

Metal Oxide Varistor Encapsulated Type

MVS-P Series

MERITEK

FEATURE

- Operating Temperature: -40°C ~ +85°C
- Storage Temperature: -40°C ~ +125°C
- Varistor Voltage: 18V ~ 750V
- Large capability to withstand high surge current
- UL/cUL safety approved: certification No: E326004



PART NUMBERING SYSTEM

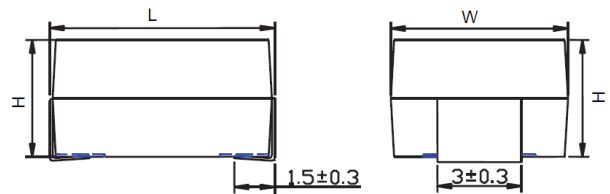
MVS 3225 P 180 K
(1) (2) (3) (4) (5)



No	Item	Code	Description	Series Reference
(1)	Meritek Series	MVS	Metal Oxide Varistor	Encapsulated Type
(2)	Size	3225	3225: L x W: 3.2x2.5inch = 8.0x6.3 mm	4032: 4.0x3.2inch = 10.2x8.0mm
(3)	Lead/Package type	P	P: Plastic Encapsulated Type	General Purpose
(4)	Voltage	180	180: 18V	180: 18V~ 751: 750V

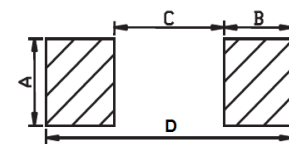
DIMENSION

Size (EIA)	Varistor Voltage Range (V)	L	W	H
3225	$V_{1mA} = 180 \sim 271$	8.0±0.3	6.3±0.3	3.2±0.3
	$V_{1mA} = 361 \sim 561$			4.5±0.3
4032	$V_{1mA} = 180 \sim 271$	10.2±0.3	8.0±0.3	3.2±0.3
	$V_{1mA} = 301 \sim 751$			4.5±0.3

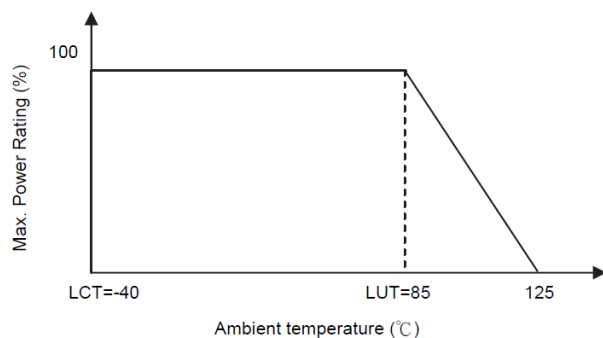


SOLDERING PAD

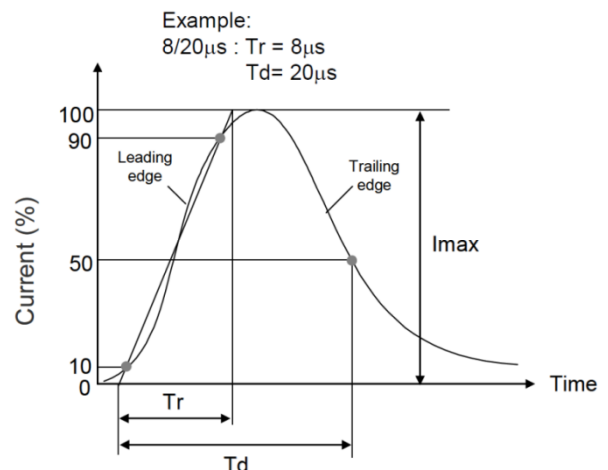
Size (EIA)	A	B	C	D
3225	3.5	2.8	4.5	10.1
4032	3.5	2.8	6.5	12.1



