

# SPECIFICATION

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- Samsung P/N : **CL31A475KBHNNNE**
- Description : **CAP, 4.7 $\mu$ F, 50V,  $\pm$ 10%, X5R, 1206**

## A. Samsung Part Number

**CL**   **31**   **A**   **475**   **K**   **B**   **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 $\pm$ 0.2 | mm | W: 1.6 $\pm$ 0.2  | mm                             |  |  |  |  |  |
| ③ Dielectric            | X5R                                   |                  |    | ⑧ Inner electrode | Ni                             |  |  |  |  |  |
| ④ Capacitance           | 4.7 $\mu$ F                           |                  |    | Termination       | Cu                             |  |  |  |  |  |
| ⑤ Capacitance tolerance | $\pm$ 10 %                            |                  |    | Plating           | Sn 100% (Pb Free)              |  |  |  |  |  |
| ⑥ Rated Voltage         | 50 V                                  |                  |    | ⑨ Product         | Normal                         |  |  |  |  |  |
| ⑦ Thickness             | 1.6 $\pm$ 0.2 mm                      |                  |    | ⑩ Special         | Reserved for future use        |  |  |  |  |  |
|                         |                                       |                  |    | ⑪ Packaging       | Embossed Type, 7"reel(2,000ea) |  |  |  |  |  |

## B. Samsung Reliability Test and Judgement condition

|                                  | Performance                                                                                      | Test condition                                                                                                       |
|----------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Capacitance                      | Within specified tolerance                                                                       | 1kHz $\pm$ 10%      1.0 $\pm$ 0.2Vrms                                                                                |
| Tan $\delta$ (DF)                | 0.1 max.                                                                                         |                                                                                                                      |
| Insulation Resistance            | More than 500Mohm $\cdot\mu$ F                                                                   | Rated Voltage      60~120 sec.                                                                                       |
| Appearance                       | No abnormal exterior appearance                                                                  | Visual inspection                                                                                                    |
| Withstanding Voltage             | No dielectric breakdown or mechanical breakdown                                                  | 250% of the rated voltage                                                                                            |
| Temperature Characteristics      | X5R<br>(From -55 $^{\circ}$ C to 85 $^{\circ}$ C, Capacitance change should be within $\pm$ 15%) |                                                                                                                      |
| Adhesive Strength of Termination | No peeling shall be occur on the terminal electrode                                              | 500g $\cdot$ 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 $^{\circ}$ C, 3 $\pm$ 0.3sec.<br>(preheating : 80~120 $^{\circ}$ 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 $^{\circ}$ C, 10 $\pm$ 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 $\delta$ : 0.125 max<br>IR : More than 12.5M $\Omega \cdot \mu F$ | With rated voltage<br>40 $\pm 2$ °C, 90~95%RH, 500 +12/-0 hour                                                                                                                     |
| <b>High Temperature Resistance</b> | Capacitance change : within $\pm 12.5\%$<br>Tan $\delta$ : 0.125 max<br>IR : More than 25M $\Omega \cdot \mu F$   | With 150% of the rated voltage<br>Max. operating temperature<br><br>1000+48/-0 hour                                                                                                |
| <b>Temperature Cycling</b>         | Capacitance change : within $\pm 7.5\%$<br>Tan $\delta$ , IR : initial spec.                                      | 1 cycle condition<br>Min. operating temperature $\rightarrow 25^{\circ}\text{C}$<br>$\rightarrow$ Max. operating temperature $\rightarrow 25^{\circ}\text{C}$<br><br>5 cycles 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.