SAMSUNG ELECTRO-MECHANICS

RoHS+Halogen Compliant ecoparts

Specification of Automotive MLCC

- **Supplier : Samsung electro-mechanics**
- **Product : Multi-layer Ceramic Capacitor**
- **Samsung P/N : CL31B225KBH4PNE**
- **Description : CAP, 2.2㎌, 50V, ±10%, X7R, 1206**
- **AEC-Q 200 Specified**

A. Samsung Part Number

CL	31	B	225	K	B	H	4	P	N	E
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪

①	**Series**	Samsung Multi-layer Ceramic Capacitor			
②	**Size**	1206 (inch code)	L: 3.2 ± 0.2 mm	W: 1.6 ± 0.2 mm	
③	**Dielectric**	X7R	⑧	**Inner electrode**	Ni
④	**Capacitance**	2.2 ㎌		**Termination**	Metal Epoxy
⑤	**Capacitance tolerance**	±10 %		**Plating**	Sn 100% (Pb Free)
			⑨	**Product**	Automotive
⑥	**Rated Voltage**	50 V	⑩	**Grade code**	Standard
⑦	**Thickness**	1.6 ± 0.2 mm	⑪	**Packaging**	Embossed Type, 7" reel

B. Reliability Test and Judgement condition

	Performance	Test condition
High Temperature Exposure	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10% Tan δ : 0.03 max IR : More than 10,000㏁ or 500㏁×㎌ Whichever is Smaller	Unpowered, 1000hrs@T=150℃ Measurement at 24±2hrs after test conclusion
Temperature Cycling	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10% Tan δ : 0.03 max IR : More than 10,000㏁ or 500㏁×㎌ Whichever is Smaller	1000Cycles Measurement at 24±2hrs after test conclusion 1 cycle condition : -55+0/-3℃(15±3min) -> Room Temp(1min.) -> 125+3/-0℃(15±3min) -> Room Temp(1min.)
Destructive Physical Analysis	No Defects or abnormalities	Per EIA 469
Moisture Resistance	Appearance : No abnormal exterior appearance Capacitance Change : Within ±12.5% Tan δ : 0.03 max IR : More than 10,000㏁ or 500㏁×㎌ Whichever is Smaller	10Cycles, t=24hrs/cycle Heat (25~65℃) and humidity (80~98%), Unpowered measurement at 24±2hrs after test conclusion
Humidity Bias	Appearance : No abnormal exterior appearance Capacitance Change : Within ±12.5% Tan δ : 0.035 max IR : More than 500㏁ or 25㏁×㎌ Whichever is Smaller	1000hrs 85℃/85%RH, Rated Voltate and 1.3~1.5V, Add 100kohm resistor Measurement at 24±2hrs after test conclusion The charge/discharge current is less than 50mA.
High Temperature Operating Life	Appearance : No abnormal exterior appearance Capacitance Change : Within ±12.5% Tan δ : 0.035 max IR : More than 1000㏁ or 50㏁×㎌ Whichever is Smaller	1000hrs @ TA=125℃, 200% Rated Voltage, Measurement at 24±2hrs after test conclusion The charge/discharge current is less than 50mA.

	Performance	Test condition
External Visual	No abnormal exterior appearance	Microscope (´10)
Physical Dimensions	Within the specified dimensions	Using The calipers
Mechanical Shock	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10% Tan δ, IR : initial spec.	Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks) Peakvalue / Duration / Wave / Velocity 1,500G / 0.5ms / Half sine / 4.7m/sec.
Vibration	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10% Tan δ, IR : initial spec.	5g's for 20min., 12cycles each of 3 orientations, Use 8"×5" PCB 0.031" Thick 7 secure points on one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10~2000㎐.
Resistance to Solder Heat	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10% Tan δ, IR : initial spec.	Solder pot : 260±5℃, 10±1sec.
Thermal Shock	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10% Tan δ, IR : initial spec.	-55℃/+125℃. Note: Number of cycles required-300, Maximum transfer time-20 sec, Dwell time-15min. Air-Air
ESD	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10% Tan δ, IR : initial spec.	AEC-Q200-002
Solderability	95% of the terminations is to be soldered evenly and continuously	a) Preheat at 155℃ for 4 hours, Immerse in solder for 5s at 245±5℃ b) Steam aging for 8 hours, Immerse in solder for 5s at 245±5℃ c) Steam aging for 8 hours, Immerse in solder for 120s at 260±5℃ solder : a solution ethanol and rosin
Electrical Characterization	Capacitance : Within specified tolerance Tan δ (DF) : 0.025 max. IR(25℃) : More than 10,000㏁ or 500㏁×㎌ IR(125℃) : More than1,000㏁ or 10㏁×㎌ Whichever is Smaller Dielectric Strength	The Capacitance /D.F. should be measured at 25℃, 1㎑±10%, 1.0±0.2Vrms I.R. should be measured with a DC voltage not exceeding Rated Voltage @25℃, @125℃ for 60~120 sec. Dielectric Strength : 250% of the rated voltage for 1~5 seconds
Board Flex	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10%	Bending to the limit (2㎜) for 5 seconds
Terminal Strength(SMD)	Appearance : No abnormal exterior appearance Capacitance Change : Within ±10%	18N, for 60±1 sec.
Beam Load	Destruction value should not be exceed Chip Length ≥ 3.2㎜ a) Chip Thickness < 1.25㎜ : 15N b) Chip Thickness ≥ 1.25㎜ : 54.5N	Beam speed 2.5±0.25㎜/sec
Temperature Characteristics	X7R (From -55℃ to 125℃, Capacitance change should be within ±15%)	

C. Recommended Soldering method :

Reflow (Reflow Peak Temperature : 260+0/-5℃, 10sec. Max)

Meet IPC/JEDEC J-STD-020 D Standard

* For the more detail Specification, Please refer to the Samsung MLCC catalogue.