



SPECIFICATION

(Reference sheet)

· Supplier : Samsung electro-mechanics · Samsung P/N : CL21B474KAFNNNE

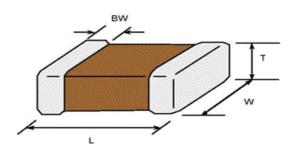
· Product : Multi-layer Ceramic Capacitor · Description : CAP, 470nF, 25V, ±10%, X7R, 0805

A. Samsung Part Number

<u>CL</u> <u>21</u> <u>B</u> <u>474</u> <u>K</u> <u>A</u> <u>F</u> <u>N</u> <u>N</u> <u>N</u> <u>E</u> 1 2 3 4 5 6 7 8 9 10 11

1	Series	Samsung Multi-layer Ceramic Capacitor					
2	Size	0805 (inch code)	L: 2.00	± 0.10 mm	W:	1.25 ± 0.10 mm	
3	Dielectric	X7R	8	Inner electrode		Ni	
4	Capacitance	470 nF		Termination		Cu	
⑤	Capacitance	±10 %		Plating		Sn 100% (Pb Free)	
	tolerance		9	Product		Normal	
6	Rated Voltage	25 V	10	Special		Reserved for future use	
7	Thickness	$1.25 \pm 0.10 \text{ mm}$	11)	Packaging		Embossed Type, 7" reel	

B. Structure & Dimension



Samsung P/N	Dimension(mm)					
Samsung F/N	L	W	Т	BW		
CL21B474KAFNNNE	2.00 ± 0.10	1.25 ± 0.10	1.25 ± 0.10	0.50 +0.20/-0.30		

C. Samsung Reliablility Test and Judgement Condition

Tan δ (DF) 0.025 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±2 hours. Rated Voltage 60~120 sec. Whichever is smaller Appearance No abnormal exterior appearance Microscope (×10) Withstanding No dielectric breakdown or mechanical breakdown Temperature Characteristics Adhesive Strength of 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 is to be soldered newly Soldering Heat Tan δ, IR: initial spec. Within ±12.5% Amplitude: 1.5mm From 10liz to 56liz (return: 1min.) Zhours × 3 direction (x, y, z) Moisture Resistance Capacitance change: within ±12.5% Resistance Tan δ : 0.05 max IR: 500Mohm or 25Mohm × μF Whichever is smaller Temperature Resistance Resistance Capacitance change: within ±12.5% With 720% of the rated voltage Max. operating temperature Max. operating temperature Max. operating temperature Temperature Capacitance change: within ±7.5% Toyloc defined to 10.000 max IR: 1.000Mohm or 50Mohm × μF Whichever is smaller Temperature Capacitance change: within ±7.5% Toyloc condition		Judgement	Test condition		
Tan δ (DF) 0.025 max. treated at 150℃+0/-10℃ for 1 hour and maintained in ambient air for 24±2 hours. Insulation 10.000Mohm or 500Mohm×μF Rated Voltage 60~120 sec. Resistance Whichever is smaller Appearance Mo abnormal exterior appearance Microscope (×10) Withstanding No dielectric breakdown or wechanical breakdown 250% of the rated voltage Voltage mechanical breakdown Temperature X7R Characteristics (From-55℃ to 125℃, Capacitance change should be within ±15%) Adhesive Strength No peeling shall be occur on the 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 is to be soldered newly SnAg3.0Cu0.5 solder 245±5℃, 32-0.3sec. (preheating : 80~120℃ for 10~30sec.) Resistance to Capacitance change : within ±7.5% Solder pot : 270±5℃, 10±1sec. Soldering Heat Tan δ, IR : initial spec. Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z) Wibration Test Capacitance change : within ±12.5% With rated voltage 40±2℃, 90~95%RH, 500+12/-0hrs Resistance Tan δ : 0.05 max IR : initial spec. Within ±12.5%	Capacitance	Within specified tolerance	1kHz ±10% / 1.0±0.2Vrms		
Resistance Whichever is smaller Appearance No abnormal exterior appearance Microscope (×10)	Tan δ (DF)	0.025 max.	treated at 150 ℃+0/-10 ℃ for 1 hour and maintained in		
Appearance No abnormal exterior appearance Microscope (×10) Withstanding No dielectric breakdown or mechanical breakdown 250% of the rated voltage Temperature X7R Characteristics (From-55℃ to 125℃, Capacitance change should be within ±15%) Adhesive Strength No peeling shall be occur on the terminal electrode 500g·f, for 10±1 sec. Bending Strength Capacitance change: within ±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±5℃, 3±0.3sec. (preheating: 80~120℃ for 10~30sec.) Resistance to Capacitance change: within ±7.5% Solder pot: 270±5℃, 10±1sec. Soldering Heat Tan δ, IR: initial spec. Amplitude: 1.5mm From 10Hz to 55Hz (return: 1min.) 2hours × 3 direction (x, y, z) Wibration Test Capacitance change: within ±12.5% With rated voltage 40±2℃, 90~95%RH, 500+12/-0hrs Resistance Tan δ: 0.05 max IR: 500Mohm × μF Whichever is smaller With 200% of the rated voltage Max. operating temperature High Temperature Capacitance change: within ±12.5% With 200% of the rated voltage Max. operating temperature Max. operating temperature Temperature Capacitance change: within ±7.5% 1 cycle c	Insulation	10,000Mohm or 500Mohm× <i>μ</i> F	Rated Voltage 60~120 sec.		
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is to be soldered newly 245±5°C, 3±0.3sec. (preheating: 80~120°C for 10~30sec.)	Solderability	More than 75% of terminal surface	SnAg3.0Cu0.5 solder		
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IR: 1,000Mohm or 50Mohm × μ F Whichever is smaller Temperature Capacitance change: within ±7.5% 1 cycle condition Tan δ, IR: initial spec. 1 cycle condition Min. operating temperature \rightarrow 25°C	High Temperature	Capacitance change: within ±12.5%	With 200% of the rated voltage		
	Resistance	Tan δ: 0.05 max	Max. operating temperature		
Temperature Capacitance change : within $\pm 7.5\%$ 1 cycle condition Cycling Tan δ, IR : initial spec. Min. operating temperature \rightarrow 25°C		IR: 1,000Mohm or 50Mohm × μ F	1000+48/-0hrs		
Cycling Tan δ, IR : initial spec. Min. operating temperature → 25°C		Whichever is smaller			
	Temperature	Capacitance change : within ±7.5%	1 cycle condition		
→ Max. operating temperature → 25°C	Cycling	Tan δ, IR : initial spec.	Min. operating temperature → 25°C		
			→ Max. operating temperature → 25°C		
5 cycle test			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.

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
- 4 Military equipment
- ⑤ Disaster prevention/crime prevention equipment
- 6 Power plant control equipment
- Atomic energy-related equipment
- Undersea equipment
- Traffic signal equipment
- Data-processing equipment
- ## Electric heating apparatus, burning equipment
- Safety equipment
- ® Any other applications with the same as or similar complexity or reliability to the applications