Part Numbering

MV 0402 C 050 T 100

MV Multilayer Varistor

Chip Size

Performance Designator
S Surge Protection
E ESD Protection(series 1)
C ESD & EMI Protection(series 2)

Working Voltage
050= 5.0 X 10^0= 5VDC

Packaging
T- Tape on reel
B- Bulk

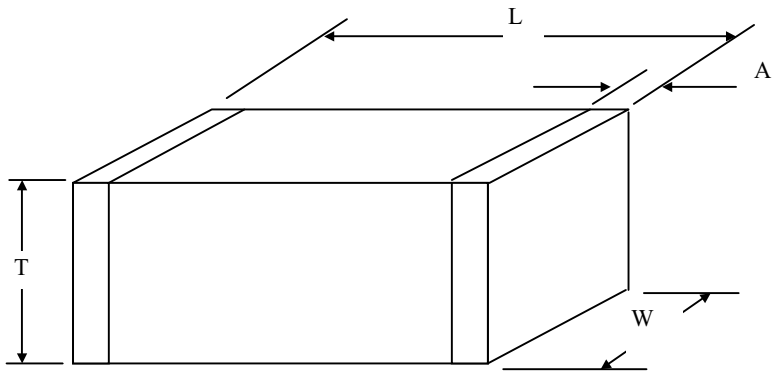
Typical Capacitance
100= 10X 10^0= 10 pF

External Dimension

Chip Dimension

inch(mm)

Chip Size	L	W	T	A
	Tolerance	Tolerance	max	min - max
0402 (1005)	0.039±0.004 (1.0±0.1)	0.02±0.004 (0.5±0.1)	0.024 (0.6)	0.004-0.016 (0.1-0.4)
0603 (1608)	0.063±0.006 (1.6±0.15)	0.031±0.006 (0.8±0.15)	0.035 (0.9)	0.008-0.02 (0.2-0.5)
0805 (2012)	0.079±0.008 (2.0±0.2)	0.049±0.008 (1.25±0.2)	0.04 (1.02)	0.008-0.028 (0.2-0.71)
1206 (3216)	0.126±0.008 (3.2±0.2)	0.063±0.008 (1.6±0.2)	0.071 (1.8)	0.008-0.031 (0.2-0.8)
1210 (3225)	0.126±0.008 (3.2±0.2)	0.098±0.008 (2.5±0.2)	0.071 (1.8)	0.008-0.031 (0.2-0.8)



