

# SPECIFICATION

(Reference sheet)

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

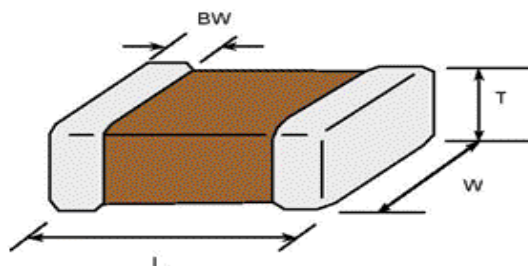
- Samsung P/N: **CL31A226MPHNNNE**
- Description : **CAP, 22uF, 10V, ±20%, X5R, 1206**

## A. Samsung Part Number

**CL** **31** **A** **226** **M** **P** **H** **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>	1206 (inch code)	L: 3.20 ± 0.20 mm	W: 1.60 ± 0.20 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>	10 V	⑨ <b>Product</b>	Normal
⑦ <b>Thickness</b>	1.60 ± 0.20 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
CL31A226MPHNNNE	3.20 ± 0.20	1.60 ± 0.20	1.60 ± 0.20	0.50 ± 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°C +0/-10°C for 1 hour and maintained in ambient air for 24 $\pm 2$ hours.
Insulation Resistance	10,000Mohm or 100Mohm $\times \mu F$ 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 (From -55°C to 85°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 245 $\pm 5$ °C, 3 $\pm 0.3$ sec. (preheating : 80~120°C for 10~30sec.)
Resistance to Soldering Heat	Capacitance change : within $\pm 7.5\%$ Tan $\delta$ , IR : initial spec.	Solder pot : 270 $\pm 5$ °C, 10 $\pm 1$ sec.
Vibration Test	Capacitance change : within $\pm 5\%$ Tan $\delta$ , IR : initial spec.	Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours $\times$ 3 direction (x, y, z)
Moisture Resistance	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.125 max IR : 500Mohm or 12.5Mohm $\times \mu F$ Whichever is smaller	With rated voltage 40 $\pm 2$ °C, 90~95%RH, 500+12/-0hrs
High Temperature Resistance	Capacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.125 max IR : 1,000Mohm or 25Mohm $\times \mu F$ Whichever is smaller	With 150% of the rated voltage Max. operating temperature 1000+48/-0hrs
Temperature Cycling	Capacitance change : within $\pm 7.5\%$ Tan $\delta$ , IR : initial spec.	1 cycle condition Min. operating temperature $\rightarrow$ 25°C $\rightarrow$ Max. operating temperature $\rightarrow$ 25°C  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°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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- ② Automotive or Transportation equipment (vehicles, trains, ships, etc)
- ③ Medical equipment
- ④ Military equipment
- ⑤ Disaster prevention/crime prevention equipment
- ⑥ Any other applications with the same as or similar complexity or reliability to the applications set forth above.