SAMSUNG ELECTRO-MECHANICS

RoHS+Halogen Compliant ecoparts

SPECIFICATION (Reference sheet)

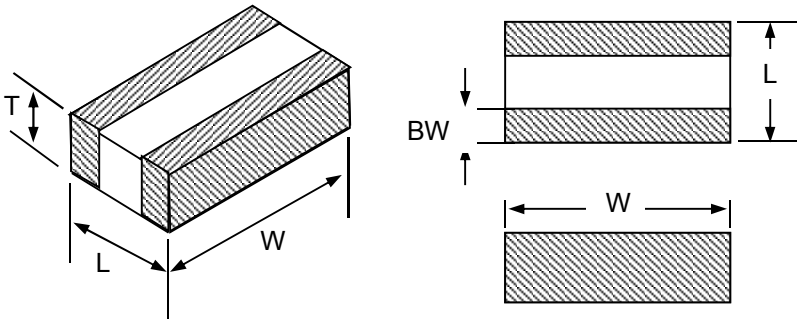
- **Supplier : Samsung electro-mechanics**
- **Product : Multi-layer Ceramic Capacitor**
- **Samsung P/N : CLL5X105MR3NLNC**
- **Description : CAP, 1㎌, 4V, ±20%, X6S, 0204**

A. Samsung Part Number

CL	L5	X	105	M	R	3	N	L	N	C
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪

① **Series**	Samsung Multi-layer Ceramic Capacitor		
② **Size**	0204 (inch code)	L: 0.52 ± 0.05 mm	W: 1.00 ± 0.05 mm
③ **Dielectric**	X6S	⑧ **Inner electrode**	Ni
④ **Capacitance**	1 ㎌	**Termination**	Cu
⑤ **Capacitance tolerance**	±20 %	**Plating**	Sn 100% (Pb Free)
		⑨ **Product**	LICC
⑥ **Rated Voltage**	4 V	⑩ **Special**	Reserved for future use
⑦ **Thickness**	0.30 ±0.05 mm	⑪ **Packaging**	Cardboard Type, 7" reel

B. Structure and Dimensions



Samsung P/N (Lead Free)	Dimension(㎜)			
	L	W	T	BW
CLL5X105MR3NLNC	0.52±0.05	1.00±0.05	0.30±0.05	0.18±0.06

C. Samsung Reliability Test and Judgement condition

	Performance	Test condition
Capacitance	Within specified tolerance	1㎑±10% 0.5±0.1Vrms *A capacitor prior to measuring the capacitance is heat treated at 150℃+0/-10℃ for 1hour and maintained in ambient air for 24±2 hours.
Tan δ (DF)	0.12 max.	
Insulation Resistance	10,000Mohm or 50Mohm·㎌ Whichever is smaller	Rated Voltage 60~120 sec.
Appearance	No abnormal exterior appearance	Microscope (×10)
Withstanding Voltage	No dielectric breakdown or mechanical breakdown	250% of the rated voltage
Temperature Characteristics	X6S (From -55℃ to 105℃, Capacitance change should be within ±22%)	
Adhesive Strength of Termination	No peeling shall be occur on the terminal electrode	500g·F, for 10±1 sec.
Bending Strength	Capacitance change : within ±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±5℃, 3±0.3sec. (preheating : 80~120℃ for 10~30sec.)
Resistance to Soldering heat	Capacitance change : within ±7.5% Tan δ, IR : initial spec.	Solder pot : 270±5℃, 10±1sec.
Vibration Test	Capacitance change : within ±10% Tan δ, IR : initial spec.	Amplitude : 1.5mm From 10㎐ to 55㎐ (return : 1min.) 2hours × 3 direction (x, y, z)
Moisture Resistance	Capacitance change : within ±12.5% Tan δ : 0.2 max IR : 500Mohm or 12.5 Mohm · ㎌ Whichever is smaller	With rated voltage 40±2℃, 90~95%RH, 500+12/-0hrs
High Temperature Resistance	Capacitance change : within ±12.5% Tan δ : 0.2 max IR : 1,000Mohm or 25Mohm · ㎌ Whichever is smaller	With 100% of the rated voltage Max. operating temperature 1000+48/-0hrs
Temperature Cycling	Capacitance change : within ±15% Tan δ, IR : initial spec.	1 cycle condition Min. operating temperature → 25℃ → Max. operating temperature → 25℃ 5 cycle test

