MULTILAYER CHIP VARISTORS

1 Electrical Characteristics

1.1 Technical Data	Symbol	Value	Unit
Maximum allowable continuous AC voltage at 50-60Hz	VRMS	NIL	V
Maximum allowable continuous DC voltage	VDC	5.5	V
Varistor breakdown voltage	Vv	100-150	V
Typical capacitance value measured at 1MHz	C	0.5	pF
Typical capacitance value tolerance	t	0.4-1.5	pF
Maximum allowable clamping voltage	VC	200	V
Leakage current at V_{DC} (at initial state)	I_{LDC} <	1	uA
Leakage current at V_{DC} (after ESD test)	I_{LDCA} <	2	uA

1.2 Reference Data	Symbol	Value	Unit
Response time	Trise <	1	ns
Operation ambient temperature	T_{OPT}	-55~+125	℃
Storage temperature range	T_{STG}	-55~+125	℃
ESD testing	IEC61000-4-2	Level 4	

1.3 Other Data	Symbol	Value	Unit
Response time	Trise <	1	ns
Operation ambient temperature	T_{OPT}	-50~+125	℃
Storage temperature range	T_{STG}	-50~+125	℃
ESD testing	IEC61000-4-2	Level 4	
Body		ZnO	
End termination		Ag/Ni/Sn	
Packaging		Reel	
Complies with standard		IEC61000-4-2	
Complies with RoHs standard		Yes	
Lead content	<	1000	ppm
Marking		None	

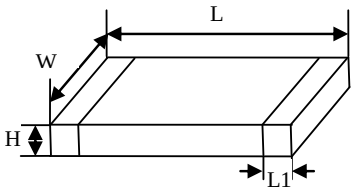
Notes :

*1 The varistor breakdown voltage was measured at 1mA. .*2 The clamping voltage was measured at 8/20μs standard current.

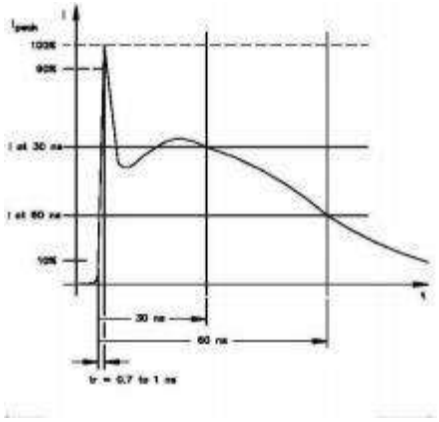
*3 The leakage current was measured at working voltage *4 Insulation resistance greater than 10MΩ

2 Dimensional Drawings

Type	Length （L）	Width （W）	High（H）	Termination（L1）
0603	1.60±0.25	0.80±0.25	1.00(max)	0.35±0.10



3 ESD Wave Form



IEC61000-4-2 Standards

SEVERITY LEVEL	AIR DIRCHARGE	DIRECT DISCHARGE
1	2KV	2KV
2	4KV	4KV
3	8KV	6KV
4	15KV	8KV

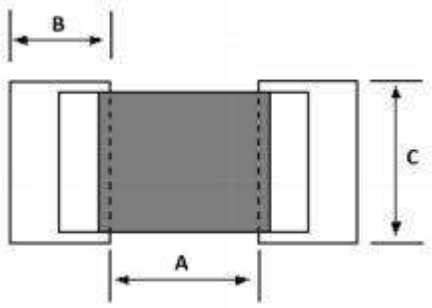
4 Environment Reliability Test

Characteristic	Test method and description			
High Temperature Storage	The specimen shall be subjected to 125℃ for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. The change of varistor voltage shall be within 10%.			
Temperature Cycle	The temperature cycle of specified temperature shall be repeated five times and then stored at room temperature and humidity for one two hours. The change of varistor voltage shall be within 10%and mechanical damage shall be examined.	Step	Temperature	Period
		1	-40±3℃	30min±3
		2	Room Temperature	1~2hours
		3	125±2℃	30min±3
		4	Room Temperature	1~2hours
High Temperature Load	After being continuously applied the maximum allowable voltage at 125℃ for 1000hours, the specimen shall be stored at room temperature and humidity for one or hours, the change of varistor voltage shall be within 10%.			
Damp Heat Load/ Humidity Load	The specimen should be subjected to 40℃,90 to 95%RH environment, and the maximum allowable voltage applied for 1000 hours, then stored at room temperature and humidity for one or two hours. The change of varistor voltage shall be within 10%.			
Low Temperature Storage	The specimen should be subjected to -40℃, without load for 1000 hours and then stored at room temperature for one two hours. The change of varistor voltage shall be within 10%.			

