

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from, Europe, America and south Asia, supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts, Customers Priority, Honest Operation, and Considerate Service", our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip, ALPS, ROHM, Xilinx, Pulse, ON, Everlight and Freescale. Main products comprise IC, Modules, Potentiometer, IC Socket, Relay, Connector. Our parts cover such applications as commercial, industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



# Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China











# **SPECIFICATION**

(Reference sheet)

· Supplier : Samsung electro-mechanics · Samsung P/N : CL21C120JBANNNC

Product : Multi-layer Ceramic Capacitor

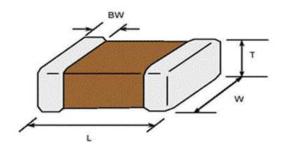
Description : CAP, 12pF, 50V, ± 5%, C0G, 0805

### A. Samsung Part Number

<u>CL</u> <u>21</u> <u>C</u> <u>120</u> <u>J</u> <u>B</u> <u>A</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	0805 (inch code)	L: 2.00 ± 0.10 mm	W: 1.25 ± 0.10 mm			
3	Dielectric	C0G	Inner electrode	Ni			
4	Capacitance	<b>12</b> pF	Termination	Cu			
(5)	Capacitance	± 5%	Plating	Sn 100% (Pb Free)			
	tolerance		9 Product	Normal			
6	Rated Voltage	50 V	<b>10</b> Special	Reserved for future use			
7	Thickness	0.65 ± 0.10 mm	① Packaging	Cardboard Type, 7" reel			

### B. Structure and dimension



Samsung P/N	Dimension(mm)				
(Lead Free)	L	W	Т	BW	
CL21C120JBANNNC	2.00 ± 0.10	1.25 ± 0.10	0.65 ± 0.10	0.50+0.20/-0.30	

