



SPECIFICATION

(Reference sheet)

· Supplier : Samsung electro-mechanics · Samsung P/N : CL10X106MR8NNNC

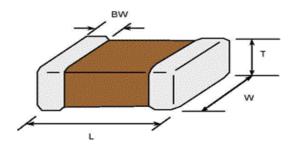
· Product : Multi-layer Ceramic Capacitor · Description : CAP, 10uF, 4V, ±20%, X6S, 0603

A. Samsung Part Number

<u>CL</u> <u>10</u> <u>X</u> <u>106</u> <u>M</u> <u>R</u> <u>8</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	0603 (inch code)	L: 1.60	± 0.10 mm	W:	0.80 ± 0.10 mm	
3	Dielectric	X6S	8	Inner electrode		Ni	
4	Capacitance	10 uF		Termination		Cu	
(5)	Capacitance	±20 %		Plating		Sn 100% (Pb Free)	
	tolerance		9	Product		Normal	
6	Rated Voltage	4 V	10	Special		Reserved for future use	
7	Thickness	$0.80 \pm 0.10 \text{ mm}$	11	Packaging		Cardboard Type, 7" reel	

B. Structure & Dimension



Samsung P/N	Dimension(mm)					
Samsung F/N	L	W	Т	BW		
CL10X106MR8NNNC	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.30 ± 0.20		

