

# SPECIFICATION

(Reference sheet)

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

· Samsung P/N : **CL21B224KBFNFNE**  
· Description : **CAP, 220nF, 50V, ±10%, X7R, 0805**

## A. Samsung Part Number

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

|                         |                                       |                   |  |                               |  |  |  |  |  |  |
|-------------------------|---------------------------------------|-------------------|--|-------------------------------|--|--|--|--|--|--|
| ① Series                | Samsung Multi-layer Ceramic Capacitor |                   |  |                               |  |  |  |  |  |  |
| ② Size                  | 0805 (inch code)                      | L: 2.00 ± 0.10 mm |  | W: 1.25 ± 0.10 mm             |  |  |  |  |  |  |
| ③ Dielectric            | X7R                                   | ⑧ Inner electrode |  | Ni                            |  |  |  |  |  |  |
| ④ Capacitance           | 220 nF                                | Termination       |  | Cu                            |  |  |  |  |  |  |
| ⑤ Capacitance tolerance | ±10 %                                 | Plating           |  | Sn 100% (Pb Free)             |  |  |  |  |  |  |
| ⑥ Rated Voltage         | 50 V                                  | ⑨ Product         |  | Product for POWER application |  |  |  |  |  |  |
| ⑦ Thickness             | 1.25 ± 0.10 mm                        | ⑩ Special         |  | Reserved for future use       |  |  |  |  |  |  |
|                         |                                       | ⑪ Packaging       |  | Embossed Type, 7" reel        |  |  |  |  |  |  |

## B. Structure & Dimension



| Samsung P/N     | Dimension(mm) |             |             |                  |
|-----------------|---------------|-------------|-------------|------------------|
|                 | L             | W           | T           | BW               |
| CL21B224KBFNFNE | 2.00 ± 0.10   | 1.25 ± 0.10 | 1.25 ± 0.10 | 0.50 +0.20/-0.30 |

### C. Samsung Reliability Test and Judgement Condition

|                                  | Judgement                                                                                                                              | Test condition                                                                                                                                         |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capacitance                      | Within specified tolerance                                                                                                             | 1kHz $\pm 10\%$ / 1.0 $\pm 0.2$ Vrms                                                                                                                   |
| Tan $\delta$ (DF)                | 0.025 max.                                                                                                                             | *A capacitor prior to measuring the capacitance is heat treated at 150°C $\pm 0/-10$ °C for 1 hour and maintained in ambient air for 24 $\pm 2$ hours. |
| Insulation Resistance            | 10,000Mohm or 500Mohm $\times \mu F$<br>Whichever is smaller                                                                           | Rated Voltage 60~120 sec.                                                                                                                              |
| Appearance                       | No abnormal exterior appearance                                                                                                        | Microscope ( $\times 10$ )                                                                                                                             |
| Withstanding Voltage             | No dielectric breakdown or mechanical breakdown                                                                                        | 250% of the rated voltage                                                                                                                              |
| Temperature Characteristics      | X7R<br>(From -55°C to 125°C, Capacitance change should be within $\pm 15\%$ )                                                          |                                                                                                                                                        |
| Adhesive Strength of Termination | No peeling shall be occur on the terminal electrode                                                                                    | 500g·f, for 10 $\pm 1$ sec.                                                                                                                            |
| Bending Strength                 | Capacitance change : within $\pm 12.5\%$                                                                                               | Bending to the limit (1mm) with 1.0mm/sec.                                                                                                             |
| Solderability                    | More than 75% of terminal surface is to be soldered newly                                                                              | SnAg3.0Cu0.5 solder<br>245 $\pm 5$ °C, 3 $\pm 0.3$ sec.<br>(preheating : 80~120°C for 10~30sec.)                                                       |
| Resistance to Soldering Heat     | Capacitance change : within $\pm 7.5\%$<br>Tan $\delta$ , IR : initial spec.                                                           | Solder pot : 270 $\pm 5$ °C, 10 $\pm 1$ sec.                                                                                                           |
| Vibration Test                   | 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)                                                       |
| Moisture Resistance              | Capacitance change : within $\pm 12.5\%$<br>Tan $\delta$ : 0.05 max<br>IR : 500Mohm or 25Mohm $\times \mu F$<br>Whichever is smaller   | With rated voltage<br>40 $\pm 2$ °C, 90~95%RH, 500+12/-0hrs                                                                                            |
| High Temperature Resistance      | Capacitance change : within $\pm 12.5\%$<br>Tan $\delta$ : 0.05 max<br>IR : 1,000Mohm or 50Mohm $\times \mu F$<br>Whichever is smaller | With 200% of the rated voltage<br>Max. operating temperature<br>1,000+48/-0hrs                                                                         |
| Temperature Cycling              | Capacitance change : within $\pm 7.5\%$<br>Tan $\delta$ , IR : initial spec.                                                           | 1 cycle condition<br>Min. operating temperature $\rightarrow$ 25°C<br>$\rightarrow$ Max. operating temperature $\rightarrow$ 25°C<br><br>5 cycle test  |

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

### D. Recommended Soldering method :

Reflow ( Reflow Peak Temperature : 260 $\pm 5$ °C, 30sec. )



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.

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So, you need to approve the product specifications before placing an order.

Should you have any question regarding the product specifications,

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