



PART NO. MLV1005L050PT

1.1 DEVICE RATINGS AND SPECIFICATIONS

PART NUMBER	Maximum Ratings(125°C)					Specifications(25°C)		
	Maximum Continuous Working Voltage		Maximum Non-Repetitive Surge Current (8/20µs)	Maximum Non-Repetitive Surge Energy (10/1000µs)	Maximum Clamping Voltage at Specified Current (8/20µs)	Nominal Voltage at 1 mA (DC) Test Current		Typical Capacitance @1 MHz
	V _{M(DC)}	V _{M(AC)}	I _{TM}	W _{TM}	V _c	V _{N(DC) min.}	V _{N(DC) max.}	C
	(V)	(V)	(A)	(J)	(V)	(V)	(V)	(pF)
MLV1005L050PT	5.5	4	20	0.05	15.5 at 1 A	7.1	9.8	280
MLV1005L090PT	9	6	20	0.05	23 at 1 A	10.0	14.5	200
MLV1005L120PT	12	9	20	0.05	27 at 1 A	14.0	18.5	160
MLV1005L140PT	14	11	20	0.05	30 at 1 A	16.0	21.0	145
MLV1005L180PT	18	14	20	0.05	40 at 1 A	22.0	28.0	85
MLV1005L220PT	22	17	20	0.05	44 at 1 A	24.3	30.0	75

1.2 Reference Data

	Symbol	Value	Unit
Response time	T _{rise}	< 1	ns
Leakage current at Nominal Voltage × 80%	I _L	< 50	µA
Leakage current at Nominal Voltage (< 18V) × 80%	I _L	< 200	µA
Operating ambient temperature		-55~ +85	°C
Storage temperature		-55~+125	°C
Reflow solder profile temperature(Recommend)		225	°C

1.3 Other Data

Body	ZnO
End termination	Ag/Ni/Sn plated
Packaging	Reel
Complies with Standard	IEC61000-4-5
Procedure	Single
Marking	None

Notes :

* The capacitance value was not to be defined .

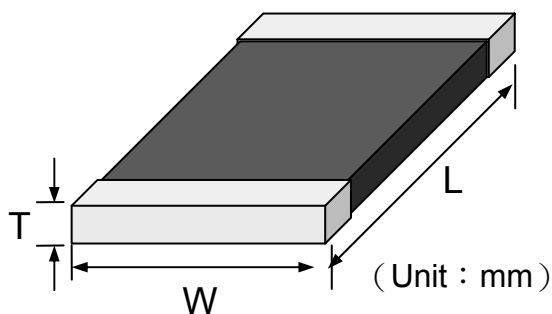
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2. Size

Unit mm

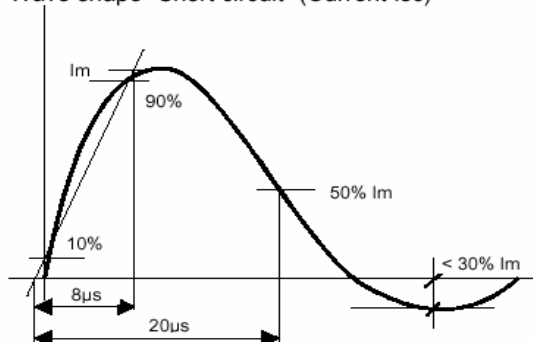
Model	1005 Series
Length(L)	1.00 ±0.10
Width(W)	0.50 ±0.10
Thickness : (T)	0.60(Max)



3. Surge Wave Form

IEC61000-4-5 STANDARDS

Wave shape "Short circuit" (Current I_{sc})



SEVERITY LEVEL	T1	T2
1	8 uS	10 uS
2	20 uS	1000 uS

IEC 61000-4-2 Compliant ESD Current Pulse Waveform

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4. Environmental Reliability Test

