For ESD protection - C series

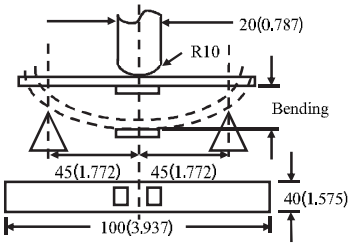
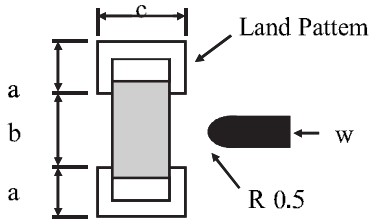
Part No.	Working Voltage (Vw)	Clamping Voltage (Vc)	ESD Withstanding	Capacitance (C)		Capacitance Tolerance
	Volts	Volts	Times	pF		%
	<15μA	1A,8/20μs	8KV*	1KHz	1MHz	
0402						
JMV0402C050T4R7	5.0	50.0	> 1000	-	4.7	-20%~+80%
JMV0402C050T100	5.0	50.0	> 1000	-	10	± 20%
JMV0402C050T120	5.0	50.0	> 1000	-	12	± 20%
JMV0402C050T150	5.0	50.0	> 1000	-	15	± 20%
JMV0402C050T180	5.0	50.0	> 1000	-	18	± 20%
JMV0402C050T220	5.0	50.0	> 1000	-	22	± 20%
JMV0402C050T270	5.0	50.0	> 1000	-	27	± 20%
JMV0402C050T330	5.0	50.0	> 1000	-	33	± 20%
JMV0402C050T390	5.0	50.0	> 1000	-	39	± 20%
JMV0402C050T470	5.0	50.0	> 1000	-	47	± 20%
JMV0402C050T560	5.0	50.0	> 1000	-	56	± 20%
JMV0402C050T680	5.0	50.0	> 1000	-	68	± 20%
JMV0402C050T820	5.0	50.0	> 1000	-	82	± 20%
JMV0402C050T101	5.0	30.0	> 1000	100	-	± 20%
JMV0402C050T121	5.0	30.0	> 1000	120	-	± 20%
JMV0402C050T151	5.0	29.0	> 1000	150	-	± 20%
JMV0402C050T181	5.0	29.0	> 1000	180	-	± 20%
JMV0402C050T221	5.0	27.0	> 1000	220	-	± 20%
JMV0402C050T271	5.0	27.0	> 1000	270	-	± 20%
JMV0402C050T331	5.0	26.0	> 1000	330	-	± 20%
JMV0402C120T4R7	12.0	80.0	> 1000	-	4.7	-20%~+80%
JMV0402C120T100	12.0	60.0	> 1000	-	10	± 20%
JMV0402C120T120	12.0	60.0	> 1000	-	12	± 20%
JMV0402C120T220	12.0	50.0	> 1000	-	22	± 20%
JMV0402C120T330	12.0	50.0	> 1000	-	33	± 20%
JMV0402C120T470	12.0	50.0	> 1000	-	47	± 20%
JMV0402C120T560	12.0	50.0	> 1000	-	56	± 20%
JMV0402C120T820	12.0	50.0	> 1000	-	82	± 20%
JMV0402C120T101	12.0	50.0	> 1000	100	-	± 20%
JMV0402C240T3R3	24.0	200.0	> 1000	-	3.3	-20%~+80%
JMV0402C240T4R7	24.0	130.0	> 1000	-	4.7	-20%~+80%

