

Specification of Automotive MLCC

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor

- Samsung P/N : **CL10C270JB81PNC**
- Description : **CAP, 27pF, 50V, ±5%, COG, 0603**
- AEC-Q 200 Specified

A. Samsung Part Number

CL **10** **C** **270** **J** **B** **8** **1** **P** **N** **C**
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

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|---|-----------------------|---------------------------------------|----|-----------------|----------------------------------|--------------|--|--|
| ① | Series | Samsung Multi-layer Ceramic Capacitor | | | | | | |
| ② | Size | 0603 (inch code) | L: | 1.6 ± 0.1 mm | W: | 0.8 ± 0.1 mm | | |
| ③ | Dielectric | C0G | ⑧ | Inner electrode | Ni | | | |
| ④ | Capacitance | 27 pF | | Termination | Cu | | | |
| ⑤ | Capacitance tolerance | ±5 % | | Plating | Sn 100% (Pb Free) | | | |
| | | | ⑨ | Product | Automotive | | | |
| ⑥ | Rated Voltage | 50 V | ⑩ | Grade code | Standard | | | |
| ⑦ | Thickness | 0.8 ± 0.1 mm | ⑪ | Packaging | Cardboard Type, 7" reel(4,000ea) | | | |

B. Reliability Test and Judgement condition

| | Performance | Test condition |
|--|---|---|
| High Temperature Exposure | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q : 940 min IR : More than 10,000MΩ or 500MΩ×μF Whichever is Smaller | Unpowered, 1000hrs@T=150℃ Measurement at 24±2hrs after test conclusion |
| Temperature Cycling | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q : 940 min IR : More than 10,000MΩ or 500MΩ×μF Whichever is Smaller | 1000Cycles Measurement at 24±2hrs after test conclusion 1 cycle condition : -55+0/-3℃(15±3min) -> Room Temp(1min.) -> 125+3/-0℃(15±3min) -> Room Temp(1min.) |
| Destructive Physical Analysis | No Defects or abnormalities | Per EIA 469 |
| Moisture Resistance | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q : 342.5 min IR : More than 10,000MΩ or 500MΩ×μF Whichever is Smaller | 10Cycles, t=24hrs/cycle Heat (25~65℃) and humidity (80~98%), Unpowered measurement at 24±2hrs after test conclusion |
| Humidity Bias | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q : 190 min IR : More than 500MΩ or 25MΩ×μF Whichever is Smaller | 1000hrs 85℃/85%RH, Rated Voltate and 1.3~1.5V, Add 100kohm resistor Measurement at 24±2hrs after test conclusion The charge/discharge current is less than 50mA. |
| High Temperature Operating Life | Appearance : No abnormal exterior appearance Capacitance Change : within ±3.0% or ±0.3pF whichever is larger Q : 342.5 min IR : More than 10,000MΩ or 500MΩ×μF Whichever is Smaller | 1000hrs @ TA=125℃, 200% Rated Voltage, Measurement at 24±2hrs after test conclusion The charge/discharge current is less than 50mA. |

| | Performance | Test condition | | | | | | | | | | | |
|-----------------------------|--|---|-----------|--|--|-----------|----------|------|----------|--------|-------|-----------|-----------|
| External Visual | No abnormal exterior appearance | Visual inspection | | | | | | | | | | | |
| Physical Dimensions | Within the specified dimensions | Using The calipers | | | | | | | | | | | |
| Mechanical Shock | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q, IR : initial spec. | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks) <table><tr><td>Peakvalue</td><td>Duration</td><td>Wave</td><td>Velocity</td></tr><tr><td>1,500G</td><td>0.5ms</td><td>Half sine</td><td>4.7m/sec.</td></tr></table> | | | | Peakvalue | Duration | Wave | Velocity | 1,500G | 0.5ms | Half sine | 4.7m/sec. |
| Peakvalue | Duration | Wave | Velocity | | | | | | | | | | |
| 1,500G | 0.5ms | Half sine | 4.7m/sec. | | | | | | | | | | |
| Vibration | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q, IR : initial spec. | 5g's for 20min., 12cycles each of 3 orientations, Use 8"x5" PCB 0.031" Thick 7 secure points on one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10~2000Hz. | | | | | | | | | | | |
| Resistance to Solder Heat | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q, IR : initial spec. | Solder pot : 260±5℃, 10±1sec. | | | | | | | | | | | |
| Thermal Shock | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q, IR : initial spec. | -55℃/+125℃. Note: Number of cycles required-300, Maximum transfer time-20 sec, Dwell time-15min. Air-Air | | | | | | | | | | | |
| ESD | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger Q, IR : initial spec. | AEC-Q200-002 | | | | | | | | | | | |
| Solderability | 95% of the terminations is to be soldered evenly and continuously | a) Preheat at 155℃ for 4 hours, Immerse in solder for 5s at 245±5℃ b) 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 Characterization | Capacitance : Within specified tolerance Q : 940 max. IR(25℃) : More than 100,000MΩ or 1,000MΩ×μF IR(125℃) : More than10,000MΩ or 100MΩ×μF Whichever is Smaller Dielectric Strength | The Capacitance /Q should be measured at 25℃, 1MHz±10%, 0.5~5Vrms I.R. should be measured with a DC voltage not exceeding Rated Voltage @25℃, @125℃ for 60~120 sec. Dielectric Strength : 250% of the rated voltage for 1~5 seconds | | | | | | | | | | | |
| Board Flex | Appearance : No abnormal exterior appearance Capacitance Change : within ±5.0% or ±0.5pF whichever is larger | Bending to the limit (3mm) for 5 seconds | | | | | | | | | | | |
| Terminal Strength(SMD) | Appearance : No abnormal exterior appearance Capacitance Change : within ±2.5% or ±0.25pF whichever is larger | 10N, for 60±1 sec. | | | | | | | | | | | |
| Beam Load | Destruction value should not be exceed Chip Length < 2.5mm a) Chip Thickness > 0.5mm : 20N b) Chip Thickness ≤ 0.5mm : 8N | Beam speed 0.5±0.05mm/sec | | | | | | | | | | | |
| Temperature Characteristics | C0G (From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃) | | | | | | | | | | | | |

C. Recommended Soldering method :

Reflow (Reflow Peak Temperature : $260+0/-5^\circ\text{C}$, 10sec. Max)
Meet IPC/JEDEC J-STD-020 D Standard

* For the more detail Specification, Please refer to the Samsung MLCC catalogue.