



SPECIFICATION

- · Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- · Samsung P/N :
- CL32A106KLULNNE

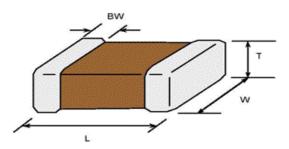
(Reference sheet)

- · Description :
- CAP, 10uF, 35V, ±10%, X5R, 1210

A. Samsung Part Number

| | | | <u>CL</u> ① | <u>32</u> ② | <u>▲</u> ③ | <u>106</u> ④ | <u>K</u> 5 | <u>L</u> 6 | <u>U</u> ⑦ | <u>∟</u> ⑧ | <u>N</u> 9 | <u>N</u> 10 | <u>Е</u> 11) | | |
|------------|---------------|-----------|----------------|----------------|---------------|-----------------|---------------|---------------|---------------|---------------|---------------|----------------|-----------------|--------------|--|
| 1 | Series | Samsung | g Multi- | layer | Cerai | nic Ca | pacito | or | | | | | | | |
| 2 | Size | 1210 | (inch c | ode) | | L : | 3.20 | ± 0.30 | mm | | | W : | 2.50 ± 0.20 r | mm | |
| | | | | | | | 8 | Thick | ness | divis | ion | | Low profile | | |
| 3 | Dielectric | X5R | | | | | | Inner | elect | rode | | | Ni | | |
| 4 | Capacitance | 10 | uF | | | | | Term | inatic | n | | | Cu | | |
| 5 | Capacitance | ±10 | % | | | | | Platir | ıg | | | | Sn 100% | (Pb Free) | |
| | tolerance | | | | | | 9 | Prod | uct | | | | Normal | | |
| 6 | Rated Voltage | 35 | V | | | | 10 | Spec | ial | | | | Reserved for | r future use | |
| \bigcirc | Thickness | 1.80 ± 0. | 20 mm | | | | 1 | Packa | aging | | | | Embossed T | ype, 7" reel | |

B. Structure & Dimension



| Samsung P/N | Dimension(mm) | | | | | | | |
|-----------------|---------------|-------------|-------------|-------------|--|--|--|--|
| Samsung F/N | L | W | Т | BW | | | | |
| CL32A106KLULNNE | 3.20 ± 0.30 | 2.50 ± 0.20 | 1.80 ± 0.20 | 0.60 ± 0.30 | | | | |