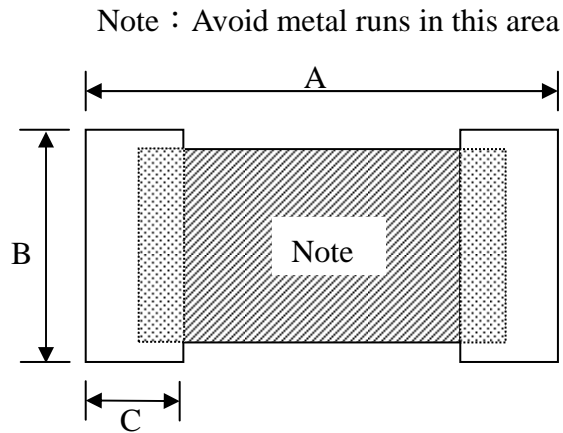
Characteristic	Test method and description			
High Temperature Storage	The specimen shall be subjected to $150 \pm 2^{\circ}\text{C}$ for 1000 ± 12 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. The change of varistor voltage shall be within 10 % .			
Temperature Cycle	The temperature cycle of specified temperature shall be repeated five times and then stored at room temperature and humidity for one or two hours. the change of varistor voltage shall be within 10 % and mechanical damage shall be examined.	Step	Temperature	Period
		1	$-40 \pm 3^{\circ}\text{C}$	30Min \pm 3
		2	Room Temperature	1~2 hours
		3	$125 \pm 2^{\circ}\text{C}$	30Min \pm 3
		4	Room Temperature	1~2 hours
High Temperature Load	After being continuously applied the maximum allowable voltage at $125 \pm 2^{\circ}\text{C}$ for 1000 ± 2 hours, the specimen shall be stored at room temperature and humidity for one or two hours, the change of varistor voltage shall be within 10% .			
Damp Heat Load/ Humidity Load	The specimen should be subjected to $40 \pm 2^{\circ}\text{C}$, 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 $40 \pm 2^{\circ}\text{C}$, without load for 1000 hours and then stored at room temperature for one or two hours. the change of varistor voltage shall be within 10 %			



5. Soldering Recommendations

5.1 Recommended solder pad layout

(Unit : mm)		
A	B	C
1.7~2.3	0.51~0.65	0.61~0.70

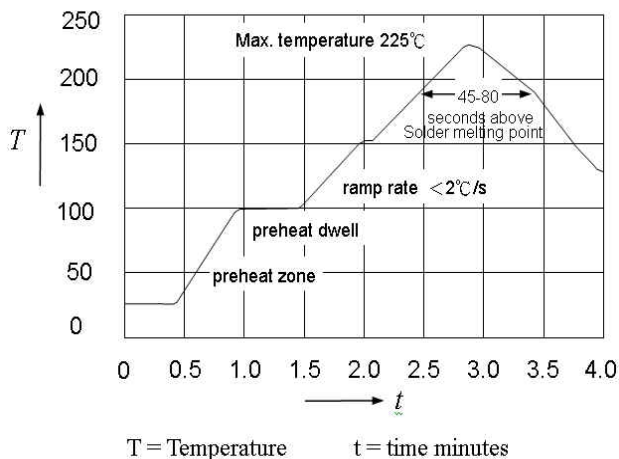


5.2 The solder paste shall be printed in a thickness of 150 to 200µm.

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

5.4 IR Soldering

Rapid heating, partial heating or rapid cooling will easily cause defect of the component, so preheating and gradual cooling process is suggested. IR soldering has the highest yields due to controlled heating rates and solder liquidized times. Make sure that the element is not subjected to a thermal gradient steeper than 4 degrees per second. 2 degrees per second is the ideal gradient. During the soldering process, pre- heating to within 100 degrees of the solders peak temperature is essential to minimize thermal shock.



- (a) Preheat
 1. The temperature rising speed is suggested to be $2\sim 4^{\circ}\text{C}/\text{s}$.
 2. Appropriate preheat time will be from 60 to 120 seconds.
- (b) Heating
 1. Careful about sudden rise in temperature as it may worsen the solder ability.
 2. Set the peak temperature in the range from 215°C to 225°C .
- (c) Cooling
 1. Careful about slow cooling as it may cause the position shift of component.

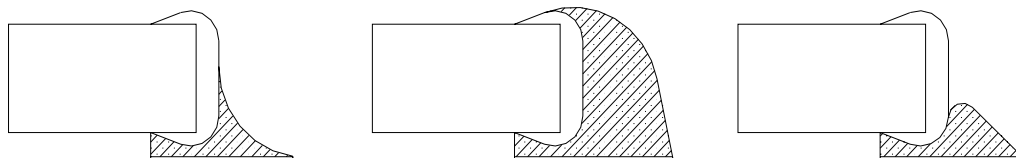
※Perform adequate test in advance as the reflow temperature profile will vary according to the conditions of the manufacturing process, and the specification of the reflow furnace

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5.5

Solder joint profiles for silver/nickel/tin terminations



Good solder joint

Too much solder
Pad geometry too large

Poor wetting

Soldering Note:

Iron soldering should be avoided, hot air methods are recommended for repair purposes.

