



SPECIFICATION

- · Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- · Samsung P/N:
- CL05B102KA5NNNC

(Reference sheet)

- · Description :
- CAP, 1nF, 25V, ±10%, X7R, 0402

A. Samsung Part Number

| | | CL ① | <u>05</u> ② | <u>B</u> 3 | <u>102</u> ④ | <u>K</u> 5 | <mark>4</mark> 6 | <u>5</u> 7 | <u>N</u> 8 | <u>N</u> 9 | <u>N</u> 10 | <mark>C</mark> 1) |
|------------|---------------|--------------------|----------------|---------------|-----------------|---------------|---------------------|---------------|---------------|---------------|----------------|-------------------------|
| 1 | Series | Samsung Multi | -laye | r Cer | amic C | apac | itor | | | | | |
| 2 | Size | 0402 (inch co | de) | | L: | 1.00 | ± 0.05 | mm | | | W: | 0.50 ± 0.05 mm |
| 3 | Dielectric | X7R | | | | 8 | Inner | elect | rode | | | Ni |
| 4 | Capacitance | 1 nF | | | | | Term | inatio | n | | | Cu |
| 5 | Capacitance | ±10 % | | | | | Platir | ng | | | | Sn 100% (Pb Free) |
| | tolerance | | | | | 9 | Prod | uct | | | | Normal |
| 6 | Rated Voltage | 25 V | | | | 10 | Spec | ial | | | | Reserved for future use |
| \bigcirc | Thickness | 0.50 ± 0.05 mm | | | | 1 | Pack | aging | l | | | Cardboard Type, 7" reel |

B. Structure & Dimension



| Samsung D/N | Dimension(mm) | | | | | | | |
|-----------------|---------------|-------------|-------------|-------------|--|--|--|--|
| Samsung P/N | L | W | Т | BW | | | | |
| CL05B102KA5NNNC | 1.00 ± 0.05 | 0.50 ± 0.05 | 0.50 ± 0.05 | 0.25 ± 0.10 | | | | |

