



SPECIFICATION

- · Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- · Samsung P/N :
- CL21A475KOFNNNE

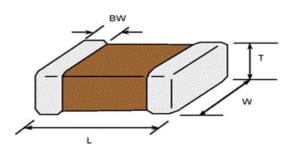
(Reference sheet)

- · Description :
- CAP, 4.7uF, 16V, ±10%, X5R, 0805

A. Samsung Part Number

		<u>CL</u> ①	<mark>21</mark> ②	<mark>4</mark> 3	<u>475</u> ④	<u>K</u> 5	<u>0</u> 6	<u>F</u> ⑦	<u>N</u> 8	<u>N</u> 9	<u>N</u> 10	<u>Е</u> Ш	
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	X5R				8	Inner	elect	trode			Ni	
4	Capacitance	4.7 uF					Term	inatio	on			Cu	
5	Capacitance	±10 %					Platir	ng				Sn 100%	(Pb Free)
	tolerance					9	Prod	uct				Normal	
6	Rated Voltage	16 V				10	Spec	ial				Reserved fo	r future use
1	Thickness	1.25 ± 0.10 mm				1	Pack	aging	I			Embossed T	Type, 7" reel

B. Structure & Dimension



Samsung P/N	Dimension(mm)							
Samsung F/N	L	W	Т	BW				
CL21A475KOFNNNE	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

		Judgement	Test condition				
Tan δ (DF)0.1 max.treated at 150°C+0/-10°C for 1 hour and maintained ambient air for 24±2 hours.Insulation10,000Mohm or 100Mohm×µ ^E Rated Voltage60~120 sec.ResistanceWhichever is smallerAppearanceMicroscope (×10)WithstandingNo abnormal exterior appearanceMicroscope (×10)WithstandingNo dielectric breakdown or mechanical breakdown250% of the rated voltageTemperatureX5RCharacteristics(From-55°C to 85°C, Capacitance change should be within ±15%)Adhesive Strength Bending StrengthNo peeling shall be occur on the capacitance change : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Vibration TestCapacitance change : Capacitance change : man $\delta_1 \mathbb{R}$: initial spec.Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : m $\delta_1 \mathbb{R}$: initial spec.Within ±12.5% Within ±12.5%With rated voltage High Temperature Capacitance change : m thin ±12.5%With 150% of the rated voltageHigh Temperature ResistanceCapacitance change : m $\delta_1 \mathbb{R}$: 1,000Mohm or 25Mohm × µ ^E With 150% of the rated voltage Max. operating temperature 1000+48/-0hrs	Capacitance	Within specified tolerance	1 ^{kHz} ±10% / 1.0±0.2Vrms				
Resistance Whichever is smaller Appearance No abnormal exterior appearance Microscope (×10) Withstanding No dielectric breakdown or mechanical breakdown 250% of the rated voltage Temperature K5R Characteristics (From-55°C to 85°C, Capacitance change should be within ±15%) Adhesive Strength of Termination 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 Solder pot : 270±5°C, 10±1sec. Soldering Heat Tan δ, IR : initial spec. Solder pot : 270±5°C, 10±1sec. Vibration Test Capacitance change : within ±12.5% Tan δ : 0.125 max Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z) Moisture Resistance Capacitance change : within ±12.5% Tan δ : 0.125 max With nated voltage 40±2°C, 90~95%RH, 500+12/-0hrs High Temperature Resistance Capacitance change : within ±12.5% Tan δ : 0.125 max With 150% of the rated voltage Max. operating temperature IR : 1,000Mohm or 25Mohm × μ ^E	Tan δ (DF)	0.1 max.	*A capacitor prior to measuring the capacitance is heat treated at $150^{\circ}C+0/-10^{\circ}C$ for 1 hour and maintained in ambient air for 24±2 hours.				
Appearance No abnormal exterior appearance Microscope (×10) Withstanding No dielectric breakdown or mechanical breakdown 250% of the rated voltage Yoltage mechanical breakdown 250% of the rated voltage Temperature X5R Characteristics (From-55°C to 85°C, Capacitance change should be within ±15%) Adhesive Strength of Termination 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°C, 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. Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z) Moisture Capacitance change : within ±12.5% Tan δ : 0.125 max IR : 500Mohm or 12.5Mohm × μ ^c Whichever is smaller With rated voltage High Temperature Capacitance change : within ±12.5% With nated voltage With 150% of the rated voltage Resistance Tan δ : 0.125 max IR : 1,000Mohm or 25Mohm × μ ^c IA δ : 0.125 max With 150% of the rated voltage	Insulation	10,000Mohm or 100Mohm× <i>μ</i> F	Rated Voltage 60~120 sec.				
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ResistanceTan δ :0.125 max $40\pm 2^{\circ}$ C, 90~95%RH, 500+12/-0hrsIR:500Mohm or 12.5Mohm × μ F $40\pm 2^{\circ}$ C, 90~95%RH, 500+12/-0hrsHigh TemperatureCapacitance change : within $\pm 12.5\%$ With 150% of the rated voltageResistanceTan δ :0.125 maxMax. operating temperatureIR:1,000Mohm or 25Mohm × μ F1000+48/-0hrs	Vibration Test		From 10Hz to 55Hz (return : 1min.)				
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Whichever is smallerHigh Temperature ResistanceCapacitance change : within $\pm 12.5\%$ Tan δ : 0.125 max IR : 1,000Mohm or 25Mohm × μ FWith 150% of the rated voltage Max. operating temperature 1000+48/-0hrs	Resistance	Tan δ : 0.125 max	40±2℃, 90~95%RH, 500+12/-0hrs				
High Temperature ResistanceCapacitance change : 0.125 maxwithin $\pm 12.5\%$ Max. operating temperatureWith 150% of the rated voltage Max. operating temperature $1000+48/-0hrs$		IR : 500Mohm or 12.5Mohm × μ F					
ResistanceTan δ :0.125 maxMax. operating temperatureIR:1,000Mohm or 25Mohm × μ F1000+48/-0hrs		Whichever is smaller					
Resistance Tan δ: 0.125 max Max. operating temperature IR: 1,000Mohm or 25Mohm × μF 1000+48/-0hrs	High Temperature	Capacitance change : within ±12.5%	With 150% of the rated voltage				
		Tan δ : 0.125 max	-				
Whichever is smaller		IR : 1,000Mohm or 25Mohm × μF	1000+48/-0hrs				
		Whichever is smaller					
Temperature Capacitance change : within ±7.5% 1 cycle condition	Temperature	Capacitance change : within ±7.5%	1 cycle condition				
Cycling Tan δ , IR : initial spec. Min. operating temperature $\rightarrow 25^{\circ}$ C	-	Tan δ, IR : initial spec.	-				
\rightarrow Max. operating temperature \rightarrow 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)

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
- Ø Power plant control equipment
- ⑦ Atomic energy-related equipment
- Indersea equipment
- Itraffic signal equipment
- Data-processing equipment
- ① Electric heating apparatus, burning equipment
- ② Safety equipment
- 13 Any other applications with the same as or similar complexity or reliability to the applications