

# SPECIFICATION

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

- Samsung P/N : **CL32A226KPJNFNE**
- Description : **CAP, 22 $\mu$ F, 10V,  $\pm$ 10%, X5R, 1210**

## A. Samsung Part Number

**CL**   **32**   **A**   **226**   **K**   **P**   **J**   **N**   **F**   **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 $\pm$ 0.3	mm	W: 2.5 $\pm$ 0.2	mm					
③ Dielectric	X5R			⑧ Inner electrode	Ni					
④ Capacitance	22 $\mu$ F			Termination	Cu					
⑤ Capacitance tolerance	$\pm$ 10 %			Plating	Sn 100% (Pb Free)					
⑥ Rated Voltage	10 V			⑨ Product	Product for POWER application					
⑦ Thickness	2.5 $\pm$ 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	120Hz $\pm$ 20%      0.5 $\pm$ 0.1Vrms
Tan $\delta$ (DF)	0.1 max.	
Insulation Resistance	10,000Mohm or 100Mohm $\cdot\mu$ 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 Characterisitcs	X5R (From -55 $^{\circ}$ C to 85 $^{\circ}$ C, Capacitance change should be within $\pm$ 15%)	
Adhesive Strength of Termination	No peeling shall be occur on the terminal electrode	500g $\cdot$ 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 $^{\circ}$ C, 3 $\pm$ 0.3sec. (preheating : 80~120 $^{\circ}$ C for 10~30sec.)
Resistance to Soldering heat	Capacitance change : within $\pm$ 7.5% Tan $\delta$ , IR : initial spec.	Solder pot : 270 $\pm$ 5 $^{\circ}$ C, 10 $\pm$ 1sec.

	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 : 12.5M $\Omega \cdot \mu F$ 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 : 25M $\Omega \cdot \mu F$ 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+0/-5 $^\circ\text{C}$ , 10sec. Max )

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