

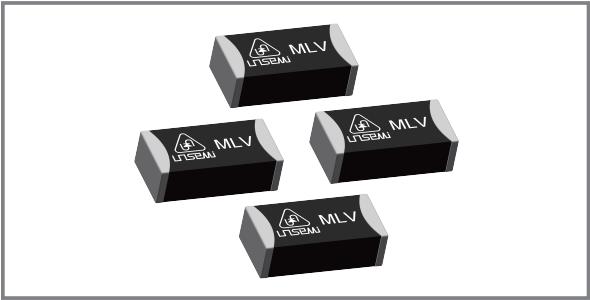
MULTILAYER CHIP VARISTORS

Features

- ◆ Series size from 0402 to 0603
- ◆ Working Voltage from 2V to 24Vdc
- ◆ Fast response time (<0.5ns)
- ◆ Low leakage current
- ◆ High surge current ability
- ◆ Bidirectional clamping, high energy
- ◆ Wide Operating temperature range from -55℃-125℃
- ◆ Suitable for ESD protection
- ◆ Good solderability



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Part Numbering

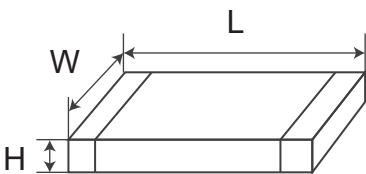
**ESD - 0603 - 5R5 - E - 0R2**

( 1 )      ( 2 )      ( 3 )      ( 4 )      ( 5 )

- (1) Series Name
- (2) 0603: Chip size –0603 (1.6 x 0.8 mm) size
- (3) Maximum continuous working voltage 5R5 5.5V 240 24V
- (4) High surge absorption series
- (5) Capacitance value:0R2 0.2pF /2R5 2.5pF /121 120pF

Dimensions

Model	1005(0402)	1608(0603)	2012(0805)	3216(1206)	3225(1210)	4532(1812)	5750(2220)	8050(3220)
Length(L)	1.00±0.15	1.60±0.20	2.00±0.20	3.20±0.20	3.20±0.20	4.50±0.30	5.70±0.30	8.00±0.30
Width(W)	0.50±0.15	0.80±0.20	1.20±0.20	1.60±0.20	2.50±0.20	3.20±0.20	5.00±0.30	5.00±0.30
High(H)	0.70max	0.90max	1.30max	1.60max	2.50max	3.20max	4.50max	4.50max

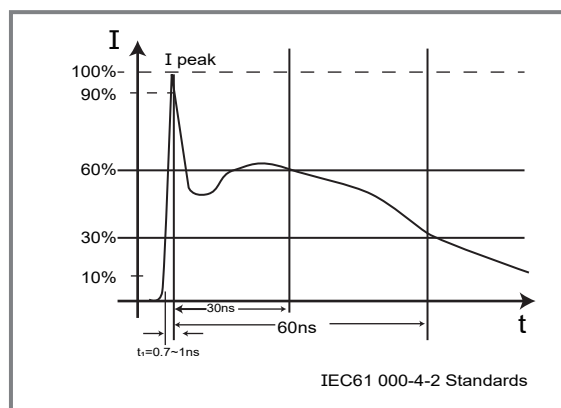


Unit: mm

**Electrical Characteristics @ 25°C Unless Otherwise Specified )**

Part Number	Working Voltage	Typical Capacitance	Peak Current	Clamping Voltage		Maximum ESD IEC61000-4-2
	DC	@ 1kHz	8/20μS	8/20μS		
	Vdc	pF	Ip(MAX)	VC	A	
ESD0402						
ESD0402-5R5E0R2	5.5	0.2	0.05	250	1	Contact Discharge Voltage: 8 KV  Air Gap Discharge Voltage: 15 KV
ESD0402-5R5E0R8	5.5	0.8	0.05	250	1	
ESD0402-5R5E100	5.5	10	1	50	1	
ESD0402-5R5E220	5.5	22	5	45	1	
ESD0402-5R5E500	5.5	50	10	45	1	
ESD0402-5R5E481	5.5	480	20	16	1	
ESD0402-9R0E181	9.0	180	20	30	1	
ESD0402-120E5R0	12	5.0	1	60	1	
ESD0402-120E101	12	100	20	40	1	
ESD0402-120E131	12	130	20	40	1	
ESD0402-140E330	14	33	5	45	1	
ESD0402-140E161	14	160	20	35	1	
ESD0402-180E150	18	15	1	45	1	
ESD0402-240E2R5	24	2.5	1	250	1	
ESD0603						
ESD0603-5R5E100	5.5	10	1	50	1	Contact Discharge Voltage: 8 KV  Air Gap Discharge Voltage: 15 KV
ESD0603-5R5E220	5.5	22	5	45	1	
ESD0603-5R5E500	5.5	50	5	40	1	
ESD0603-140E330	14	33	5	45	1	
ESD0603-180E0R2	18	0.2	0.1	250	1	
ESD0603-180E0R8	18	0.8	0.1	250	1	
ESD0603-180E5R0	18	5	1	60	1	
ESD0603-240E2R5	24	2.5	1	250	1	