C. Samsung Reliablility Test and Judgement Condition

| CapacitanceWithin specified tolerance14½ ±10% / 1.0±0.2VrmsTan 5 (DF)0.1 max.*A capacitor prior to measuring the capacitance is heat trated at 150 ° +0/-10° for 1 hour and maintained in ambient air for 24±2 hours.Insulation10,000 Mohm or 100 Mohm× μ^{f} Rated Voltage60~120 sec.ResistanceWhichever is smallerMo abnormal exterior appearanceMicroscope (×10)WithstandingNo dielectric breakdown or mechanical breakdown250% of the rated voltageTemperatureXSRCharacteristics(From-55° to 85°C, Capacitance change should be within ±15%)Adhesive StrengthNo peeling shall be occur on the terminal electrodeBending StrengthCapacitance change : within ±12.5%Bending StrengthCapacitance change : within ±12.5%SolderabilityMore than 75% of terminal surface is to be soldered newlySoldering HeatTan 5, IR : initial spec.Vibration TestCapacitance change : acapacitance change : within ±12.5%Kibration TestCapacitance change : acapacitance change : within ±12.5%MoistureCapacitance change : acapacitance change : within ±12.5%ResistanceTan 5 : 0.125 max Whichever is smallerHigh Temperature ResistanceCapacitance change : within ±12.5%ResistanceTan 5 : 0.125 max Whichever is smallerHigh Temperature ResistanceCapacitance change : within ±12.5%ResistanceTan 5 : 0.125 max Whichever is smallerHigh Temperature ResistanceCapacitance change : within | | Judgement | Test condition | | | |
|---|-------------------|--|---|--|--|--|
| Tan 5 (DF) 0.1 max. treated at 150°C+0/-10°C for 1hour and maintained in ambient air for 24±2 hours.Insulation10,000Mohm or 100Mohm×//FRated Voltage $60\sim120 \text{ sec.}$ ResistanceWhichever is smallerMicroscope (×10)AppearanceNo abnormal exterior appearanceMicroscope (×10)WithstandingNo dielectric breakdown or temperature 250% of the rated voltageCharacteristics(From-55°C to 85°C, Capacitance change should be within ±15%)Adhesive StrengthNo peeling shall be occur on the terminal electrodeof Terminationterminal electrodeBending StrengthCapacitance change : within ±12.5%Bending StrengthCapacitance change : within ±12.5%SolderabilityMore than 75% of terminal surface is to be soldered newlySoldering HeatTan δ , IR : initial spec.Vibration TestCapacitance change : within ±5%Vibration TestCapacitance change : within ±12.5%MoistureCapacitance change : within ±12.5%Resistance Tan δ : 0.125 max Wichever is smallerHigh Temperature Capacitance change : Within ±12.5%High Temperature ResistanceCapacitance change : within ±12.5%High Temperature Capacitance change : Within ±12.5%Resistance Tan δ : 0.125 max With red voltageResistanceTan δ : 0.125 max Within ±12.5%ResistanceTan δ : 0.125 max Within ±12.5%ResistanceTan δ : 0.125 max Within ±12.5%High Temperature Within ever is smalle | Capacitance | Within specified tolerance | 1 ^{kHz} ±10% / 1.0±0.2Vrms | | | |
| ResistanceWhichever is smallerAppearanceNo abnormal exterior appearanceMicroscope (×10)WithstandingNo dielectric breakdown or mechanical breakdown 250% of the rated voltageYoltagemechanical breakdown 250% of the rated voltageTemperatureXSR (From-55 °C to 85 °C, Capacitance change should be within ±15%)Adhesive StrengthNo peeling shall be occur on the terminal electrode $500g$ f, for 10±1 sec.Bending StrengthCapacitance change : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering HeatCapacitance change : Tan δ, IR : initial spec.within ±7.5% Mithin ±5%Solder pot : 270±5°C, 10±1sec.Vibration Test Wibration TestCapacitance change : Capacitance change : Within ±12.5%Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : Tan δ : 0.125 max IR : Michever is smallerWith 150% of the rated voltage Max.operating temperature 1,000+48/.0hrsHigh Temperature Capacitance change : Whichever is smallerWithin ±12.5% Mith 150% of the rated voltageTemperature Capacitance change : Whichever is smaller1000+48/.0hrsHigh Temperature Capacitance change : Michever is smaller1000+48/.0hrs | Tan δ (DF) | 0.1 max. | | | | |
