

Specification of Automotive MLCC (Reference sheet)

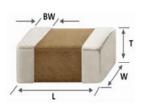


● Supplier : Samsung Electro-Mechanics ● Samsung P/N : CL05B104KB54PNC

● AEC-Q200 Qualified

A. Dimension

Dimension



| Size | 0402 inch |
|------|--------------|
| L | 1.00±0.05 mm |
| W | 0.50±0.05 mm |
| Т | 0.50±0.05 mm |
| BW | 0.25±0.10 mm |

B. Samsung Part Number

| <u>CL</u> | <u>05</u> | <u>B</u> | <u>104</u> | <u>K</u> | <u>B</u> | <u>5</u> | <u>4</u> | <u>P</u> | <u>N</u> | <u>C</u> |
|-----------|-----------|----------|------------|----------|----------|----------|----------|----------|----------|----------|
| 1 | 2 | 3 | 4 | (5) | ⑥ | 1 | 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 | X7R | ® Inner electrode | Ni | | |
| 4 Capacitance | 100 nF | Termination | Metal-Epoxy | | |
| ⑤ Capacitance | ± 10% | Plating | Sn 100% (Pb Free) | | |
| tolerance | | 9 Product | Automotive | | |
| Rated Voltage | 50 V | Special code | Normal | | |
| 7 Thickness | 0.50±0.05 mm | ① Packaging | Cardboard Type, 7" Reel | | |

C. Reliability Test and Judgement condition

| Test items | Performance | Test condition |
|--|---|---|
| High Temperature | Appearance : No abnormal exterior appearance | Unpowered, 1,000hrs @ Max. temperature |
| Exposure Capacitance Change Within ±10 % | | Measurement at 24±2hrs after test conclusion |
| | Tan δ : 0.2 max. | |
| | IR More than 10,000 MΩ or 50 MΩ×/JF | Initial Measurement 2* |
| | Whichever is smaller | Final Measurement 3* |
| Temperature Cycling | Appearance : No abnormal exterior appearance | 1,000Cycles |
| | Capacitance Change Within ±10 % | Initial Measurement 2* |
| | Tan δ : 0.2 max. | Final Measurement 3* |
| | IR More than 10,000 № or 50 № × μF | Measurement at 24±2hrs after test conclusion |
| | Whichever is smaller | 1 cycle condition : -55+0/-3°C(30±3min) → Room Temp. (1min) |
| | | → 125+3/-0 °C (30±3min) → Room Temp. (1min) |
| Destructive Physical | No Defects or abnormalities | Per EIA 469 |
| Analysis | | |
| Humidity Bias | Appearance : No abnormal exterior appearance | 1,000hrs 85 °C/85%RH, Rated Voltage and 1.3~1.5V, |
| | Capacitance Change Within ±12.5 % | Add 100kohm resistor |
| | Tan δ : 0.2 max. | Initial Measurement 2* |
| | IR More than 500 ^{MΩ} or 5 ^{MΩ} ×μF | Final Measurement 4* |
| | Whichever is smaller | Measurement at 24±2hrs after test conclusion |
| | | The charge/discharge current is less than 50mA. |
| High Temperature | Appearance : No abnormal exterior appearance | 1,000hrs @ 125℃, 150% Rated Voltage, |
| Operating Life | Capacitance Change Within ±12.5 % | Initial Measurement 2* |
| | Tan δ : 0.2 max. | Final Measurement 4* |
| | IR More than 1,000 MΩ or 5 MΩ×//F | Measurement at 24±2hrs after test conclusion |
| | Whichever is smaller | The charge/discharge current is less than 50mA. |