5 Soldering Recommendations

5.1 Recommended solder pad layout

	A	B	C
0603	0.9~1.2	0.9~1.2	0.8~1.0



5.2 The SIR test of the solder paste shall be done (Based on JIS-Z-3284)

5.3 Steel plate and foot distance printing

Foot distance printing (mm)	Steel plate thickness (mm)
≧0.65mm	0.18mm
0.50~0.65mm	0.15mm
0.40~0.50mm	0.12mm
≦0.40mm	0.10mm

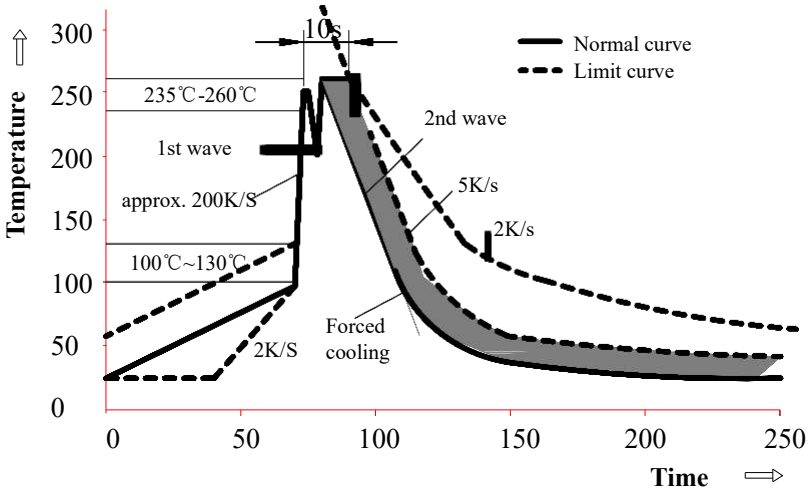
5.4 The IR reflow and temperature of soldering for Pb free process

6 Soldering guidelines

The usage of mild, non-activated fluxes for soldering is recommended, as well as proper cleaning of the

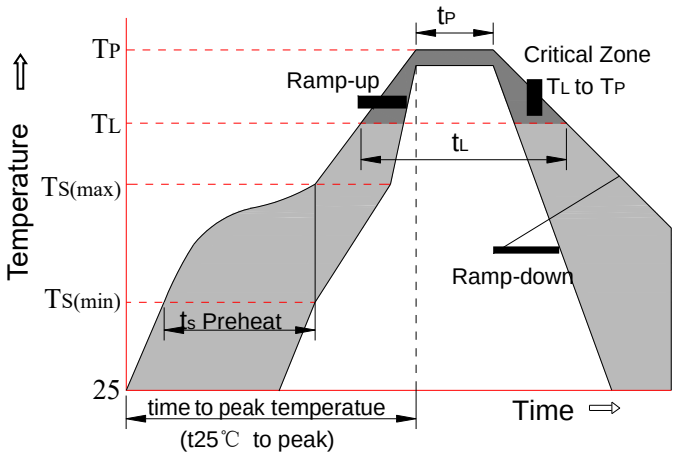
The components are suitable for reflow soldering per JEDEC J-STD-020C

