ VRms
Tan $\delta$ (DF)	0.1 max.		
Insulation Resistance	10,000Mohm or $100\text{Mohm} \cdot \mu\text{F}$ 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 Characterisitcs	X5R (From -55°C to 85°C, Capacitance change shoud 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.	

	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 $\delta$ : 0.125 max IR : $12.5\text{M}\Omega \cdot \mu\text{F}$ or Over	With rated voltage $40 \pm 2^\circ\text{C}$ , 90~95%RH, 500+12/-0hrs
<b>High Temperature Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.125 max IR : $25\text{M}\Omega \cdot \mu\text{F}$ or Over	With 150% 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 $\rightarrow 25^\circ\text{C}$ $\rightarrow$ Max. operating temperature $\rightarrow 25^\circ\text{C}$ 5 cycle 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.