

# SPECIFICATION

(Reference sheet)

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

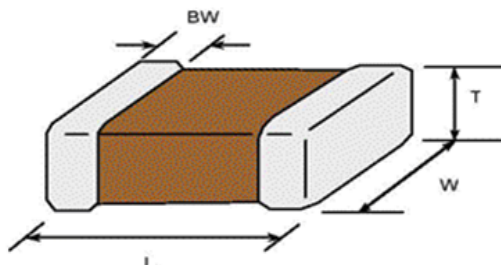
- Samsung P/N : **CL31C221JGFNNNE**
- Description : **CAP, 220pF, 500V, ± 5%, COG, 1206**

## A. Samsung Part Number

**CL** **31** **C** **221** **J** **G** **F** **N** **N** **N** **E**  
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

|                         |                                       |             |                   |                         |
|-------------------------|---------------------------------------|-------------|-------------------|-------------------------|
| ① Series                | Samsung Multi-layer Ceramic Capacitor |             |                   |                         |
| ② Size                  | 1206                                  | (inch code) | L: 3.20 ± 0.15 mm | W: 1.60 ± 0.15 mm       |
| ③ Dielectric            | C0G                                   |             | ⑧ Inner electrode | Ni                      |
| ④ Capacitance           | 220 pF                                |             | Termination       | Cu                      |
| ⑤ Capacitance tolerance | ± 5%                                  |             | Plating           | Sn 100% (Pb Free)       |
| ⑥ Rated Voltage         | 500 V                                 |             | ⑨ Product         | Normal                  |
| ⑦ Thickness             | 1.25 ± 0.15 mm                        |             | ⑩ Special         | Reserved for future use |
|                         |                                       |             | ⑪ Packaging       | Embossed Type, 7" reel  |

## B. Structure and dimension



| Samsung P/N<br>(Lead Free) | Dimension(mm) |             |             |             |
|----------------------------|---------------|-------------|-------------|-------------|
|                            | L             | W           | T           | BW          |
| CL31C221JGFNNNE            | 3.20 ± 0.15   | 1.60 ± 0.15 | 1.25 ± 0.15 | 0.50 ± 0.30 |

### C. Samsung Reliability Test and Judgement condition

|                                  | Performance                                                                                                                                    | Test condition                                                                                                  |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Capacitance                      | Within specified tolerance                                                                                                                     | 1MHz±10% / 0.5~5Vrms                                                                                            |
| Q                                | 1,000 min                                                                                                                                      |                                                                                                                 |
| Insulation Resistance            | 10,000Mohm or 500Mohm× $\mu$ F<br>Whichever is smaller                                                                                         | Rated Voltage 60~120 sec.                                                                                       |
| Appearance                       | No abnormal exterior appearance                                                                                                                | Microscop (X10)                                                                                                 |
| Withstanding Voltage             | No dielectric breakdown or mechanical breakdown                                                                                                | 150% of the rated voltage                                                                                       |
| Temperature Characteristics      | COG<br>(From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃)                                                                       |                                                                                                                 |
| Adhesive Strength of Termination | No peeling shall be occur on the terminal electrode                                                                                            | 500g×F, for 10±1 sec.                                                                                           |
| Bending Strength                 | Capacitance change :<br>within ±5% or ±0.5pF whichever is larger                                                                               | Bending to the limit (1mm)<br>with 1.0mm/sec.                                                                   |
| Solderability                    | More than 75% of terminal surface is to be soldered newly                                                                                      | SnAg3.0Cu0.5 solder<br>245±5℃, 3±0.3sec.<br>(preheating : 80~120℃ for 10~30sec.)                                |
| Resistance to Soldering heat     | Capacitance change :<br>within ±2.5% or ±0.25pF whichever is larger<br>Tan δ, IR : initial spec.                                               | Solder pot : 270±5℃, 10±1sec.                                                                                   |
| Vibration Test                   | Capacitance change :<br>within ±2.5% or ±0.25pF whichever is larger<br>Tan δ, IR : initial spec.                                               | Amplitude : 1.5mm<br>From 10Hz to 55Hz (return : 1min.)<br>2hours ´ 3 direction (x, y, z)                       |
| Moisture Resistance              | Capacitance change :<br>within ±7.5% or ±0.75pF whichever is larger<br>Q : 200 min<br>IR : 500Mohm or 25Mohm × $\mu$ F<br>Whichever is smaller | With rated voltage<br>40±2℃, 90~95%RH, 500+12/-0hrs                                                             |
| High Temperature Resistance      | Capacitance change :<br>within ±3% or ±0.3pF whichever is larger<br>Q : 350 min<br>IR : 1,000Mohm or 50Mohm × $\mu$ F<br>Whichever is smaller  | With 150% of the rated voltage<br>Max. operating temperature<br>1000+48/-0hrs                                   |
| Temperature Cycling              | Capacitance change :<br>within ±2.5% or ±0.25pF whichever is larger<br>Tan δ, IR : initial spec.                                               | 1 cycle condition<br>Min. operating temperature → 25℃<br>→ Max. operating temperature → 25℃<br><br>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+0/-5℃, 10sec. Max )



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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- ② Automotive or Transportation equipment (vehicles , trains , ships , etc)
- ③ Medical equipment
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