ELECTRICAL CHARACTERISTICS

C Series

Part No.	Working Voltage (Vw)	Clamping Voltage (Vc)	ESD Withstanding	ESD Voltage	Capacitance (C)		Capacitance Tolerance
	Volt	Volt	Times	KV 2)E	pF		%
	<15 μA	1A,8/20 μs	15KV 1)		1KHz	1MHz	
C-Series : 0402							
MV0402C050T4R7	5.0	34.0	> 1000	± 30	-	4.7	-20% ~ +80%
MV0402C050T100	5.0	34.0	> 1000	± 30	-	10	±20%
MV0402C050T120	5.0	34.0	> 1000	± 30	-	12	±20%
MV0402C050T150	5.0	32.0	> 1000	± 30	-	15	±20%
MV0402C050T180	5.0	32.0	> 1000	± 30	-	18	±20%
MV0402C050T220	5.0	30.0	> 1000	± 30	-	22	±20%
MV0402C050T270	5.0	30.0	> 1000	± 30	-	27	±20%
MV0402C050T330	5.0	28.0	> 1000	± 30	-	33	±20%
MV0402C050T390	5.0	28.0	> 1000	± 30	-	39	±20%
MV0402C050T470	5.0	26.0	> 1000	± 30	-	47	±20%
MV0402C050T560	5.0	26.0	> 1000	± 30	-	56	±20%
MV0402C050T680	5.0	25.0	> 1000	± 30	-	68	±20%
MV0402C050T820	5.0	25.0	> 1000	± 30	-	82	±20%
MV0402C050T101	5.0	23.0	> 1000	± 30	100	-	±20%
MV0402C050T121	5.0	23.0	> 1000	± 30	120	-	±20%
MV0402C050T151	5.0	22.0	> 1000	± 30	150	-	±20%
MV0402C050T181	5.0	22.0	> 1000	± 30	180	-	±20%
MV0402C050T221	5.0	20.0	> 1000	± 30	220	-	±20%
MV0402C050T271	5.0	20.0	> 1000	± 30	270	-	±20%
MV0402C050T331	5.0	19.0	> 1000	± 30	330	-	±20%
MV0402C120T4R7	12.0	80.0	> 1000	± 30	-	4.7	-20% ~ +80%
MV0402C120T100	12.0	60.0	> 1000	± 30	-	10	±20%
MV0402C120T220	12.0	40.0	> 1000	± 30	-	22	±20%
MV0402C120T330	12.0	40.0	> 1000	± 30	-	33	±20%
MV0402C120T560	12.0	39.0	> 1000	± 30	-	56	±20%
MV0402C120T820	12.0	34.0	> 1000	± 30	-	82	±20%
MV0402C120T101	12.0	34.0	> 1000	± 30	100	-	±20%
C-Series : 0603							
MV0603C050T4R7	5.0	34.0	> 1000	± 30	-	4.7	-20% ~ +80%
MV0603C050T100	5.0	34.0	> 1000	± 30	-	10	±20%
MV0603C050T120	5.0	34.0	> 1000	± 30	-	12	±20%
MV0603C050T150	5.0	32.0	> 1000	± 30	-	15	±20%
MV0603C050T180	5.0	32.0	> 1000	± 30	-	18	±20%
MV0603C050T220	5.0	30.0	> 1000	± 30	-	22	±20%
MV0603C050T270	5.0	29.0	> 1000	± 30	-	27	±20%
MV0603C050T330	5.0	28.0	> 1000	± 30	-	33	±20%

ELECTRICAL CHARACTERISTICS

C Series

Part No.	Working Voltage (Vw)	Clamping Voltage (Vc)	ESD Withstanding	ESD Voltage	Capacitance (C)		Capacitance Tolerance
	Volt	Volt	Times	KV 2)E	pF		%
	<15 μA	1A,8/20 μs	15KV 1)		1KHz	1MHz	
C-Series : 0603							
MV0603C050T390	5.0	28.0	> 1000	± 30	-	39	±20%
MV0603C050T470	5.0	26.0	> 1000	± 30	-	47	±20%
MV0603C050T560	5.0	26.0	> 1000	± 30	-	56	±20%
MV0603C050T680	5.0	25.0	> 1000	± 30	-	68	±20%
MV0603C050T820	5.0	25.0	> 1000	± 30	-	82	±20%
MV0603C050T101	5.0	23.0	> 1000	± 30	100	-	±20%
MV0603C050T151	5.0	22.0	> 1000	± 30	150	-	±20%
MV0603C050T181	5.0	22.0	> 1000	± 30	180	-	±20%
MV0603C050T221	5.0	20.0	> 1000	± 30	220	-	±20%
MV0603C050T271	5.0	20.0	> 1000	± 30	270	-	±20%
MV0603C050T331	5.0	19.0	> 1000	± 30	330	-	±20%
MV0603C050T391	5.0	19.0	> 1000	± 30	390	-	±20%
MV0603C050T471	5.0	19.0	> 1000	± 30	470	-	±20%
MV0603C050T102	5.0	16.0	> 1000	± 30	1000	-	±20%
MV0603C120T4R7	12.0	80.0	> 1000	± 30	-	4.7	-20% ~ +80%
MV0603C120T100	12.0	60.0	> 1000	± 30	-	10	±20%
MV0603C120T150	12.0	52.0	> 1000	± 30	-	15	±20%
MV0603C120T220	12.0	40.0	> 1000	± 30	-	22	±20%
MV0603C120T330	12.0	40.0	> 1000	± 30	-	33	±20%
MV0603C120T390	12.0	39.0	> 1000	± 30	-	39	±20%
MV0603C120T470	12.0	39.0	> 1000	± 30	-	47	±20%
MV0603C120T560	12.0	39.0	> 1000	± 30	-	56	±20%
MV0603C120T820	12.0	34.0	> 1000	± 30	-	82	±20%
MV0603C120T101	12.0	34.0	> 1000	± 30	100	-	±20%
MV0603C120T151	12.0	34.0	> 1000	± 30	150	-	±20%
MV0603C120T181	12.0	31.0	> 1000	± 30	180	-	±20%
MV0603C120T331	12.0	30.0	> 1000	± 30	330	-	±20%