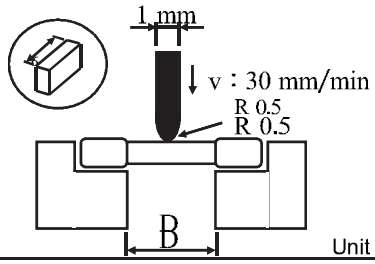
Part No.	Working Voltage (Vw)	Clamping Voltage (Vc)	ESD Withstanding	Capacitance (C)		Capacitance Tolerance
	Volts	Volts	Times	pF		%
	<15 μ A	1A,8/20 μ s	8KV*	1KHz	1MHz	
0603						
JMV0603C050T4R7	5.0	50.0	> 1000	-	4.7	-20% ~ +80%
JMV0603C050T100	5.0	50.0	> 1000	-	10	± 20%
JMV0603C050T120	5.0	50.0	> 1000	-	12	± 20%
JMV0603C050T150	5.0	50.0	> 1000	-	15	± 20%
JMV0603C050T180	5.0	50.0	> 1000	-	18	± 20%
JMV0603C050T220	5.0	50.0	> 1000	-	22	± 20%
JMV0603C050T270	5.0	50.0	> 1000	-	27	± 20%
JMV0603C050T330	5.0	50.0	> 1000	-	33	± 20%
JMV0603C050T390	5.0	50.0	> 1000	-	39	± 20%
JMV0603C050T470	5.0	50.0	> 1000	-	47	± 20%
JMV0603C050T560	5.0	50.0	> 1000	-	56	± 20%
JMV0603C050T680	5.0	50.0	> 1000	-	68	± 20%
JMV0603C050T820	5.0	50.0	> 1000	-	82	± 20%
JMV0603C050T101	5.0	30.0	> 1000	100	-	± 20%
JMV0603C050T151	5.0	29.0	> 1000	150	-	± 20%
JMV0603C050T181	5.0	29.0	> 1000	180	-	± 20%
JMV0603C050T221	5.0	27.0	> 1000	220	-	± 20%
JMV0603C050T271	5.0	27.0	> 1000	270	-	± 20%
JMV0603C050T331	5.0	26.0	> 1000	330	-	± 20%
JMV0603C050T391	5.0	26.0	> 1000	390	-	± 20%
JMV0603C050T471	5.0	26.0	> 1000	470	-	± 20%
JMV0603C050T102	5.0	23.0	> 1000	1000	-	± 20%
JMV0603C120T4R7	12.0	80.0	> 1000	-	4.7	-20% ~ +80%
JMV0603C120T100	12.0	60.0	> 1000	-	10	± 20%
JMV0603C120T150	12.0	50.0	> 1000	-	15	± 20%
JMV0603C120T220	12.0	50.0	> 1000	-	22	± 20%
JMV0603C120T330	12.0	50.0	> 1000	-	33	± 20%
JMV0603C120T390	12.0	50.0	> 1000	-	39	± 20%
JMV0603C120T470	12.0	50.0	> 1000	-	47	± 20%
JMV0603C120T560	12.0	50.0	> 1000	-	56	± 20%
JMV0603C120T820	12.0	50.0	> 1000	-	82	± 20%
JMV0603C120T101	12.0	50.0	> 1000	100	-	± 20%
JMV0603C120T151	12.0	50.0	> 1000	150	-	± 20%
JMV0603C120T181	12.0	47.0	> 1000	180	-	± 20%
JMV0603C120T331	12.0	46.0	> 1000	330	-	± 20%
JMV0603C240T3R3	24.0	200.0	> 1000	-	3.3	-20% ~ +80%

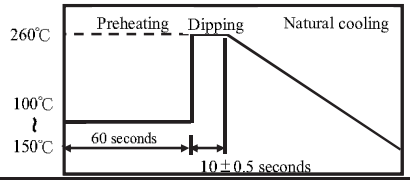
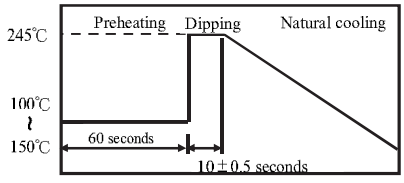
* - In system ESD withstanding pulse per IEC 61000-4-2 , 8KV , contact discharge method.
Vw - The max. steady state DC operating voltage of which varistor could maintain also not exceeding 15μA leakage current.
Vc - The peak voltage acrossed the varistor measured at a specified pulse current and waveform.
C - The device capacitance measured with 1.0 Vrms and 1KHz / 0.5 Vrms and 1MHz.
*Any special design or request is welcomed. Please contact our e-mail address : sales@joyin.com.tw