| Physical Dimension Within the specified dimensions Using The calipers | | Performance | Test condition | | | | |
|---|---|---|--|--|--|--|--|
| Physical Dimension Within the specified dimensions Using The calipers | External Visual | No abnormal exterior appearance | | | | | |
| Mechanical Shock Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Vibration Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance: Within specified tolerance Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance: Within specified tolerance Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Capacitance: Within specified tolerance Tan δ, IR: Initial spec. Appearance: No abnormal exterior appearance Tan δ (IR: Initial Measurement 2* Final Measureme | | | | | | | |
| Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Peak value Duration Wave Velocity 1,500G 0.5ms Half sine 4.7m/sec No per speciment 2" 1,500G 0.5ms Half sine 4.7m/sec No per speciment 2" 1,500G 0.5ms Half sine 4.7m/sec No per speciment 2" 1,500G 0.5ms Half sine 4.7m/sec No per speciment 5" No per speciment 2" No per speciment 3" No per speciment 4" No per speciment 4 | Physical Dimension: Within the specified dimensions | | Using The calipers | | | | |
| Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Peak value Duration Wave Velocity 1,500G 0.5ms Half sine 4.7m/sec No per speciment 2" 1,500G 0.5ms Half sine 4.7m/sec No per speciment 2" 1,500G 0.5ms Half sine 4.7m/sec No per speciment 2" 1,500G 0.5ms Half sine 4.7m/sec No per speciment 5" No per speciment 2" No per speciment 3" No per speciment 4" No per speciment 4 | Mechanical Shock | Appearance : No abnormal exterior appearance | Three shocks in each direction should be applied along | | | | |
| Peak value Duration Wave Velocity 1,500G 0.5ms Half sine 4.7m/sec Initial Measurement 2* Final Measurement 5* Final Measurement 2* Final Measurement 2* Final Measurement 2* Final Measurement 2* Final Measurement 5* Final Measurement 2* Final Measurement 2* Final Measurement 3* Final Measurement 2* Final Measurement 2* Final Measurement 2* Final Measurement 2* Final Measurement 3* Final Measurement 4* Fin | Mechanical onock | | | | | | |
| Time | | • | | | | | |
| Initial Measurement 2* Final Measurement 5* | | , | | | | | |
| Final Measurement 5* Vibration Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. AEC-Q200-002 or ISO/DIS10605 Initial Measurement 2* Final Measurement 2* Final Measurement 4* Solderability 95% of the terminations is to be soldered evenly and continuously 95% of the terminations is to be soldered evenly and continuously 10 Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5 °C solder : a solution ethanol and rosin Electrical Capacitance : Within specified tolerance Tan δ : 0.1 max. IR(25 °C) : More than 1,000 ™ or 5 ™ x x x x I № ± 10%, 1 ± 0.2 V rms Whichever is smaller Whichever is smaller IR(125 °C) More than 1,000 ™ or 5 ™ x x x x x x x x x x x x x x x x x x | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | | |
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| within 2" from any secure point. Test from 10–2,000 Hz. Initial Measurement 2* Final Measurement 5* Resistance to Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Initial Measurement 2* Final Measurement 2* Final Measurement 2* Final Measurement 3* ESD Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Initial Measurement 3* ESD Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Initial Measurement 2* Final Measurement 2* Final Measurement 2* Final Measurement 4* Solderability 95% of the terminations is to be soldered evenly and continuously by Steam aging for 8 hours, Immerse in solder for 5s at 245±5 ℃ c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5 ℃ solder : a solution ethanol and rosin Electrical Capacitance : Within specified tolerance Tan δ : 0.1 max. IR(25 ℃): More than 1,000 № or 50 № x/F Whichever is smaller IR(125 ℃) More than 1,000 № or 50 № x/F Whichever is smaller IR. should be measured with a DC voltage not exceeding Rated Voltage @25 ℃, @125 ℃ for 60–120 sec. Dielectric Strength Dielectric Strength: 250% of the rated voltage for 1–5 seconds | | • | · | | | | |
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| Final Measurement 5* Resistance to Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Initial Measurement 2* Final Measurement 3* ESD Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Initial Measurement 3* ESD Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Initial Measurement 2* Final Measurement 2* Final Measurement 4* Solderability So of the terminations is to be soldered evenly and continuously by So of the terminations is to be soldered evenly and continuously by Steam aging for 8 hours, Immerse in solder for 5s at 245±5 ℃ c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5 ℃ solder : a solution ethanol and rosin Electrical Capacitance : Within specified tolerance Tan δ : 0.1 max. IR(25℃) : More than 1,0000 № or 50 №x //F Whichever is smaller IR(125 ℃) More than 1,000 № or 50 №x //F IR Capacitance / D.F. should be measured at 25 ℃, Whichever is smaller IR(125 ℃) More than 1,000 № or 5 №x //F IR Should be measured with a DC voltage not exceeding Rated Voltage @25 ℃, @125 ℃ for 60–120 sec. Dielectric Strength Dielectric Strength : 250% of the rated voltage for 1~5 seconds | | | | | | | |
| Resistance to Appearance : No abnormal exterior appearance preheating : 150°C for 60~120 sec. Solder Heat Capacitance Change Within ±10 % Solder pot : 260±5°C, 10±1sec. Linitial Measurement 2* Final Measurement 3* ESD Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. AEC-Q200-002 or ISO/DIS10605 Initial Measurement 2* Final Measurement 4* Solderability 95% of the terminations is to be soldered evenly and continuously a) Preheat at 155°C for 4 hours, Immerse in solder for 5s at 245±5°C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5°C c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5°C solder : a solution ethanol and rosin Electrical Capacitance : Within specified tolerance Tan δ : 0.1 max. | | | | | | | |
