



# **SPECIFICATION**

(Reference sheet)

- Supplier : Samsung electro-mechanics - Samsung P/N : CL10C090DB8NNNC

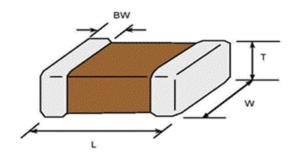
• Product : Multi-layer Ceramic Capacitor • Description : CAP, 9pF, 50V, ± 0.5pF, C0G, 0603

#### A. Samsung Part Number

<u>CL</u> <u>10</u> <u>C</u> <u>090</u> <u>D</u> <u>B</u> <u>8</u> <u>N</u> <u>N</u> <u>N</u> <u>C</u> ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

1	Series	Samsung Multi-layer Ceramic Capacitor			
2	Size	0603 (inch code)	L: 1.60 ± 0.10 mm	W: 0.80 ± 0.10 mm	
3	Dielectric	C0G	8 Inner electrode	Ni	
4	Capacitance	<b>9</b> pF	Termination	Cu	
(5)	Capacitance	<b>±</b> 0.5 pF	Plating	Sn 100% (Pb Free)	
	tolerance		9 Product	Normal	
6	Rated Voltage	50 V	<b>⑩</b> Special	Reserved for future use	
7	Thickness	0.80 ± 0.10 mm	① Packaging	Cardboard Type, 7" reel	

#### B. Structure and dimension



Samsung P/N	Dimension(mm)				
(Lead Free)	L	W	Т	BW	
CL10C090DB8NNNC	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.30 ± 0.20	