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

Capacitance       Within specified tolerance       1Mb ± 10% / 0.5~5Vrms         Q       640 min       10,000Mohm or 500Mohm×μF       Rated Voltage       60~120 sec.         Resistance       Whichever is smaller       Rated Voltage       60~120 sec.         Appearance       No abnormal exterior appearance       Microscop (X10)         Withstanding       No dielectric breakdown or mechanical breakdown       300% of the rated voltage         Voltage       COG       (From -55°C to 125°C, Capacitance change should be within ±30PPM/°C)         Adhesive Strength       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         Solder pot : 270±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)         Resistance to       Capacitance change : within ±2.5% or ±0.25pF whichever is larger       Solder pot : 270±5°C, 10±1sec.         Soldering heat       within ±2.5% or ±0.25pF whichever is larger       Solder pot : 270±5°C, 10±1sec.	1₩z±10% / 0.5~5Vrms	Within an aified talarance	Performance Test cond	~		
Q       640 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       Microscop (X10)         Withstanding       No dielectric breakdown or mechanical breakdown       300% of the rated voltage         Temperature       C0G       (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 ±0.5pF 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°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)         Resistance to       Capacitance change : within ±2.5% or ±0.25pF whichever is larger Tan δ, IR : initial spec.       Solder pot : 270±5°C, 10±1sec.		within specified tolerance	Within specified tolerance 1Mb±10% / 0.5~5Vrms	15 ± 10% / 0.5~5 Vrms		
ResistanceWhichever is smallerAppearanceNo abnormal exterior appearanceMicroscop (X10)WithstandingNo dielectric breakdown or mechanical breakdown300% of the rated voltageTemperatureCOGCharacteristics(From -55°C to 125°C, Capacitance change should be within ±30PPM/°C)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g×F, for 10±1 sec.Bending StrengthCapacitance change : within ±5% or ±0.5pF whichever is largerBending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering heatCapacitance change : within ±2.5% or ±0.25pF whichever is larger Tan δ, IR : initial spec.Solder pot : 270±5°C, 10±1sec.		640 min	640 min			
Appearance       No abnormal exterior appearance       Microscop (X10)         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 : with 1.0mm/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       SnAg3.0Cu0.5 solder         245±5℃, 3±0.3sec. (preheating : 80~120℃ for 10~30sec.)       (preheating : 80~120℃ for 10~30sec.)         Resistance to       Capacitance change : within ±2.5% or ±0.25pF whichever is larger Tan δ, IR : initial spec.       Solder pot : 270±5℃, 10±1sec.	Rated Voltage 60~120 sec.	10,000Mohm or 500Mohm×μF	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°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 ±0.5pF 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°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)         Resistance to       Capacitance change : within ±2.5% or ±0.25pF whichever is larger Tan δ, IR : initial spec.       Solder pot : 270±5°C, 10±1sec.		Whichever is smaller	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 : 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.)         Resistance to Soldering heat       Capacitance change : within ±2.5% or ±0.25 pF whichever is larger Tan δ, IR : initial spec.       Solder pot : 270±5 °C, 10±1sec.	Microscop (X10)	No abnormal exterior appearance	No abnormal exterior appearance Microscop (X10)			
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 ±0.5 pF whichever is larger  Solderability  More than 75% of terminal surface is to be soldered newly  Resistance to Soldering heat  Capacitance change: Solder pot: 270±5 °C, 10±1 sec.	300% of the rated voltage	No dielectric breakdown or	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 TerminationNo peeling shall be occur on the terminal electrode500g×F, for 10±1 sec.Bending StrengthCapacitance change : within ±5% or ±0.5pF whichever is largerBending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance toCapacitance change : within ±2.5% or ±0.25pF whichever is larger Tan δ, IR : initial spec.Solder pot : 270±5°C, 10±1sec.		mechanical breakdown	mechanical breakdown			
Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode500g×F, for 10±1 sec.Bending StrengthCapacitance change : within ±5% or ±0.5pF whichever is largerBending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance toCapacitance change : within ±2.5% or ±0.25pF whichever is larger Tan δ, IR : initial spec.Solder pot : 270±5°C, 10±1sec.		C0G				
of Terminationterminal electrodeBending StrengthCapacitance change : within ±5% or ±0.5pF whichever is largerBending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering heatCapacitance change : within ±2.5% or ±0.25pF whichever is larger Tan δ, IR : initial spec.Solder pot : 270±5°C, 10±1sec.	should be within ±30PPM/℃)	s (From -55°C to 125°C, Capacitance change				
