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# SPECIFICATION

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor

- Samsung P/N : **CL21B224KBFSFNE**
- Description : **CAP, 220nF, 50V, ±10%, X7R, 0805**

## A. Samsung Part Number

**CL 21 B 224 K B F S F N E**  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

|                                |                                       |                          |                               |
|--------------------------------|---------------------------------------|--------------------------|-------------------------------|
| ① <b>Series</b>                | Samsung Multi-layer Ceramic Capacitor |                          |                               |
| ② <b>Size</b>                  | 0805 (inch code)                      | L: 2.0 ± 0.1 mm          | W: 1.25 ± 0.1 mm              |
| ③ <b>Dielectric</b>            | X7R                                   | ⑧ <b>Inner electrode</b> | Ni                            |
| ④ <b>Capacitance</b>           | 220 nF                                | <b>Termination</b>       | Cu/Ag-Epoxy                   |
| ⑤ <b>Capacitance tolerance</b> | ±10 %                                 | <b>Plating</b>           | Sn 100% (Pb Free)             |
| ⑥ <b>Rated Voltage</b>         | 50 V                                  | ⑨ <b>Product</b>         | Product for POWER application |
| ⑦ <b>Thickness</b>             | 1.25 ± 0.1 mm                         | ⑩ <b>Special</b>         | Reserved for future use       |
|                                |                                       | ⑪ <b>Packaging</b>       | Embossed Type, 7" reel        |

## B. Samsung Reliability Test and Judgement condition

|   | Performance  | Test condition   |
|---|--|--|
| <b>Capacitance</b>                      | Within specified tolerance   | 1kHz±10%<br>1.0±0.2Vrms  |
| <b>Tan δ (DF)</b>                       | 0.025 max.   |  |
| <b>Insulation Resistance</b>            | 10,000Mohm or 500Mohm·μF<br>Whichever is Smaller                     | Rated Voltage 60~120 sec.  |
| <b>Appearance</b>                       | No abnormal exterior appearance                                      | Microscope (×10)   |
| <b>Withstanding Voltage</b>             | No dielectric breakdown or mechanical breakdown                      | 250% of the rated voltage  |
| <b>Temperature Characterisitcs</b>      | X7R<br>(From -55℃ to 125℃, Capacitance change should be within ±15%) |  |
| <b>Adhesive Strength of Termination</b> | No peeling shall be occur on the terminal electrode                  | 500g·F, for 10±1 sec.  |
| <b>Bending Strength</b>                 | Capacitance change : within ±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<br>245±5℃, 3±0.3sec.<br>(preheating : 80~120℃ for 10~30sec.) |
| <b>Resistance to Soldering heat</b>     | Capacitance change : within ±7.5%<br>Tan δ, IR : initial spec.       | Solder pot : 270±5℃, 10±1sec.  |

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

**C. Recommended Soldering method :**

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

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