



SPECIFICATION

(Reference sheet)

- Supplier : Samsung electro-mechanics - Samsung P/N : CL10C1R5CB8NNNC

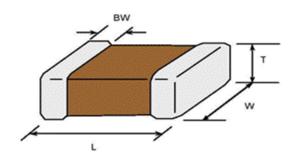
• Product : Multi-layer Ceramic Capacitor • Description : CAP, 1.5pF, 50V, ± 0.25pF, C0G, 0600

A. Samsung Part Number

<u>CL</u> <u>10</u> <u>C</u> <u>1R5</u> <u>C</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	Inner electrode	Ni		
Capacitance	1.5 pF	Termination	Cu		
⑤ Capacitance	± 0.25 pF	Plating	Sn 100% (Pb Free)		
tolerance		Product	Normal		
6 Rated Voltage	50 V	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
CL10C1R5CB8NNNC	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.30 ± 0.20

C. Samsung Reliability Test and Judgement condition

Capacitance Within specified tolerance 1Mt±10% 0.5~5Vrms Q 430 min Insulation 10,000Mohm or 500Mohm×μF Rated Voltage 60~120 sec. Resistance Whichever is smaller Rated Voltage 60~120 sec. Appearance No abnormal exterior appearance Microscope (*10) Withstanding No dielectric breakdown or mechanical breakdown 300% of the rated voltage Voltage mechanical breakdown *** COG Characteristics (From -55°C to 125°C, Capacitance change should be within ±30PPM/°C) Adhesive Strength of Termination No peeling shall be occur on the terminal electrode 500g×F, for 10±1 sec. Bending Strength Capacitance change : with 1.0mm/sec. 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 Solderability Solderability SnAg3.0Cu0.5 solder Voltage Voltage SnAg3.0Cu0.5 solder Solderability With 1.0mm/sec. SnAg3.0Cu0.5 solder Restored Notation of the properties of		Performance	Test condition		
Insulation	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 mechanical breakdown 300% of the rated voltage Temperature COG Characteristics (From -55°C to 125°C, Capacitance change should be within ±30PPM/°C) Adhesive Strength of Termination No peeling shall be occur on the terminal electrode 500g×F, for 10±1 sec. Bending Strength Capacitance change : within ±5% or ±0.5 pF whichever is larger 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°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)	Q	430 min	1		
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 : within ±5% or ±0.5pF whichever is larger 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.)	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 Bending Strength Capacitance change : with 1.0mm/sec. Bending Strength Within ±5% or ±0.5pF whichever is larger 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	Whichever is smaller			
Voltage mechanical breakdown Temperature C0G Characteristics (From -55 °C to 125 °C, Capacitance change should be within ±30PPM/°C) Adhesive Strength of Termination No peeling shall be occur on the terminal electrode 500g×F, for 10±1 sec. Bending Strength Capacitance change : with 1.0mm/sec. 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 °C, 3±0.3sec. (preheating : 80~120 °C for 10~30sec.)	Appearance	No abnormal exterior appearance	Microscope ('10)		
Temperature Characteristics (From -55°C to 125°C, Capacitance change should be within ±30PPM/°C) Adhesive Strength of Termination Bending Strength Capacitance change: within ±5% or ±0.5pF whichever is larger More than 75% of terminal surface is to be soldered newly COG (From -55°C to 125°C, Capacitance change should be within ±30PPM/°C) Solog×F, for 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec. SnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating: 80~120°C for 10~30sec.)	Withstanding	No dielectric breakdown or	300% of the rated voltage		
Characteristics (From -55 °C to 125 °C, Capacitance change should be within ±30PPM/°C) Adhesive Strength of Termination No peeling shall be occur on the terminal electrode 500g×F, for 10±1 sec. Bending Strength Capacitance change : within ±5% or ±0.5 pF whichever is larger 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 °C, 3±0.3sec. Value (preheating : 80~120 °C for 10~30sec.)	Voltage	mechanical breakdown			
Adhesive Strength of Termination Bending Strength Capacitance change: within ±5% or ±0.5pF whichever is larger Solderability More than 75% of terminal surface is to be soldered newly More than 75% of terminal surface is to be soldered newly Solderability No peeling shall be occur on the terminal sec. Section 10±1 sec. Bending to the limit (1mm) with 1.0mm/sec. SnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating: 80~120°C for 10~30sec.)	Temperature	COG			
of Termination terminal electrode Bending Strength Capacitance change : within ±5% or ±0.5pF whichever is larger 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.)	Characteristics	(From -55℃ to 125℃, Capacitance change should be within ±30PPM/℃)			
Bending Strength Capacitance change : within ±5% or ±0.5pF whichever is larger 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.)	Adhesive Strength	No peeling shall be occur on the	500g×F, for 10±1 sec.		
within ±5% or ±0.5pF whichever is larger with 1.0mm/sec. Solderability More than 75% of terminal surface is to be soldered newly 245±5℃, 3±0.3sec. (preheating : 80~120℃ for 10~30sec.)	of Termination	terminal electrode			
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.)	Bending Strength	Capacitance change :	Bending to the limit (1mm)		
is to be soldered newly 245±5 ℃, 3±0.3sec. (preheating : 80~120 ℃ for 10~30sec.)		within ±5% or ±0.5pF whichever is larger	with 1.0mm/sec.		
(preheating : 80~120 ℃ for 10~30sec.)	Solderability	More than 75% of terminal surface	SnAg3.0Cu0.5 solder		
, , , , , , , , , , , , , , , , , , ,		is to be soldered newly	245±5℃, 3±0.3sec.		
			(preheating : 80~120 ℃ for 10~30sec.)		
Resistance to Capacitance change : Solder pot : 270±5℃, 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℃, 90~95%RH, 500+12/-0hrs	Resistance	within ±7.5% or ±0.75pF whichever is larger	40±2°C, 90~95%RH, 500+12/-0hrs		
Q: 105 min		Q: 105 min			
IR: 500Mohm or 25Mohm × μ F		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 ±0.3pF whichever is larger Max. operating temperature	Resistance	within ±3% or ±0.3pF whichever is larger	Max. operating temperature		
Q: 215 min 1000+48/-0hrs		Q: 215 min			
IR: 1,000Mohm or 50Mohm × μ 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 ±2.5% or ±0.25pF whichever is larger Min. operating temperature → 25°C	I	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					

^{*} 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.

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.

- ① Aerospace/Aviation equipment
- 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.