| AppearanceNo abnormal exterior appearanceMicroscope (×10)WithstandingNo dielectric breakdown or mechanical breakdown 250% of the rated voltageTemperatureX5RCharacteristics(From-55° to 85°C, Capacitance change should be within ±15%)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode $500g$ -f, for 10±1 sec.Bending StrengthCapacitance change : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.))Resistance to Soldering HeatCapacitance change : tan 5, IR : initial spec.within ±7.5% Tan 5, IR : initial spec.Solder pot : 270±5°C, 10±1sec. Solder pot : 270±5°C, 10±1sec.Vibration TestCapacitance change : within ±12.5% Tan 5, IR : initial spec.Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : within ±12.5% Tan 5 : 0.125 max IR : Michever is smallerWith 150% of the rated voltage High Temperature Tan 5 : 0.125 max IR : 1,000Mohm or 25Mohm × μ^{E} Whichever is smallerWith 150% of the rated voltage Max.operating temperature 1,000+48/-0hrsTemperature Capacitance change : Whichever is smallerCapacitance change : Within ±7.5%1 cycle condition Min. operating temperature $\rightarrow 25°C$ | Insulation | 10,000Mohm or 100Mohm×µF | Rated Voltage 60~120 sec. | | | |
| Withstanding VoltageNo dielectric breakdown or mechanical breakdown 250% of the rated voltageTemperature CharacteristicsXSR (From-55°C to 85°C, Capacitance change should be within ±15%)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode $500g$ -f, for 10 ± 1 sec.Bending StrengthCapacitance change : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering HeatCapacitance change : within ±9c.Solder pot : 270±5°C, 10±1sec.Vibration Test ResistanceCapacitance change : an δ : 0.125 max IR : initial spec.Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : within ±12.5% ResistanceWith 150% of the rated voltage Max. operating temperature 1, 0.0040hm or 12.5Mohm × μ^{E} Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsHigh Temperature Capacitance change : within ±7.5%With 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature Capacitance change : within ±7.5%1 cycle condition Min. operating temperature 1,000+48/-0hrs | Resistance | Whichever is smaller | | | | |
| WorkingThe status breakdownTemperatureX5RCharacteristics(From-55°C to 85°C, Capacitance change should be within $\pm 15\%$)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g.f, for 10±1 sec.Bending StrengthCapacitance change : within $\pm 12.5\%$ Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering HeatCapacitance change : mather initial spec.within $\pm 7.5\%$ Solder pot : $270\pm5°C$, $10\pm1sec$.Vibration TestCapacitance change : within $\pm 12.5\%$ Amplitude : $1.5mm$ From 10Hz to 55Hz (return : 1min.) 2hours ×3 direction (x, y, z)Moisture ResistanceCapacitance change : mather initial spec.within $\pm 12.5\%$ With rated voltage $40\pm2°C$, $90~95\%$ RH, $500+12/-0hrs$ High Temperature ResistanceCapacitance change : mather is smallerwith $\pm 12.5\%$ With 150% of the rated voltage Max. operating temperature $1,0004hm or 25Mohm × \mu^{E}Whichever is smallerWith 150\% of the rated voltageMax. operating temperature1,000+48/-0hrsTemperatureCyclingCapacitance change :mather is mallerWith \pm 7.5\%1 cycle conditionMin. operating temperature\rightarrow 25°C$ | Appearance | No abnormal exterior appearance | Microscope (×10) | | | |
| Temperature CharacteristicsX5R (From-55℃ to 85℃, Capacitance change should be within ±15%)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g·f, for 10±1 sec.Bending StrengthCapacitance change : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5℃, 3±0.3sec. (preheating : 80~120℃ for 10~30sec.)Resistance to Soldering HeatCapacitance change : man δ, IR : initial spec.Solder pot : 270±5℃, 10±1sec.Vibration Test ResistanceCapacitance change : man δ, IR : initial spec.Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : man δ : 0.125 max IR : 500Mohm or 12.5Mohm × //² Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsHigh Temperature Whichever is smallerCapacitance change : Whichever is smallerWith 150% Max. operating temperature 1,000+48/-0hrsTemperature CyclingCapacitance change : m δ, IR : initial spec.With 150% Min .25%Max. operating temperature 1,000+48/-0hrs | Withstanding | No dielectric breakdown or | 250% of the rated voltage | | | |
