MULTILAYER CHIP VARISTOR

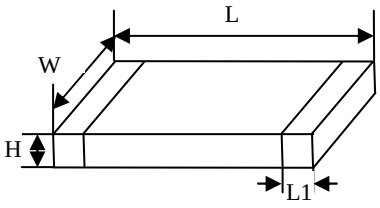
For ESD / Surge Protection

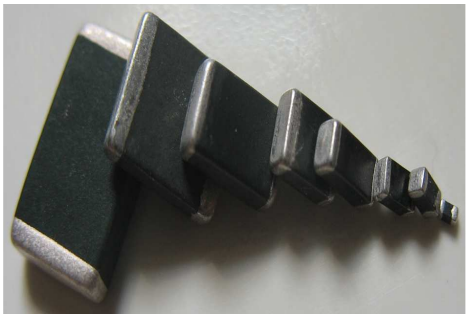
Features

- Series size from 0402 to 2220,08CH
- Working Voltage from 2V to 470V dc
- Low cap design (0.2pf) for fast data transmission
- Fast response time (<0.5ns)
- Low leakage current
- High surge current ability
- Suitable for ESD protection
- Bidirectional clamping, high energy
- Wide Operating temperature range from -55℃-125℃
- Good slderability

Size

Model	1005(0402)	1608(0603)	2012(0805)	3216(1206)	3225(1210)	4532(1812)	5650(2220)	8050/08CH(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	5.60±0.30	8.0±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





ESD Solutions Suppressor Series

MVR 0603 - 5R5 E 0R2

Capacitance value

0R2	0.2pF	2R5	2.5pF	121	120pF

ESD Solutions Suppressor series

Maximum continuous working voltage

5R5	5.5V	240	24V

Chip size

0402(1005)	1.0×0.5mm	0603(1608)	1.6×0.8mm

Series name

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DEVICE RATING AND SPECIFICATIONS

Part Number		Working Voltage	Clamping Voltage	Peak Current	Capacitance	Maximum ESD IEC61000-4-2
		DC	8/20uS 1A	8/20uS	@ 1KHz	
		V_{DC}	V_C(MAX)	Ip	pF	
0402	MVR0402-5R5E0R2	5.5	250	0.05	0.2	Contact Discharge Voltage: 8 KV Air Gap Discharge Voltage: 15 KV
	MVR0402-5R5E0R8	5.5	250	0.05	0.8	
	MVR0402-240E2R5	24	250	1	2.5	
	MVR0402-120E5R0	12	60	1	5	
	MVR0402-5R5E100	5.5	50	1	10	
	MVR0402-180E150	18	45	1	15	
	MVR0402-5R5E220	5.5	45	5	22	
	MVR0402-140E330	14	45	5	33	
	MVR0402-5R5E500	5.5	45	10	50	
	MVR0402-120E101	12	40	20	100	
	MVR0402-120E131	12	40	20	130	
	MVR0402-140E161	14	35	20	160	
	MVR0402-9R0E181	9	30	20	180	
	MVR0402-5R5E481	5.5	16	20	480	
0603	MVR0603-180E0R2	18	250	0.1	0.2	
	MVR0603-180E0R8	18	250	0.1	0.8	
	MVR0603-240E2R5	24	250	1	2.5	
	MVR0603-180E5R0	18	60	1	5	
	MVR0603-5R5E100	5.5	50	1	10	
	MVR0603-5R5E220	5.5	45	5	22	
	MVR0603-140E330	14	45	5	33	
	MVR0603-5R5E500	5.5	40	5	50	

※ More Working Voltage range 5.5V～30V.

High surge absorption series

MVR 1206 - 270 G

- G → High surge absorption series
- 270 → Varistor voltage(Breakdown voltage)

8R0	8V	270	27V	391	390V

- 1206 → Chip size

0603(1608)	1.6×0.8mm	08CH/3220(8050)	8.0×5.0mm
1206(3216)	3.2×1.6mm		

- MVR → Series name

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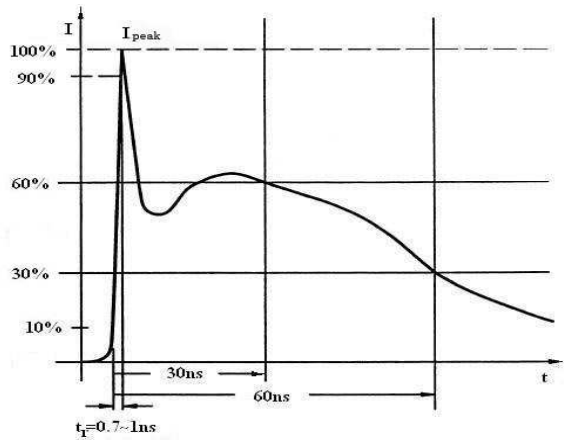
DEVICE RATING AND SPECIFICATIONS