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

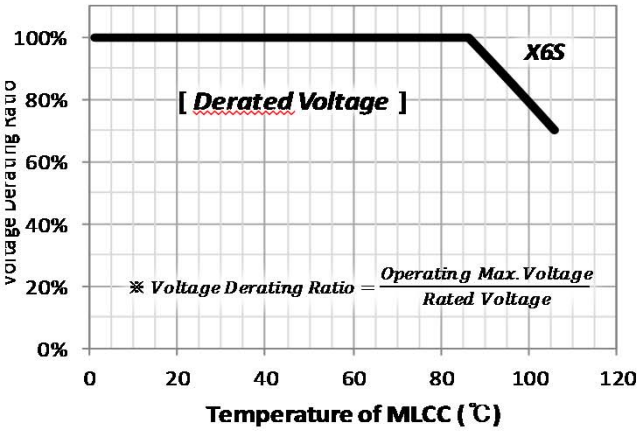
D. Recommended Soldering method :

Reflow (Reflow Peak Temperature : 260±5℃, 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.

⚠ This MLCC with the test voltage at 100% of the rated voltage in the high temperature resistance test should be applied with the derating voltage and temperature according to 3-1 derating guide

● Derating



This product ,which guarantees High Temperature Reliability Test with 100% of rated voltage at the maximum temperature, is recommended to be used in the circuit with derated voltage compared to the rated voltage of the capacitor for long lifetime.

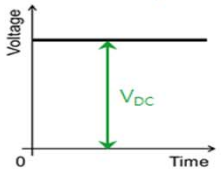
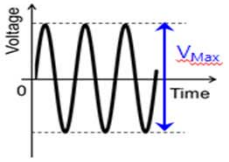
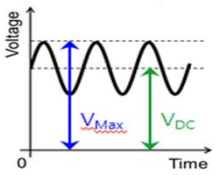
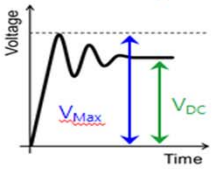
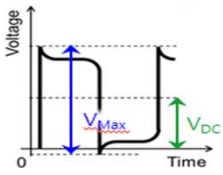
Max. voltage(V_{Max}) and DC voltage(V_{DC}) applied to this product shown in the table below are recommended to be used under the following conditions for long lifetime, respectively.

[Recommendations for long lifetime]

· V_{Max} ≤ (Derated Voltage on the left graph)

* Temperature of MLCC : Surface temperature of MLCC in the circuit.

[Types of voltage applied to the capacitor]

DC Voltage	AC Voltage	DC+AC Voltage 1	DC+AC Voltage 2	DC+Pulse Voltage
				

● Caution of Application

Disclaimer

The products listed as follows are NOT designed and manufactured for any use and applications set forth below. Please note that any misuse of the products deviating from products specifications or information provided in this Spec sheet may cause serious property damages or personal injury.

① Aerospace/Aviation equipment
② Automotive of Transportation equipment (vehicles , trains , ships , etc)
③ Military equipment
④ Atomic energy-related equipment
⑤ Undersea equipment
⑥ Any other applications with the same as or similar complexity or reliability to the applications

Limitation

Please contact us with usage environment information such as voltage, current, temperature, or other special conditions before using our products for the applications listed below. The below application conditions require especially high reliability products to prevent defects that may directly cause damages or loss to third party's life, body or property.
If you have any questions regarding this 'Limitation', you should first contact our sales personnel or application engineers.

① Medical equipment
② Disaster prevention/crime prevention equipment
③ Power plant control equipment
④ Traffic signal equipment
⑤ Data-processing equipment
⑥ Electric heating apparatus , burning equipment
⑦ Safety equipment
⑧ Any other applications with the same as or similar complexity or reliability to the applications