



# **SPECIFICATION**

(Reference sheet)

• Supplier : Samsung electro-mechanics • Samsung P/N : CL05C221JO5NNNC

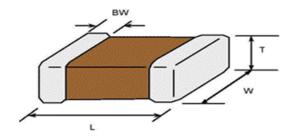
• Product : Multi-layer Ceramic Capacitor • Description : CAP, 220 pF, 16V, ±5%, C0G, 0402

### A. Samsung Part Number

<u>CL</u> <u>05</u> <u>C</u> <u>221</u> <u>J</u> <u>O</u> <u>5</u> <u>N</u> <u>N</u> <u>N</u> <u>C</u> 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 ± 0.05 mm	W: 0.50 ± 0.05 mm
(3)	Dielectric	COG	Inner electrode	Ni
4		<b>220</b> pF	Termination	Cu
(5)	Capacitance	±5 %	Plating	Sn 100% (Pb Free)
	tolerance		9 Product	Normal
6	Rated Voltage	16 V	<b>⑩</b> Special	Reserved for future use
7	Thickness	$0.50 \pm 0.05$ mm	① Packaging	Cardboard Type, 7" reel

#### **B.** Structure and dimension



Samsung P/N	Dimension(mm)				
(Lead Free)	L	W	Т	BW	
CL05C221JO5NNNC	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10	

#### C. Samsung Reliability Test and Judgement condition

	Performance	Test condition			
Capacitance	Within specified tolerance	1Mb±10% 0.5~5Vrms			
Q	1,000 min				
Insulation 10,000Mohm or 500Mohm μF		Rated Voltage 60~120 sec.			
Resistance	Whichever is smaller				
Appearance	No abnormal exterior appearance	Microscope (×10)			
Withstanding	No dielectric breakdown or	300% of the rated voltage			
Voltage	mechanical breakdown				
Temperature	COG				
Characteristics	(From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃)				
Adhesive Strength No peeling shall be occur on the		500g·F, for 10±1 sec.			
of Termination	terminal electrode				
Bending Strength	Capacitance change :	Bending to the limit (1mm)			
	within ±5% or ±0.5pF whichever is larger	with 1.0mm/sec.			
Solderability	More than 75% of terminal surface	SnAg3.0Cu0.5 solder			
	is to be soldered newly	245±5℃, 3±0.3sec.			
		(preheating: 80~120°C for 10~30sec.)			
Resistance to Capacitance change :		Solder pot : 270±5°C, 10±1sec.			
Soldering heat	within ±2.5% or ±0.25pF whichever is larger				
	Tan δ, IR : initial spec.				
Vibration Test	Capacitance change :	Amplitude: 1.5mm			
	within ±2.5% or ±0.25pF whichever is larger	From 10Hz to 55Hz (return : 1min.)			
	Tan δ, IR : initial spec.	2hours × 3 direction (x, y, z)			
Moisture	Capacitance change :	With rated voltage			
Resistance	within ±7.5% or ±0.75pF whichever is larger	40±2℃, 90~95%RH, 500+12/-0hrs			
	Q: 200 min				
	IR: 500Mohm or 25Mohm · μF				
	Whichever is smaller				
High Temperature	Capacitance change :	With 200% of the rated voltage			
Resistance	within ±3% or ±0.3pF whichever is larger	Max. operating temperature			
	Q: 350 min	1000+48/-0hrs			
	IR: 1,000Mohm or 50Mohm $\cdot \mu$ F				
	Whichever is smaller				
Temperature	Capacitance change :	1 cycle condition			
Cycling	within ±2.5% or ±0.25pF whichever is larger	Min. operating temperature $\rightarrow$ 25 $^{\circ}$ C			
	Tan δ, IR : initial spec.	$ ightarrow$ Max. operating temperature $ ightarrow$ 25 $^{\circ}$ C			
		5 cycle test			

<sup>\*</sup> The reliability test condition can be replaced by the corresponding accelerated test condition.

## D. Recommended Soldering method:

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

# - Disclaimer & Limitation of Use and Application -

The products listed in this Specification sheet are **NOT** designed and manufactured for any use and applications set forth below.

Please note that any misuse of the products deviating from products specifications or information provided in this Spec sheet may cause serious property damages or personal injury.

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.

If you have any questions regarding this 'Limitation of Use and Application', you should first contact our sales personnel or application engineers.

- ① Aerospace/Aviation equipment
- ② Automotive or Transportation equipment (vehicles, trains, ships, etc)
- 3 Medical equipment
- Military equipment
- 5 Disaster prevention/crime prevention equipment
- Any other applications with the same as or similar complexity or reliability to the applications set forth above.