



# SPECIFICATION

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- Samsung P/N: **CL05A225KQ5NFNC**
- Description : **CAP, 2.2 $\mu$ F, 6.3V,  $\pm$ 10%, X5R, 0402**

## A. Samsung Part Number

**CL 05 A 225 K Q 5 N F N C**  
 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 $\pm$ 0.05 mm	W: 0.5 $\pm$ 0.05 mm	
③ Dielectric	X5R	⑧ Inner electrode	Ni	
④ Capacitance	2.2 $\mu$ F	Termination	Cu	
⑤ Capacitance tolerance	$\pm$ 10 %	Plating	Sn 100% (Pb Free)	
⑥ Rated Voltage	6.3 V	⑨ Product	Product for POWER application	
⑦ Thickness	0.5 $\pm$ 0.05 mm	⑩ Special	Reserved for future use	
		⑪ Packaging	Cardboard Type, 7" reel	

## B. Samsung Reliability Test and Judgement condition

	Judgement	Test condition
Capacitance	Within specified tolerance	1kHz $\pm$ 10% 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.

	Judgement	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 $40 \pm 2^\circ C$ , 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 100% 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 $\rightarrow 25^\circ C$ $\rightarrow$ Max. operating temperature $\rightarrow 25^\circ C$  5 cycle test

**C. Recommended Soldering method :**

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

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