

# SPECIFICATION

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

- Samsung P/N : **CL05B152KB5NCNC**
- Description : **CAP, 1.5nF, 50V, ±10%, X7R, 0402**

## A. Samsung Part Number

CL   05   B   152   K   B   5   N   C   N   C  
 ①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧   ⑨   ⑩   ⑪

|                         |                                       |                   |        |    |                         |        |    |
|-------------------------|---------------------------------------|-------------------|--------|----|-------------------------|--------|----|
| ① Series                | Samsung Multi-layer Ceramic Capacitor |                   |        |    |                         |        |    |
| ② Size                  | 0402 (inch code)                      | L: 1.0            | ± 0.05 | mm | W: 0.5                  | ± 0.05 | mm |
| ③ Dielectric            | X7R                                   | ⑧ Inner electrode |        |    | Ni                      |        |    |
| ④ Capacitance           | 1.5 nF                                | Termination       |        |    | Cu                      |        |    |
| ⑤ Capacitance tolerance | ±10 %                                 | Plating           |        |    | Sn 100% (Pb Free)       |        |    |
| ⑥ Rated Voltage         | 50 V                                  | ⑨ Product         |        |    | High-Q                  |        |    |
| ⑦ Thickness             | 0.5 ± 0.05 mm                         | ⑩ Special         |        |    | Reserved for future use |        |    |
|                         |                                       | ⑪ Packaging       |        |    | Cardboard Type, 7" reel |        |    |

## B. Samsung Reliability Test and Judgement condition

|                                  | Performance                                                          | Test condition                                                                                                                 |
|----------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Capacitance                      | Within specified tolerance                                           | 1kHz±10%      1.0±0.2Vrms                                                                                                      |
| Tan δ (DF)                       | 0.025 max.                                                           |                                                                                                                                |
| Insulation Resistance            | 10,000Mohm or 500Mohm·μF<br>Whichever is Smaller                     | Rated Voltage      60~120 sec.                                                                                                 |
| Appearance                       | No abnormal exterior appearance                                      | Microscope (×10)                                                                                                               |
| Withstanding Voltage             | No dielectric breakdown or mechanical breakdown                      | 250% of the rated voltage                                                                                                      |
| Temperature Characterisitcs      | X7R<br>(From -55℃ to 125℃, Capacitance change should be within ±15%) |                                                                                                                                |
| Adhesive Strength of Termination | No peeling shall be occur on the terminal electrode                  | 500g·F, for 10±1 sec.                                                                                                          |
| Bending Strength                 | Capacitance change : within ±12.5%                                   | Bending to the limit (1mm) with 1.0mm/sec.                                                                                     |
| Solderability                    | More than 75% of terminal surface is to be soldered newly            | 1) Sn63Pb37 solder<br>235±5℃, 5±0.5sec.<br>2) SnAg3.0Cu0.5 solder<br>245±5℃, 3±0.3sec.<br>(preheating : 80~120℃ for 10~30sec.) |
| Resistance to Soldering heat     | Capacitance change : within ±7.5%<br>Tan δ, IR : initial spec.       | Solder pot : 270±5℃, 10±1sec.                                                                                                  |

|                                    | Performance                                                                                                                          | Test condition                                                                                                                                                    |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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>Humidity</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 | 40 $\pm 2^\circ C$ , 90~95%RH, 500+12/-0hrs                                                                                                                       |
| <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><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.