Part Number								Working Voltage		Breakdown Voltage		Peak Current	Clamping Voltage	
								AC	DC	@ 1mA DC		8/20uS	8/20uS	
								V_{RMS}	V_{DC}	V_B		Ip(MAX)	V_C	A
0603							MVR****-3R3G	1.4	2	3.3	2.6～4.0	0603 10A～30A	9	1
	0805	1206					MVR****-5R0G	2.4	3.3	5	4.0～6.0		12	1
							MVR****-8R0G	4	5.5	8	6.6～9.9		14	1
							MVR****-120G	7	9	12	10～14.0		24	1
			1210	1812	2220		MVR****-180G	11	14	18	16～20.0		30	1～10
							MVR****-210G	12	16	21	19～23		35	1～10
							MVR****-240G	14	18	24	22～27		38	1～10
							MVR****-270G	17	22	27	24～30		42	1～10
							MVR****-300G	19	24	30	27～33	0805 60A～100A	47	1～10
							MVR****-330G	20	26	33	29～36		54	1～10
							MVR****-370G	21	27	37	33～40.5		60	1～10
						3220	MVR****-390G	24	30	39	35～42		65	1～10
							MVR****-470G	28	36	47	42～52.5	1206 80A～150A	77	1～10
							MVR****-530G	30	42	53	47～58.5		85	1～10
							MVR****-560G	35	45	56	51～62		90	1～10
							MVR****-600G	36	47	60	53～66		98	1～10
							MVR****-680G	40	56	68	61～75	1210 250A～500A	110	1～10
							MVR****-760G	45	60	76	68～84		120	1～10
							MVR****-820G	50	65	82	74～92		135	1～10
							MVR****-900G	52	68	90	80～100		150	1～10
							MVR****-101G	60	85	100	90～110	1812 400A～800A	165	2.5～10
							MVR****-121G	75	100	120	108～132		200	2.5～10
							MVR****-151G	95	125	150	135～165		250	2.5～10
							MVR****-181G	115	150	180	162～198		300	5～10
							MVR****-201G	130	170	205	184.5～225.5	2220 1000A～2000A	340	5～10
							MVR****-221G	140	180	220	198～242		360	5～10
							MVR****-241G	150	200	240	216～264		395	5～10
							MVR****-271G	175	225	270	243～297		455	5～10
							MVR****-361G	230	300	360	324～396	3220(08CH) 500A～800A	595	5～10
							MVR****-391G	250	320	390	351～429		650	5～10
							MVR****-431G	275	350	430	387～473		710	5～10
							MVR****-471G	300	385	470	423～517		775	5～10

※ **** means 0603～3220(08CH)

ESD Wave Form

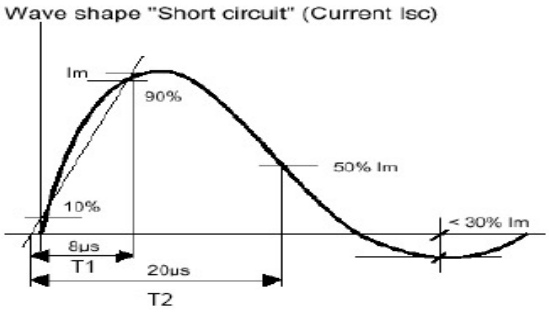


SEVERITY LEVEL	AIRDIRCHARGE	DIRECT ISCHARGE
1	2 kV	2 kV
2	4 kV	4 kV
3	8 kV	6 kV
4	15 kV	8 kV

IEC61000-4-2 Compliant ESD Current Pulse Waveform

IEC61000-4-2 Standards

Surge Wave Form



SEVERITY LEVEL	T1	T2
1	8 µS	20 µS

IEC61000-4-5 Standards

Enviromental 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 85℃ 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%.			

7.Soldering Recommendation

The principal techniques used for the soldering of components in surface mount technology are infrared reflow and wave soldering.

