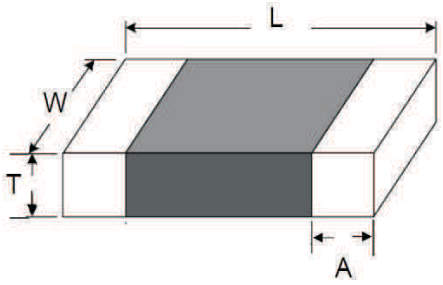
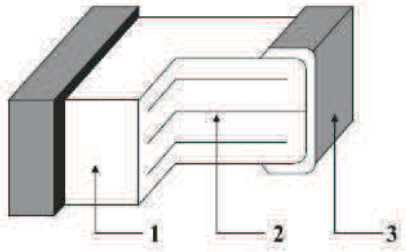
Introduction





Chip Dimensions

inch (mm)

Chip Size	L	W	T	A
0402 (1005)	0.040 ± 0.004 (1.00 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.024 max. (0.6 max)	0.01 ± 0.006 (0.25 ± 0.15)
0603 (1608)	0.063 ± 0.006 (1.60 ± 0.15)	0.031 ± 0.006 (0.80 ± 0.15)	0.035 max. (0.9 max.)	0.014 ± 0.006 (0.35 ± 0.15)
0805 (2012)	0.079 ± 0.008 (2.01 ± 0.20)	0.049 ± 0.008 (1.25 ± 0.20)	0.04 max. (1.02 max.)	0.028 max. (0.71 max.)
1206 (3216)	0.126 ± 0.008 (3.20 ± 0.20)	0.063 ± 0.008 (1.60 ± 0.20)	0.071 max. (1.8 max.)	0.028 max. (0.71 max.)
1210 (3225)	0.126 ± 0.008 (3.20 ± 0.20)	0.098 ± 0.01 (2.50 ± 0.25)	0.071 max. (1.8 max.)	0.028 max. (0.71 max.)
1812 (4532)	0.177 ± 0.016 (4.5 ± 0.40)	0.126 ± 0.016 (3.2 ± 0.40)	0.098 max. (2.5 max.)	0.031 max. (0.8 max.)
2220 (5750)	0.224 ± 0.016 (5.7 ± 0.40)	0.197 ± 0.016 (5.0 ± 0.50)	0.098 max. (2.5 max.)	0.031 max. (0.8 max.)

Chip Structure

Symbol	Materials
1	Zinc Oxide Ceramics
2	Metal Inner Electrodes (Ag / Pd)
3	Metal End Termination (Ag / Ni / Sn)

ORDERING CODE

JMV 0603 S 5R6 T 182

Joyin Multilayer Varistors
久尹積層壓敏電阻系列

Capacitance Value
ex.3R0= 3.0×10^{0}=3pF
331= 33×10^{1}=330pF
182= 18×10^{2}=1800pF

Chip Size
(See Dimension Table)

Packaging
T-Tape on reel

Performance Designator
S: Surge Protection and/or ESD Protection
E: For ESD Protection Only
C: For ESD Protection Only
A: Surge Protection and/or ESD Protection (Sb free)
P: For ESD Protection Only (Sb free)