6.1 Wave soldering



Temperature characteristics at component terminal with dual-wave soldering

6.2 Reflow soldering

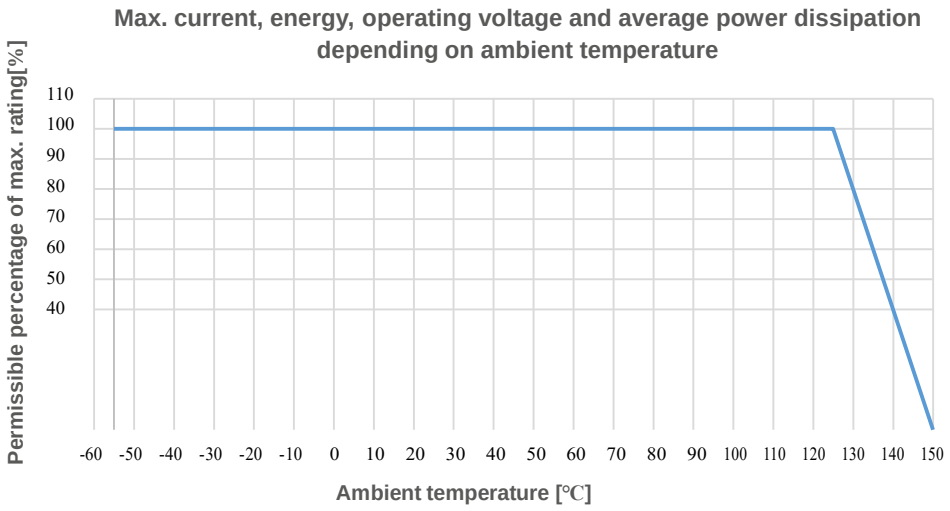


Profile feature		Sn-Pb assembly	Pb-Free assembly
Average ramp-up rate (T_{Smax} to T_p)		3℃/sec. Max	3℃/sec. Max
Preheat	-Temperature min. ($T_{s(min)}$)	+100℃	+150℃
	-Temperature max.($T_{s(max)}$)	+150℃	+200℃
	-Time (t_{Smin} to t_{Smax})	60-120 secs.	60-180 secs.
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max	3℃/sec. Max
Time maintained above	-Temperature min. (T_L)	+183℃	+217℃
	-Time (t_L)	60-150 secs.	60-150 secs.
Peak classification temperature (T_p)		+220℃ to +240℃	+240℃ to +260℃
Time within 5℃of actual peak temperature (t_p)		10 secs. to 30 secs.	20 secs. to 40 secs.
Ramp-down rate		6℃/sec. max.	6℃/sec. max.
Time 25℃ to peak temperature		6 min. max.	8 min. max.

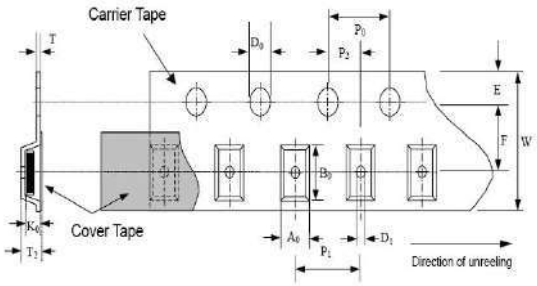
Notes: All temperature refer to topside of the package, measured on the package body surface

Maximum number of reflow cycles

7 Temperature derating curve



8 Packaging Specification



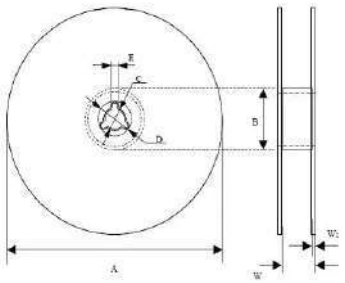
8.1 Carrier tape transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape.

8.2 The adhesion of the heat-sealed cover tape shall be 40 + 20/ - 15 grams.

8.3 Both the head and the end portion of taping shall be empty for reel package and SMT auto-pickup machine. And a normal paper tape shall be connected in the head of taping for the operator handle.

Type	A_0 ±0.10	B_0 ±0.10	K_0 ±0.10	T ±0.05	T_2 ±0.05	D_0 +0.10	D_1 ±0.05	P_1 ±0.10	P_2 ±0.05	P_0 ±0.05	W ±0.20	E ±0.10	F ±0.05
0402	1. 08	1. 88	1. 04	0. 22	0. 87	1. 50	1. 00	4. 00	2. 00	4. 00	8. 00	1. 75	3. 50
0603	1. 08	1. 88	1. 04	0. 22	1. 17	1. 50	1. 00	4. 00	2. 00	4. 00	8. 00	1. 75	3. 50
0805	1. 42	2. 30	1. 04	0. 22	1. 26	1. 50	1. 00	4. 00	2. 00	4. 00	8. 00	1. 75	3. 50
1206	1. 88	3. 50	1. 27	0. 20	1. 49	1. 50	1. 00	4. 00	2. 00	4. 00	8. 00	1. 75	3. 50

9 Reel dimension



type	A	B	C	D	E	W	W_1
0402-1206	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15

10 Standard Packaging

Size 0603: 4000PCS