



# SPECIFICATION

- · Supplier : Samsung electro-mechanics
- · Product : Multi-layer Ceramic Capacitor
- · Samsung P/N:
- CL21B224KBFNNNE

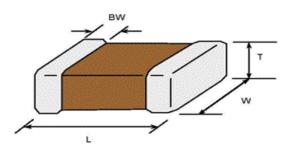
(Reference sheet)

- · Description :
- CAP, 220nF, 50V, ±10%, X7R, 0805

A. Samsung Part Number

		<u>CL</u> ①	<mark>21</mark> ②	<u>B</u> 3	<u>224</u> ④	<u>K</u> 5	<u>B</u> 6	<u>Е</u> ⑦	<u>N</u> 8	<u>N</u> 9	<u>N</u> 10	<u>Е</u> Ш	
1	Series	Samsung Mult	ti-laye	r Cer	amic C	apac	itor						
2	Size	0805 (inch c	ode)		L:	2.00	± 0.10	mm			W:	1.25 ± 0.10 r	nm
3	Dielectric	X7R				8	Inner	elect	rode			Ni	
4	Capacitance	220 nF					Term	inatio	on			Cu	
5	Capacitance	±10 %					Platir	ng				Sn 100%	(Pb Free)
	tolerance					9	Prod	uct				Normal	
6	Rated Voltage	50 V				10	Spec	ial				Reserved fo	r future use
$\bigcirc$	Thickness	1.25 ± 0.10 mm	l			1	Pack	aging	I			Embossed T	ype, 7" reel

## **B. Structure & Dimension**



Samsung P/N	Dimension(mm)							
Samsung P/N	L	W	Т	BW				
CL21B224KBFNNNE	2.00 ± 0.10	1.25 ± 0.10	1.25 ± 0.10	0.50 +0.20/-0.30				