C. Samsung Reliablility Test and Judgement Condition

Capacitance Within specified tolerance 1 № ±10% / 0.5±0.1Vrms Tan δ (DF) 0.1 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. Insulation 10,000Mohm or 100Mohm×μF Rated Voltage 60~120 sec. Resistance Whichever is smaller Microscope (×10) Appearance No abnormal exterior appearance Microscope (×10) Withstanding No dielectric breakdown 250% of the rated voltage Temperature Characteristics (From-55°C to 105°C, Capacitance change should be within ±22%) Adhesive Strength No peeling shall be occur on the terminal electrode 500g·ft, for 10±1 sec. Bending Strength Capacitance change : within ±12.5% Bending to the limit (1mm) with 1.0mm/sec. SnAg3.0cu0.5 solder is to be soldered newly SnAg3.0cu0.5 solder 245±5°C, 3±0.3sec. (preheating: 80~120°C for 10~30sec.) Resistance to Soldering Heat Tan δ, IR: initial spec. Within ±12.5% 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 <t< th=""><th></th><th>Judgement</th><th>Test condition</th></t<>		Judgement	Test condition		
Tan δ (DF) 0.1 max. 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 X6S Characteristics (From-55 °C to 105 °C, Capacitance change should be within ±22%) Adhesive Strength of Termination Bending Strength Capacitance change: within ±12.5% Bending Strength Soldered newly More than 75% of terminal surface is to be soldered newly With 1.0mm/sec. Solderability More than 75% of terminal surface is to be soldered newly Capacitance change: within ±7.5% Soldering Heat Tan δ, IR: initial spec. Vibration Test Capacitance change: within ±10% Tan δ, IR: initial spec. Moisture Capacitance change: within ±12.5% Resistance Tan δ: 0.2 max IR: 500Mohm or 12.5Mohm × μF Whichever is smaller Rated Voltage 60~120 sec. Microscope (×10) Adhesive (×10) With 1.22%) Microscope (×10) Microscope (×10) Adhesive (×10) With 1.22%) Microscope (×10) Adhesive (×10) With 1.22%) Microscope (×10) Microscope (×10) Microscope (×10) Microscope (×10) Adhesive (×10) With 1.22%) Microscope (×10) Adhesive (×10) With 1.25% of the rated voltage Moisture (×10) Tan δ: 0.2 max IR: 500Mohm or 12.5Mohm × μF Whichever is smaller Within ±12.5% of the rated voltage Max. operating temperature	Capacitance	Within specified tolerance	1kHz ±10% / 0.5±0.1Vrms		
Resistance Whichever is smaller Appearance No abnormal exterior appearance Microscope (×10) Withstanding No dielectric breakdown or mechanical breakdown Temperature X6S Characteristics (From-55°C to 105°C, Capacitance change should be within ±22%) Adhesive Strength No peeling shall be occur on the terminal electrode 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 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. Vibration Test Capacitance change: within ±10% From 10Hz to 55Hz (return: 1min.) 2hours × 3 direction (x, y, z) Moisture Capacitance change: within ±12.5% With rated voltage 40±2°C, 90~95%RH, 500+12/-0hrs IR: 500Mohm or 12.5Mohm × µF Whichever is smaller High Temperature Capacitance change: within ±12.5% Max. operating temperature	Tan δ (DF)	0.1 max.	treated at 150 °C+0/-10 °C for 1 hour and maintained in		
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is to be soldered newly			with 1.0mm/sec.		
is to be soldered newly $ 245\pm5^{\circ}C, 3\pm0.3\sec. \\ (preheating: 80\sim120^{\circ}C \text{ for } 10\sim30\sec.) $ Resistance to $ Capacitance \text{ change: within } \pm7.5\% \\ Solder \text{ pot: } 270\pm5^{\circ}C, 10\pm1\sec. $ Solder pot: $ 270\pm5^{\circ}C, 10\pm1\sec. $ Amplitude: $ 1.5\text{mm} \\ From 10\text{Hz to } 55\text{Hz (return: } 1\text{min.}) \\ 2\text{hours} \times 3 \text{ direction } (x, y, z) $ Moisture $ Capacitance \text{ change: within } \pm12.5\% \\ Resistance \\ Tan \delta: 0.2 \text{ max} \\ IR: 500\text{Mohm or } 12.5\text{Mohm} \times \mu\text{F} \\ \text{Whichever is smaller} $ With $ 150\% \text{ of the rated voltage} \\ Resistance \\ Resistance \\ Tan \delta: 0.2 \text{ max} \\ IR: 500\text{ Mohm or } 2.5\text{ Mohm} \times \mu\text{F} \\ \text{Whichever is smaller} $ With $ 150\% \text{ of the rated voltage} \\ \text{Max. operating temperature} \\ \text{Max. operating temperature} $	Solderability	More than 75% of terminal surface	SnAg3.0Cu0.5 solder		
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Tan δ , IR : initial spec. From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z) Moisture Capacitance change : within $\pm 12.5\%$ With rated voltage $\pm 40\pm 2\%$, ± 90 $\pm 95\%$ RH, ± 500 ± 12 ± 100					
ResistanceTan δ : 0.2 max IR : 500Mohm or 12.5Mohm × μ F Whichever is smaller $40\pm2^{\circ}$ C, $90\sim95\%$ RH, $500+12/-0$ hrsHigh Temperature ResistanceCapacitance change : within $\pm12.5\%$ Tan δ : 0.2 maxWith 150% of the rated voltage Max. operating temperature	Vibration Test	, · · · · · · · · · · · · · · · · · · ·	From 10Hz to 55Hz (return : 1min.)		
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	Resistance	Tan δ: 0.2 max	40±2°C, 90~95%RH, 500+12/-0hrs		
High Temperature Capacitance change : within ±12.5% With 150% of the rated voltage Resistance Tan δ : 0.2 max Max. operating temperature		IR: 500Mohm or 12.5Mohm × μ F			
Resistance Tan δ : 0.2 max Max. operating temperature		Whichever is smaller			
	High Temperature	Capacitance change: within ±12.5%	With 150% of the rated voltage		
ID . 1 000Mohm or 25Mohm x //F	Resistance	Tan δ: 0.2 max	Max. operating temperature		
TR: 1,000Month of 25Month $\times \mu$ 1,000+48/-0nrs Whichever is smaller		IR: 1,000Mohm or 25Mohm × <i>μ</i> F Whichever is smaller	1,000+48/-0hrs		
Temperature Capacitance change: within ±15% 1 cycle condition	Temperature		1 cycle condition		
Cycling Tan δ , IR: initial spec. Min. operating temperature \rightarrow 25°C			1 ·		
→ 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±5°C, 30sec.)



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