

# SPECIFICATION

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

- Samsung P/N : **CL31B473KEHNNNE**
- Description : **CAP, 47nF, 250V, ±10%, X7R, 1206**

## A. Samsung Part Number

**CL** **31** **B** **473** **K** **E** **H** **N** **N** **N** **E**  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

|                         |                                       |                   |                         |  |  |  |  |  |  |  |
|-------------------------|---------------------------------------|-------------------|-------------------------|--|--|--|--|--|--|--|
| ① Series                | Samsung Multi-layer Ceramic Capacitor |                   |                         |  |  |  |  |  |  |  |
| ② Size                  | 1206 (inch code)                      | L: 3.2 ± 0.2 mm   | W: 1.6 ± 0.2 mm         |  |  |  |  |  |  |  |
| ③ Dielectric            | X7R                                   | ⑧ Inner electrode | Ni                      |  |  |  |  |  |  |  |
| ④ Capacitance           | 47 nF                                 | Termination       | Cu                      |  |  |  |  |  |  |  |
| ⑤ Capacitance tolerance | ±10 %                                 | Plating           | Sn 100% (Pb Free)       |  |  |  |  |  |  |  |
| ⑥ Rated Voltage         | 250 V                                 | ⑨ Product         | Normal                  |  |  |  |  |  |  |  |
| ⑦ Thickness             | 1.6 ± 0.2 mm                          | ⑩ Special         | Reserved for future use |  |  |  |  |  |  |  |
|                         |                                       | ⑪ Packaging       | Embossed 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                      | 200% 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            | 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>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 $\pm 2$ °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 150% 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 °C<br>$\rightarrow$ Max. operating temperature $\rightarrow$ 25 °C<br><br>5 cycle test |

### C. Recommended Soldering method :

Reflow ( Reflow Peak Temperature : 260+0/-5 °C, 10sec. Max )

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