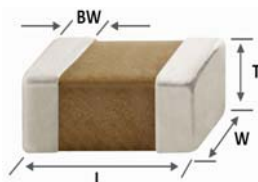


# Specification of Automotive MLCC (Reference sheet)

- Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- Samsung P/N : **CL21C101JC61PNC**
- Description : **CAP, 100pF, 100V, ± 5%, COG, 0805**
- AEC-Q200 Qualified

## A. Dimension

### ● Dimension



| Size | 0805 inch          |
|------|--------------------|
| L    | 2.00±0.10 mm       |
| W    | 1.25±0.10 mm       |
| T    | 0.60±0.10 mm       |
| BW   | 0.50+0.20/-0.30 mm |

## B. Samsung Part Number

CL   21   C   101   J   C   6   1   P   N   C  
 ①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧   ⑨   ⑩   ⑪

|                                |                                       |                          |                         |
|--------------------------------|---------------------------------------|--------------------------|-------------------------|
| ① <b>Series</b>                | Samsung Multi-layer Ceramic Capacitor |                          |                         |
| ② <b>Size</b>                  | 0805 (inch code)                      | L: 2.00±0.10 mm          | W: 1.25±0.10 mm         |
| ③ <b>Dielectric</b>            | COG                                   | ⑧ <b>Inner electrode</b> | Ni                      |
| ④ <b>Capacitance</b>           | 100 pF                                | <b>Termination</b>       | Cu                      |
| ⑤ <b>Capacitance tolerance</b> | ± 5%                                  | <b>Plating</b>           | Sn 100% (Pb Free)       |
| ⑥ <b>Rated Voltage</b>         | 100 V                                 | ⑨ <b>Product</b>         | Automotive              |
| ⑦ <b>Thickness</b>             | 0.60±0.10 mm                          | ⑩ <b>Special code</b>    | Normal                  |
|                                |                                       | ⑪ <b>Packaging</b>       | Cardboard Type, 7" Reel |

## C. Reliability Test and Judgement condition

|  | Performance   | Test condition  |
|--|---|---|
| <b>High Temperature Exposure</b>       | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within ±2.5% or ±0.25pF whichever is larger<br><br>Q : 1,000 min.<br>IR : More than 10,000 MΩ or 500 MΩ×μF<br>Whichever is smaller | Unpowered, 1,000hrs @ Max. temperature<br>Measurement at 24±2hrs after test conclusion  |
| <b>Temperature Cycling</b>             | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within ±2.5% or ±0.25pF whichever is larger<br><br>Q : 1,000 min.<br>IR : More than 10,000 MΩ or 500 MΩ×μF<br>Whichever is smaller | 1,000Cycles<br>Measurement at 24±2hrs after test conclusion<br><br>1 cycle condition : -55+0/-3℃(30±3min) → Room Temp. (1min)<br>→ 125+3/-0℃(30±3min) → Room Temp. (1min) |
| <b>Destructive Physical Analysis</b>   | No Defects or abnormalities   | Per EIA 469   |
| <b>Humidity Bias</b>                   | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within ±2.5% or ±0.25pF whichever is larger<br><br>Q : 200 min.<br>IR : More than 500 MΩ or 25 MΩ×μF<br>Whichever is smaller       | 1,000hrs 85℃/85%RH, Rated Voltage and 1.3~1.5V,<br>Add 100kohm resistor<br><br>The charge/discharge current is less than 50mA.  |
| <b>High Temperature Operating Life</b> | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within ±3% or ±0.3pF whichever is larger<br><br>Q : 350 min.<br>IR : More than 1,000 MΩ or 50 MΩ×μF<br>Whichever is smaller        | 1,000hrs @ 125℃, 200% Rated Voltage,<br>Measurement at 24±2hrs after test conclusion<br>The charge/discharge current is less than 50mA.                                   |