POWER DERATING CURVE



SURGE CURRENT STANDARD WAVEFORM



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ELECTRICAL CHARACTERISTICS

MVS3225 series

Voltage Code	Varistor Voltage @1mA DC	Max. Continuous Voltage		Max. Clamping Voltage (8/20 μ s)		Max. Surge Current (8/20 μ s)	Max. Energy (10/1K μ s)	Rated Power	Refer. Cap. @1KHz
	V _{1mA}	V _{AC(rms)}	V _{DC}	V _P	I _P	I _{MAX}	W _{MAX}	P	C _P
	(V)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
180	18 (16~20)	11	14	36	1.0	150	0.6	0.01	1750
220	22 (20~24)	14	18	43	1.0	150	0.7	0.01	1450
270	27 (24~30)	17	22	53	1.0	150	0.9	0.01	1200
330	33 (30~36)	20	26	65	1.0	150	1.1	0.01	980
390	39 (35~43)	25	31	77	1.0	150	1.2	0.01	850
470	47 (42~52)	30	38	93	1.0	150	1.5	0.01	720
560	56 (50~62)	35	45	110	1.0	150	1.8	0.01	620
680	68 (61~75)	40	56	135	1.0	150	2.2	0.01	520
820	82 (74~90)	50	65	135	5.0	400	2.5	0.1	300
101	100 (90~110)	60	85	165	5.0	400	3.0	0.1	250
121	120 (108~132)	75	100	200	5.0	400	4.0	0.1	210
151	150 (135~165)	95	125	250	5.0	400	6.0	0.1	135
181	180 (162~198)	115	150	300	5.0	400	6.5	0.1	110
201	200 (180~220)	130	170	340	5.0	400	7.0	0.1	100
221	220 (198~242)	140	180	360	5.0	400	7.5	0.1	95
241	240 (216~264)	150	200	395	5.0	400	9.0	0.1	90
271	270 (243~297)	175	225	455	5.0	400	9.5	0.1	75
361	360 (324~396)	230	300	595	5.0	400	10.0	0.1	60
391	390 (351~429)	250	320	650	5.0	400	11.0	0.1	55
431	430 (387~473)	275	350	710	5.0	400	13.0	0.1	50
471	470 (423~517)	300	385	775	5.0	400	15.0	0.1	45
511	510 (459~561)	320	410	845	5.0	400	16.5	0.1	40
561	560 (504~616)	350	450	930	5.0	400	18.0	0.1	35

MVS4032 series

Voltage Code	Varistor Voltage @1mA DC	Max. Continuous Voltage		Max. Clamping Voltage (8/20 μ s)		Max. Surge Current (8/20 μ s)	Max. Energy (10/1K μ s)	Rated Power	Refer. Cap. @1KHz
	V _{1mA}	V _{AC(rms)}	V _{DC}	V _P	I _P	I _{MAX}	W _{MAX}	P	C _P
	(V)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
180	18 (16~20)	11	14	36	2.5	300	1.1	0.02	2750
220	22 (20~24)	14	18	43	2.5	300	1.3	0.02	2300
270	27 (24~30)	17	22	53	2.5	300	1.6	0.02	1900
330	33 (30~36)	20	26	65	2.5	300	2.0	0.02	1600
390	39 (35~43)	25	31	77	2.5	300	2.4	0.02	1400
470	47 (42~52)	30	38	93	2.5	300	2.8	0.02	1200
560	56 (50~62)	35	45	110	2.5	300	3.4	0.02	1050
680	68 (61~75)	40	56	135	2.5	300	4.1	0.02	900
820	82 (74~90)	50	65	135	10	1200	6.5	0.25	530
101	100 (90~110)	60	85	165	10	1200	7.0	0.25	480
121	120 (108~132)	75	100	200	10	1200	9.0	0.25	430
151	150 (135~165)	95	125	250	10	1200	11.0	0.25	260
181	180 (162~198)	115	150	300	10	1200	13.0	0.25	220
201	200 (180~220)	130	170	340	10	1200	15.0	0.25	200