JOYIN CO., LTD.
Metal Oxide Varistor

■Reliability-Multilayer Chip Varistor

<table>
<tr><th>Test description</th><th>Standard</th><th>Performance</th><th>Test condition</th></tr>
<tr><td>Board flexure strength</td><td>IEC60068-2-21</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>Specification Standard</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><td>1210</td><td>1812</td><td>2220</td></tr>
<tr><td>a</td><td>-</td><td>1.0</td><td>1.0</td><td>1.3</td><td>1.3</td><td>1.5</td><td>1.8</td></tr>
<tr><td>b</td><td>-</td><td>0.8</td><td>1.0</td><td>1.5</td><td>1.5</td><td>3.6</td><td>4.6</td></tr>
<tr><td>c</td><td>-</td><td>1.3</td><td>1.3</td><td>3.0</td><td>3.0</td><td>3.8</td><td>5.8</td></tr>
<tr><td>w(kgf)</td><td>-</td><td>1.0</td><td>4.0</td><td>5.0</td><td>5.0</td><td>5.0</td><td>5.0</td></tr>
</table></td><td> 

Unit : mm</td></tr>
<tr><td>Bending strength</td><td>IEC60068-2-21</td><td>The ceramic chip shall not be damaged be the forces applied under the following conditions.
<table>
<tr><td>TYPE</td><td>0402</td><td>0603</td><td>0805</td><td>1206</td><td>1210</td><td>1812</td><td>2220</td></tr>
<tr><td>D(mm)</td><td>-</td><td>1.3</td><td>1.3</td><td>2.0</td><td>2.0</td><td>3.8</td><td>4.8</td></tr>
<tr><td>W(kgf)</td><td>-</td><td>2.0</td><td>3.0</td><td>4.0</td><td>4.0</td><td>5.0</td><td>5.0</td></tr>
</table></td><td> 

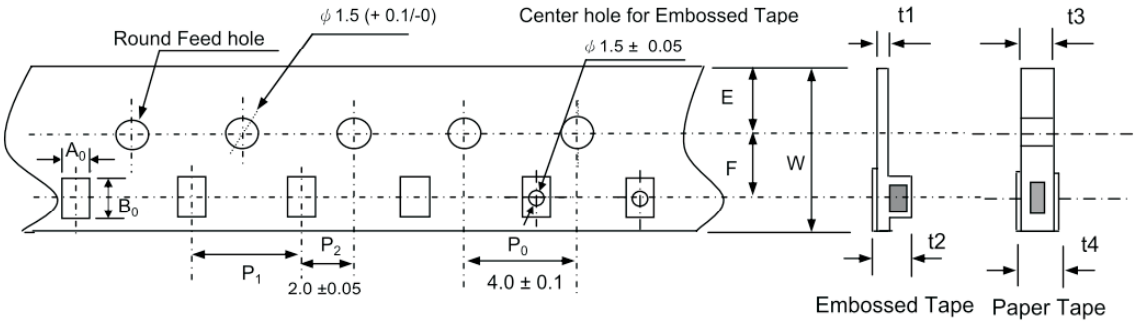
Unit : mm</td></tr>
<tr><td>Resistance to solder heat</td><td>IEC60068-2-20</td><td>The ceramic chip shall not be damaged.
Shall be covered with solder.
Vb: Within ±10% of the initial value.</td><td>Preheat:100℃~150℃,60seconds
Solder temperature:260±5℃
Dip time:10±1 seconds
 
</td></tr>
<tr><td>Solderability</td><td>IEC60068-2-58</td><td>More than 90% of terminal electrode shall be covered with solder.</td><td>Preheat:100℃~150℃,60seconds
Solder temperature:245±3℃
Dip time:3±0.3seconds
 
