

# SPECIFICATION

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- Part Number : **CL32B225KBJNNNE**
- Description : **CAP, 2.2 $\mu$ F, 50V,  $\pm$ 10%, X7R, 1210**

## A. Samsung Part Number

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<b>① Series</b>	Samsung Multi-layer Ceramic Capacitor		
<b>② Size</b>	1210 (inch code)	L: 3.2 $\pm$ 0.3 mm	W: 2.5 $\pm$ 0.2 mm
<b>③ Dielectric</b>	X7R	<b>⑧ Inner electrode</b>	Ni
<b>④ Capacitance</b>	2.2 $\mu$ F	<b>Termination</b>	Cu
<b>⑤ Capacitance tolerance</b>	$\pm$ 10 %	<b>Plating</b>	Sn 100% (Pb Free)
<b>⑥ Rated Voltage</b>	50 V	<b>⑨ Product</b>	Normal
<b>⑦ Thickness</b>	2.5 $\pm$ 0.2 mm	<b>⑩ Special</b>	Reserved for future use
		<b>⑪ Packaging</b>	Embossed Type, 7" reel (1,000ea)

## B. Samsung Reliability Test and Judgement condition

	Performance	Test condition
<b>Capacitance</b>	Within specified tolerance	1kHz $\pm$ 10% 1.0 $\pm$ 0.2Vrms
<b>Tan <math>\delta</math> (DF)</b>	0.025 max.	
<b>Insulation Resistance</b>	More than 500Mohm $\cdot\mu$ F	Rated Voltage 60~120 sec.
<b>Appearance</b>	No abnormal exterior appearance	Visual inspection
<b>Withstanding Voltage</b>	No dielectric breakdown or mechanical breakdown	250% of the rated voltage
<b>Temperature Characteristics</b>	X7R (From -55 $^{\circ}$ C to 125 $^{\circ}$ C, Capacitance change should be within $\pm$ 15%)	
<b>Adhesive Strength of Termination</b>	No peeling shall be occur on the terminal electrode	500g-F, for 10 $\pm$ 1 sec.
<b>Bending Strength</b>	Capacitance change : within $\pm$ 12.5%	Bending to the limit (1mm) with 1.0mm/sec.
<b>Solderability</b>	More than 75% of terminal surface is to be soldered newly	SnAg3.0Cu0.5 solder 245 $\pm$ 5 $^{\circ}$ C, 3 $\pm$ 0.3sec. (preheating : 80~120 $^{\circ}$ C for 10~30sec.)
<b>Resistance to Soldering heat</b>	Capacitance change : within $\pm$ 7.5% Tan $\delta$ , IR : initial spec.	Solder pot : 270 $\pm$ 5 $^{\circ}$ C, 10 $\pm$ 1sec.

	<b>Performance</b>	<b>Test condition</b>
<b>Vibration Test</b>	Capacitance change : within $\pm 5\%$ Tan $\delta$ , IR : initial spec.	Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours $\times$ 3 direction (x, y, z)
<b>Moisture Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.05 max IR : More than $25M\Omega \cdot \mu F$	With rated voltage $40 \pm 2^\circ C$ , 90~95%RH, 500 +12/-0 hour
<b>High Temperature Resistance</b>	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.05 max IR : More than $50M\Omega \cdot \mu F$	With 200% of the rated voltage Max. operating temperature  1000+48/-0 hour
<b>Temperature Cycling</b>	Capacitance change : within $\pm 7.5\%$ Tan $\delta$ , IR : initial spec.	1 cycle condition Min. operating temperature $\rightarrow 25^\circ C$ $\rightarrow$ Max. operating temperature $\rightarrow 25^\circ C$  5 cycles test

**C. Recommended Soldering method :**

Reflow ( Reflow Peak Temperature :  $260 \pm 0/-5^\circ C$ , 10sec. Max )

\* For the more detail Specification, Please refer to the Samsung MLCC catalogue.