

# SPECIFICATION

(Reference sheet)

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

- Samsung P/N: **CL05B103KB5NFNC**
- Description : **CAP, 10nF, 50V, ±10%, X7R, 0402**

## A. Samsung Part Number

**CL** **05** **B** **103** **K** **B** **5** **N** **F** **N** **C**  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

|                                |                                       |                          |                               |
|--------------------------------|---------------------------------------|--------------------------|-------------------------------|
| ① <b>Series</b>                | Samsung Multi-layer Ceramic Capacitor |                          |                               |
| ② <b>Size</b>                  | 0402 (inch code)                      | L: 1.00 ± 0.05 mm        | W: 0.50 ± 0.05 mm             |
| ③ <b>Dielectric</b>            | X7R                                   | ⑧ <b>Inner electrode</b> | Ni                            |
| ④ <b>Capacitance</b>           | 10 nF                                 | <b>Termination</b>       | Cu                            |
| 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>             | 0.50 ± 0.05 mm                        | ⑩ <b>Special</b>         | Reserved for future use       |
|                                |                                       | ⑪ <b>Packaging</b>       | Cardboard Type, 7" reel       |

## B. Structure & Dimension



| Samsung P/N     | Dimension(mm) |             |             |             |
|-----------------|---------------|-------------|-------------|-------------|
|                 | L             | W           | T           | BW          |
| CL05B103KB5NFNC | 1.00 ± 0.05   | 0.50 ± 0.05 | 0.50 ± 0.05 | 0.25 ± 0.10 |

### 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 +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>1000+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+0/-5°C, 10sec. Max )



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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