| Solder Heat Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Solder pot : 260±5 ℃, 10±1sec. Initial Measurement 2* Final Measurement 3* ESD Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Solder pot : 260±5 ℂ, 10±1sec. Initial Measurement 3* AEC-Q200-002 or ISO/DIS10605 Initial Measurement 2* Final Measurement 2* Final Measurement 4* a) Preheat at 155 ℂ for 4 hours, Immerse in solder for 5s at 245±5 ℂ c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 ℂ c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5 ℂ solder : a solution ethanol and rosin Electrical Characterization Capacitance : Within specified tolerance Tan δ : 0.1 max. IR(25 ℂ) : More than 1,0000 № or 50 № x/F Whichever is smaller IR(125 ℂ) More than 1,000 № or 5 № x/F Whichever is smaller IR(125 ℂ) More than 1,000 № or 5 № x/F Whichever is smaller Dielectric Strength Dielectric Strength Dielectric Strength : 250% of the rated voltage for 1-5 seconds | Posiotoneo to | Appearance : No abnormal exterior appearance | | | | | |
| Tan δ, IR : Initial spec. Initial Measurement 2* Final Measurement 3* | | '' | li. | | | | |
| ESD Appearance : No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Solderability 95% of the terminations is to be soldered evenly and continuously Electrical Characterization Electrical Characterization IR(25℃): More than 1,0000 № or 50 № № № IR(125℃) More than 1,0000 № or 55 № № № IR(125℃) More than 1,0000 № or 55 № № № IR(125℃) More than 1,0000 № or 55 № № № IR(125℃) More than 1,0000 № or 55 № № № IR(125℃) More than 1,0000 № or 55 № № № IR(125℃) More than 1,0000 № or 55 № № № IR(125℃) More than 1,0000 № or 55 № № № IR(125℃) More than 1,000 № or 55 № № № IR(125℃) More than 1,000 № or 55 № № № IR(125℃) More than 1,000 № or 55 № № № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More than 1,000 № or 55 № 00 № IR(125℃) More th | Solder neat | | · · | | | | |
| Appearance: No abnormal exterior appearance Capacitance Change Within ±10 % Tan δ, IR: Initial spec. Solderability 95% of the terminations is to be soldered evenly and continuously Capacitance: Within specified tolerance Characterization Electrical Characterization IR(25°C): More than 1,000 № or 5 № x //F Whichever is smaller IR(125°C) More than 1,000 № or 5 № x //F Whichever is smaller Dielectric Strength AEC-Q200-002 or ISO/DIS10605 Initial Measurement 2* Final Measurement 4* a) Preheat at 155°C for 4 hours, Immerse in solder for 5s at 245±5°C c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5°C solder: a solution ethanol and rosin *A capacitor prior to measuring the capacitance is heat treated at 150 +0/-10°C for 1 hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25°C, Whichever is smaller IR(125°C) More than 1,000 № or 5 № x //F Whichever is smaller IR(125°C) More than 1,000 № or 5 № x //F Whichever is smaller IR(125°C) More than 1,000 № or 5 № x //F Uniform to measuring the capacitance is heat treated at 150 +0/-10°C for 1 hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25°C, Whichever is smaller IR(125°C) More than 1,000 № or 5 № x //F Uniform to measured with a DC voltage not exceeding Rated Voltage @ 25°C, @ 125°C for 60~120 sec. Dielectric Strength Dielectric Strength: 250% of the rated voltage for 1~5 seconds | | Tan o, no. mada opoo. | | | | | |
| Capacitance Change Within ±10 % Tan δ, IR : Initial spec. Solderability 95% of the terminations is to be soldered evenly and continuously Electrical Capacitance : Within specified tolerance Tan δ : 0.1 max. IR(25 °C) : More than 1,0000 № or 50 № x μF Whichever is smaller IR(125 °C) More than 1,000 № or 55 № x μF Whichever is smaller IR(125 °C) More than 1,000 № or 55 № x μF Whichever is smaller Dielectric Strength Initial Measurement 2* Final Measurement 4* a) Preheat at 155 °C for 4 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) St | ESD | Appearance : No abnormal exterior appearance | | | | | |
| Tan δ, IR : Initial spec. Solderability 95% of the terminations is to be soldered evenly and continuously 10 Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5 °C c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5 °C solder : a solution ethanol and rosin Electrical Characterization Capacitance : Within specified tolerance Tan δ : 0.1 max. IR(25 °C) : More than 1,0000 № or 50 № x ≠ The Capacitance / D.F. should be measured at 25 °C, Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x ≠ In the Capacitance with a DC voltage not exceeding whichever is smaller IR(125 °C) Dielectric Strength Dielectric Strength : 250% of the rated voltage for 1~5 seconds | | | | | | | |
| Solderability 95% of the terminations is to be soldered evenly and continuously a) Preheat at 155°C for 4 hours, Immerse in solder for 5s at 245±5°C b) Steam aging for 8 hours, Immerse in solder for 5s at 245±5°C c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5°C solder: a solution ethanol and rosin Electrical Capacitance: Within specified tolerance Tan δ:0.1 max. IR(25°C): More than 1,0000 № 0 or 50 № x/JF Whichever is smaller IR(125°C) More than 1,000 № 0 or 5 № x/JF Whichever is smaller IR(125°C) More than 1,000 № 0 or 5 № x/JF Whichever is smaller Dielectric Strength Dielectric Strength: 250% of the rated voltage for 1~5 seconds | | • | | | | | |
