



SPECIFICATION

(Reference sheet)

· Supplier : Samsung electro-mechanics · Samsung P/N: CL05A224MP5NNNC

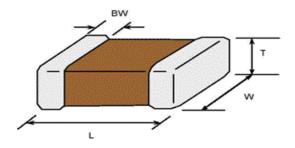
· Product : Multi-layer Ceramic Capacitor · Description : CAP, 220nF, 10V, ±20%, X5R, 0402

A. Samsung Part Number

<u>CL</u> <u>05</u> <u>A</u> <u>224</u> <u>M</u> <u>P</u> <u>5</u> <u>N</u> <u>N</u> <u>N</u> <u>C</u> 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 | ı |
| 3 | Dielectric | X5R | 8 | Inner electrode | | Ni | |
| 4 | Capacitance | 220 nF | | Termination | | Cu | |
| (5) | Capacitance | ±20 % | | Plating | | Sn 100% | (Pb Free) |
| | tolerance | | 9 | Product | | Normal | |
| 6 | Rated Voltage | 10 V | 10 | Special | | Reserved for fu | uture use |
| 7 | Thickness | 0.50 ± 0.05 mm | 11 | Packaging | | Cardboard Typ | e, 7" reel |

B. Structure & Dimension



| Samsung P/N | Dimension(mm) | | | | | |
|-----------------|---------------|-------------|-------------|-------------|--|--|
| Samsung F/N | L | W | Т | BW | | |
| CL05A224MP5NNNC | 1.00 ± 0.05 | 0.50 ± 0.05 | 0.50 ± 0.05 | 0.25 ± 0.10 | | |

C. Samsung Reliablility Test and Judgement Condition

| | Judgement | Test condition | | |
|---|--|---|--|--|
| Capacitance | Within specified tolerance | 1 ^{kHz} ±10% / 1.0±0.2Vrms | | |
| Tan δ (DF) | 0.05 max. | *A capacitor prior to measuring the capacitance is heat treated at $150^{\circ}\text{C}+0/-10^{\circ}\text{C}$ for 1 hour and maintained in ambient air for 24±2 hours. | | |
| Insulation 10,000Mohm or 100Mohm×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 | X5R | | | |
| Characteristics (From-55 ℃ to 85 ℃, Capacitance change sh | | hould 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℃, 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: 0.075 max | 40±2℃, 90~95%RH, 500+12/-0hrs | | |
| | IR: 500Mohm or 25Mohm × μ F | | | |
| | Whichever is smaller | | | |
| High Temperature | Capacitance change: within ±12.5% | With 200% of the rated voltage | | |
| Resistance | Tan δ: 0.075 max | Max. operating temperature | | |
| | IR: 1,000Mohm or 50Mohm × μ F | 1000+48/-0hrs | | |
| | Whichever is smaller | | | |
| Temperature | Capacitance change: within ±7.5% | 1 cycle condition | | |
| Cycling | Tan δ, IR : initial spec. | Min. operating temperature → 25°C | | |
| | | → Max. operating temperature → 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,

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- ② Automotive or Transportation equipment (vehicles, trains, ships, etc)
- 3 Medical equipment
- Military equipment
- 5 Disaster prevention/crime prevention equipment
- Any other applications with the same as or similar complexity or reliability to the applications set forth above.