## Surge Wave Form



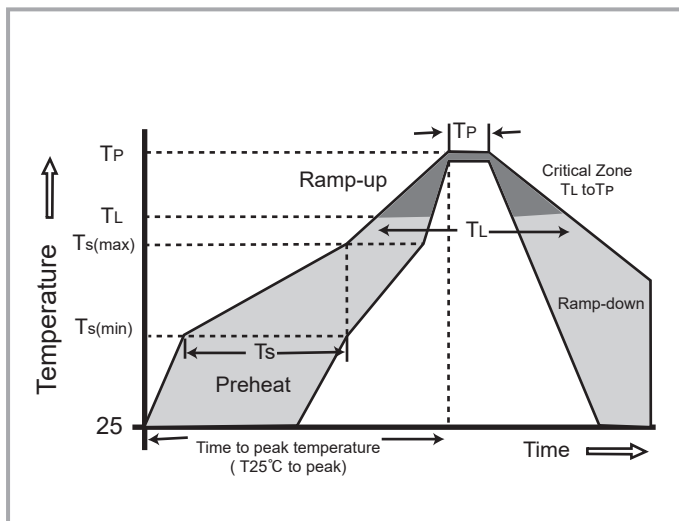
SEVERITY LEVEL	AIRDIRCHARGE	DIRECT ISCHARGE
1	2 kV	2 kV
2	4 kV	4 kV
3	8 kV	6 kV
4	15 kV	8 kV

IEC61000-4-2 Compliant ESD Current Pulse Waveform

## Environmental Reliability Test

Characteristic	Test method and description			
High Temperature Storage	The specimen shall be subjected to 125°C 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°C	30 min±3
		2	RoomTemp	1~2hours
		3	125±2°C	30 min±3
High Temperature Load	After being continuously applied the maximum allowable voltage at 85°C 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%.	4	RoomTemp	1~2hours
Damp Heat Load/ Humidity Load	The specimen should be subjected to 40°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°C, without load for 1000 hours and then stored at room temperature for one two hours. The change of varistor voltage shall be within 10%.			

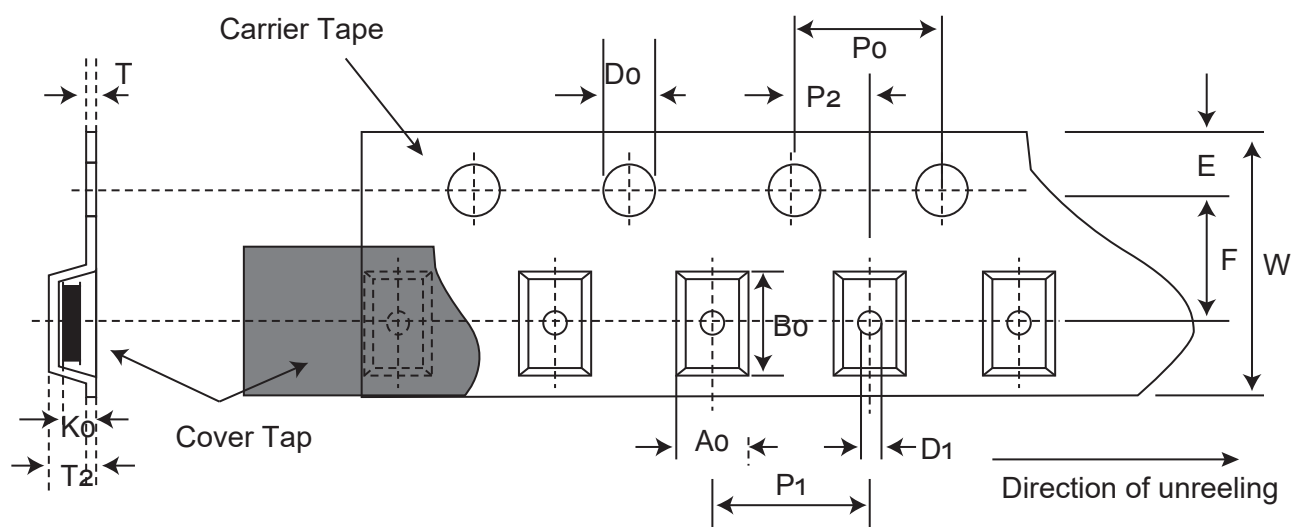
## Soldering Parameters



Reflow Condition		Lead-free assembly
Pre Heat	-Temperature Min (Ts(min))	+150°C
	-Temperature Max (Ts(max))	+200°C
	- Time (min to max) (Ts)	60 -180 Seconds
Average ramp up rate ( Liquidus Temp TL) to peak		3°C/Second max
Ts(max) to TL - Ramp-up Rate		5°C/Second max
Reflow	- Temperature (TL) (Liquidus)	217°C
	- Time (min to max) (Ts)	60 -150 Seconds
Peak Temperature (TP)		260 +0/-5°C
Time within 5°C of actual peak Temperature (TP)		20-40 Seconds
Ramp-down Rate		6°C/Second Max
Time 25°C to peak Temperature (TP)		8 minutes Max
Do not exceed		+280°C

## Reliability Test (Mechanical Ratings)

- ◆ Carrier tape transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape.
- ◆ The adhesion of the heat-sealed cover tape shall be  $40 \pm 20 / -15$  grams.
- ◆ 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	Ao ±0.10	Bo ±0.10	Ko ±0.10	T ±0.05	T2 ±0.05	Do +0.10 -0.00	D1 ±0.05	P1 ±0.10	P2 ±0.05	Po ±0.05	W ±0.20	E ±0.10	F ±0.05
1005	1.08	1.88	1.04	0.22	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1608	1.08	1.88	1.04	0.22	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
2012	1.42	2.30	1.04	0.22	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
3216	1.88	3.50	1.27	0.20	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
3225	2.18	3.46	1.45	0.22	0.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
4532	3.66	4.95	1.74	0.25	0.10	1.50	1.50	8.00	2.00	8.00	12.00	1.75	5.50
5650	5.10	5.97	2.80	0.25	0.10	1.50	1.50	8.00	2.00	8.00	12.00	1.75	5.50

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