# imall

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With the principle of "Quality Parts, Customers Priority, Honest Operation, and Considerate Service", our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip, ALPS, ROHM, Xilinx, Pulse, ON, Everlight and Freescale. Main products comprise IC, Modules, Potentiometer, IC Socket, Relay, Connector. Our parts cover such applications as commercial, industrial, and automotives areas.

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## **SPECIFICATION**

- · Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- · Samsung P/N :
- CL21A106KOQNNNE

(Reference sheet)

A. Samsung Part Number

-	
· Description :	

- CAP, 10uF, 16V, ±10%, X5R, 0805

				21 2)	<u>▲</u> ③	<u>106</u> ④	<u>K</u> 5	<mark>0</mark> 6	<mark>Q</mark> ⑦	<u>N</u> 8	<u>N</u> 9	<u>N</u> 10	<u>Е</u> 11		
1	Series	Samsung M	ulti-lay	er C	Cerar	nic Ca	pacito	or							
2	Size	0805 (inc	ch cod	e)		L:	2.00	± 0.15	mm			W:	1.25 ± 0.15 m	m	
3	Dielectric	X5R					8	Inner	elect	rode			Ni		
4	Capacitance	10 uF					-	Term	inatio	n			Cu		
(5)	Capacitance	±10 %						Platin	g				Sn 100%	(Pb Free)	
	tolerance						9	Produ	ıct				Normal		
6	Rated Voltage	16 V					10	Speci	al				Reserved for	future use	
7	Thickness	1.25 ± 0.15	mm				1	Packa	aging				Embossed Ty	/pe, 7" reel	

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



Samsung P/N				
Samsung F/N	L	W	Т	BW
CL21A106KOQNNNE	2.00 ± 0.15	1.25 ± 0.15	1.25 ± 0.15	0.50 +0.20/-0.30