Vw- The max. steady state DC operating voltage of which varistor could maintain also not exceeding 15uA leakage current.

Vc - The max. peak voltage acrossed the varistor measured at a specified pulse current and waveform.

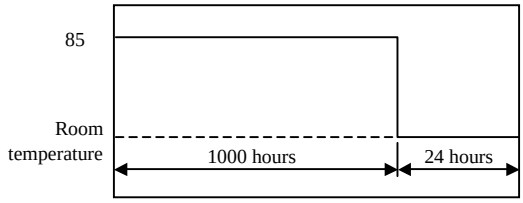
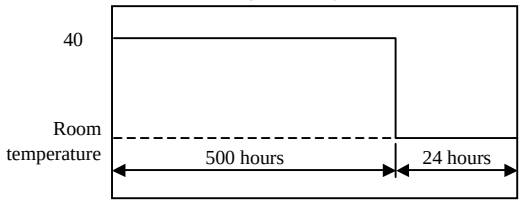
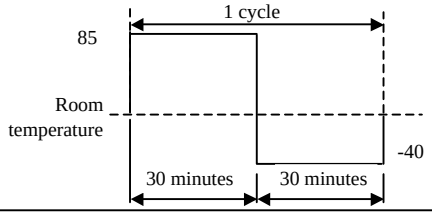
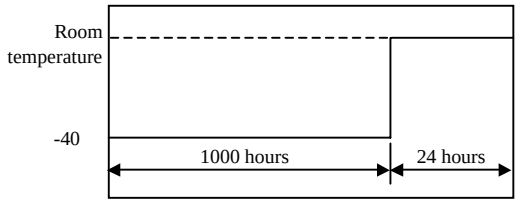
1). In system ESD withstanding pulse per IEC 61000-4-2,15KV, contact discharge method.

2). In system ESD withstanding voltage per IEC 61000-4-2,15KV, design and method guarantee thisproperty.

C - The device capacitance measured with 1.0Vrms and 1KHz / 1 MHz.

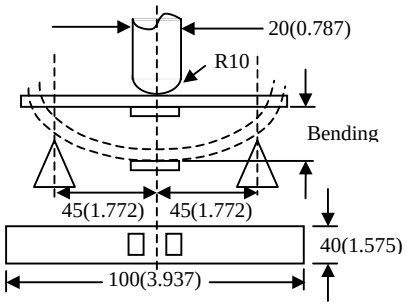
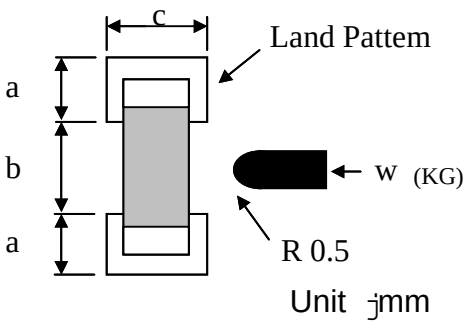
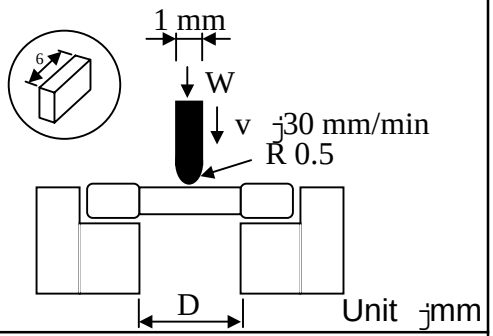
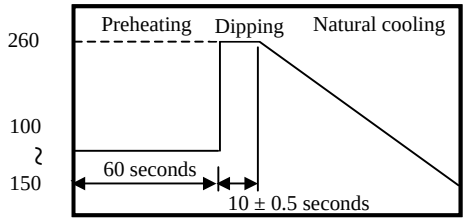
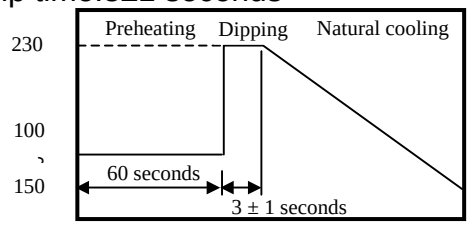
MLV Storage condition → Temperature: ≦ 30'C/Humidity: ≦ 60% RH (Moisture Sensitivity Levels: 2a)
MLV Preservation period → 6 months.

