



# **SPECIFICATION**

- · Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- · Samsung P/N:
- CL05B103MA5NNNC

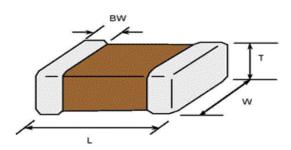
(Reference sheet)

- · Description :
- CAP, 10nF, 25V, ±20%, X7R, 0402

A. Samsung Part Number

		<u>CL</u> ①	<u>05</u> ②	<u>B</u> 3	<u>103</u> ④	<u>M</u> 5	<mark>4</mark> 6	<u>5</u> 7	<u>N</u> 8	<u>N</u> 9	<u>N</u> 10	<mark>C</mark> 11)	
1	Series	Samsung Mult	ti-laye	r Cer	amic C	apac	itor						
2	Size	0402 (inch c	ode)		L:	1.00	± 0.05	mm			W:	0.50 ± 0.05	mm
3	Dielectric	X7R				8	Inner	elect	rode			Ni	
4	Capacitance	10 nF					Term	inatio	n			Cu	
5	Capacitance	±20 %					Platir	ng				Sn 100%	(Pb Free)
	tolerance					9	Prod	uct				Normal	
6	Rated Voltage	25 V				10	Spec	ial				Reserved for	or future use
$\bigcirc$	Thickness	$0.50 \pm 0.05$ mr	n			1	Pack	aging	l			Cardboard <sup>-</sup>	Type, 7" reel

### **B. Structure & Dimension**



Samsung P/N	Dimension(mm)								
Sallisung F/N	L	W	Т	BW					
CL05B103MA5NNNC	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.05	0.25 ± 0.10					

