



# SPECIFICATION (Reference sheet)

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

- Samsung P/N: **CL05A105KO5NNNC**
- Description : **CAP, 1 $\mu$ F, 16V,  $\pm$ 10%, X5R, 0402**

## A. Samsung Part Number

CL 05 A 105 K O 5 N N 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: 1.00 $\pm$ 0.05 mm	W: 0.50 $\pm$ 0.05 mm
③ Dielectric	X5R	⑧ Inner electrode	Ni
④ Capacitance	1 $\mu$ F	Termination	Cu
⑤ Capacitance tolerance	$\pm$ 10 %	Plating	Sn 100% (Pb Free)
⑥ Rated Voltage	16 V	⑨ Product	Normal
⑦ Thickness	0.50 $\pm$ 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% 1.0 $\pm$ 0.2Vrms *A capacitor prior to measuring the capacitance is heat treated at 150 $\pm$ 0/-10 $\pm$ 0 $\pm$ 2 hours.
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 $\pm$ 0 to 85 $\pm$ 0, 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 $\pm$ 0.3sec. (preheating : 80~120 $\pm$ 0 for 10~30sec.)
Resistance to Soldering heat	Capacitance change : within $\pm$ 7.5% Tan $\delta$ , IR : initial spec.	Solder pot : 270 $\pm$ 5 $\pm$ 0, 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 $\delta$ 0.2 max IR : 500Mohm or 12.5 Mohm $\cdot \mu F$ Whichever is Smaller	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 $\delta$ 0.2 max IR : 1,000Mohm or 25Mohm $\cdot \mu F$ Whichever is Smaller	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+0/-5 $^{\circ}$ C, 10sec. Max )

 Product specifications included in the specifications are effective as of March 1, 2013.  
Please be advised that they are standard product specifications for reference only.  
We may change, modify or discontinue the product specifications without notice at any time.  
So, you need to approve the product specifications before placing an order.  
Should you have any question regarding the product specifications,  
please contact our sales personnel or application engineers.