RELIABILITY TEST

Item	Performance	Test condition
Heat load resistance	Appearance:ceramic chip shall not be damaged. Vb:Within±10% of the initial value	Temperature: 85±2 Testing time:1000hours Load Voltage:Working voltage Measurement : After placing for 24 hours min. 
Humidity resistance	Appearance:ceramic chip shall not be damaged. Vb:Within±10% of the initial value	Humidiy:90 to 95% RH Temperature: 40±2 Testing time:500hours Measurement : After placing for 24 hours min. 
Thermal shock	Appearance:Cracking,chipping or any other defects harmful to the characteristics shall not be allowed Vb:Within±10% of the initial value	Temperature: -40,+85 ,Kept stabilized for 30 minutes each Cycle:100 cycles Measurement : After placing for 24 hours min. 
Low temperature resistance	Appearance:Cracking,chipping or any other defects harmful to the characteristics shall not be allowed Vb:Within±10% of the initial value	Temperature: -40±2 Testing time:1000hours Measurement:After placing for 24 hours min. 
ESD test (Only for E-type)	Appearance:ceramic chip shall not be damaged. Vb:Within±10% of the initial value	Discharge:Air discharge Voltage:15KV Polarity: ¬, Number:10 times in 10 seconds.
ESD life (Only for E-type)	Appearance:ceramic chip shall not be damaged. Vb:Within±10% of the initial value	Discharge:Contact discharge Voltage:8KV Polarity: ¬, Number:10000 times in 10 seconds.

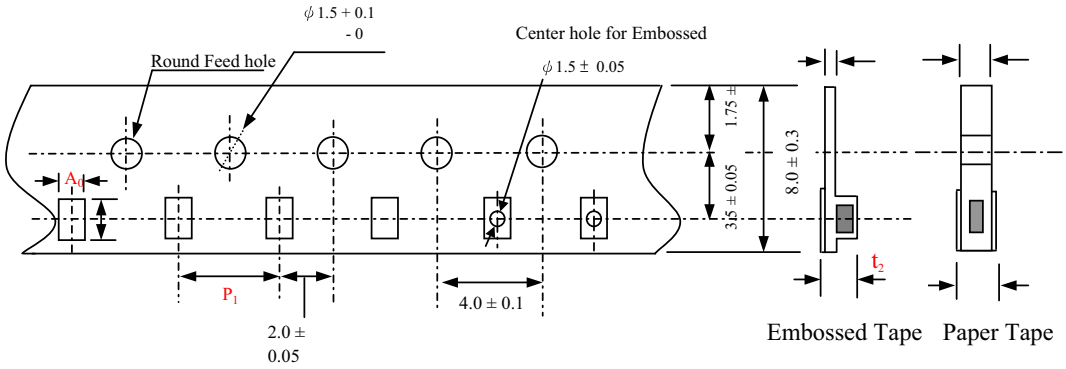
MECHANICAL TEST

041210

<table>
<tr><th>Item</th><th>Performance</th><th>Test condition</th></tr>
<tr><td>Board flexure strength</td><td>No mechanical damage shall be noticed even when the board is bent 2mm (0.079inches)</td><td>Solder a chip on a test substrate.
Bend the substrat by 2mm(0.079in)
 
