



# SPECIFICATION

- · Supplier : Samsung electro-mechanics
- Product : Multi-layer Ceramic Capacitor
- · Samsung P/N :
- CL21B684KPFNNNE

(Reference sheet)

- · Description : CAP, 6
- CAP, 680nF, 10V, ±10%, X7R, 0805

A. Samsung Part Number

			<u>CL</u> ①	<mark>21</mark> ②	<u>B</u> 3	<u>684</u> ④	<u>K</u> 5	<u>Р</u> 6	<b>F</b> ⑦	<u>N</u> 8	<u>N</u> 9	<u>N</u> 10	<u>Е</u> Ш		
1	Series	Samsung	Multi-	layer	Cerar	nic Ca	pacito	or							
2	Size	0805 (	(inch c	ode)		L:	2.00	± 0.10	mm			W:	1.25 ± 0.10	mm	
3	Dielectric	X7R					8	Inner	elect	rode			Ni		
4	Capacitance	680 ו	nF					Term	inatio	n			Cu		
5	Capacitance	±10 °	%					Platir	ıg				Sn 100%	(Pb Free)	
	tolerance						9	Prod	uct				Normal		
6	Rated Voltage	10 \	V				10	Spec	ial				Reserved for	r future use	
1	Thickness	1.25 ± 0.1	10 mm				1	Pack	aging				Embossed 7	Гуре, 7" reel	