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

Tan δ (DF)0.025 m.Insulation10,000 McResistanceWhichevAppearanceNo abnorWithstandingNo dielecVoltagemechanicTemperatureX7RCharacteristics(From-55Adhesive StrengthNo peelinof Terminationterminal eBending StrengthCapacitarSolderabilityMore tharResistance toCapacitarSoldering HeatTan δ, IRVibration TestCapacitarResistanceIan δ, IRMoistureCapacitarResistanceIan δ, IRMoistureCapacitarResistanceIan δ, IR	ohm or 500Mohm×µF er is smaller mal exterior appearance tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5%	1kHz ±10% / 1.0±0.2Vrms   *A capacitor prior to measuring the capacitance is heat 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.
Insulation10,000MoResistanceWhichevAppearanceNo abnorWithstandingNo dielectVoltagemechanicTemperatureX7RCharacteristics(From-55Adhesive StrengthNo peelinof Terminationterminal eBending StrengthCapacitarSolderabilityMore thatSoldering HeatTan δ, IRVibration TestCapacitarTan δ, IRCapacitarTan δ, IRIRSoldering HeatTan δ, IRSoldering HeatTan δ, IRSoldering HeatSoldering Tan δ, IR	ohm or 500Mohm×µF er is smaller mal exterior appearance tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g 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)
Resistance Whichev   Appearance No abnor   Withstanding No dielector   Voltage mechanic   Temperature X7R   Characteristics (From-55)   Adhesive Strength No peelin   of Termination terminal e   Bending Strength Capacitar   Solderability More than   is to be so Soldering Heat   Vibration Test Capacitar   Tan δ, IR Tan δ, IR   Moisture Capacitar   Resistance Tan δ   IR : 50	er is smaller mal exterior appearance tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5%	Microscope (×10)   250% of the rated voltage   e should be within ±15%)   500g·f, for 10±1 sec.   Bending to the limit (1mm)
AppearanceNo abnorWithstandingNo dielectVoltagemechanicTemperatureX7RCharacteristics(From-55Adhesive StrengthNo peelinof Terminationterminal etBending StrengthCapacitanSolderabilityMore thanResistance toCapacitanSoldering HeatTan δ, IRVibration TestCapacitanMoistureCapacitanResistanceIR :Soldering HeatSoldering Heat	mal exterior appearance tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5%	250% of the rated voltage e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm)
Withstanding No dielection   Voltage mechanic   Temperature X7R   Characteristics (From-55   Adhesive Strength No peelin   of Termination terminal eterminal etermin	tric breakdown or al breakdown <u>°C to 125°C, Capacitance chang</u> g shall be occur on the electrode nce change : within ±12.5%	250% of the rated voltage e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm)
Voltage mechanic   Temperature X7R   Characteristics (From-55   Adhesive Strength No peelin   of Termination terminal e   Bending Strength Capacitar   Solderability More than   Solderability More than   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Resistance Tan δ, IR   Moisture Capacitar   Resistance Tan δ, IR   Moisture Capacitar   Resistance Tan δ, IR	al breakdown <sup>°</sup> C to 125 <sup>°</sup> C, Capacitance chang g shall be occur on the electrode nce change : within ±12.5% n 75% of terminal surface	e should be within ±15%) 500g·f, for 10±1 sec. Bending to the limit (1mm)
Temperature X7R   Characteristics (From-55   Adhesive Strength No peelin   of Termination terminal e   Bending Strength Capacitar   Solderability More thar   Resistance to Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Resistance Ian ō, IR   Moisture Capacitar   Resistance Ian ō, IR   Moisture Capacitar   IR : 50	℃ 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)
Characteristics (From-55   Adhesive Strength No peelin   of Termination terminal e   Bending Strength Capacitar   Solderability More than   Solderability More than   Resistance to Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Moisture Capacitar   Resistance IR : 50	g shall be occur on the electrode nce change : within ±12.5%	500g·f, for 10±1 sec. Bending to the limit (1mm)
Adhesive Strength of Termination No peelin terminal e   Bending Strength Capacitar   Solderability More than is to be so   Resistance to Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Resistance Tan δ, IR   Image: Strength Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Tan δ, IR Tan δ, IR   Moisture Capacitar   Resistance Tan δ :   IR : 50	g shall be occur on the electrode nce change : within ±12.5%	500g·f, for 10±1 sec. Bending to the limit (1mm)
of Termination terminal e   Bending Strength Capacitar   Solderability More than is to be so   Resistance to Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Resistance Tan δ, IR   Moisture Capacitar   Resistance Tan δ, IR   Moisture Capacitar   IR : 50	nce change : within ±12.5%	Bending to the limit (1mm)
Bending Strength Capacitan   Solderability More than   Solderability More than   Resistance to Capacitan   Soldering Heat Tan δ, IR   Vibration Test Capacitan   Resistance Capacitan   Tan δ, IR Tan δ, IR   Moisture Capacitan   Resistance Tan δ :   IR : 50	nce change : within ±12.5%	
Solderability More that is to be soldering   Resistance to Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Tan δ, IR Tan δ, IR   Moisture Capacitar   Resistance Tan δ, IR   IR : 50	n 75% of terminal surface	
Resistance to Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Tan δ, IR Tan δ, IR   Moisture Capacitar   Resistance Tan δ :   IR : 50		with 1.0mm/sec.
Resistance to Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Tan δ, IR Tan δ, IR   Moisture Capacitar   Resistance Tan δ :   IR : 50		
Resistance to Capacitar   Soldering Heat Tan δ, IR   Vibration Test Capacitar   Tan δ, IR Tan δ, IR   Moisture Capacitar   Resistance Tan δ :   IR : 50		SnAg3.0Cu0.5 solder
Soldering Heat Tan δ, IR   Vibration Test Capacitar   Tan δ, IR   Moisture Capacitar   Resistance Tan δ :   IR : 50	oldered newly	245±5°C, 3±0.3sec.
Soldering Heat Tan δ, IR   Vibration Test Capacitar   Moisture Capacitar   Resistance Tan δ :   IR : 50		(preheating : 80~120℃ for 10~30sec.)
Vibration Test Capacitar   Tan δ, IR   Moisture Capacitar   Resistance Tan δ :   IR : 50	nce change : within ±7.5%	Solder pot : 270±5℃, 10±1sec.
Moisture   Capacitar     Resistance   Tan δ :     IR :   50	: initial spec.	
Resistance   Tan δ :     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
W	00Mohm or 25Mohm × $\mu$ F	
	hichever is smaller	
High Temperature Capacitar	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 Capacitar	nce change : within ±7.5%	1 cycle condition
-	ioconange. within ±1.0/0	Min. operating temperature $\rightarrow 25^{\circ}$ C
	: initial spec.	
	•	$\rightarrow$ 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,

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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.