5.6 Post Soldering Cleaning

5.6.1 Residues of corrosive soldering fluxes on the PC board after cleaning may greatly have influences on the electrical characteristic and the reliability (such as humidity resistance)of the Varistors which have been mounted on the board. It shall be confirmed that the characteristic and the reliability of the devices are not affected by the applied cleaning conditions.

5.6.2. When an ultrasonic cleaning is applied to the mounted Varistors on PC Boards, following conditions are recommended for preventing failures or damages of the devices due to the large vibration energy and the resonance caused by the ultrasonic waves.

- (1) Frequency 29MHz max
- (2) Radiated Power 20w/lithr max
- (3) Period 5minuets max

6. Label and marking Unit mm

6.1 The paper label shall be plastered on the obvious side of the reel, and the information show as right side

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PART NO :	
LOT NO :	
QUANTITY :	
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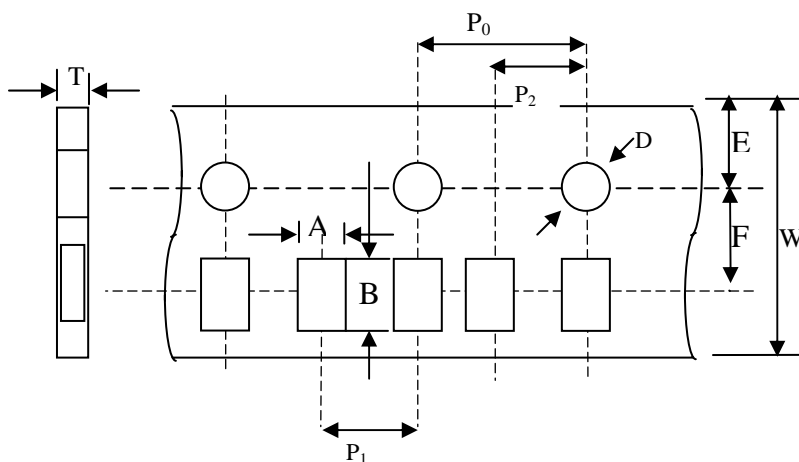


7. Packaging Specification

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

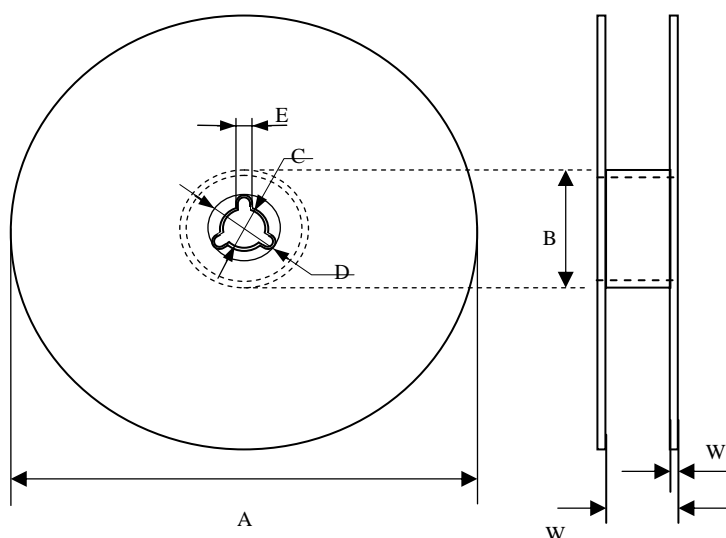
7.2 The adhesion of the heat-sealed cover tape shall be $40 + 20 / - 15$ grams.

7.3 Both the head and the end portion of the 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 to handle.



Symbol	A ±0.03	B ±0.03	T ±0.03	D ±0.05	P ₁ ±0.05	P ₂ ±0.10	P ₀ ±0.05	W ±0.1	E ±0.05	F ±0.05
mm	0.60	1.10	0.60	1.55	2.00	2.00	4.00	8.00	1.75	3.50

8. Reel Dimension



Symbol	A	B	C	D	E	W	W ₁
Unit(mm)	178±1	60±0.2	13±0.1	21±0.1	2.0±0.5	9±0.05	1.4±0.1

Standard packaging : 10,000 pcs/Reel.

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