C. Samsung Reliablility Test and Judgement Condition

| Tan δ (DF)0.025 m.Insulation10,000 McResistanceWhichevAppearanceNo abnorWithstandingNo dielecVoltagemechanicTemperatureX7RCharacteristics(From-55Adhesive StrengthNo peelinof Terminationterminal eBending StrengthCapacitarSolderabilityMore tharResistance toCapacitarSoldering HeatTan δ, IRVibration TestCapacitarResistanceIan δ, IRMoistureCapacitarResistanceIan δ, IRMoistureCapacitarResistanceIan δ, IR | ohm or 500Mohm×µF er is smaller mal exterior appearance tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5% | 1kHz ±10% / 1.0±0.2Vrms *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. Rated Voltage 60~120 sec. Microscope (×10) 250% of the rated voltage e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec. |
|--|---|--|
| Insulation10,000MoResistanceWhichevAppearanceNo abnorWithstandingNo dielectVoltagemechanicTemperatureX7RCharacteristics(From-55Adhesive StrengthNo peelinof Terminationterminal eBending StrengthCapacitarSolderabilityMore thatSoldering HeatTan δ, IRVibration TestCapacitarTan δ, IRCapacitarTan δ, IRIRSolderueCapacitarTan δ, IRSolderability | ohm or 500Mohm×µF er is smaller mal exterior appearance tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5% | treated at 150°C+0/-10°C for 1 hour and maintained in ambient air for 24±2 hours. Rated Voltage 60~120 sec. Microscope (×10) 250% of the rated voltage e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) |
| Resistance Whichev Appearance No abnor Withstanding No dielector Voltage mechanic Temperature X7R Characteristics (From-55) Adhesive Strength No peelin of Termination terminal e Bending Strength Capacitar Solderability More than is to be so Soldering Heat Vibration Test Capacitar Resistance Capacitar Tan ō, IR Moisture Resistance Tan ō : IR : 50 | er is smaller mal exterior appearance tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5% | Microscope (×10) 250% of the rated voltage e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) |
| AppearanceNo abnorWithstandingNo dielectVoltagemechanicTemperatureX7RCharacteristics(From-55Adhesive StrengthNo peelinof Terminationterminal etBending StrengthCapacitanSolderabilityMore thanResistance toCapacitanSoldering HeatTan δ, IRVibration TestCapacitanMoistureCapacitanResistanceIR :Soldering HeatSoldering Heat | mal exterior appearance tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5% | 250% of the rated voltage e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) |
| Withstanding No dielection Voltage mechanic Temperature X7R Characteristics (From-55 Adhesive Strength No peelin of Termination terminal eterminal etermin | tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5% | 250% of the rated voltage e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) |
| Voltage mechanic Temperature X7R Characteristics (From-55 Adhesive Strength No peelin of Termination terminal e Bending Strength Capacitar Solderability More than Solderability More than Soldering Heat Tan δ, IR Vibration Test Capacitar Resistance Tan δ, IR Moisture Capacitar Resistance Tan δ, IR Moisture Capacitar Resistance Tan δ, IR | al breakdown [°] C to 125 [°] C, Capacitance chang g shall be occur on the electrode nce change : within ±12.5% n 75% of terminal surface | e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) |
| Temperature X7R Characteristics (From-55 Adhesive Strength No peelin of Termination terminal e Bending Strength Capacitar Solderability More thar Resistance to Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Resistance Ian ō, IR Moisture Capacitar Resistance Ian ō, IR Moisture Capacitar IR : 50 | ℃ to 125℃, Capacitance chang g shall be occur on the electrode nce change : within ±12.5% | 500g·f, for 10±1 sec. Bending to the limit (1mm) |
| Characteristics (From-55 Adhesive Strength No peelin of Termination terminal e Bending Strength Capacitar Solderability More than Solderability More than Resistance to Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Moisture Capacitar Resistance IR : 50 | g shall be occur on the electrode nce change : within ±12.5% | 500g·f, for 10±1 sec. Bending to the limit (1mm) |
| Adhesive Strength of Termination No peelin terminal e Bending Strength Capacitar Solderability More than is to be so Resistance to Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Resistance Tan δ, IR Image: Strength Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Tan δ, IR Tan δ, IR Moisture Capacitar Resistance Tan δ : IR : 50 | g shall be occur on the electrode nce change : within ±12.5% | 500g·f, for 10±1 sec. Bending to the limit (1mm) |
| of Termination terminal e Bending Strength Capacitar Solderability More than is to be so Resistance to Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Resistance Tan δ, IR Moisture Capacitar Resistance Tan δ, IR Moisture Capacitar IR : 50 | nce change : within ±12.5% | Bending to the limit (1mm) |
| Bending Strength Capacitan Solderability More than Solderability More than Resistance to Capacitan Soldering Heat Tan δ, IR Vibration Test Capacitan Resistance Capacitan Tan δ, IR Tan δ, IR Moisture Capacitan Resistance Tan δ : IR : 50 | nce change : within ±12.5% | |
| Solderability More that is to be soldering Resistance to Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Tan δ, IR Tan δ, IR Moisture Capacitar Resistance Tan δ, IR IR : 50 | n 75% of terminal surface | |
| Resistance to Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Tan δ, IR Tan δ, IR Moisture Capacitar Resistance Tan δ : IR : 50 | | with 1.0mm/sec. |
| Resistance to Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Tan δ, IR Tan δ, IR Moisture Capacitar Resistance Tan δ : IR : 50 | | |
| Resistance to Capacitar Soldering Heat Tan δ, IR Vibration Test Capacitar Tan δ, IR Tan δ, IR Moisture Capacitar Resistance Tan δ : IR : 50 | | SnAg3.0Cu0.5 solder |
| Soldering Heat Tan δ, IR Vibration Test Capacitar Tan δ, IR Moisture Capacitar Resistance Tan δ : IR : 50 | oldered newly | 245±5°C, 3±0.3sec. |
| Soldering Heat Tan δ, IR Vibration Test Capacitar Moisture Capacitar Resistance Tan δ : IR : 50 | | (preheating : 80~120℃ for 10~30sec.) |
| Vibration Test Capacitar Tan δ, IR Moisture Capacitar Resistance Tan δ : IR : 50 | nce change : within ±7.5% | Solder pot : 270±5℃, 10±1sec. |
| Moisture Capacitar Resistance Tan δ : IR : 50 | : initial spec. | |
| Resistance Tan δ : IR : 50 | nce change : within ± 5% : initial spec. | Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z) |
| IR : 50 | nce change : within ±12.5% | With rated voltage |
| | 0.05 max | 40±2°C, 90~95%RH, 500+12/-0hrs |
| W | 00Mohm or 25Mohm × μ F | |
| | hichever is smaller | |
| High Temperature Capacitar | nce change : within ±12.5% | With 200% of the rated voltage |
| | 0.05 max | Max. operating temperature |
| | 000Mohm or 50Mohm × <i>μ</i> F hichever is smaller | 1000+48/-0hrs |
| Temperature Capacitar | nce change : within ±7.5% | 1 cycle condition |
| - | ioconange. within ±1.0/0 | Min. operating temperature $\rightarrow 25^{\circ}$ C |
| | : initial spec. | |
| | • | \rightarrow Max. operating temperature \rightarrow 25°C |
| | • | |

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)

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.

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- Aerospace/Aviation equipment
- ② Automotive or Transportation equipment (vehicles, trains, ships, etc)
- 3 Medical equipment
- *④ 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.