SAMSUNG ELECTRO-MECHANICS

RoHS+Halogen Compliant ecoparts

# SPECIFICATION (Reference sheet)

- **Supplier : Samsung electro-mechanics**
- **Product : Multi-layer Ceramic Capacitor**
- **Samsung P/N: CL05A225KP5NNNC**
- **Description : CAP, 2.2㎌, 10V, ±10%, X5R, 0402**

## A. Samsung Part Number

| CL | 05 | A | 225 | K | P | 5 | N | N | 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: 1.00 ± 0.05 mm | W: 0.50 ± 0.05 mm | |
| ③ | **Dielectric** | X5R | ⑧ | **Inner electrode** | Ni |
| ④ | **Capacitance** | 2.2 ㎌ | | **Termination** | Cu |
| ⑤ | **Capacitance tolerance** | ±10 % | | **Plating** | Sn 100% (Pb Free) |
| | | | ⑨ | **Product** | Normal |
| ⑥ | **Rated Voltage** | 10 V | ⑩ | **Special** | Reserved for future use |
| ⑦ | **Thickness** | 0.50 ± 0.05 mm | ⑪ | **Packaging** | Cardboard Type,7"reel |

## B. Samsung Reliability Test and Judgement condition

| | Judgement | Test condition |
|---|---|---|
| **Capacitance** | Within specified tolerance | 1㎑±10% 0.5±0.1Vrms<br>*A capacitor prior to measuring the capacitance is heat treated at 150℃+0/-10℃, and maintained in ambient air for 24±2 hours. |
| **Tan δ (DF)** | 0.1 max. | |
| **Insulation Resistance** | 10,000Mohm or 100Mohm·㎌ Whichever is Smaller | 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 Characterisitcs** | X5R<br>(From -55℃ to 85℃, Capacitance change shoud 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. |

| | Judgement | Test condition |
|---|---|---|
| **Vibration Test** | Capacitance change : within ±5%<br>Tan δ, IR : initial spec. | Amplitude : 1.5mm<br>From 10Hz to 55Hz (return : 1min.)<br>2hours × 3 direction (x, y, z) |
| **Moisture Resistance** | Capacitance change : within ±12.5%<br>Tan δ : 0.2 max<br>IR : 500Mohm or 12.5 Mohm · μF<br>Whichever is Smaller | With rated voltage<br>40±2℃, 90~95%RH, 500 +12/-0 hour |
| **High Temperature Resistance** | Capacitance change : within ±12.5%<br>Tan δ : 0.2 max<br>IR : 1,000Mohm or 25Mohm · μF<br>Whichever is Smaller | With 100% of the rated voltage<br>Max. operating temperature<br><br>1000+48/-0 hour |
| **Temperature Cycling** | Capacitance change : within ±7.5%<br>Tan δ, IR : initial spec. | 1 cycle condition<br>Min. operating temperature → 25℃<br>→ Max. operating temperature → 25℃<br><br>5 cycles test |

**C. Recommended Soldering method :**

Reflow ( Reflow Peak Temperature : 260+0/-5℃, 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.
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.