Working Voltage

Symbol	Voltage	Symbol	Voltage
5R6	5.6V	090	9.0V
140	14V	180	18V
260	26V	300	30V

for ESD / Surge protection - S series

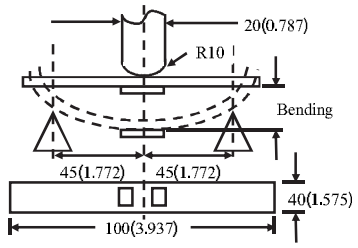
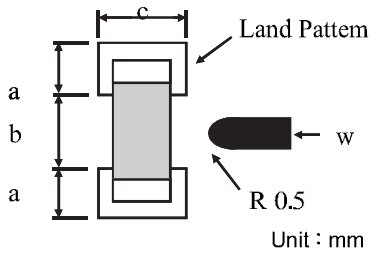
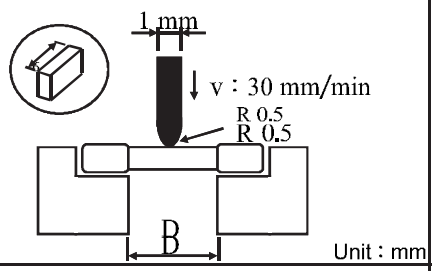
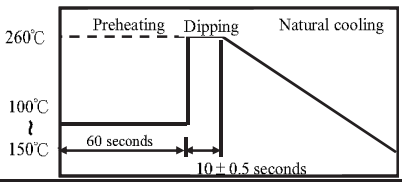
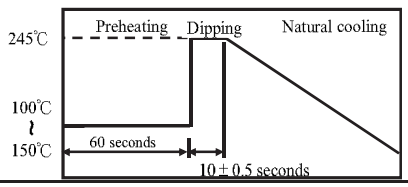
Part No.	Working Voltage (Vw)	Breakdown Voltage (Vb)	Clamping Voltage 8/20 μS		Peak Current (Ip)	Transient Energy (Et)	Typical Capacitance (C)	
	Volt	Volt	Volt	Amp	Amp	Joule	p F	
	< 50 μA	1 mA (DC)	Vc	Ic	8/20 μS	10/1000 μS	1KHz	1MHz
0402								
JMV0402S5R6T301	5.6	7.0~10.0	22.0	1.0	20	0.05	—	300
JMV0402S090T201	9.0	10.0~15.0	32.0	1.0	20	0.05	—	200
JMV0402S140T850	14.0	16.2~19.8	38.0	1.0	20	0.05	—	85
JMV0402S180T550	18.0	21.6~26	45.0	1.0	20	0.05	—	55
0603								
JMV0603S5R6T102	5.6	7.0~10.0	22.0	1.0	30	0.1	1000	—
JMV0603S5R6T351	5.6	7.0~10.0	22.0	1.0	30	0.1	350	—
JMV0603S090T651	9.0	10.0~15.0	30.0	1.0	30	0.1	650	—
JMV0603S090T331	9.0	10.0~15.0	30.0	1.0	30	0.1	330	—
JMV0603S140T451	14.0	16.2~19.8	37.0	1.0	30	0.1	450	—
JMV0603S140T181	14.0	16.2~19.8	37.0	1.0	30	0.1	180	—
JMV0603S180T281	18.0	21.6~26.0	48.0	1.0	30	0.1	280	—
JMV0603S180T111	18.0	21.6~26.0	48.0	1.0	30	0.1	110	—
JMV0603S260T151	26.0	31.0~38.0	62.0	1.0	30	0.1	150	—
JMV0603S260T800	26.0	31.0~38.0	62.0	1.0	30	0.1	80	—
JMV0603S300T101	30.0	37.0~46.0	73.0	1.0	30	0.1	100	—
0805								
JMV0805S5R6T132	5.6	7.0~10.0	22.0	1.0	80	0.1	1300	—
JMV0805S5R6T451	5.6	7.0~10.0	22.0	1.0	40	0.1	450	—
JMV0805S5R6T661	5.6	7.0~10.0	22.0	1.0	40	0.1	660	—
JMV0805S090T781	9.0	10.0~15.0	27.0	1.0	40	0.1	780	—
JMV0805S090T271	9.0	10.0~15.0	27.0	1.0	40	0.1	270	—
JMV0805S120T531	12.0	14.0~18.3	34.0	1.0	40	0.1	530	—
JMV0805S120T431	12.0	14.0~18.3	34.0	1.0	40	0.1	430	—
JMV0805S120T251	12.0	14.0~18.3	34.0	1.0	40	0.1	250	—
JMV0805S140T381	14.0	16.2~19.8	37.0	1.0	40	0.1	380	—
JMV0805S140T201	14.0	16.2~19.8	37.0	1.0	40	0.1	200	—
JMV0805S180T351	18.0	21.6~26.0	48.0	1.0	40	0.1	350	—
JMV0805S180T111	18.0	21.6~26.0	48.0	1.0	40	0.1	110	—
JMV0805S260T161	26.0	31.0~38.0	62.0	1.0	40	0.1	160	—
JMV0805S260T101	26.0	31.0~38.0	62.0	1.0	40	0.1	100	—
JMV0805S300T101	30.0	37.0~46.0	30.0	1.0	40	0.1	100	—
JMV0805S300T311	30.0	37.0~46.0	30.0	1.0	100	0.3	310	—
1206								
JMV1206S5R6T152	5.6	7.0~10.0	22.0	1.0	150	1.0	1500	—
JMV1206S120T801	12.0	14.0~18.3	34.0	1.0	150	0.6	800	—
JMV1206S140T401	14.0	16.2~19.8	37.0	1.0	100	0.3	400	—
JMV1206S140T801	14.0	16.2~19.8	37.0	1.0	200	0.5	800	—
JMV1206S160T132	16.0	19.8~24.2	40.0	1.0	200	1.0	1300	—
JMV1206S180T132	18.0	21.6~26.0	48.0	1.0	200	1.0	1300	—
JMV1206S180T901	18.0	21.6~26.0	48.0	1.0	100	0.3	900	—
JMV1206S260T901	26.0	31.0~38.0	62.0	1.0	200	1.0	900	—
JMV1206S300T201	30.0	37.0~46.0	73.0	1.0	100	0.3	200	—