7.1 wave Soldering

When wave soldering. The MLCV is attach to the circuit board by means of an adhesive. The assembly is then place on a conveyor and run though the soldering process to contact the wave. Wave soldering is the most strenuous of the processes. To avoid the possibility of generating stresses due to thermal shock., a preheat stage in the soldering process is recommended, and the peak temperature of the solder process should be rigidly controlled. The following is the typical profiles.

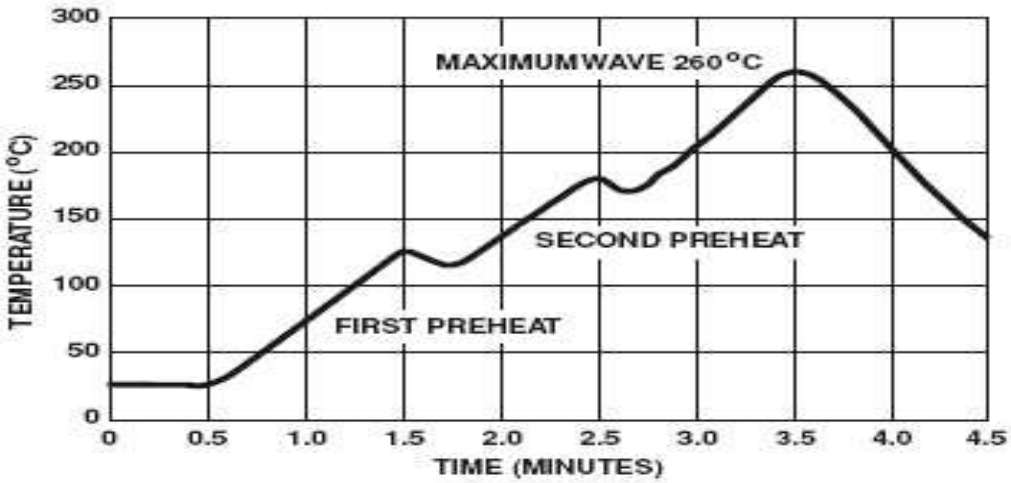


FIGURE 6. WAVE SOLDER PROFILE

7.2 Reflow Soldering

When reflow soldering, the device is placed a solder paste on the substrate ,as the solder paste is heated, it re-flows and solders the unite to board. When using a reflow process ,care should be taken to ensure that the MLCV is not subjected to an thermal gradient steeper than 4 degrees per second; the ideal gradient being 2degrees per second. During the soldering process, preheating to within 100 degrees of the soldier's peak temperature is essential to minimize thermal shock. The following is typical profile.

