



# **SPECIFICATION**

• Samsung P/N :

• Description :

(Reference sheet)

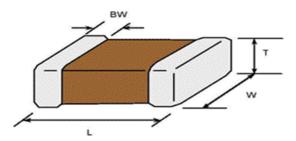
CL31B333KEHNNNE

CAP, 33nF, 250V, ±10%, X7R, 1206

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- A. Samsung Part Number

		<u>CL</u> 31 <u>B</u> ① ② ③		<u>N N E</u> 9 10 11
1	Series	Samsung Multi-layer Ceramic Capacitor		
2	Size	1206 (inch code)	L: 3.20 ± 0.20 mm	W: 1.60 ± 0.20 mm
3	Dielectric	X7R	Inner electrode	Ni
4	Capacitance	<b>33</b> nF	Termination	Cu
5	Capacitance	±10 %	Plating	Sn 100% (Pb Free)
	tolerance		9 Product	Normal
6	Rated Voltage	250 V	10 Special	Reserved for future use
$\bigcirc$	Thickness	1.60 ± 0.20 mm	1 Packaging	Embossed Type, 7"reel

### B. Structure and dimension



Samouna D/N	Dimension(mm)				
Samsung P/N	L	W	Т	BW	
CL31B333KEHNNNE	3.20 ± 0.20	1.60 ± 0.20	1.60 ± 0.20	0.50 ± 0.30	