Part No.	Working Voltage (Vw)	Breakdown Voltage (Vb)	Clamping Voltage 8/20 μS		Peak Current (Ip)	Transient Energy (Et)	Typical Capacitance (C)	
	Volt	Volt	Volt	Amp	Amp	Joule	p F	
	< 50 μA	1 mA (DC)	Vc	Ic	8/20 μS	10/1000 μS	1KHz	1MHz
JMV1206S300T401	30.0	37.0~46.0	73.0	1.0	100	0.3	400	—
JMV1206S300T551	30.0	37.0~46.0	73.0	1.0	200	1.0	550	—
JMV1206S330T551	33.0	39.0~47.0	75.0	1.0	180	1.0	550	—
JMV1206S380T501	38.0	42.3~51.7	88.0	1.0	200	1.1	500	—
JMV1206S450T551	45.0	50.4~61.6	95.0	1.0	180	0.8	550	—
JMV1206S480T251	48.0	55.8~68.2	100.0	1.0	100	0.8	250	—
JMV1206S560T101	56.0	61.0~77.0	120.0	1.0	100	0.3	100	—
JMV1206S560T381	56.0	61.0~77.0	120.0	1.0	180	1.0	380	—
JMV1206S650T241	65.0	73.8~90.2	135.0	1.0	100	0.6	240	—
1210								
JMV1210S5R6T502	5.6	7.0~10.0	22.0	2.5	250	0.4	5000	—
JMV1210S180T202	18.0	21.6~26.0	48.0	2.5	400	1.5	2000	—
JMV1210S220T182	22.0	24.3~29.7	52.0	2.5	400	1.7	1800	—
JMV1210S260T112	26.0	31.0~38.0	62.0	2.5	250	1.2	1100	—
JMV1210S260T152	26.0	31.0~38.0	62.0	2.5	400	1.9	1500	—
JMV1210S300T901	30.0	37.0~46.0	77.0	2.5	250	1.7	900	—
JMV1210S300T122	30.0	37.0~46.0	77.0	2.5	400	1.9	1200	—
JMV1210S450T951	45.0	50.4~61.6	95.0	2.5	250	2.2	950	—
1812								
JMV1812S180T452	18.0	21.6~26.0	48.0	5	800	2.3	4500	—
JMV1812S220T352	22.0	24.3~29.7	52.0	5	500	2.0	3500	—
JMV1812S220T402	22.0	24.3~29.7	52.0	5	800	2.7	4000	—
JMV1812S260T282	26.0	31.0~38.0	65.0	5	500	2.5	2800	—
JMV1812S260T302	26.0	31.0~38.0	65.0	5	800	3.0	3000	—
JMV1812S300T252	30.0	37.0~46.0	78.0	5	800	3.7	2500	—
JMV1812S380T202	38.0	42.3~51.7	88.0	5	800	4.2	2000	—
2220								
JMV2220S5R6T203	5.6	7.0~10.0	19.0	10	1200	1.4	20000	—
JMV2220S180T153	18.0	22.0~27.0	56.0	10	1200	5.8	15000	—
JMV2220S300T502	30.0	37.0~46.0	85.0	10	1200	9.6	5000	—
JMV2220S380T402	38.0	42.3~51.7	88.0	10	1200	12.0	4000	—

Vw - The max. steady state DC operating voltage of which varistor could maintain also not exceeding 50μA leakage current.
Vb - The voltage acrossed the devic measured at 1mA DC current.
Vc - The peak voltage acrossed the varistor measured at a specified pulse current and waveform.
Ip - The max. peak current applied with specified waveform without any possibility of device fail.
Et - The max. energy which dissipated with the specified waveform without any possibility of device fail.
C - The device capacitance measured with zero volt bias , 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

