



SPECIFICATION

(Reference sheet)

· Supplier : Samsung electro-mechanics · Samsung P/N: CL05A224KO5NNNC

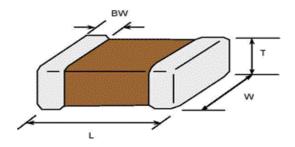
· Product : Multi-layer Ceramic Capacitor · Description : CAP, 220nF, 16V, ±10%, X5R, 0402

A. Samsung Part Number

<u>CL</u> <u>05</u> <u>A</u> <u>224</u> <u>K</u> <u>O</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 | |
| 3 | Dielectric | X5R | 8 | Inner electrode | | Ni | |
| 4 | Capacitance | 220 nF | | Termination | | Cu | |
| (5) | Capacitance | ±10 % | | Plating | | Sn 100% (Pb Free) | |
| | tolerance | | 9 | Product | | Normal | |
| 6 | Rated Voltage | 16 V | 10 | Special | | Reserved for future use | |
| 7 | Thickness | 0.50 ± 0.05 mm | 11 | Packaging | | Cardboard Type, 7" reel | |

B. Structure & Dimension



| Samsung P/N | Dimension(mm) | | | | | |
|-----------------|---------------|-------------|-------------|-------------|--|--|
| Samsung F/N | L | W | Т | BW | | |
| CL05A224KO5NNNC | 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 ^{kltz} ±10% / 1.0±0.2Vrms | | | |
| Tan δ (DF) | 0.1 max. | *A capacitor prior to measuring the capacitance is heat treated at 150°C+0/-10°C for 1 hour and maintained in ambient air for 24±2 hours. | | | |
| Insulation | 10,000Mohm or 100Mohm× <i>µ</i> F | 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 s | 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°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 \pm 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: 0.125 max | 40±2°C, 90~95%RH, 500+12/-0hrs | | | |
| | IR: 500Mohm or 12.5Mohm × μ F | | | | |
| | Whichever is smaller | | | | |
| High Temperature | Capacitance change: within ±12.5% | With 150% of the rated voltage | | | |
| Resistance | Tan δ: 0.125 max | Max. operating temperature | | | |
| | IR: 1,000Mohm or 25Mohm × 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.

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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.