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

	 Test condition	Judgement	
Tan δ (DF) 0.1 max. treated at 150°C+0/-10°C for 1 hour and maintaine ambient air for 24±2 hours.   Insulation 10,000Mohm or 100Mohm×μ <sup>F</sup> Rated Voltage 60~120 sec.   Resistance Whichever is smaller Rated Voltage 60~120 sec.   Appearance No abnormal exterior appearance Microscope (×10)   Withstanding No dielectric breakdown or 250% of the rated voltage   Voltage mechanical breakdown 250%   Temperature X5R   Characteristics (From-55°C to 85°C, Capacitance change should be within ±15%)   Adhesive Strength No peeling shall be occur on the terminal electrode   Bending Strength Capacitance change : within ±12.5%   Bending Strength Capacitance change : within ±12.5%   Solderability More than 75% of terminal surface is to be soldered newly   Solder pot : 270±5°C, 10±1sec. (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   Vibration Test Capacitance change : within ±5% Amplitude : 1.5mm   From 10Hz to 55Hz (return : 1min.) 2hours < 3 direction (x	1 <sup>kHz</sup> ±10% / 1.0±0.2Vrms	Within specified tolerance	Capacitance
Resistance Whichever is smaller   Appearance No abnormal exterior appearance Microscope (×10)   Withstanding No dielectric breakdown or mechanical breakdown 250% of the rated voltage   Voltage mechanical breakdown 250% of the rated voltage   Temperature X5R 250% of the rated voltage   Characteristics (From-55°C to 85°C, Capacitance change should be within ±15%)   Adhesive Strength No peeling shall be occur on the of Termination 500g·f, for 10±1 sec.   Gending 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, 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   Vibration Test Capacitance change : within ±5% Tan δ, IR : initial spec. Amplitude : 1.5mm   Moisture Capacitance change : within ±12.5% With rated voltage   Resistance Tan δ : 0.2 max With in ±2.5% With rated voltage   Tan δ : 0.2 max Within ±2.5% With rated voltage	*A capacitor prior to measuring the capacitance is he treated at 150°C+0/-10°C for 1 hour and maintained i ambient air for 24±2 hours.	0.1 max.	Tan δ (DF)
AppearanceNo abnormal exterior appearanceMicroscope (×10)WithstandingNo dielectric breakdown or mechanical breakdown $250\%$ of the rated voltageTemperatureX5RCharacteristics(From-55 °C to 85 °C, Capacitance change should be within ±15%)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode $500g \cdot f$ , for $10\pm 1$ sec.Bending StrengthCapacitance change : within ±12.5%within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySolder pot : $270\pm 5^\circ$ C, $10\pm 3$ sec. (preheating : $80-120^\circ$ C for $10-30$ sec.)Resistance to Soldering HeatCapacitance change : Tan $\delta_1$ IR : initial spec.within $\pm 7.5\%$ Solder pot : $270\pm 5^\circ$ C, $10\pm 1$ sec.Vibration TestCapacitance change : macitance change : Tan $\delta_1$ IR : initial spec.within $\pm 5\%$ Tan $\delta_1$ IR : initial spec.Amplitude : $1.5mm$ From $10Hz$ to $55Hz$ (return : 1min.) $2hours × 3$ direction (x, y, z)Moisture ResistanceCapacitance change : Tan $\delta_1$ IR : initial spec.Within $\pm 12.5\%$ With rated voltage $40\pm 2^\circ$ C, $90-95\%$ RH, $500+12/-0hrs$	 Rated Voltage 60~120 sec.	10,000Mohm or 100Mohm× <i>μ</i> F	Insulation
Withstanding VoltageNo dielectric breakdown or mechanical breakdown $250\%$ of the rated voltageTemperature CharacteristicsX5R 		Whichever is smaller	Resistance
Voltagemechanical breakdownTemperatureX5RCharacteristics(From-55°C to 85°C, Capacitance change should be within ±15%)Adhesive StrengthNo peeling shall be occur on the terminal electrode500g f, for 10±1 sec.Bending StrengthCapacitance change : terminal electrodewithin ±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 Soldering HeatCapacitance change : tan ō, IR : initial spec.within ±7.5% thin ±5% Tan ō, IR : initial spec.Solder pot : 270±5°C, 10±1sec.Vibration TestCapacitance change : tan ō, IR : initial spec.within ±12.5% thin ±12.5%Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : tan ō : IR : S00Mohm or 12.5Mohm × $\mu^{F}$ Whichever is smallerWith rated voltage 40±2°C, 90~95%RH, 500+12/-0hrs	 Microscope (×10)	No abnormal exterior appearance	Appearance
Temperature CharacteristicsX5R (From-55 °C to 85 °C, Capacitance change should be within $\pm 15\%$ )Adhesive Strength of TerminationNo peeling shall be occur on the 	250% of the rated voltage	No dielectric breakdown or	Withstanding
$\begin{array}{c c} \textbf{Characteristics} & (From-55 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $		mechanical breakdown	Voltage
Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g·f, for 10±1 sec.Bending StrengthCapacitance 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 Soldering HeatCapacitance change : within ±7.5% Tan $\delta$ , IR : initial spec.Solder pot : 270±5°C, 10±1sec.Vibration TestCapacitance change : within ±5% Tan $\delta$ , IR : initial spec.Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : within ±12.5% Tan $\delta$ : 0.2 max IR : 500Mohm or 12.5Mohm × $\mu$ F Whichever is smallerWith rated voltage 40±2°C, 90~95%RH, 500+12/-0hrs		X5R	Temperature
of Terminationterminal electrodeBending StrengthCapacitance change :within $\pm 12.5\%$ Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245 $\pm 5^{\circ}$ C, $3\pm 0.3$ sec. (preheating : $80 \sim 120^{\circ}$ C for $10 \sim 30$ sec.)Resistance toCapacitance change :within $\pm 7.5\%$ Solder pot : $270\pm 5^{\circ}$ C, $10\pm 1$ sec.Soldering HeatTan $\delta$ , IR : initial spec.Amplitude : $1.5$ mm From 10Hz to $55$ Hz (return : 1min.) 2hours × 3 direction (x, y, z)MoistureCapacitance change :within $\pm 12.5\%$ Tan $\delta$ :Output $12.5$ Mohm × $\mu^{F}$ Whichever is smaller	should be within ±15%)	(From-55℃ to 85℃, Capacitance change sh	Characteristics
Bending StrengthCapacitance change :within $\pm 12.5\%$ Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder $245\pm5^{\circ}$ C, $3\pm0.3$ sec. (preheating : $80^{-}120^{\circ}$ C for 10~30sec.)Resistance toCapacitance change :within $\pm 7.5\%$ Solder pot : $270\pm5^{\circ}$ C, $10\pm1$ sec.Soldering HeatTan $\delta$ , IR : initial spec.Solder pot : $270\pm5^{\circ}$ C, $10\pm1$ sec.Vibration TestCapacitance change :within $\pm 5\%$ Tan $\delta$ , IR : initial spec.Amplitude : $1.5mm$ From 10Hz to 55Hz (return : $1min.$ ) $2hours × 3 direction (x, y, z)$ Moisture ResistanceCapacitance change :within $\pm 12.5\%$ Tan $\delta$ :Output $12.5Mohm × \mu^{F}$ Whichever is smaller	500g·f, for 10±1 sec.	No peeling shall be occur on the	Adhesive Strength
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is to be soldered newly $245\pm5^{\circ}$ C, $3\pm0.3$ sec. (preheating : $80\sim120^{\circ}$ C for $10\sim30$ sec.)Resistance toCapacitance change : Tan $\delta$ , IR : initial spec.Solder pot : $270\pm5^{\circ}$ C, $10\pm1$ sec.Vibration TestCapacitance change : Tan $\delta$ , IR : initial spec.Amplitude : $1.5$ mm 	with 1.0mm/sec.		
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Resistance toCapacitance change : Tan $\delta$ , IR : initial spec.within $\pm 7.5\%$ Solder pot : $270\pm5^{\circ}$ C, $10\pm1$ sec.Vibration TestCapacitance change : Tan $\delta$ , IR : initial spec.within $\pm 5\%$ Amplitude : $1.5$ mm From 10Hz to 55Hz (return : 1min.) 	245±5℃, 3±0.3sec.	is to be soldered newly	
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Vibration TestCapacitance change : Tan $\delta$ , IR : initial spec.within $\pm 5\%$ From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : 0.2 max IR : $500$ Mohm or 12.5Mohm × $\mu$ F Whichever is smallerWith in $\pm 12.5\%$ $40\pm 2^{\circ}$ C, 90~95%RH, 500+12/-0hrs	 Solder pot : 270±5°C, 10±1sec.	Capacitance change : within ±7.5%	Resistance to
Tan $\delta$ , IR : initial spec.From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : within ±12.5% Tan $\delta$ : 0.2 max 			Soldering Heat
ResistanceTan $\delta$ :0.2 max40±2°C, 90~95%RH, 500+12/-0hrsIR:500Mohm or 12.5Mohm × $\mu$ FWhichever is smaller	From 10Hz to 55Hz (return : 1min.)	i e	Vibration Test
IR : 500Mohm or 12.5Mohm × $\mu$ F Whichever is smaller	 With rated voltage	Capacitance change : within ±12.5%	Moisture
Whichever is smaller	40±2℃, 90~95%RH, 500+12/-0hrs	Tan δ : 0.2 max	Resistance
		IR : 500Mohm or 12.5Mohm × $\mu$ F	
High Temperature Capacitance change : within ±12.5% With <sup>100%</sup> of the rated voltage		Whichever is smaller	
	With 100% of the rated voltage	Capacitance change : within ±12.5%	High Temperature
Resistance   Tan δ :   0.2 max   Max. operating temperature	_		
IR : 1,000Mohm or 25Mohm × <i>μ</i> F 1000+48/-0hrs	1000+48/-0hrs	IR : 1,000Mohm or 25Mohm × <i>μ</i> F	
Whichever is smaller		Whichever is smaller	
Temperature   Capacitance change :   within ±7.5%   1 cycle condition	1 cycle condition	Capacitance change : within ±7.5%	Temperature
<b>Cycling</b> Tan $\delta$ , 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.

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- 3 Medical equipment
- ④ 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.