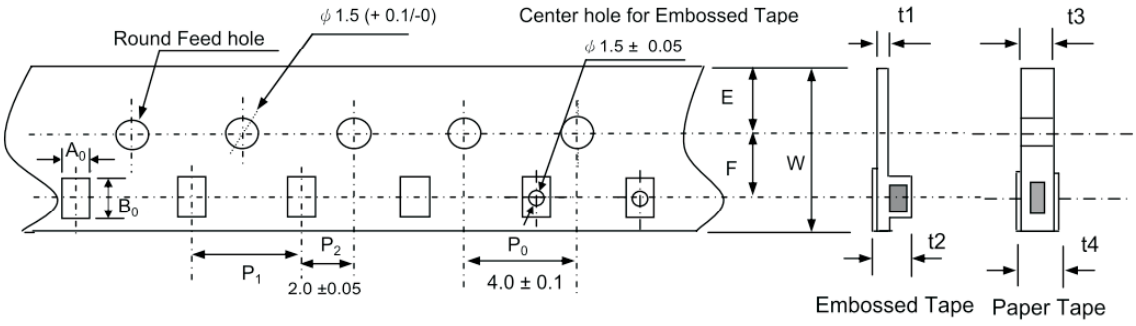
<table>
<tr><th>Test description</th><th>Standard</th><th>Performance</th><th>Test condition</th></tr>
<tr><td>Board flexure strength</td><td>IEC60068-2-21</td><td>No mechanical damage shall be noticed even when the board is bent 2mm (0.079inches)</td><td>Solder a chip on a test substrate.
Bend the substrat 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><th>SIZE</th><th>0402</th><th>0603</th><th>0805</th><th>1206</th><th>1210</th><th>1812</th><th>2220</th></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> 
</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><th>TYPE</th><th>0402</th><th>0603</th><th>0805</th><th>1206</th><th>1210</th><th>1812</th><th>2220</th></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> 
</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

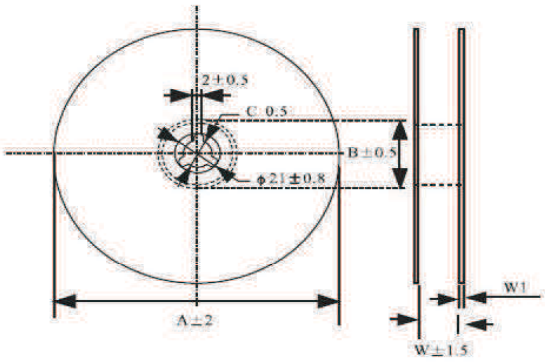
Size	A_0±0.1 (mm)	B_0±0.1 (mm)	P_1±0.1 (mm)	t_1/t_2 (mm)	t_3/t_4 (mm)	Quantity/Reel(Pcs)	
						Paper Tape	Embossed Tape
0402	0.62	1.10	2	—	1.0max/ 1.1max	10000	—
0603	1.08	1.88	4	—	1.0max/ 1.1max	4000	—
0805	1.42	2.30	4	0.6max/2.0max	1.0max/ 1.1max	4000	4000
1206	1.88	3.50	4	0.6max/2.9max	—	—	3000
1210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

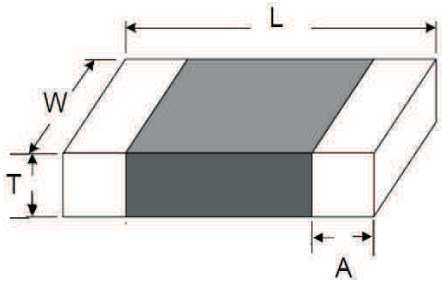
Reel Specifications

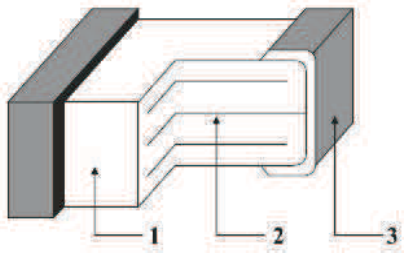


Dimensions mm

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

Introduction





Chip Dimensions

inch (mm)

Chip Size	L	W	T	A
0402 (1005)	0.040 ± 0.004 (1.00 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.024 max. (0.6 max)	0.01 ± 0.006 (0.25 ± 0.15)
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JMV 0603 S 5R6 T 182

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S: Surge Protection and/or ESD Protection
E: For ESD Protection Only
C: For ESD Protection Only
A: Surge Protection and/or ESD Protection (Sb free)
P: For ESD Protection Only (Sb free)

Working Voltage

Symbol	Voltage	Symbol	Voltage
5R6	5.6V	090	9.0V
140	14V	180	18V
260	26V	300	30V