|                                    | Performance   | Test condition   |            |          |      |          |        |       |           |          |
|------------------------------------|---|--|------------|----------|------|----------|--------|-------|-----------|----------|
| <b>External Visual</b>             | No abnormal exterior appearance   | Microscope (10)  |            |          |      |          |        |       |           |          |
| <b>Physical Dimensions</b>         | Within the specified dimensions   | Using The calipers   |            |          |      |          |        |       |           |          |
| <b>Mechanical Shock</b>            | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ whichever is larger<br><br>Q, IR : Initial spec.   | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks)<br><table border="1"> <thead> <tr> <th>Peak value</th> <th>Duration</th> <th>Wave</th> <th>Velocity</th> </tr> </thead> <tbody> <tr> <td>1,500G</td> <td>0.5ms</td> <td>Half sine</td> <td>4.7m/sec</td> </tr> </tbody> </table> | Peak value | Duration | Wave | Velocity | 1,500G | 0.5ms | Half sine | 4.7m/sec |
| Peak value                         | Duration  | Wave   | Velocity   |          |      |          |        |       |           |          |
| 1,500G                             | 0.5ms   | Half sine  | 4.7m/sec   |          |      |          |        |       |           |          |
| <b>Vibration</b>                   | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ whichever is larger<br><br>Q, IR : Initial spec.   | 5g's for 20min., 12cycles each of 3 orientations,<br>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 10~2,000Hz.  |            |          |      |          |        |       |           |          |
| <b>Resistance to Solder Heat</b>   | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ whichever is larger<br><br>Q, IR : Initial spec.   | Preheating : 150°C for 60~120 sec.<br>Solder pot : 260 $\pm$ 5°C, 10 $\pm$ 1sec.   |            |          |      |          |        |       |           |          |
| <b>ESD</b>                         | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ whichever is larger<br><br>Q, IR : Initial spec.   | AEC-Q200-002 or ISO/DIS10605   |            |          |      |          |        |       |           |          |
| <b>Solderability</b>               | 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 $\pm$ 5°C<br>b) Steam aging for 8 hours, Immerse in solder for 5s at 245 $\pm$ 5°C<br>c) Steam aging for 8 hours, Immerse in solder for 120s at 260 $\pm$ 5°C<br>solder : a solution ethanol and rosin  |            |          |      |          |        |       |           |          |
| <b>Electrical Characterization</b> | Capacitance : Within specified tolerance<br>Q : 1,000 min.<br>IR(25°C) : More than 100,000 M $\Omega$ or 1,000 M $\Omega$ $\times$ $\mu\text{F}$ Whichever is smaller.<br>IR(125°C) : More than 10,000 M $\Omega$ or 100 M $\Omega$ $\times$ $\mu\text{F}$ Whichever is smaller.<br><br>Dielectric Strength | The Capacitance / D.F. should be measured at 25°C, 1 MHz $\pm$ 10%, 0.5~5 Vrms<br>I.R. should be measured with a DC voltage not exceeding Rated Voltage @25°C, @125°C for 60~120 sec.<br><br>Dielectric Strength : 200% of the rated voltage for 1~5 seconds   |            |          |      |          |        |       |           |          |
| <b>Board Flex</b>                  | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within $\pm 5\%$ or $\pm 0.5\text{pF}$ whichever is larger   | Bending to the limit, 3 mm for 60 seconds  |            |          |      |          |        |       |           |          |
| <b>Terminal Strength(SMD)</b>      | Appearance : No abnormal exterior appearance<br>Capacitance Change : Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ whichever is larger  | 18 N, for 60 sec.  |            |          |      |          |        |       |           |          |
| <b>Beam Load</b>                   | Destruction value should be exceed 20 N   | Beam speed : 0.5 $\pm$ 0.05 mm/sec   |            |          |      |          |        |       |           |          |
| <b>Temperature Characteristics</b> | C0G<br>From -55°C to 125°C, Capacitance change should be within 0 $\pm$ 30ppm/°C  |  |            |          |      |          |        |       |           |          |

#### D. Recommended Soldering method :

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



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.

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- ⑥ Atomic energy-related equipment
- ⑦ Undersea equipment
- ⑧ Traffic signal equipment
- ⑨ Data-processing equipment
- ⑩ Electric heating apparatus, burning equipment
- ⑪ Safety equipment
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