| Characteristics (From-55 ℃ to 85 ℃, Capacitance change should 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 Sn Ag3.0Cu0.5 solder 245±5℃, 3±0.3sec. (preheating : 80~120℃ for 10~30sec.) Resistance to Capacitance change : within ±7.5% Solder pot : 270±5℃, 10±1sec. Soldering Heat Tan õ, IR : initial spec. Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z) Moisture Capacitance change : within ±12.5% Tan õ : 0.125 max IR : 500Mohm or 12.5Mohm × μ ^c Whichever is smaller With 150% of the rated voltage High Temperature Resistance Capacitance change : within ±12.5% Tan õ : 0.125 max IR : 1,000Mohm or 25Mohm × μ ^c Whichever is smaller With 150% of the rated voltage High Temperature Resistance Capacitance change : within ±12.5% Tan õ : 0.125 max IR : 1,000Mohm or 25Mohm × μ ^c Whichever is smaller With 150% of the rated voltage Temperature Capacitance change : within ±12.5% With 150% of the rated voltage Max. operating temperature 1,000+48/-0hrs Temperature Capacitance change : within ±7.5% 1 cycle condition Min. operating temperature → 25°C <td>Voltage</td> <td>mechanical breakdown</td> <td></td> | Voltage | mechanical breakdown | | | | |
| Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g-f, for 10±1 sec.Bending StrengthCapacitance change : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering HeatCapacitance change : Tan δ , IR : initial spec.Solder pot : 270±5°C, 10±1sec.Vibration TestCapacitance change : vibration Testwithin ±7.5% Capacitance change : within ±12.5%Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : vibraticeWithin ±12.5% Whichever is smallerWith rated voltage 40±2°C, 90~95%RH, 500+12/-0hrsHigh Temperature ResistanceCapacitance change : within ±12.5% Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature Capacitance change : whichever is smallerCapacitance change : within ±12.5% Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature Capacitance change : whichever is smaller1 cycle condition Min. operating temperature $\rightarrow 25°C$ | Temperature | X5R | | | | |
| of Terminationterminal electrodeBending StrengthCapacitance change : within $\pm 12.5\%$ Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245 \pm °C, 3 \pm 0.3sec. (preheating : 80~120°C for 10~30sec.))Resistance to Soldering HeatCapacitance change : within $\pm 7.5\%$ Tan δ , IR : initial spec.Solder pot : $270\pm5^\circ$ C, 10 ± 1 sec.Vibration TestCapacitance 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 ResistanceCapacitance change : within $\pm 12.5\%$ Tan δ : 0.125 max IR : 500Mohm or 12.5Mohm × μ^c Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsHigh Temperature Capacitance change : within $\pm 12.5\%$ Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature CyclingCapacitance change : within $\pm 7.5\%$ Tan δ , IR : initial spec.Vith is $\pm 7.5\%$ 1 cycle condition Min. operating temperature $\rightarrow 25^\circ$ C | Characteristics | (From-55℃ to 85℃, Capacitance change s | hould be within ±15%) | | | |
| Bending StrengthCapacitance change :within $\pm 12.5\%$ Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245 \pm 5°C, 3 \pm 0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering HeatCapacitance change :within $\pm 7.5\%$ Tan δ , IR : initial spec.Solder pot : 270 \pm 5°C, 10 \pm 1sec.Vibration Test Vibration TestCapacitance 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 ResistanceCapacitance change :within $\pm 12.5\%$ Tan δ :0.125 max With $\pm 12.5\%$ Whichever is smallerHigh Temperature ResistanceCapacitance change :within $\pm 12.5\%$ Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature CyclingCapacitance change :within $\pm 12.5\%$ Whichever is smaller1 cycle condition Min. operating temperature 1 cycle condition Min. operating temperature | Adhesive Strength | No peeling shall be occur on the | 500g·f, for 10±1 sec. | | | |
| with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245 \pm 5°C, 3 \pm 0.3 sec. (preheating : 80~120°C for 10~30 sec.)Resistance to Soldering HeatCapacitance change : Tan δ , IR : initial spec.within \pm 7.5% Solder pot : 270 \pm 5°C, 10 \pm 1 sec.Vibration TestCapacitance change : capacitance change : Tan δ , IR : initial spec.Solder pot : 270 \pm 5°C, 10 \pm 1 sec.Moisture ResistanceCapacitance change : Tan δ : 0.125 max IR : S00Mohm or 12.5Mohm × μ F Whichever is smallerAmplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : tan δ : 0.125 max IR : S00Mohm or 12.5Mohm × μ F Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsHigh Temperature ResistanceCapacitance change : tan δ : 0.125 max IR : 1,000Mohm or 25Mohm × μ F Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature CyclingCapacitance change : Tan δ , IR : initial spec.1 cycle condition Min. operating temperature 1 cycle condition Min. operating temperature | of Termination | terminal electrode | | | | |
| SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder $245\pm5^{\circ}C, 3\pm0.3sec.$ (preheating : $80^{-1}20^{\circ}C$ for $10^{-3}0sec.$)Resistance to Soldering HeatCapacitance change : Tan δ , IR : initial spec.within $\pm 7.5\%$ Solder pot : $270\pm5^{\circ}C$, $10\pm1sec.$ Vibration TestCapacitance change : apacitance change : Tan δ , IR : initial spec.within $\pm 5\%$ From 10Hz to $55Hz$ (return : 1min.) $2hours \times 3$ direction (x, y, z)Moisture ResistanceCapacitance change : Tan δ : 0.125 max IR : 500 Mohm or 12.5 Mohm × μ^{c} Whichever is smallerWith 150% of the rated voltage Max. operating temperature $1,000+48/-0hrs$ High Temperature ResistanceCapacitance change : N δ : 0.125 max IR : $1,000$ Mohm or 25 Mohm × μ^{c} Whichever is smallerWith 150% of the rated voltage Max. operating temperature $1,000+48/-0hrs$ Temperature CyclingCapacitance change : N R : initial spec.With $\pm 7.5\%$ I cycle condition Min. operating temperature $40\pm2^{\circ}C$ | Bending Strength | Capacitance change : within ±12.5% | Bending to the limit (1mm) | | | |
| is to be soldered newly $245\pm5^{\circ}$ C, 3 ± 0.3 sec. (preheating : $80\sim120^{\circ}$ C for $10\sim30$ sec.)Resistance to Soldering HeatCapacitance change : Tan δ , IR : initial spec.within $\pm7.5\%$ Solder pot : $270\pm5^{\circ}$ C, 10 ± 1 sec.Vibration TestCapacitance change : Tan δ , IR : initial spec.within $\pm5\%$ Tan δ , IR : initial spec.Amplitude : 1.5 mm From 10Hz to 55 Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : tan δ : 0.125 max IR : S00Mohm or 12.5Mohm × μ F Whichever is smallerWith rated voltage $40\pm2^{\circ}$ C, $90\sim95\%$ RH, $500+12/-0$ hrsHigh Temperature ResistanceCapacitance change : within $\pm12.5\%$ ResistanceWith 150% of the rated voltage Max. operating temperature $1,000+48/-0$ hrsTemperature CyclingCapacitance change : within $\pm7.5\%$ Tan δ , IR : initial spec.Vith $\pm7.5\%$ T cycle condition Min. operating temperature $-\rightarrow 25^{\circ}$ C | | | with 1.0mm/sec. | | | |
| Resistance to Soldering HeatCapacitance change : Tan δ , IR : initial spec.within $\pm 7.5\%$ Solder pot : $270\pm5^{\circ}$ C, 10 ± 1 sec.Vibration TestCapacitance change : Capacitance change : Tan δ , IR : initial spec.within $\pm 5\%$ From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : Tan δ : 0.125 maxwithin $\pm 12.5\%$ Whichever is smallerAmplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : Tan δ : 0.125 maxwithin $\pm 12.5\%$ Whichever is smallerWith rated voltage $40\pm2^{\circ}$ C, $90\sim95\%$ RH, $500+12/-0hrs$ High Temperature ResistanceCapacitance change : Whichever is smallerWith $\pm 12.5\%$ Max. operating temperature $1,000+48/-0hrs$ With $\pm 100\%$ of the rated voltage Max. operating temperature $1,000+48/-0hrs$ Temperature CyclingCapacitance change : Whichever is smaller1 cycle condition Min. operating temperature $- 25^{\circ}$ C | Solderability | More than 75% of terminal surface | SnAg3.0Cu0.5 solder | | | |
| Resistance to Soldering HeatCapacitance change : Tan δ , IR : initial spec.within $\pm 7.5\%$ Solder pt : $270\pm5^{\circ}$ C, 10 ± 1 sec.Vibration TestCapacitance change : Tan δ , IR : initial spec.within $\pm 5\%$ Tom 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : Tan δ : 0.125 maxwithin $\pm 12.5\%$ Whichever is smallerWith rated voltage $40\pm2^{\circ}$ C, $90\sim95\%$ RH, $500+12/-0hrs$ High Temperature ResistanceCapacitance change : whichever is smallerwithin $\pm 12.5\%$ Whichever is smallerWith 150% of the rated voltage Max. operating temperature $1,000+48/-0hrs$ Temperature CyclingCapacitance change : within $\pm 7.5\%$ Tan δ , IR : initial spec.1 cycle condition Min. operating temperature $1, cycle condition$ Min. operating temperature $\rightarrow 25^{\circ}C$ | | is to be soldered newly | 245±5℃, 3±0.3sec. | | | |
| Soldering HeatTan δ , IR : initial spec.Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Woisture ResistanceCapacitance change : within ±12.5% Tan δ : 0.125 max IR : 500Mohm or 12.5Mohm × μ F Whichever is smallerAmplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)High Temperature ResistanceCapacitance change : within ±12.5% Tan δ : 0.125 max IR : 500Mohm or 12.5Mohm × μ F Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature CyclingCapacitance change : within ±7.5% Tan δ , IR : initial spec.1 cycle condition Min. operating temperature Min. operating temperature | | | (preheating : 80~120℃ for 10~30sec.) | | | |