### **B. Structure & Dimension**



Samsung P/N		Dime	ension(mm)	
Samsung F/N	L	W	Т	BW
CL21B684KPFNNNE	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) 0.05 max. treated at 150 °C +0/-10 °C for 1 hour and maintaine ambient air for 24±2 hours.   Insulation 10,000Mohm or 100Mohm×μ <sup>F</sup> Rated Voltage 60~120 sec.   Resistance Whichever is smaller Rated Voltage 60~120 sec.   Appearance No abnormal exterior appearance Microscope (×10) Withstanding   Voltage mechanical breakdown or 250% of the rated voltage   Voltage mechanical breakdown 250% of the rated voltage   Temperature X7R Characteristics (From-55 °C to 125 °C, Capacitance change should be within ±15%)   Adhesive Strength No peeling shall be occur on the of Termination terminal electrode 500g f, for 10±1 sec.   Bending Strength Capacitance change : within ±12.5% Bending to the limit (1mm) with 1.0mm/sec.   Solderability More than 75% of terminal surface is to be soldered newly Solder pot : 270±5°C, 10±1sec.   Soldering Heat Tan δ, IR : initial spec. Vibration Test Capacitance change : within ±7.5%   Soldering Heat Tan δ, IR : initial spec. Amplitude : 1.5mm From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)   Moisture Capacitance change : within ±12.5% Amplitude : 1.5mm From 10Hz to 55Hz (ret	 Test condition	Judgement	
Tan δ (DF)0.05 max.treated at 150 °C +0/-10 °C for 1 hour and maintaine ambient air for 24±2 hours.Insulation10,000Mohm or 100Mohm×//FRated Voltage60~120 sec.ResistanceWhichever is smallerMicroscope (×10)WithstandingAppearanceNo abnormal exterior appearanceMicroscope (×10)WithstandingNo dielectric breakdown or250% of the rated voltageVoltagemechanical breakdown250% of the rated voltageTemperatureX7R(From-55 °C to 125 °C, Capacitance change should be within ±15%)Adhesive Strength of Terminationterminal electrode500g f, for 10±1 sec.Bending StrengthCapacitance change : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface 	1 <sup>kHz</sup> ±10% / 1.0±0.2Vrms	Within specified tolerance	Capacitance
Resistance   Whichever is smaller     Appearance   No abnormal exterior appearance   Microscope (×10)     Withstanding   No dielectric breakdown or mechanical breakdown   250% of the rated voltage     Voltage   mechanical breakdown   250% of the rated voltage     Temperature   X7R   250% of the rated voltage     Characteristics   (From-55 °C to 125 °C, Capacitance change should be within ±15%)     Adhesive Strength of Termination   No peeling shall be occur on the terminal electrode   500g·f, for 10±1 sec.     Bending Strength   Capacitance change : within ±12.5%   Bending to the limit (1mm) with 1.0mm/sec.     Solderability   More than 75% of terminal surface is to be soldered newly   Solder 245±5°C, 3±0.3sec. (preheating : 80~120°C for 10~30sec.)     Resistance to   Capacitance change : within ±7.5%   Solder pot : 270±5°C, 10±1sec.     Soldering Heat   Tan δ, IR : initial spec.   Amplitude : 1.5mm     Yibration Test   Capacitance change : within ±12.5% Tan δ; IR : initial spec.   Amplitude : 1.5mm     Moisture   Capacitance change : within ±12.5% Tan δ : 0.075 max   Mith ±12.5% With rated voltage   With rated voltage     Resistance   Tan δ : 0.075 max   I# <sup>c</sup> Whichever is smaller<	*A capacitor prior to measuring the capacitance is he treated at 150°C+0/-10°C for 1 hour and maintained i ambient air for 24±2 hours.	0.05 max.	Tan δ (DF)
AppearanceNo abnormal exterior appearanceMicroscope (×10)WithstandingNo dielectric breakdown or mechanical breakdown $250\%$ of the rated voltageVoltagemechanical breakdown $250\%$ of the rated voltageTemperatureX7R CharacteristicsX7R (From-55°C to 125°C, Capacitance change should be within ±15%)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode $500g$ ·f, for $10\pm1$ sec.Bending Strength of TerminationCapacitance change : within $\pm12.5\%$ Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySolder pot: $270\pm5°C$ , $10\pm3$ sec. (preheating : $80^{-}120°C$ for $10^{-}30$ sec.)Resistance to Vibration TestCapacitance change : within $\pm7.5\%$ Solder pot: $270\pm5°C$ , $10\pm1$ sec.Vibration Test ResistanceCapacitance change : within $\pm12.5\%$ Tan $\delta$ , IR : initial spec.Amplitude : $1.5mm$ From 10Hz to $55Hz$ (return : 1min.) $2hours × 3$ direction (x, y, z)Moisture ResistanceCapacitance change : within $\pm12.5\%$ Tan $\delta$ : $0.075$ max IR : $500Mohm$ or $25Mohm \times \mu^{dF}$ Whichever is smallerWith rated voltage $40\pm2°C$ , $90~95\%$ RH, $500+12/-0hrs$	Rated Voltage 60~120 sec.	10,000Mohm or 100Mohm× <i>μ</i> F	Insulation
Withstanding VoltageNo dielectric breakdown or mechanical breakdown $250\%$ of the rated voltageTemperature CharacteristicsX7R (From-55 °C to 125 °C, Capacitance change should be within ±15%)Adhesive Strength of TerminationNo peeling shall be occur on the terminal electrode $500g \cdot f, \text{ for } 10\pm 1 \text{ sec.}$ Bending StrengthCapacitance change : within ±12.5%Bending to the limit (1mm) with 1.0mm/sec.SolderabilityMore than 75% of terminal surface is to be soldered newlySnAg3.0Cu0.5 solder $245\pm5°C, 3\pm 0.3sec.$ (preheating : $80\sim120°C$ for 10~30sec.)Resistance to Soldering HeatCapacitance change : Tan $\delta$ , IR : initial spec.within $\pm 7.5\%$ From 10Hz to 55Hz (return : 1min.) $2hours \times 3$ direction (x, y, z)Moisture ResistanceCapacitance change : Tan $\delta$ : $0.075$ max IR : S00Mohm or 25Mohm × $\mu^{F}$ Whichever is smallerWith rated voltage		Whichever is smaller	Resistance
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of Terminationterminal electrodeBending StrengthCapacitance change :within ±12.5%Bending 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 ±7.5%Solder pot : 270±5°C, 10±1sec.Soldering HeatTan δ, IR : initial spec.More than present to the spect of the spec	should be within ±15%)	(From-55℃ to 125℃, Capacitance change s	Characteristics
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is to be soldered newly $245\pm5^{\circ}$ C, $3\pm0.3$ sec. (preheating : $80\sim120^{\circ}$ C for $10\sim30$ sec.)Resistance to Soldering HeatCapacitance change : Tan $\delta$ , IR : initial spec.within $\pm7.5\%$ 	with 1.0mm/sec.		
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$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	245±5℃, 3±0.3sec.	is to be soldered newly	
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Tan $\delta$ , IR : initial spec.From 10Hz to 55Hz (return : 1min.) 2hours × 3 direction (x, y, z)Moisture ResistanceCapacitance change : within ±12.5% Tan $\delta$ : 0.075 max 			
Moisture ResistanceCapacitance change : within $\pm 12.5\%$ Tan $\delta$ : 0.075 maxWith rated voltage $40\pm2^{\circ}$ C, 90~95%RH, 500+12/-0hrsIR : 500Mohm or 25Mohm × $\mu$ F Whichever is smallerWith rated voltage	From 10Hz to 55Hz (return : 1min.)	i e	Vibration Test
ResistanceTan $\delta$ :0.075 max40±2°C, 90~95%RH, 500+12/-0hrsIR:500Mohm or 25Mohm × $\mu$ FWhichever is smaller		Capacitance change : within ±12.5%	Moisture
Whichever is smaller	-		Resistance
		IR : 500Mohm or 25Mohm × $\mu$ F	
		Whichever is smaller	
<b>High Temperature</b> Capacitance change : within ±12.5% With <sup>200%</sup> of the rated voltage	 With 200% of the rated voltage	Capacitance change : within ±12.5%	High Temperature
<b>Resistance</b> Tan $\delta$ : 0.075 max Max. operating temperature	-		
IR : 1,000Mohm or 50Mohm × <i>μ</i> F 1000+48/-0hrs		IR : 1,000Mohm or 50Mohm × <i>μ</i> F	
Whichever is smaller			
Temperature   Capacitance change :   within ±7.5%   1 cycle condition	 1 cycle condition	Capacitance change : within ±7.5%	Temperature
CyclingTan $\delta$ , IR : initial spec.Min. operating temperature $\rightarrow$ 25°C	-		
$\rightarrow$ Max. operating temperature $\rightarrow$ 25°C	$\rightarrow$ Max. operating temperature $\rightarrow$ 25°C		
5 cycle test	5 cycle test		

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.

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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.