| b) Steam aging for 8 hours, Immerse in solder for 5s at 245±5 °C c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5 °C solder : a solution ethanol and rosin Electrical Capacitance : Within specified tolerance Tan δ : 0.1 max. IR(25 °C) : More than 1,0000 № or 50 № x //F Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x //F Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x //F Whichever is smaller Dielectric Strength Dielectric Strength Dielectric Strength Dielectric Strength: 250% of the rated voltage for 1~5 seconds | Solderability | • | | | | | |
| c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5 °C solder : a solution ethanol and rosin Electrical Capacitance : Within specified tolerance Tan δ : 0.1 max. IR(25 °C) : More than 1,0000 № or 50 № x / IF Whichever is smaller IR(125 °C) More than 1,000 № or 50 № x / IF Whichever is smaller IR(125 °C) More than 1,000 № or 50 № x / IF Whichever is smaller IR(125 °C) More than 1,000 № or 50 № x / IF Under the capacitance is heat treated at 150 +0/-10 °C for 1hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25 °C, Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x / IF Under the capacitance is heat treated at 150 +0/-10 °C for 1hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25 °C, Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x / IF Under the capacitance is heat treated at 150 +0/-10 °C for 1hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25 °C, Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x / IF Under the capacitance is heat treated at 150 +0/-10 °C for 1hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25 °C, Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x / IF Under the capacitance is heat treated at 150 +0/-10 °C for 1hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25 °C, Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x / IF Under the capacitance is heat treated at 150 +0/-10 °C for 1hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25 °C, Whichever is smaller IR(125 °C) More than 1,000 № or 5 № x / IF Under the capacitance is heat treated at 150 +0/-10 °C for 1hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25 °C, Under the capacitance is heat treated at 150 +0/-10 °C for 1hour and mainta | | evenly and continuously | | | | | |
| Electrical Capacitance: Within specified tolerance Tan δ:0.1 max. IR(25°C): More than 1,0000 № or 50 № x μ The Capacitance of the Language of the Languag | | | | | | | |
| Tan δ : 0.1 max. IR(25℃): More than 1,0000 № or 50 № x ≠ The Capacitance / D.F. should be measured at 25 ℂ, Whichever is smaller IR(125ℂ) More than 1,000 № or 5 № x ≠ I.R. should be measured with a DC voltage not exceeding Whichever is smaller Dielectric Strength Tan δ : 0.1 max. 150 +0/-10℃ for 1hour and maintained in ambient air for 24±2 hours The Capacitance / D.F. should be measured at 25 ℂ, 1 ★ ½ ± 10%, 1 ± 0.2 Vrms I.R. should be measured with a DC voltage not exceeding Rated Voltage @ 25 ℂ, @ 125 ℂ for 60~120 sec. | | | solder : a solution ethanol and rosin | | | | |
| IR(25 °C): More than 1,0000 MΩ or 50 MΩ×//F Whichever is smaller IR(125 °C) More than 1,000 MΩ or 5 MΩ×//F Whichever is smaller IR(125 °C) More than 1,000 MΩ or 5 MΩ×//F Whichever is smaller IR. should be measured with a DC voltage not exceeding Rated Voltage @ 25 °C, @ 125 °C for 60~120 sec. Dielectric Strength Dielectric Strength: 250% of the rated voltage for 1~5 seconds | Electrical | Capacitance : Within specified tolerance *A capacitor prior to measuring the capacitance is heat treated. | | | | | |
| Whichever is smaller IR(125°C) More than 1,000 № or 5 № x ≠ Whichever is smaller I.R. should be measured with a DC voltage not exceeding Rated Voltage @ 25°C, @ 125°C for 60~120 sec. Dielectric Strength Dielectric Strength: 250% of the rated voltage for 1~5 seconds | Characterization | Tan δ : 0.1 max. | 150 +0/-10 °C for 1hour and maintained in ambient air for 24±2 h | | | | |
| IR(125℃) More than 1,000 № or 5 № x μ I.R. should be measured with a DC voltage not exceeding Whichever is smaller Rated Voltage @ 25℃, @ 125℃ for 60~120 sec. Dielectric Strength Dielectric Strength: 250% of the rated voltage for 1~5 seconds | | IR(25℃): More than 1,0000 № or 50 №× <i>μ</i> F | The Capacitance / D.F. should be measured at 25 ℃, | | | | |
| Whichever is smaller Rated Voltage @25℃, @125℃ for 60~120 sec. Dielectric Strength Dielectric Strength : 250% of the rated voltage for 1~5 seconds | | Whichever is smaller | 1 $^{\text{kHz}}$ ± 10%, 1 ± 0.2 Vrms | | | | |
| Dielectric Strength Dielectric Strength: 250% of the rated voltage for 1~5 seconds | | IR(125℃) More than 1,000 ^{MΩ} or 5 ^{MΩ} ×μ ^F | I.R. should be measured with a DC voltage not exceeding | | | | |
| , , , , , , , , , , , , , , , , , , , | | Whichever is smaller | Rated Voltage @25℃, @125℃ for 60~120 sec. | | | | |
| | | Dielectric Strength | Dielectric Strength: 250% of the rated voltage for 1~5 seconds | | | | |
| Board Flex Appearance: No abnormal exterior appearance Bending to the limit, 2 mm for 60 seconds 1* | Board Flex | Appearance : No abnormal exterior appearance | Bending to the limit, 2 mm for 60 seconds 1* | | | | |
| Capacitance Change Within ±10 % Initial Measurement 2* | | | | | | | |
| Final Measurement 5* | | | | | | | |
| Terminal Appearance : No abnormal exterior appearance 2 N, for 60 sec. | Terminal | Appearance : No abnormal exterior appearance | 2 N, for 60 sec. | | | | |
| Strength(SMD) Capacitance Change Within ±10 % Initial Measurement 2* | Strength(SMD) | Capacitance Change Within ±10 % | Initial Measurement 2* | | | | |
| Final Measurement 5* | | | Final Measurement 5* | | | | |
| Beam Load Destruction value should be exceed 8 N Beam speed: 0.5±0.05 mm/sec | Beam Load | Destruction value should be exceed 8 N | Beam speed: 0.5±0.05 mm/sec | | | | |
| Temperature X7R | Temperature | X7R | | | | | |
| Characteristics From -55 ℃ to 125 ℃, Capacitance change should be within ±15% | Characteristics | From -55 $^{\circ}$ C to 125 $^{\circ}$ C, Capacitance change should | ld be within ±15% | | | | |

