SAMSUNG ELECTRO-MECHANICS

RoHS+Halogen Compliant ecoparts

# SPECIFICATION

- **Supplier : Samsung electro-mechanics**
- **Product : Multi-layer Ceramic Capacitor**
- **Samsung P/N: CL05A225MR5NNNC**
- **Description : CAP, 2.2㎌, 4V, ±20%, X5R, 0402**

## A. Samsung Part Number

| CL | 05 | A | 225 | M | R | 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: 1.0 ± 0.05 mm | W: 0.5 ± 0.05 mm | |
| ③ | **Dielectric** | X5R | ⑧ | **Inner electrode** | Ni |
| ④ | **Capacitance** | 2.2 ㎌ | | **Termination** | Cu |
| ⑤ | **Capacitance tolerance** | ±20 % | | **Plating** | Sn 100% (Pb Free) |
| | | | ⑨ | **Product** | Normal |
| ⑥ | **Rated Voltage** | 4 V | ⑩ | **Special** | Reserved for future use |
| ⑦ | **Thickness** | 0.5 ± 0.05 mm | ⑪ | **Packaging** | Cardboard Type, 7" reel |

## B. Samsung Reliablility Test and Judgement condition

| | Judgement | Test condition |
|---|---|---|
| **Capacitance** | Within specified tolerance | 1㎑±10% 0.5±0.1Vrms |
| **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 | Microscope (×10) |
| **Withstanding Voltage** | No dielectric breakdown or mechanical breakdown | 250% of the rated voltage |
| **Temperature Characterisitcs** | X5R (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 | 1) Sn63Pb37 solder 235±5℃, 5±0.5sec.<br>2) SnAg3.0Cu0.5 solder 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 10㎐ to 55㎐ (return : 1min.)<br>2hours × 3 direction (x, y, z) |
| **Humidity** | Capacitance change : within ±12.5%<br>Tan δ 0.125 max<br>IR : 25㏁·㎌ or Over | 40±2℃, 90~95%RH, 500+12/-0hrs |
| **Moisture Resistance** | Capacitance change : within ±12.5%<br>Tan δ 0.125 max<br>IR : 12.5㏁·㎌ or Over | With rated voltage<br>40±2℃, 90~95%RH, 500+12/-0hrs |
| **High Temperature Resistance** | Capacitance change : within ±12.5%<br>Tan δ 0.125 max<br>IR : 25㏁·㎌ or Over | With 100% of the rated voltage<br>Max. operating temperature<br>1000+48/-0hrs |
| **Temperature Cycling** | Capacitance change : within ±7.5%<br>Tan δ, IR : initial spec. | 1 cycle condition<br>Min. operating temperatur → 25℃<br>→ Max. operating temperature → 25℃<br><br>5 cycle test |

**C. Recommended Soldering method :**

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

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