

# SPECIFICATION

(Reference sheet)

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

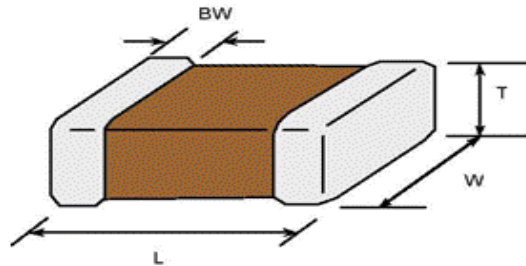
- Samsung P/N : **CL31X476MRHNNNE**
- Description : **CAP, 47uF, 4V, ±20%, X6S, 1206**

## A. Samsung Part Number

**CL** **31** **X** **476** **M** **R** **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>	X6S	⑧ <b>Inner electrode</b>	Ni
④ <b>Capacitance</b>	47 uF	<b>Termination</b>	Cu
⑤ <b>Capacitance tolerance</b>	±20 %	<b>Plating</b>	Sn 100% (Pb Free)
⑥ <b>Rated Voltage</b>	4 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
CL31X476MRHNNNE	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 $\pm 20\%$ / $0.5 \pm 0.1V_{rms}$
Tan $\delta$ (DF)	0.1 max.	*A capacitor prior to measuring the capacitance is heat treated at $150^{\circ}C \pm 10^{\circ}C$ for 1hour 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	X6S (From $-55^{\circ}C$ to $105^{\circ}C$ , Capacitance change should be within $\pm 22\%$ )	
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 $245 \pm 5^{\circ}C$ , $3 \pm 0.3$ sec. (preheating : $80 \sim 120^{\circ}C$ for $10 \sim 30$ sec.)
Resistance to Soldering Heat	Capacitance change : within $\pm 7.5\%$ Tan $\delta$ , IR : initial spec.	Solder pot : $270 \pm 5^{\circ}C$ , $10 \pm 1$ sec.
Vibration Test	Capacitance change : within $\pm 10\%$ 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 $40 \pm 2^{\circ}C$ , 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 1,000+48/-0hrs
Temperature Cycling	Capacitance change : within $\pm 15\%$ Tan $\delta$ , IR : initial spec.	1 cycle condition Min. operating temperature $\rightarrow 25^{\circ}C$ $\rightarrow$ Max. operating temperature $\rightarrow 25^{\circ}C$  5 cycle test

※ The reliability test condition can be replaced by the corresponding accelerated test condition.

### D. Recommended Soldering method :

Reflow ( Reflow Peak Temperature :  $260 \pm 5^{\circ}C$ , 30sec. )

 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. We may change, modify or discontinue the product specifications without notice at any time. So, you need to approve the product specifications before placing an order. Should you have any question regarding the product specifications, please contact our sales personnel or application engineers.

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- ③ Medical equipment
- ④ Military equipment
- ⑤ Disaster prevention/crime prevention equipment
- 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