#### C. Samsung Reliability Test and Judgement condition

CapacitanceWithin specified tolerance $1 \text{kl}\pm 10\%$ $1.0\pm 0.2 \text{Vrms}$ *A capacitor prior to measuring the capacitance is heat treated at $150 \text{ °C} + 0/ \cdot 10 \text{ °C}$ for thour and maintained in ambient air for $24\pm 2$ hours.Insulation10.000 Mohm or $500 \text{Mohm-}_{a}\text{f}$ Rated Voltage $60 - 120 \text{ sec.}$ ResistanceWhichever is smallerRated Voltage $60 - 120 \text{ sec.}$ AppearanceNo abnormal exterior appearanceVisual inspectionWithstandingNo dielectric breakdown or mechanical breakdown $200\%$ of the rated voltageTemperatureX7R Characteristics(From -55 °C to $125 ^\circ$ °, Capacitance change should be within $\pm 15\%$ )Adhesive StrengthNo peeling shall be occur on the terminal electrode500g.F, for $10\pm 1 \text{ sec.}$ Bending StrengthCapacitance change : within $\pm 12.5\%$ Bending to the limit (1mm) with $1.0 \text{mm/sec.}$ SolderabilityMore than 95% of terminal surface is to be soldered newlySolder pot : $270\pm5°$ C, $10\pm1\text{ sec.}$ Vibration TestCapacitance change : within $\pm 7.5\%$ Solder pot : $270\pm5°$ C, $10\pm1\text{ sec.}$ Soldering heatTan $\delta$ , IR : initial spec.Amplitude : $1.5 \text{ mm}$ Vibration TestCapacitance change : capacitance change : within $\pm 12.5\%$ Amplitude : $1.5 \text{ mm}$ ResistanceTan $\delta$ , IR : initial spec.Within $\pm 12.5\%$ Mith ated voltageVibration TestCapacitance change : capacitance change : mathem of $\pm 12.5\%$ Amplitude : $1.5 \text{ mm}$ ResistanceTan $\delta$ , IR : initial spec.Within $\pm 12.5\%$ Mith ated voltage </th <th></th> <th>Performance</th> <th>Test condition</th>		Performance	Test condition		
Tan $\delta$ (DF)0.025 max.ambient air for 24±2 hours.Insulation10,000Mohm or 500Mohm: $\mu$ FRated Voltage60~120 sec.ResistanceWhichever is smallerAppearanceVisual inspectionAppearanceNo abnormal exterior appearanceVisual inspectionWithstandingNo dielectric breakdown or200% of the rated voltageVoltagemechanical breakdown200% of the rated voltageCharacteristics(From -55°C to 125°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 : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 95% 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 $\delta$ : 0.05 max IR : 500Mohm or 25Mohm · $\mu$ FWith rated voltage	Capacitance	Within specified tolerance	*A capacitor prior to measuring the capacitance is heat		
ResistanceWhichever is smallerAppearanceNo abnormal exterior appearanceVisual inspectionWithstanding VoltageNo dielectric breakdown or mechanical breakdown200% of the rated voltageTemperature CharacteristicsX7R (From -55°C to 125°C, Capacitance change should be within ±15%)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g-F, for 10±1 sec.Bending Strength of TerminationCapacitance change : within ±12.5% with 1.0mm/sec.Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 95% 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 δ, IR : initial spec.Solder pot : 270±5°C, 10±1sec.Vibration Test ResistanceCapacitance change : within ±5% Tan δ : 0.05 max IR : 500Mohm or 25Mohm · $\mu$ FAmplitude : 1.5mm	Tan δ (DF)	0.025 max.			
AppearanceNo abnormal exterior appearanceVisual inspectionWithstandingNo dielectric breakdown or mechanical breakdown200% of the rated voltageTemperatureX7RCharacteristics(From -55°C to 125°C, Capacitance change should be within ±15%)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g-F, for 10±1 sec.Bending StrengthCapacitance change : within ±12.5% is to be soldered newlyBending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 95% 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 δ, IR : initial spec.Solder pot : 270±5°C, 10±1sec.Vibration Test ResistanceCapacitance change : within ±5% Tan δ, 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 δ : 0.05 max IR : 500Mohm or 25Mohm · $\mu$ FWith rated voltage 40±2°C, 90~95%RH, 500 +12/-0 hours	Insulation	10,000Mohm or 500Mohm⋅ <i>μ</i> F	Rated Voltage 60~120 sec.		
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Soldering heatTan $\delta$ , IR : initial spec.Amplitude : 1.5mmVibration 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% IR : 500Mohm or 25Mohm · $\mu$ FWith rated voltage 40±2 °C, 90~95%RH, 500 +12/-0 hours			(preheating : 80~120 ℃ for 10~30sec.)		
Vibration TestCapacitance change : within $\pm 5\%$ Tan $\delta$ , IR : initial spec.Amplitude : 1.5mm From 10Hz to $55$ Hz (return : 1min.) 2hours $\times$ 3 direction (x, y, z)Moisture ResistanceCapacitance change : within $\pm 12.5\%$ IR : $0.05$ maxWith rated voltage $40\pm 2$ °C, $90\sim 95\%$ RH, $500 \pm 12/-0$ hours	Resistance to	Capacitance change : within ±7.5%	Solder pot : 270±5℃, 10±1sec.		
Tan $\delta$ , IR : initial spec.From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : within ±12.5% Tan $\delta$ : 0.05 max IR : 500Mohm or 25Mohm · $\mu$ FWith rated voltage 40±2 °C, 90~95%RH, 500 +12/-0 hours	Soldering heat	Tan δ, IR : initial spec.			
Moisture ResistanceCapacitance change : within $\pm 12.5\%$ IR : 500Mohm or 25Mohm · $\mu$ FWith rated voltage $40\pm 2\degree$ C, 90~95%RH, 500 +12/-0 hours	Vibration Test	Capacitance change : within ±5%	Amplitude : 1.5mm		
Moisture ResistanceCapacitance change : within $\pm 12.5\%$ Tan $\overline{0}$ : 0.05 maxWith rated voltage $40\pm 2$ °C, 90~95%RH, 500 +12/-0 hoursIR: 500Mohm or 25Mohm · $\mu$ F		Tan δ, IR : initial spec.	From 10Hz to 55Hz (return : 1min.)		
Resistance         Tan δ : 0.05 max         40±2℃, 90~95%RH, 500 +12/-0 hours           IR         : 500Mohm or 25Mohm · μF         40±2℃, 90~95%RH, 500 +12/-0 hours			2hours $\times$ 3 direction (x, y, z)		
IR : 500Mohm or 25Mohm $\cdot \mu F$	Moisture	Capacitance change : within ±12.5%	With rated voltage		
	Resistance	Tan δ:0.05 max	40±2℃, 90~95%RH, 500 +12/-0 hours		
Whichever is smaller		IR : 500Mohm or 25Mohm $\cdot \mu F$			
		Whichever is smaller			
High Temperature Capacitance change : within ±12.5% With 150% of the rated voltage	High Temperature	Capacitance change : within ±12.5%	With 150% of the rated voltage		
ResistanceTan $\delta$ : 0.05 maxMax. operating temperature	Resistance	Tan δ:0.05 max	Max. operating temperature		
IR : 1,000Mohm or 50Mohm · μF		IR : 1,000Mohm or 50Mohm $\cdot \mu F$			
Whichever is smaller 1000+48/-0 hours		Whichever is smaller	1000+48/-0 hours		
Temperature         Capacitance change : within ±7.5%         1 cycle condition	Temperature	Capacitance change : within ±7.5%	1 cycle condition		
CyclingTan $\delta$ , IR : initial spec.Min. operating temperature $\rightarrow$ 25 °C	Cycling	Tan δ, IR : initial spec.	Min. operating temperature $\rightarrow$ 25 °C		
$\rightarrow$ Max. operating temperature $\rightarrow$ 25 °C			$ ightarrow$ Max. operating temperature $ ightarrow$ 25 $^\circ \!$		
5 cycles test			5 cycles test		

X The reliability test condition can be replaced by the corresponding accelerated test condition.

#### D. Recommended Soldering method :

Reflow ( Reflow Peak Temperature : 250°C, 6sec. )

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