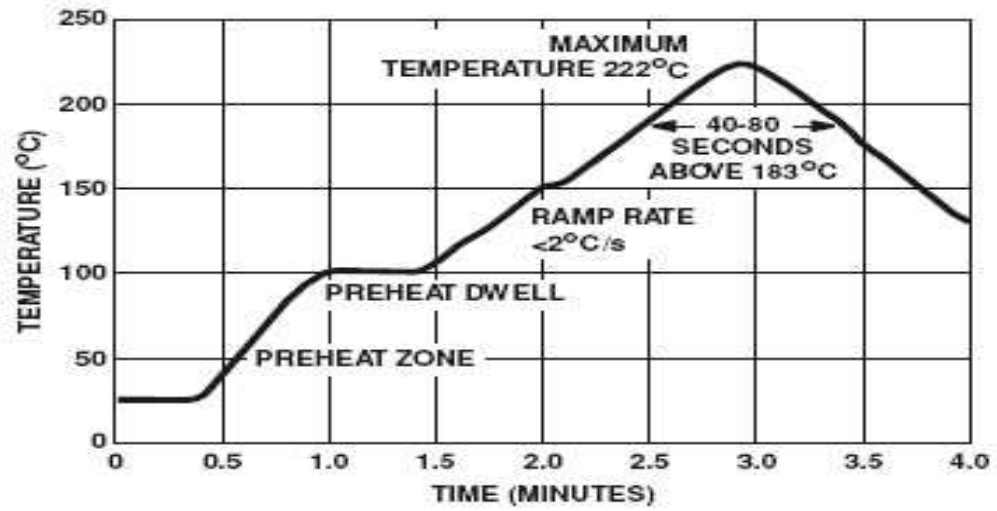


FIGURE 5. REFLOW SOLDER PROFILE

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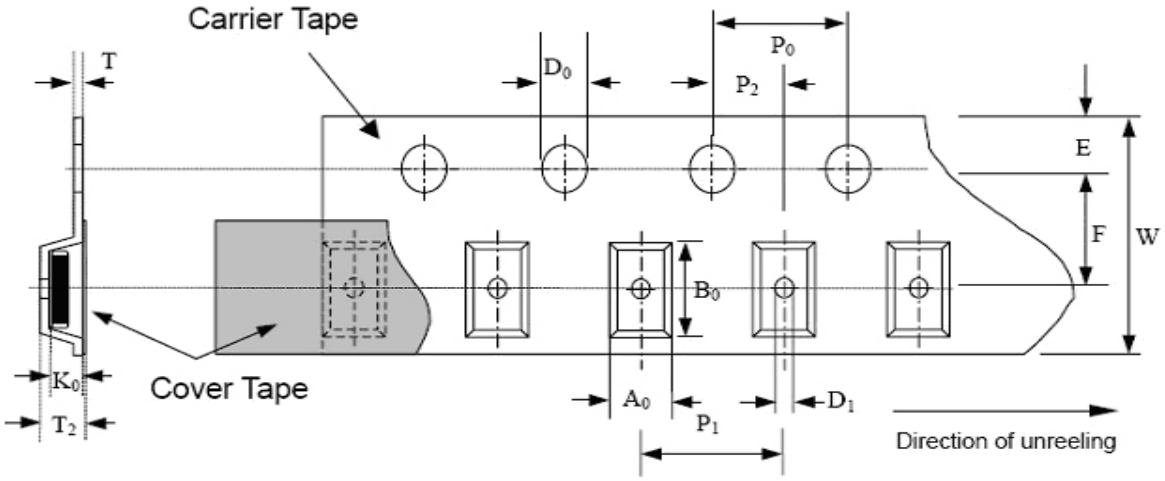
8 Packaging Specification

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.

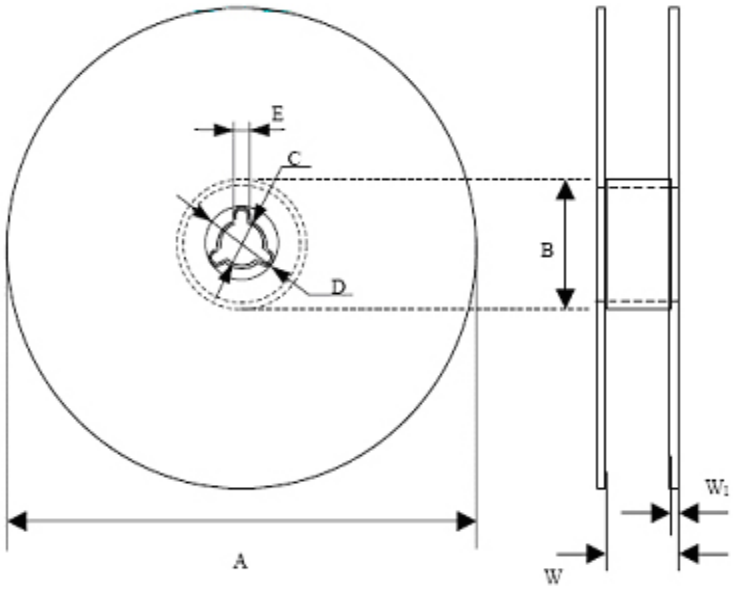
8.2 The adhesion of the heat-sealed cover tape shall be 40 + 20/ - 15 grams.

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 -0.00	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
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	4.00	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	4.00	12.00	1.75	5.50

9. reel dimension



type	A	B	C	D	E	W	W_1
1005	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
1608	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
2012	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
3216	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
3225	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
4532	178.0±1.0	60.0±0.5	13.5±0.1	21.0±0.2	2.0±0.5	13.6±0.2	1.5±0.15
5650	178.0±1.0	60.0±0.5	13.5±0.1	21.0±0.2	2.0±0.5	13.6±0.2	1.5±0.15

type		1005	1608	2012		3216	3225	4520	4532	5650
quantity	paper	10000	4000	4000	-	-	-	-	-	-
	plastic	-	-	-	3000	3000	3000	3000	3000	1000
Minimum ordering		-	4000	4000	3000	3000	3000	3000	3000	1000

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