Bending StrengthCapacitance change : within ±5% or ±0.5pF whichever is largerBending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering heatCapacitance change : within ±2.5% or ±0.25pF whichever is larger Tan $\delta$ , IR : initial spec.Solder pot : 270±5°C, 10±1sec.	500g×F, for 10±1 sec.	ngth No peeling shall be occur on the	No peeling shall be occur on the 500g×F, for 10±1 sec.			
within $\pm 5\%$ or $\pm 0.5  \mathrm{pF}$ whichever is larger with 1.0mm/sec.  Solderability  More than 75% of terminal surface is to be soldered newly $245\pm 5^{\circ}\mathrm{C}$ , $3\pm 0.3 \mathrm{sec}$ . (preheating : $80\sim 120^{\circ}\mathrm{C}$ for $10\sim 30 \mathrm{sec}$ .)  Resistance to Soldering heat  Capacitance change : within $\pm 2.5\%$ or $\pm 0.25^{\circ}\mathrm{F}$ whichever is larger Tan $\delta$ , IR : initial spec.		terminal electrode	terminal electrode			
SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)Resistance to Soldering heatCapacitance change : within ±2.5% or ±0.25pF whichever is larger Tan δ, IR : initial spec.Solder pot : 270±5°C, 10±1sec.	Bending to the limit (1mm)	ngth Capacitance change :	Capacitance change : Bending to the limit (1mm)			
is to be soldered newly $ 245\pm5^{\circ}\text{C},  3\pm0.3\text{sec.} $ (preheating : $80\sim120^{\circ}\text{C}$ for $10\sim30\text{sec.}$ ) $ \textbf{Resistance to} $ Capacitance change : Solder pot : $270\pm5^{\circ}\text{C},  10\pm1\text{sec.} $ Soldering heat within $\pm2.5\%$ or $\pm0.25^{\circ}\text{F}$ whichever is larger Tan $\delta$ , IR : initial spec.	with 1.0mm/sec.	within ±5% or ±0.5pF whichever is larger	within ±5% or ±0.5pF whichever is larger with 1.0mm/sec.			
(preheating : 80~120 °C for 10~30sec.)  Resistance to Soldering heat  Capacitance change : Solder pot : 270±5 °C, 10±1sec.  within ±2.5% or ±0.25 pF whichever is larger Tan δ, IR : initial spec.	SnAg3.0Cu0.5 solder	More than 75% of terminal surface	More than 75% of terminal surface SnAg3.0Cu0.5 solder			
Resistance to Soldering heat  Capacitance change: Solder pot: 270±5°C, 10±1sec.  Solder pot: 270±5°C, 10±1sec.	245±5℃, 3±0.3sec.	is to be soldered newly	is to be soldered newly 245±5°C, 3±0.3sec.			
Soldering heat within $\pm 2.5\%$ or $\pm 0.25 pF$ whichever is larger Tan $\delta$ , IR : initial spec.	(preheating : 80~120 ℃ for 10~30sec.)	·	(preheating : 80~120 ℃ for 10~	)sec.)		
Soldering heat within $\pm 2.5\%$ or $\pm 0.25 pF$ whichever is larger Tan $\delta$ , IR : initial spec.	,			,		
Tan δ, IR : initial spec.	Solder pot : 270±5℃, 10±1sec.	Capacitance change :	Capacitance change : Solder pot : 270±5°C, 10±1sec.			
		t within ±2.5% or ±0.25pF whichever is larger	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	Amplitude: 1.5mm	Capacitance change :	Capacitance change : Amplitude : 1.5mm			
within ±2.5% or ±0.25pF whichever is larger From 10Hz to 55Hz (return : 1min.)	From 10Hz to 55Hz (return : 1min.)	within ±2.5% or ±0.25pF whichever is larger	within ±2.5% or ±0.25pF whichever is larger From 10Hz to 55Hz (return : 1m			
Tan δ, IR : initial spec. 2hours ´3 direction (x, y, z)						
Moisture Capacitance change : With rated voltage	With rated voltage	Capacitance change :	Capacitance change : With rated voltage			
Resistance within ±7.5% or ±0.75 pF whichever is larger 40±2 ℃, 90~95%RH, 500+12/-0hrs	40±2℃, 90~95%RH, 500+12/-0hrs	within ±7.5% or ±0.75pF whichever is larger	within ±7.5% or ±0.75pF whichever is larger 40±2℃, 90~95%RH, 500+12/-0			
Q: 140 min		_				
IR: 500Mohm or 25Mohm × $\mu$ F		IR: 500Mohm or 25Mohm × $\mu$ F	IR: 500Mohm or 25Mohm × $\mu$ F			
Whichever is smaller		Whichever is smaller	Whichever is smaller			
High Temperature Capacitance change : With 200% of the rated voltage	With 200% of the rated voltage	ture Capacitance change :	Capacitance change : With 200% of the rated volt	ge		
Resistance within ±3% or ±0.3pF whichever is larger Max. operating temperature	Max. operating temperature	within ±3% or ±0.3pF whichever is larger	within ±3% or ±0.3pF whichever is larger Max. operating temperature			
Q: 305 min 1000+48/-0hrs	1000+48/-0hrs	Q: 305 min	Q: 305 min 1000+48/-0hrs			
IR: 1,000Mohm or 50Mohm × $\mu$ F		IR: 1,000Mohm or 50Mohm × $\mu$ F	IR: 1,000Mohm or 50Mohm × $\mu$ F			
Whichever is smaller		Whichever is smaller	Whichever is smaller			
Temperature Capacitance change : 1 cycle condition	1 cycle condition	Capacitance change :	Capacitance change : 1 cycle condition			
Cycling within ±2.5% or ±0.25pF whichever is larger Min. operating temperature → 25°C						
Tan $\delta$ , IR : initial spec. $\rightarrow$ Max. operating temperature $\rightarrow$ 25 $^{\circ}$ C	_ · · · · · · · · · · · · · · · · · · ·	_				
		,				
5 cycle test	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°C, 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.

## - 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.

- ① Aerospace/Aviation equipment
- ② Automotive or Transportation equipment (vehicles, trains, ships, etc)
- 3 Medical equipment
- Military equipment
- 5 Disaster prevention/crime prevention equipment
- 6 Any other applications with the same as or similar complexity or reliability to the applications set forth above.