



# **SPECIFICATION**

(Reference sheet)

· Supplier : Samsung electro-mechanics · Samsung P/N: CL05A224KP5NNWC

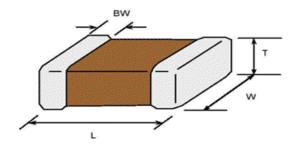
· Product : Multi-layer Ceramic Capacitor · Description : CAP, 220nF, 10V, ±10%, X5R, 0402

### A. Samsung Part Number

<u>CL</u> <u>05</u> <u>A</u> <u>224</u> <u>K</u> <u>P</u> <u>5</u> <u>N</u> <u>N</u> <u>W</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:	$0.50 \pm 0.05 \text{ mm}$	
3	Dielectric	X5R	8	Inner electrode		Ni	
4	Capacitance	220 nF		Termination		Cu	
(5)	Capacitance	±10 %		Plating		Sn 100% (Pb Free)	
	tolerance		9	Product		Normal	
6	Rated Voltage	10 V	10	Special		Industrial (Network,etc)	
7	Thickness	$0.50 \pm 0.05 \text{ mm}$	11	Packaging		Cardboard Type, 7" reel	

#### **B. Structure & Dimension**



Samouna D/N	Dimension(mm)					
Samsung P/N	L	W	Т	BW		
CL05A224KP5NNWC	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.05	0.25 ± 0.10		

#### C. Samsung Reliablility Test and Judgement Condition

	Judgement	Test condition		
Capacitance	Within specified tolerance	1 <sup>kHz</sup> ±10% / 1.0±0.2Vrms		
Tan δ (DF)	0.05 max.	*A capacitor prior to measuring the capacitance is heat treated at $150^{\circ}\text{C}+0/-10^{\circ}\text{C}$ for 1 hour and maintained in ambient air for 24±2 hours.		
Insulation	10,000Mohm or 100Mohm× <i>µ</i> F	Rated Voltage 60~120 sec.		
Resistance	Whichever is smaller			
Appearance	No abnormal exterior appearance	Microscope (×10)		
Withstanding No dielectric breakdown or		250% of the rated voltage		
Voltage	mechanical breakdown	_		
Temperature	X5R			
Characteristics (From-55 ℃ to 85 ℃, Capacitance change sh		hould be within ±15%)		
Adhesive Strength	No peeling shall be occur on the	500g·f, for 10±1 sec.		
of Termination	terminal electrode			
Bending Strength	Capacitance change: within ±12.5%	Bending to the limit (1mm)		
		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: within ±7.5%	Solder pot : 270±5°C, 10±1sec.		
Soldering Heat	Tan δ, IR : initial spec.			
Vibration Test	Capacitance change : within ± 5% Tan δ, IR : initial spec.	Amplitude: 1.5mm From 10Hz to 55Hz (return: 1min.) 2hours × 3 direction (x, y, z)		
Moisture	Capacitance change: within ±12.5%	With rated voltage		
Resistance	Tan δ: 0.075 max	40±2℃, 90~95%RH, 500+12/-0hrs		
	IR: 500Mohm or 25Mohm × $\mu$ F			
	Whichever is smaller			
High Temperature	Capacitance change: within ±12.5%	With 200% of the rated voltage		
Resistance	Tan δ: 0.075 max	Max. operating temperature		
	IR: 1,000Mohm or 50Mohm × $\mu$ F	1000+48/-0hrs		
	Whichever is smaller			
Temperature	Capacitance change: within ±7.5%	1 cycle condition		
Cycling	Tan δ, IR : initial spec.	Min. operating temperature → 25°C		
		→ Max. operating temperature → 25°C		
		5 cycle test		

X 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 )



A 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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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.