SAMSUNG ELECTRO-MECHANICS

RoHS+Halogen Compliant ecoparts

# Specification of Automotive MLCC

- **Supplier : Samsung electro-mechanics**
- **Product : Multi-layer Ceramic Capacitor**
- **Samsung P/N : CL10C820JB81PNC**
- **Description : CAP, 82㎊, 50V, ±5%, C0G, 0603**
- **AEC-Q 200 Specified**

**A. Samsung Part Number**

| CL | 10 | C | 820 | 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** | 82 ㎊ | | **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<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q : 1000 min<br>IR : More than 10,000㏁ or 500㏁×㎌<br>Whichever is Smaller | Unpowered, 1000hrs@T=150℃<br>Measurement at 24±2hrs after test conclusion |
| **Temperature Cycling** | Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q : 1000 min<br>IR : More than 10,000㏁ or 500㏁×㎌<br>Whichever is Smaller | 1000Cycles<br>Measurement at 24±2hrs after test conclusion<br>1 cycle condition :<br>-55+0/-3℃(15±3min) -> Room Temp(1min.)<br>-> 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<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q : 350 min<br>IR : More than 10,000㏁ or 500㏁×㎌<br>Whichever is Smaller | 10Cycles, t=24hrs/cycle<br>Heat (25~65℃) and humidity (80~98%), Unpowered<br>measurement at 24±2hrs after test conclusion |
| **Humidity Bias** | Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q : 200 min<br>IR : More than 500㏁ or 25㏁×㎌<br>Whichever is Smaller | 1000hrs 85℃/85%RH, Rated Voltate and 1.3~1.5V,<br>Add 100kohm resistor<br>Measurement at 24±2hrs after test conclusion<br>The charge/discharge current is less than 50mA. |
| **High Temperature Operating Life** | Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±3.0% or ±0.3㎊ whichever is larger<br>Q : 350 min<br>IR : More than 10,000㏁ or 500㏁×㎌<br>Whichever is Smaller | 1000hrs @ TA=125℃, 200% Rated Voltage,<br>Measurement at 24±2hrs after test conclusion<br>The charge/discharge current is less than 50mA. |

<table>
<tr><th></th><th>Performance</th><th>Test condition</th></tr>
<tr><td>External Visual</td><td>No abnormal exterior appearance</td><td>Visual inspection</td></tr>
<tr><td>Physical Dimensions</td><td>Within the specified dimensions</td><td>Using The calipers</td></tr>
<tr><td>Mechanical Shock</td><td>Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q, IR : initial spec.</td><td>Three shocks in each direction should be applied along<br>3 mutually perpendicular axes of the test specimen (18 shocks)<br><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></td></tr>
<tr><td>Vibration</td><td>Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q, IR : initial spec.</td><td>5g's for 20min., 12cycles each of 3 orientations,<br>Use 8"×5" PCB 0.031" Thick 7 secure points on one long side<br>and 2 secure points at corners of opposite sides. Parts mounted<br>within 2" from any secure point. Test from 10~2000㎐.</td></tr>
<tr><td>Resistance to Solder Heat</td><td>Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q, IR : initial spec.</td><td>Solder pot : 260±5℃, 10±1sec.</td></tr>
<tr><td>Thermal Shock</td><td>Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q, IR : initial spec.</td><td>-55℃/+125℃.<br>Note: Number of cycles required-300,<br>Maximum transfer time-20 sec, Dwell time-15min. Air-Air</td></tr>
<tr><td>ESD</td><td>Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger<br>Q, IR : initial spec.</td><td>AEC-Q200-002</td></tr>
<tr><td>Solderability</td><td>95% of the terminations is to be soldered<br>evenly and continuously</td><td>a) Preheat at 155℃ for 4 hours, Immerse in solder for 5s at 245±5℃<br>b) Steam aging for 8 hours, Immerse in solder for 5s at 245±5℃<br>c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5℃<br>solder : a solution ethanol and rosin</td></tr>
<tr><td>Electrical Characterization</td><td>Capacitance : Within specified tolerance<br>Q : 1000 max.<br>IR(25℃) : More than 100,000㏁ or 1,000㏁×㎌<br>IR(125℃) : More than10,000㏁ or 100㏁×㎌<br>Whichever is Smaller<br>Dielectric Strength</td><td>The Capacitance /Q should be measured at 25℃,<br>1㎒±10%, 0.5~5Vrms<br>I.R. should be measured with a DC voltage not exceeding<br>Rated Voltage @25℃, @125℃ for 60~120 sec.<br>Dielectric Strength : 250% of the rated voltage for 1~5 seconds</td></tr>
<tr><td>Board Flex</td><td>Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±5.0% or ±0.5㎊ whichever is larger</td><td>Bending to the limit (3㎜) for 5 seconds</td></tr>
<tr><td>Terminal Strength(SMD)</td><td>Appearance : No abnormal exterior appearance<br>Capacitance Change :<br>within ±2.5% or ±0.25㎊ whichever is larger</td><td>10N, for 60±1 sec.</td></tr>
<tr><td>Beam Load</td><td>Destruction value should not be exceed<br>Chip Length < 2.5㎜<br>a) Chip Thickness > 0.5㎜ : 20N<br>b) Chip Thickness ≤ 0.5㎜ : 8N</td><td>Beam speed<br>0.5±0.05㎜/sec</td></tr>
<tr><td>Temperature Characteristics</td><td colspan="2">C0G<br>(From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃)</td></tr>
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**C. Recommended Soldering method :**

Reflow ( Reflow Peak Temperature : 260+0/-5℃, 10sec. Max )

Meet IPC/JEDEC J-STD-020 D Standard

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