

SPECIFICATION

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

- Samsung P/N: **CL05X225MP5NUNC**
- Description : **CAP, 2.2 μ F, 10V, \pm 20%, X6S, 0402**

A. Samsung Part Number

CL **05** **X** **225** **M** **P** **5** **N** **U** **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 ± 0.2	mm	W:	0.5 ± 0.2	mm
③ Dielectric	X6S	⑧ Inner electrode	Ni				
④ Capacitance	2.2 μF	Termination	Cu				
⑤ Capacitance tolerance	±20 %	Plating	Sn 100% (Pb Free)				
⑥ Rated Voltage	10 V	⑨ Product	0402 Size dimension Spec.				
⑦ Thickness	0.5 ± 0.2 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 δ (DF)	0.1 max.	
Insulation Resistance	More than 100Mohm $\cdot\mu$ F	Rated Voltage 60~120 sec.
Appearance	No abnormal exterior appearance	Visual inspection
Withstanding Voltage	No dielectric breakdown or mechanical breakdown	250% of the rated voltage
Temperature Characteristics	X6S (From -55 $^{\circ}$ C to 105 $^{\circ}$ C, Capacitance change should be within \pm 22%)	
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 δ , IR : initial spec.	Solder pot : 270 \pm 5 $^{\circ}$ C, 10 \pm 1sec.

	Judgement	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 0.2 max IR : More than 12.5M $\Omega \cdot \mu F$	With rated voltage 40 $\pm 2^\circ C$, 90~95%RH, 500+12/-0 hours
High Temperature Resistance	Capacitance change : within $\pm 12.5\%$ Tan δ 0.2 max IR : More than 25M $\Omega \cdot \mu F$	With 150% of the rated voltage Max. operating temperature 1000+48/-0 hours
Temperature Cycling	Capacitance change : within $\pm 15\%$ Tan δ , IR : initial spec.	1 cycle condition Min. operating temperature $\rightarrow 25^\circ C$ \rightarrow Max. operating temperature $\rightarrow 25^\circ C$ 5 cycles 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.