D. Recommended Soldering method :

Reflow (Reflow Peak Temperature : 260 +0/-5°C, 30sec.), Meet IPC/JEDEC J-STD-020 D Standard

- *1 : The figure indicates typical specification. Please refer to individual specifications.
- *2 : Initial measurement : Perform a heat treatment at 150 +0/-10 °C for one hour after soldering process. and then let sit for 24±2 hours at room temperature. Perform the initial measurement.
- *3 : Final measurement : Let sit for 24±2 hours at room temperature after test conclusion, then measure.
- *4 : Final measurement : Perform a heat treatment at 150 +0/-10 °C for one hour after soldering process. and then let sit for 24±2 hours at room temperature. Perform the initial measurement.
- *5 : Final measurement : Let measure within 24 hours at room temperature after test conclusion.



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.

Disclaimer & Limitation of Use and Application

The products listed in this Specification sheet are **NOT** designed and manufactured for any use and applications set forth below.

Please note that any misuse of the products deviating from products specifications or information provided in this Spec sheet may cause serious property damages or personal injury.

We will **NOT** be liable for any damages resulting from any misuse of the products, specifically including using the products for high reliability applications as listed below.

If you have any questions regarding this 'Limitation of Use and Application', you should first contact our sales personnel or application engineers.

- ① Aerospace/Aviation equipment
- ② Medical equipment
- 3 Military equipment
- Disaster prevention/crime prevention equipment
- ⑤ Power plant control equipment
- Atomic energy-related equipment
- Undersea equipment
- 8 Traffic signal equipment
- Data-processing equipment
- @ Electric heating apparatus, burning equipment
- Safety equipment
- @ Any other applications with the same as or similar complexity or reliability to the applications