

# SPECIFICATION

(Reference sheet)

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

- Samsung P/N: **CL21A226MQQNNNE**
- Description : **CAP, 22uF, 6.3V, ±20%, X5R, 0805**

## A. Samsung Part Number

CL   21   A   226   M   Q   Q   N   N   N   E  
 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 ± 0.15 mm        | W: 1.25 ± 0.15 mm       |
| ③ <b>Dielectric</b>            | X5R                                   | ⑧ <b>Inner electrode</b> | Ni                      |
| ④ <b>Capacitance</b>           | 22 uF                                 | <b>Termination</b>       | Cu                      |
| ⑤ <b>Capacitance tolerance</b> | ±20 %                                 | <b>Plating</b>           | Sn 100% (Pb Free)       |
| ⑥ <b>Rated Voltage</b>         | 6.3 V                                 | ⑨ <b>Product</b>         | Normal                  |
| ⑦ <b>Thickness</b>             | 1.25 ± 0.15 mm                        | ⑩ <b>Special</b>         | Reserved for future use |
|                                |                                       | ⑪ <b>Packaging</b>       | Embossed Type, 7" reel  |

## B. Structure & Dimension



| Samsung P/N     | Dimension(mm) |             |             |                  |
|-----------------|---------------|-------------|-------------|------------------|
|                 | L             | W           | T           | BW               |
| CL21A226MQQNNNE | 2.00 ± 0.15   | 1.25 ± 0.15 | 1.25 ± 0.15 | 0.50 +0.20/-0.30 |


### C. Samsung Reliability Test and Judgement Condition

|                                  | Judgement   | Test condition  |
|----------------------------------|---|---|
| Capacitance                      | Within specified tolerance  | 120Hz $\pm 20\%$ / 0.5 $\pm 0.1$ Vrms   |
| Tan $\delta$ (DF)                | 0.1 max.  | *A capacitor prior to measuring the capacitance is heat treated at 150 $^{\circ}$ C +0/-10 $^{\circ}$ C for 1 hour and maintained in ambient air for 24 $\pm 2$ hours.      |
| Insulation Resistance            | 10,000Mohm or 100Mohm $\times \mu F$<br>Whichever is smaller  | Rated Voltage 60~120 sec.   |
| Appearance                       | No abnormal exterior appearance   | Microscope ( $\times 10$ )  |
| Withstanding Voltage             | No dielectric breakdown or mechanical breakdown   | 250% of the rated voltage   |
| Temperature Characteristics      | X5R<br>(From -55 $^{\circ}$ C to 85 $^{\circ}$ C, Capacitance change should be within $\pm 15\%$ )                                      |   |
| Adhesive Strength of Termination | No peeling shall be occur on the terminal electrode   | 500g-f, for 10 $\pm 1$ sec.   |
| Bending Strength                 | Capacitance change : within $\pm 12.5\%$  | Bending to the limit (1mm) with 1.0mm/sec.  |
| Solderability                    | More than 75% of terminal surface is to be soldered newly   | SnAg3.0Cu0.5 solder<br>245 $\pm 5^{\circ}$ C, 3 $\pm 0.3$ sec.<br>(preheating : 80~120 $^{\circ}$ C for 10~30sec.)  |
| Resistance to Soldering Heat     | Capacitance change : within $\pm 7.5\%$<br>Tan $\delta$ , IR : initial spec.  | Solder pot : 270 $\pm 5^{\circ}$ C, 10 $\pm 1$ sec.   |
| Vibration Test                   | Capacitance change : within $\pm 5\%$<br>Tan $\delta$ , IR : initial spec.  | Amplitude : 1.5mm<br>From 10Hz to 55Hz (return : 1min.)<br>2hours $\times$ 3 direction (x, y, z)  |
| Moisture Resistance              | Capacitance change : within $\pm 12.5\%$<br>Tan $\delta$ : 0.125 max<br>IR : 500Mohm or 12.5Mohm $\times \mu F$<br>Whichever is smaller | With rated voltage<br>40 $\pm 2^{\circ}$ C, 90~95%RH, 500+12/-0hrs  |
| High Temperature Resistance      | Capacitance change : within $\pm 12.5\%$<br>Tan $\delta$ : 0.125 max<br>IR : 1,000Mohm or 25Mohm $\times \mu F$<br>Whichever is smaller | With 150% of the rated voltage<br>Max. operating temperature<br>1000+48/-0hrs   |
| Temperature Cycling              | Capacitance change : within $\pm 7.5\%$<br>Tan $\delta$ , IR : initial spec.  | 1 cycle condition<br>Min. operating temperature $\rightarrow$ 25 $^{\circ}$ C<br>$\rightarrow$ Max. operating temperature $\rightarrow$ 25 $^{\circ}$ C<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 $^{\circ}$ C, 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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- ⑥ Power plant control equipment
- ⑦ Atomic energy-related equipment
- ⑧ Undersea equipment
- ⑨ Traffic signal equipment
- ⑩ Data-processing equipment
- ⑪ Electric heating apparatus, burning equipment
- ⑫ Safety equipment
- ⑬ Any other applications with the same as or similar complexity or reliability to the applications