#### C. Samsung Reliablility Test and Judgement Condition

Tan δ (DF)0.025 mInsulation10,000 MaResistanceWhichevAppearanceNo abnorWithstandingNo dielectVoltagemechanicTemperatureX7RCharacteristics(From-55Adhesive StrengthNo peelirof Terminationterminal deBending StrengthCapacitatSolderabilityMore thatResistance toCapacitatSoldering HeatTan δ, IRVibration TestCapacitatResistanceTan δ, IRMoistureCapacitatResistanceTan δ; IRMoistureCapacitatResistanceTan δ; IR	ohm or 500Mohm×⊭F er is smaller mal exterior appearance etric breakdown or cal breakdown ℃ to 125℃, Capacitance chang ng shall be occur on the	500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec.
Insulation10,000MResistanceWhichevAppearanceNo abnorWithstandingNo dieledVoltagemechanidTemperatureX7RCharacteristics(From-55Adhesive StrengthNo peelirof Terminationterminal deBending StrengthCapacitalSolderabilityMore thatSoldering HeatTan δ, IRVibration TestCapacitalTan δ, IRTan δ, IRMoistureCapacitalResistanceTan δ, IRIR :50	ohm or 500Mohm×µF er is smaller mal exterior appearance tric breakdown or cal breakdown ℃ to 125℃, Capacitance chang ig shall be occur on the electrode nce change : within ±12.5%	treated at 150°C+0/-10°C for 1 hour and maintained in ambient air for 24±2 hours. Rated Voltage 60~120 sec. Microscope (×10) 250% of the rated voltage e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec.
Resistance       Whichev         Appearance       No abnor         Withstanding       No dieled         Voltage       mechanid         Temperature       X7R         Characteristics       (From-55)         Adhesive Strength       No peelin         of Termination       terminal e         Bending Strength       Capacital         Solderability       More that         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Resistance       Tan δ, IR         Moisture       Capacital         Resistance       Tan δ, IR         Moisture       Capacital         Resistance       Tan δ	rer is smaller mal exterior appearance stric breakdown or cal breakdown <u>C to 125°C, Capacitance chang</u> ng shall be occur on the electrode nce change : within ±12.5%	Microscope (×10)         250% of the rated voltage         je should be within ±15%)         500g·f, for 10±1 sec.         Bending to the limit (1mm)         with 1.0mm/sec.
Appearance       No abnor         Withstanding       No dieled         Withstanding       No dieled         Voltage       mechanid         Temperature       X7R         Characteristics       (From-55         Adhesive Strength       No peelir         of Termination       terminal e         Bending Strength       Capacital         Solderability       More that         Solderability       More that         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Moisture       Capacital         Resistance       Tan δ :         IR :       50	mal exterior appearance tric breakdown or cal breakdown <u>C to 125°C, Capacitance chang</u> ig shall be occur on the <u>electrode</u> nce change : within ±12.5% n 75% of terminal surface	250% of the rated voltage le should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec.
Withstanding       No dielection         Voltage       mechanic         Temperature       X7R         Characteristics       (From-55         Adhesive Strength       No peelin         of Termination       terminal e         Bending Strength       Capacital         Solderability       More that         Resistance to       Capacital         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Moisture       Capacital         Resistance       Tan δ; IR         Moisture       Capacital         IR :       50	tric breakdown or cal breakdown <u>°C to 125°C, Capacitance chang</u> og shall be occur on the electrode nce change : within ±12.5%	250% of the rated voltage le should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec.
Voltage     mechanic       Temperature     X7R       Characteristics     (From-55)       Adhesive Strength     No peelin       of Termination     terminal e       Bending Strength     Capacital       Solderability     More that is to be s       Resistance to     Capacital       Soldering Heat     Tan δ, IR       Vibration Test     Capacital       Resistance     Tan δ, IR       In of the second state     Tan δ, IR	cal breakdown <sup>C</sup> to 125 <sup>°</sup> C, Capacitance chang ig shall be occur on the electrode ince change : within ±12.5% in 75% of terminal surface	<pre>b also raise rouge ge should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec.</pre>
Temperature       X7R         Characteristics       (From-55         Adhesive Strength       No peelin         of Termination       terminal e         Bending Strength       Capacital         Solderability       More that         Resistance to       Capacital         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Resistance       Tan δ, IR         In Solderability       Capacital         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Tan ō, IR       Tan ō, IR         Moisture       Capacital         Resistance       Tan ō IR	℃ to 125℃, Capacitance chang g shall be occur on the electrode nce change : within ±12.5%	500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec.
Characteristics       (From-55         Adhesive Strength       No peelin         of Termination       terminal e         Bending Strength       Capacital         Solderability       More that is to be s         Resistance to       Capacital         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Moisture       Capacital         Resistance       IR :         Moisture       Capacital         Resistance       IR :       50	ng shall be occur on the electrode nce change : within ±12.5% n 75% of terminal surface	500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec.
Adhesive Strength of Termination       No peelin terminal of Bending Strength         Solderability       More that is to be si         Resistance to       Capacitat Soldering Heat         Vibration Test       Capacitat Capacitat Tan δ, IR         Moisture       Capacitat Capacitat Tan δ : IR : 50	ng shall be occur on the electrode nce change : within ±12.5% n 75% of terminal surface	500g·f, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec.
of Termination       terminal e         Bending Strength       Capacital         Solderability       More that is to be some state of the second state of t	electrode nce change : within ±12.5% n 75% of terminal surface	Bending to the limit (1mm) with 1.0mm/sec.
Bending Strength       Capacital         Solderability       More that is to be side side side side side side side sid	nce change : within ±12.5%	with 1.0mm/sec.
Solderability       More that is to be sold i	n 75% of terminal surface	with 1.0mm/sec.
Resistance to       Capacital         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Tan δ, IR       Tan δ, IR         Moisture       Capacital         Resistance       Tan δ :         IR :       50		
Resistance to       Capacital         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Tan δ, IR       Tan δ, IR         Moisture       Capacital         Resistance       Tan δ :         IR :       50		SpAg2 0Cu0 5 colder
Resistance to       Capacital         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Tan δ, IR       Tan δ, IR         Moisture       Capacital         Resistance       Tan δ :         IR :       50	oldered newly	SnAg3.0Cu0.5 solder
Resistance to       Capacital         Soldering Heat       Tan δ, IR         Vibration Test       Capacital         Tan δ, IR       Tan δ, IR         Moisture       Capacital         Resistance       Tan δ :         IR :       50		245±5℃, 3±0.3sec.
Soldering Heat         Tan δ, IR           Vibration Test         Capacital Tan δ, IR           Moisture         Capacital Tan δ, IR           Resistance         Tan δ : IR : 50		(preheating : 80~120°C for 10~30sec.)
Vibration Test       Capacital         Tan ō, IR         Moisture       Capacital         Resistance       Tan ō :         IR :       50	nce change : within ±7.5%	Solder pot : 270±5℃, 10±1sec.
Moisture         Capacital           Resistance         Tan δ :           IR :         50	: initial spec.	
Resistance         Tan ō :           IR : 50	nce change : within ± 5% : initial spec.	Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)
IR : 50	nce change : within ±12.5%	With rated voltage
	0.05 max	40±2°C, 90~95%RH, 500+12/-0hrs
14	)0Mohm or 25Mohm × $\mu$ F	
VV	hichever is smaller	
High Temperature Capacitat	nce change : within ±12.5%	With 200% of the rated voltage
	0.05 max	Max. operating temperature
	000Mohm or 50Mohm × <i>μ</i> F ′hichever is smaller	1000+48/-0hrs
Temperature Capacitat		1 cycle condition
	nce change : within ±7.5%	
	ince change : within ±7.5%	Min. operating temperature $\rightarrow$ 25°C
	•	Min. operating temperature $\rightarrow$ 25°C $\rightarrow$ Max. operating temperature $\rightarrow$ 25°C
	•	

X 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. 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.

# - Disclaimer & Limitation of Use and Application -

The products listed in this Specification sheet 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. We will **NOT** be liable for any damages resulting from any misuse of the products, specifically including using the products for high reliability applications as listed below.

If you have any questions regarding this 'Limitation of Use and Application', you should first contact our sales personnel or application engineers.

- Aerospace/Aviation equipment
- 2 Automotive or Transportation equipment (vehicles, trains, ships, etc)
- 3 Medical equipment
- ④ Military equipment
- *⑤* Disaster prevention/crime prevention equipment
- *ⓐ* Any other applications with the same as or similar complexity or reliability to the applications set forth above.