



# **SPECIFICATION**

(Reference sheet)

· Supplier : Samsung electro-mechanics · Samsung P/N: CL31B474KBHNNNE

· Product : Multi-layer Ceramic Capacitor · Description : CAP, 470nF, 50V, ±10%, X7R, 1206

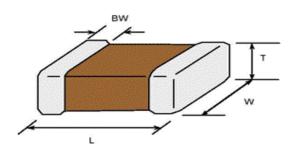
## A. Samsung Part Number

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| 1   | Series        | Samsung Multi-layer Ceramic Capacitor |         |                 |    |                            |  |
|-----|---------------|---------------------------------------|---------|-----------------|----|----------------------------|--|
| 2   | Size          | 1206 (inch code)                      | L: 3.20 | ± 0.20 mm       | W: | $1.60 \pm 0.20 \text{ mm}$ |  |
| 3   | Dielectric    | X7R                                   | 8       | Inner electrode |    | Ni                         |  |
| 4   | Capacitance   | 470 nF                                |         | Termination     |    | Cu                         |  |
| (5) | Capacitance   | ±10 %                                 |         | Plating         |    | Sn 100% (Pb Free)          |  |
|     | tolerance     |                                       | 9       | Product         |    | Normal                     |  |
| 6   | Rated Voltage | 50 V                                  | 10      | Special         |    | Reserved for future use    |  |
| 7   | Thickness     | $1.60 \pm 0.20 \text{ mm}$            | 11)     | Packaging       |    | Embossed Type, 7" reel     |  |

#### **B. Structure & Dimension**



| Samoung D/N     | Dimension(mm) |             |             |             |  |  |  |
|-----------------|---------------|-------------|-------------|-------------|--|--|--|
| Samsung P/N     | L             | W           | Т           | BW          |  |  |  |
| CL31B474KBHNNNE | 3.20 ± 0.20   | 1.60 ± 0.20 | 1.60 ± 0.20 | 0.50 ± 0.30 |  |  |  |

### C. Samsung Reliablility Test and Judgement Condition

|                                    | Judgement  | Test condition   |  |  |  |
|------------------------------------|--|--|--|--|--|
| Capacitance                        | Within specified tolerance                                 | 1kHz ±10% / 1.0±0.2Vrms  |  |  |  |
| Tan δ (DF)                         | 0.025 max.   | *A capacitor prior to measuring the capacitance is heat treated at 150 ℃ +0/-10 ℃ for 1 hour and maintained in ambient air for 24±2 hours. |  |  |  |
| nsulation 10,000Mohm or 500Mohm×µF |  | Rated Voltage 60~120 sec.  |  |  |  |
| Resistance                         | Whichever is smaller                                       |  |  |  |  |
| Appearance                         | No abnormal exterior appearance                            | Microscope (×10)   |  |  |  |
| Withstanding                       | No dielectric breakdown or                                 | 250% of the rated voltage  |  |  |  |
| Voltage                            | mechanical breakdown                                       | -  |  |  |  |
| Temperature                        | X7R  |  |  |  |  |
| Characteristics                    | (From-55℃ to 125℃, Capacitance chang                       | e should be within ±15%)   |  |  |  |
| Adhesive Strength                  | No peeling shall be occur on the                           | 500g·f, for 10±1 sec.  |  |  |  |
| of Termination                     | terminal electrode   |  |  |  |  |
| Bending Strength                   | Capacitance change: within ±12.5%                          | Bending to the limit (1mm)   |  |  |  |
|                                    |  | with 1.0mm/sec.  |  |  |  |
| Solderability                      | More than 75% of terminal surface                          | SnAg3.0Cu0.5 solder  |  |  |  |
|                                    | is to be soldered newly                                    | 245±5°C, 3±0.3sec.   |  |  |  |
|                                    | ·  | (preheating : 80~120°C for 10~30sec.)  |  |  |  |
| Resistance to                      | Capacitance change: within ±7.5%                           | Solder pot : 270±5°C, 10±1sec.   |  |  |  |
| Soldering Heat                     | Tan δ, IR : initial spec.                                  |  |  |  |  |
| Vibration Test                     | Capacitance change : within ± 5% Tan δ, IR : initial spec. | Amplitude: 1.5mm From 10Hz to 55Hz (return: 1min.) 2hours × 3 direction (x, y, z)  |  |  |  |
| Moisture                           | Capacitance change: within ±12.5%                          | With rated voltage   |  |  |  |
| Resistance                         | Tan δ : 0.05 max   | 40±2℃, 90~95%RH, 500+12/-0hrs  |  |  |  |
|                                    | IR: 500Mohm or 25Mohm × $\mu$ F                            |  |  |  |  |
|                                    | Whichever is smaller                                       |  |  |  |  |
| High Temperature                   | Capacitance change: within ±12.5%                          | With 200% of the rated voltage   |  |  |  |
| Resistance                         | Tan δ : 0.05 max   | Max. operating temperature   |  |  |  |
|                                    | IR: 1,000Mohm or 50Mohm × $\mu$ F Whichever is smaller     | 1000+48/-0hrs  |  |  |  |
| Temperature                        | Capacitance change: within ±7.5%                           | 1 cycle condition  |  |  |  |
| Cycling                            | Tan δ, IR : initial spec.                                  | Min. operating temperature → 25°C  |  |  |  |
|                                    |  | ightarrow Max. operating temperature $ ightarrow$ 25°C   |  |  |  |
|                                    |  | 5 cycle test   |  |  |  |
|                                    |  |  |  |  |  |

X 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 )



A 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.

We may change, modify or discontinue the product specifications without notice at any time.

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

Should you have any question regarding the product specifications,

please contact our sales personnel or application engineers.