</td></tr>
<tr><td>Flexure strength</td><td>The terminal electrode and chip body must not be damaged by the forces applied.
<table>
<tr><td>SIZE</td><td>0402</td><td>0603</td><td>0805</td><td>1206</td></tr>
<tr><td>a</td><td>-</td><td>1.0</td><td>1.0</td><td>1.3</td></tr>
<tr><td>b</td><td>-</td><td>0.8</td><td>1.0</td><td>1.5</td></tr>
<tr><td>c</td><td>-</td><td>1.3</td><td>1.3</td><td>3.0</td></tr>
<tr><td>w</td><td>-</td><td>1.0</td><td>4.0</td><td>5.0</td></tr>
</table></td><td> 
</td></tr>
<tr><td>Bending strength</td><td>The ceramic ship shall not be damaged be the forces applied under the following conditions.
<table>
<tr><td>TYPE</td><td>D(mm)</td><td>W(kg)</td></tr>
<tr><td>0402</td><td>-</td><td>-</td></tr>
<tr><td>0603</td><td>1.3</td><td>2.0</td></tr>
<tr><td>0805</td><td>1.3</td><td>3.0</td></tr>
<tr><td>1206</td><td>2.0</td><td>4.0</td></tr>
</table></td><td> 
</td></tr>
<tr><td>Resistance to solder heat</td><td>The ceramic chip shall not be damaged.
Shall be covered with solder.
Vb: Within ±10% of the initial value.</td><td>Preheat:100 ~150 ,60seconds
Solder temperature:260±10
Flux:Rosin
Dip time:10±0.5 seconds
 
</td></tr>
<tr><td>Solderability</td><td>More than 90% of terminal electrode shall be covered with solder.</td><td>Preheat:100 ~150 ,60seconds
Solder temperature:230±10
Flux:Rosin
Dip time:3±1 seconds
 
</td></tr>
</table>

Packaging Specifications

Carrier Tape Specifications

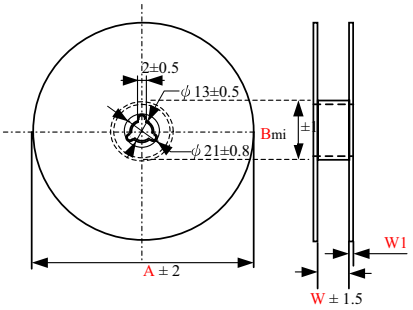


Dimensions of Embossed Tape

Size	A0±0.1 (mm)	B0±0.1 (mm)	P1±0.1 (mm)	t1 / t2 (mm)	t3 / t4 (mm)	Quantity / Rell(Pcs)	
						Paper Tape	Embossed Tape
0402	0.62	1.10	2	-	1.0 max / 1.1 max	10000	-
0603	1.14	1.90	4	-	1.0 max / 1.1 max	4000	-
0805	1.50	2.30	4	0.6 max / 2.0 max	1.0 max / 1.1 max	4000	4000
1206	1.77	3.40	4	0.6 max / 2.9 max	-	-	3000
1210	3.20	3.60	4	0.6 max / 2.9 max	-	-	2000

A_0	Width of Cavity	t_1	Embossed Tape Thickness	t_3	Paper Tape for Width
B_0	Length of Cavity	t_2	Hieght of Embossed Tape	t_4	Paper Tape Bottom Width
P_1	Pitch				

Reel Specifications



Dimensions mm

Size	A	B	W	W1
0402	178	50	10	1.6
0603	178	50	10	1.6
0805	178	50	10	1.6
1206	178	50	10	1.6

Reflow soldering temperature profile