| Vibration TestCapacitance change : Tan δ , IR : initial spec.within $\pm 5\%$ Tan δ , IR : initial spec.Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : Tan δ : 0.125 maxwithin $\pm 12.5\%$ With rated voltageWith rated voltage $40\pm 2^{\circ}$ C, 90~95%RH, 500+12/-0hrsHigh Temperature ResistanceCapacitance change : Whichever is smallerwithin $\pm 12.5\%$ Whichever is smallerWith 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature CyclingCapacitance change : Whichever is smallerwithin $\pm 7.5\%$ Min. operating temperature Tan δ , IR : initial spec.1 cycle condition Min. operating temperature Min. operating temperature | Resistance to | Capacitance change : within ±7.5% | Solder pot : 270±5°C, 10±1sec. | | | |
| $\begin{tabular}{ c c c c c c c } \hline Tan \delta, IR: initial spec. & From 10Hz to 55Hz (return : 1min.) \\ 2hours \times 3 \ direction (x, y, z) \\ \hline \end{tabular} \$ | Soldering Heat | | | | | |
| $ \begin{array}{c} \mbox{Moisture} \\ \mbox{Resistance} \\ \mbox{Resistance} \\ \mbox{In} \delta : 0.125 \mbox{ max} \\ \mbox{IR} : 500 \mbox{Mohm or } 12.5 \mbox{Mohm } \times \mbox{\sc P}^F \\ \mbox{Whichever is smaller} \\ \mbox{High Temperature} \\ \mbox{Resistance} \\ \mbox{Resistance} \\ \mbox{Tan } \delta : 0.125 \mbox{ max} \\ \mbox{In} 12.5 \mbox{\sc P} \\ \mbox{Tan } \delta : 0.125 \mbox{ max} \\ \mbox{In} 12.5 \mbox{\sc P} \\ \mbox{Tan } \delta : 0.125 \mbox{\sc max} \\ \mbox{IR} : 1,000 \mbox{Mohm or } 25 \mbox{\sc Mohm } \times \mbox{\sc P}^F \\ \mbox{\sc Mhichever is smaller} \\ \mbox{\sc P} \ \mbox{\sc P} \\ \mbox{\sc P} \ \mbox{\sc P} \ \mbox{\sc P} \\ \mbox{\sc P} \ \mb$ | Vibration Test | | From 10Hz to 55Hz (return : 1min.) | | | |
| IR :500Mohm or 12.5Mohm × μ F Whichever is smallerHigh Temperature ResistanceCapacitance change :within ±12.5% Mith ±12.5% Tan δ :With 150% of the rated voltage Max. operating temperature 1,000+48/-0hrsTemperature CyclingCapacitance change :within ±7.5% Whichever is smallerI cycle condition Min. operating temperature $\rightarrow 25^{\circ}C$ | Moisture | Capacitance change : within ±12.5% | | | | |
| Whichever is smallerWith150%of the rated voltageHigh Temperature ResistanceCapacitance change :within $\pm 12.5\%$ Tan δ :With150%of the rated voltageResistanceTan δ :0.125 max 0.125 max IR :Max. operating temperature 1,000+48/-0hrsMax. operating temperature 1,000+48/-0hrsTemperature CyclingCapacitance change :within $\pm 7.5\%$ Tan δ , IR : initial spec.1 cycle condition Min. operating temperature Min. operating temperature | Resistance | Tan δ : 0.125 max | 40±2℃, 90~95%RH, 500+12/-0hrs | | | |
| ResistanceTan δ :0.125 maxMax. operating temperatureIR:1,000Mohm or 25Mohm × μ^{F} 1,000+48/-0hrsWhichever is smaller1 cycle conditionTemperature CyclingCapacitance change :within ±7.5%Tan δ , IR : initial spec.1 cycle condition | | | | | | |
| ResistanceTan δ :0.125 maxMax. operating temperatureIR:1,000Mohm or 25Mohm × μ F1,000+48/-0hrsWhichever is smallerMax. operating temperatureTemperature CyclingCapacitance change :within $\pm 7.5\%$ 1 cycle conditionMin. operating temperature $\rightarrow 25^{\circ}$ C | High Temperature | Capacitance change : within ±12.5% | With ^{150%} of the rated voltage | | | |
| Whichever is smallerWhichever is smallerTemperature CyclingCapacitance change : within $\pm 7.5\%$ Tan δ , IR : initial spec.1 cycle condition Min. operating temperature $\rightarrow 25^{\circ}C$ | | - | Max. operating temperature | | | |
| CyclingTan δ , IR : initial spec.Min. operating temperature \rightarrow 25°C | | | 1,000+48/-0hrs | | | |
| | Temperature | Capacitance change : within ±7.5% | 1 cycle condition | | | |
| \rightarrow Max. operating temperature \rightarrow 25°C | Cycling | Tan δ, IR : initial spec. | Min. operating temperature \rightarrow 25°C | | | |
| | | | \rightarrow Max. operating temperature \rightarrow 25°C | | | |
| 5 cycle test | | | 5 cycle test | | | |

 $\,\%$ The reliability test condition can be replaced by the corresponding accelerated test condition.

D. Recommended Soldering method :

Reflow (Reflow Peak Temperature : 260±5°C, 30sec.)

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.