#### C. Samsung Reliability Test and Judgement condition

CapacitanceWithin specified tolerance1Mb±10%0.5~5VrmsQ580 minRated Voltage60~120 sec.Insulation10,000Mohm or 500Mohm×μFRated Voltage60~120 sec.ResistanceWhichever is smallerMicroscope (*10)AppearanceNo abnormal exterior appearanceMicroscope (*10)WithstandingNo dielectric breakdown or mechanical breakdown300% of the rated voltageTemperatureC0GCharacteristics(From -55 ℃ to 125 ℃, Capacitance change should be within ±30PPM/℃)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g×F, for 10±1 sec.Bending Strength within ±5% or ±0.5pF whichever is largerBending to the limit (1mm) within ±5% or ±0.5pF whichever is larger		Performance	Test condition			
Insulation       10,000Mohm or 500Mohm×μF       Rated Voltage       60~120 sec.         Resistance       Whichever is smaller       Microscope (*10)         Appearance       No abnormal exterior appearance       Microscope (*10)         Withstanding       No dielectric breakdown or mechanical breakdown       300% of the rated voltage         Temperature       C0G         Characteristics       (From -55 ℃ to 125 ℃, Capacitance change should be within ±30PPM/℃)         Adhesive Strength of Termination       No peeling shall be occur on the terminal electrode       500g×F, for 10±1 sec.         Bending Strength       Capacitance change :       Bending to the limit (1mm)	Capacitance	Within specified tolerance	1Mb±10% 0.5~5Vrms			
Resistance Whichever is smaller  Appearance No abnormal exterior appearance Microscope ('10)  Withstanding No dielectric breakdown or 300% of the rated voltage  Voltage mechanical breakdown  Temperature C0G  Characteristics (From -55°C to 125°C, Capacitance change should be within ±30PPM/°C)  Adhesive Strength of Termination terminal electrode  Bending Strength Capacitance change: Bending to the limit (1mm)	Q	580 min				
Appearance       No abnormal exterior appearance       Microscope (*10)         Withstanding       No dielectric breakdown or mechanical breakdown       300% of the rated voltage         Voltage       mechanical breakdown         Temperature       C0G         Characteristics       (From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃)         Adhesive Strength of Termination       No peeling shall be occur on the terminal electrode       500g×F, for 10±1 sec.         Bending Strength       Capacitance change :       Bending to the limit (1mm)	Insulation	10,000Mohm or 500Mohm×μF	Rated Voltage 60~120 sec.			
Withstanding       No dielectric breakdown or mechanical breakdown       300% of the rated voltage         Temperature       C0G         Characteristics       (From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃)         Adhesive Strength of Termination       No peeling shall be occur on the terminal electrode       500g×F, for 10±1 sec.         Bending Strength       Capacitance change :       Bending to the limit (1mm)	Resistance	Whichever is smaller				
Voltage       mechanical breakdown         Temperature       C0G         Characteristics       (From -55 ℃ to 125 ℃, Capacitance change should be within ±30PPM/℃)         Adhesive Strength of Termination       No peeling shall be occur on the terminal electrode       500g×F, for 10±1 sec.         Bending Strength       Capacitance change :       Bending to the limit (1mm)	Appearance	No abnormal exterior appearance	Microscope ('10)			
Temperature       C0G         Characteristics       (From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃)         Adhesive Strength of Termination       No peeling shall be occur on the terminal electrode         Bending Strength       Capacitance change :         Bending to the limit (1mm)	Withstanding	No dielectric breakdown or	300% of the rated voltage			
Characteristics       (From -55 ℃ to 125 ℃, Capacitance change should be within ±30PPM/ ℃)         Adhesive Strength of Termination       No peeling shall be occur on the terminal electrode       500g×F, for 10±1 sec.         Bending Strength       Capacitance change :       Bending to the limit (1mm)	Voltage	mechanical breakdown				
Adhesive Strength No peeling shall be occur on the of Termination Eending Strength Capacitance change : 500g×F, for 10±1 sec.  500g×F, for 10±1 sec.  Bending to the limit (1mm)	Temperature C0G					
of Termination     terminal electrode       Bending Strength     Capacitance change :     Bending to the limit (1mm)	Characteristics	(From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃)				
Bending Strength Capacitance change : Bending to the limit (1mm)	Adhesive Strength	No peeling shall be occur on the	500g×F, for 10±1 sec.			
	of Termination	terminal electrode				
within ±5% or ±0.5pF whichever is larger with 1.0mm/sec.	Bending Strength	Capacitance change :	Bending to the limit (1mm)			
		within ±5% or ±0.5pF whichever is larger	with 1.0mm/sec.			
Solderability More than 75% of terminal surface SnAg3.0Cu0.5 solder	Solderability	More than 75% of terminal surface	SnAg3.0Cu0.5 solder			
is to be soldered newly 245±5°C, 3±0.3sec.		is to be soldered newly	245±5℃, 3±0.3sec.			
(preheating : 80~120 ℃ for 10~30sec.)			(preheating : 80~120 ℃ for 10~30sec.)			
Resistance to Capacitance change : Solder pot : 270±5°C, 10±1sec.	Resistance to	Capacitance change :	Solder pot : 270±5℃, 10±1sec.			
Soldering heat within ±2.5% or ±0.25pF whichever is larger	Soldering heat	within ±2.5% or ±0.25pF whichever is larger				
Tan δ, IR : initial spec.		Tan δ, IR : initial spec.				
Vibration Test Capacitance change : Amplitude : 1.5mm	Vibration Test	Capacitance change :	Amplitude : 1.5mm			
within ±2.5% or ±0.25pF whichever is larger From 10Hz to 55Hz (return : 1min.)		within ±2.5% or ±0.25pF whichever is larger	From 10Hz to 55Hz (return : 1min.)			
Tan δ, IR: initial spec. 2hours ´3 direction (x, y, z)		Tan δ, IR : initial spec.	2hours ´ 3 direction (x, y, z)			
Moisture Capacitance change : With rated voltage	Moisture	Capacitance change :				
Resistance within ±7.5% or ±0.75pF whichever is larger 40±2°C, 90~95%RH, 500+12/-0hrs	Resistance	within ±7.5% or ±0.75pF whichever is larger	40±2℃, 90~95%RH, 500+12/-0hrs			
Q: 130 min		Q: 130 min				
IR : 500Mohm or 25Mohm × μΓ		IR: 500Mohm or 25Mohm × μF				
Whichever is smaller		Whichever is smaller				
High Temperature Capacitance change : With 200% of the rated voltage	High Temperature	Capacitance change :	With 200% of the rated voltage			
Resistance within ±3% or ±0.3 pF whichever is larger Max. operating temperature	Resistance	within ±3% or ±0.3pF whichever is larger	_			
Q: 290 min 1000+48/-0hrs		Q: 290 min				
IR: 1,000Mohm or 50Mohm × $\mu$ F		IR : 1,000Mohm or 50Mohm × μF				
Whichever is smaller		Whichever is smaller				
Temperature Capacitance change : 1 cycle condition	Temperature	Capacitance change :	1 cycle condition			
Cycling within $\pm 2.5\%$ or $\pm 0.25 \mathrm{pF}$ whichever is larger Min. operating temperature $\rightarrow 25 \mathrm{^{\circ}C}$	1	within ±2.5% or ±0.25pF whichever is larger	Min. operating temperature → 25°C			
Tan δ, IR : initial spec. $\rightarrow$ Max. operating temperature $\rightarrow$ 25 °C		_				
5 cycle test			5 cycle test			

<sup>\*</sup> The reliability test condition can be replaced by the corresponding accelerated test condition.

### D. Recommended Soldering method:

Reflow ( Reflow Peak Temperature : 260+0/-5℃, 10sec. Max )



A 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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The products listed in this Specification sheet are **NOT** designed and manufactured for any use and applications set forth below.

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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.

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- ② Automotive or Transportation equipment (vehicles, trains, ships, etc)
- 3 Medical equipment
- 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.