



SPECIFICATION

- · Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- · Samsung P/N:
- CL05B223KA5NNNC

(Reference sheet)

- · Description :
- CAP, 22nF, 25V, ±10%, X7R, 0402

A. Samsung Part Number

		<u>CL</u> ①	<u>05</u> ②	<u>B</u> 3	<u>223</u> ④	<u>K</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> (1)		
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	22 nF					Term	inatio	on			Cu		
(5)	Capacitance	±10 %					Platir	ng				Sn 100%	(Pb Free)	
	tolerance					9	Prod	uct				Normal		
6	Rated Voltage	25 V				10	Spec	ial				Reserved for	or future use	
1	Thickness	0.50 ± 0.05 mm	n			1	Pack	aging				Cardboard	Type, 7" reel	

B. Structure & Dimension



Sameung D/N	Dimension(mm)								
Samsung P/N	L	W	Т	BW					
CL05B223KA5NNNC	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 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 Resistance Capacitar Tan ō, IR Moisture Resistance Tan ō : 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)
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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 [°] C to 125 [°] 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 δ, IR Moisture Capacitar Resistance Ian δ, 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)
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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 × μ 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,

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
- (4) Military equipment
- 5 Disaster prevention/crime prevention equipment
- Ø Power plant control equipment
- ⑦ Atomic energy-related equipment
- Indersea equipment
- Itraffic signal equipment
- Data-processing equipment
- ① Electric heating apparatus, burning equipment
- ② Safety equipment
- 13 Any other applications with the same as or similar complexity or reliability to the applications