



# SPECIFICATION

(Reference sheet)

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

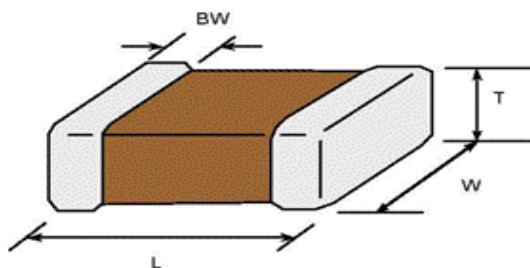
- Samsung P/N: **CL05A104KP5NNND**
- Description : **CAP, 100nF, 10V, ±10%, X5R, 0402**

## A. Samsung Part Number

<b>CL</b>	<b>05</b>	<b>A</b>	<b>104</b>	<b>K</b>	<b>P</b>	<b>5</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>D</b>
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪

① <b>Series</b>	Samsung Multi-layer Ceramic Capacitor			
② <b>Size</b>	0402 (inch code)		L: $1.00 \pm 0.05$ mm	W: $0.50 \pm 0.05$ mm
③ <b>Dielectric</b>	X5R	⑧ <b>Inner electrode</b>	Ni	
④ <b>Capacitance</b>	100 nF	⑨ <b>Termination</b>	Cu	
⑤ <b>Capacitance tolerance</b>	±10 %	⑩ <b>Plating</b>	Sn 100% (Pb Free)	
⑥ <b>Rated Voltage</b>	10 V	⑪ <b>Product</b>	Normal	
⑦ <b>Thickness</b>	$0.50 \pm 0.05$ mm	⑫ <b>Special</b>	Reserved for future use	
		⑬ <b>Packaging</b>	Cardboard Type, 13" reel	

## B. Structure & Dimension



Samsung P/N	Dimension(mm)			
	L	W	T	BW
CL05A104KP5NNND	$1.00 \pm 0.05$	$0.50 \pm 0.05$	$0.50 \pm 0.05$	$0.25 \pm 0.10$

### C. Samsung Reliability Test and Judgement Condition

	Judgement	Test condition
<b>Capacitance</b>	Within specified tolerance	1kHz $\pm 10\%$ / 1.0 $\pm 0.2$ VRms
<b>Tan δ (DF)</b>	0.05 max.	*A capacitor prior to measuring the capacitance is heat treated at 150°C+0/-10°C for 1 hour and maintained in ambient air for 24 $\pm 2$ hours.
<b>Insulation Resistance</b>	10,000Mohm or 100Mohm $\times \mu$ F Whichever is smaller	Rated Voltage 60~120 sec.
<b>Appearance</b>	No abnormal exterior appearance	Microscope (x10)
<b>Withstanding Voltage</b>	No dielectric breakdown or mechanical breakdown	250% of the rated voltage
<b>Temperature Characteristics</b>	X5R (From -55°C to 85°C, Capacitance change should be within $\pm 15\%$ )	
<b>Adhesive Strength of Termination</b>	No peeling shall be occur on the terminal electrode	500g-f, for 10 $\pm 1$ sec.
<b>Bending Strength</b>	Capacitance change : within $\pm 12.5\%$	Bending to the limit (1mm) with 1.0mm/sec.
<b>Solderability</b>	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.)
<b>Resistance to Soldering Heat</b>	Capacitance change : within $\pm 7.5\%$ Tan δ, IR : initial spec.	Solder pot : 270 $\pm 5$ °C, 10 $\pm 1$ sec.
<b>Vibration Test</b>	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)
<b>Moisture Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan δ : 0.075 max IR : 500Mohm or 25Mohm $\times \mu$ F Whichever is smaller	With rated voltage 40 $\pm 2$ °C, 90~95%RH, 500+12/-0hrs
<b>High Temperature Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan δ : 0.075 max IR : 1,000Mohm or 50Mohm $\times \mu$ F Whichever is smaller	With 200% of the rated voltage Max. operating temperature 1000+48/-0hrs
<b>Temperature Cycling</b>	Capacitance change : within $\pm 7.5\%$ Tan δ, IR : initial spec.	1 cycle condition Min. operating temperature $\rightarrow$ 25°C $\rightarrow$ Max. operating temperature $\rightarrow$ 25°C  5 cycle test

※ The reliability test condition can be replaced by the corresponding accelerated test condition.

### D. Recommended Soldering method :

Reflow ( Reflow Peak Temperature : 260+0/-5°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.

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*We will **NOT** be liable for any damages resulting from any misuse of the products, specifically including using the products for high reliability applications as listed below.*

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- ② Automotive or Transportation equipment (vehicles, trains, ships, etc)*
- ③ Medical equipment*
- ④ Military equipment*
- ⑤ Disaster prevention/crime prevention equipment*
- ⑥ Any other applications with the same as or similar complexity or reliability to the applications set forth above.*