</td></tr>
</table>

JOYIN CO., LTD.
Metal Oxide Varistor

■Reliability-Multilayer Chip Varistor

Test description	Standard	Performance	Test condition
High temperature Load	IEC61051-1	Appearance:ceramic chip shall not be damaged. Vb:Within±10% of the initial value	Temperature: 85±2℃ Testing time:1000±24hours Load Voltage:Working voltage Measurement : After placing for 24 hours min.
Damp Heat Load, Steady State	IEC60068-2-78	Appearance:ceramic chip shall not be damaged. Vb:Within±10% of the initial value	Humidiy:90 to 95% RH Temperature: 40±2℃ Testing time:500±24 hours at V_{DC} Measurement : After placing for 24 hours min.
Rapid Change of Temperature	IEC61051-1	Appearance:Cracking,chipping or any other defects harmful to the characteristics shall not be allowed Vb:Within±10% of the initial value	Temperature: -40,+125℃,Keeping 30 minutes Cycle:100 cycles Measurement : After placing for 24 hours min.
Low temperature storage	IEC61051-1	Appearance:Cracking,chipping or any other defects harmful to the characteristics shall not be allowed Vb:Within±10% of the initial value	Temperature: -40±5℃ Testing time:1000±24hours Measurement:After placing for 24 hours min.
High temperature storage	IEC61051-1	Appearance:Cracking,chipping or any other defects harmful to the characteristics shall not be allowed Vb:Within±10% of the initial value	Temperature:125±5℃ Testing time:1000±24hours Measurement:After placing for 24 hours min.
Max. Energy	Specification Standard	Appearance:ceramic chip shall not be damaged. Vb:Within±10% of the initial value	10/1000usWaveform, Wmax, 1 surge current
ESD test	IEC61000-4-2	Appearance:ceramic chip shall not be damaged. Vb:Within ±50% of the initial value (For MLV-P/C/E/JES application test only)	Discharge:Air discharge Voltage:15kV Polarity:+,− Number:10 times in 10 seconds. Discharge: Contact discharge Voltage:8kV Polarity:+,− Number:10 times in 10 seconds.

Carrier Tape Specificatons



Dimensions of Embossed Tape

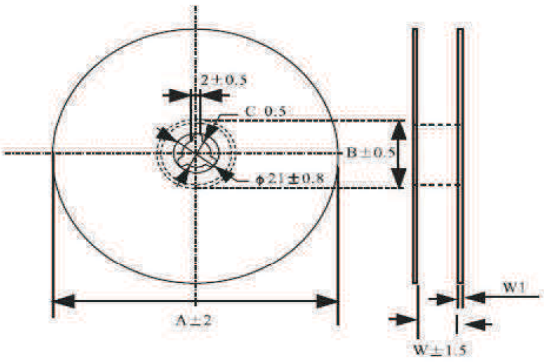
Size	A_0±0.1 (mm)	B_0±0.1 (mm)	P_1±0.1 (mm)	t_1/t_2 (mm)	t_3/t_4 (mm)	Quantity/Reel(Pcs)	
						Paper Tape	Embossed Tape
0402	0.62	1.10	2	—	1.0max/ 1.1max	10000	—
0603	1.08	1.88	4	—	1.0max/ 1.1max	4000	—
0805	1.42	2.30	4	0.6max/2.0max	1.0max/ 1.1max	4000	4000
1206	1.88	3.50	4	0.6max/2.9max	—	—	3000
1210	2.18	3.46	4	0.6max/2.9max	—	—	2000
1812	3.66	4.95	8	0.6max/2.9max	—	—	1000
2220	5.10	5.97	8	0.6max/2.9max	—	—	1000

A_0 : Width of Cavity
B_0 : Length of Cavity
P_1 : Pitch

t_1 : Embossed Tape Thickness
t_2 : Height of Embossed Tape

t_3 : Paper Tape for Width
t_4 : Paper Tape Bottom Width

Reel Specifications



Dimensions mm

Size	A	B	C	W	1W
0402	178	60	13	10	1.6
0603	178	60	13	10	1.6
0805	178	60	13	10	1.6
1206	178	60	13	10	1.6
1210	178	60	13	10	1.6
1812	178	60	13.5	13.6	1.6
2220	178	60	13.5	13.6	1.6