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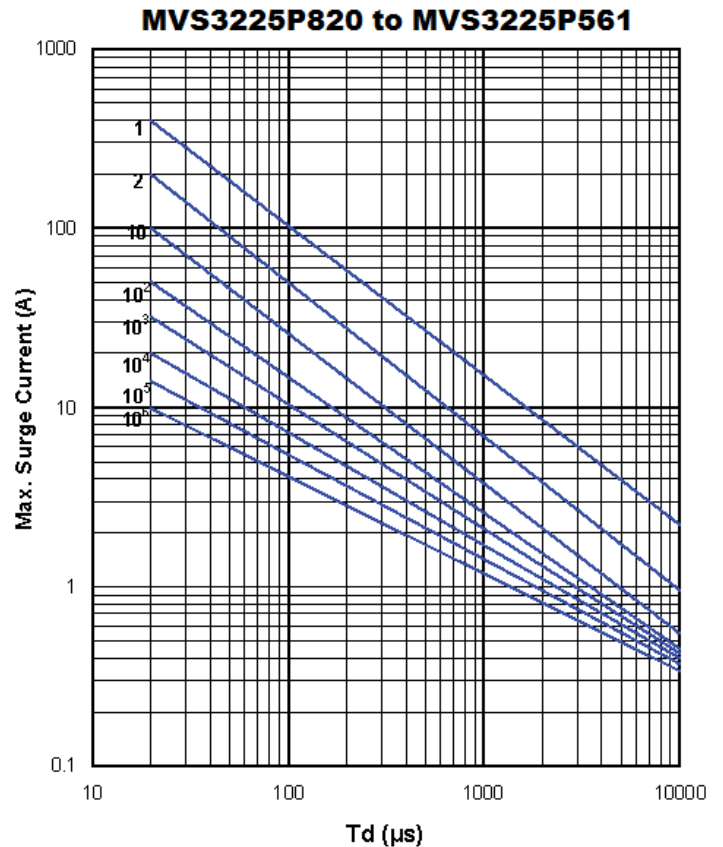
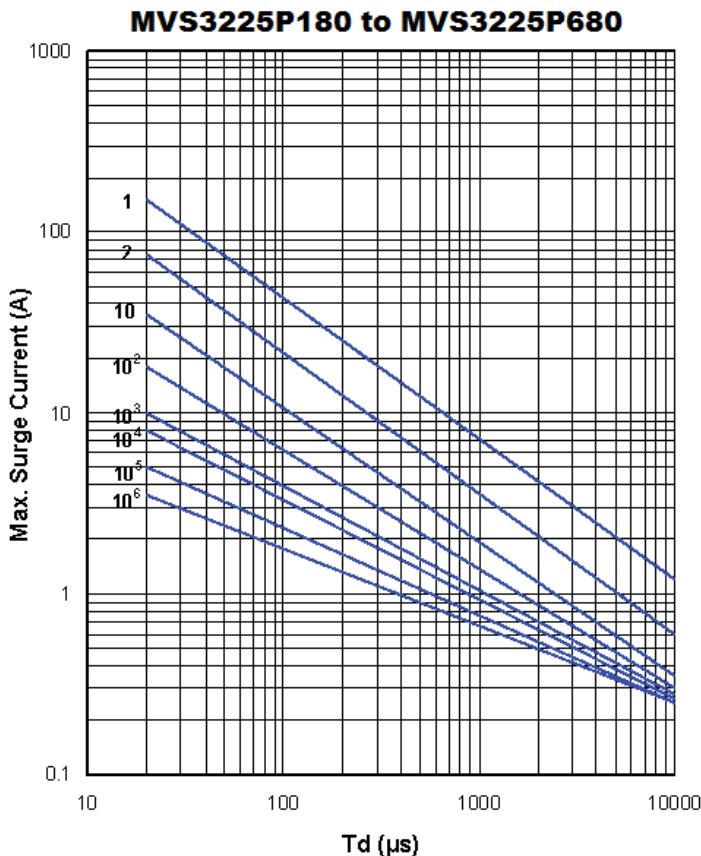
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ELECTRICAL CHARACTERISTICS (CONTINUED)

MVS4032 series

Voltage Code	Varistor Voltage @1mA DC	Max. Continuous Voltage		Max. Clamping Voltage (8/20 μ s)		Max. Surge Current (8/20 μ s)	Max. Energy (10/1K μ s)	Rated Power	Refer. Cap. @1KHz
	V_{1mA}	$V_{AC(rms)}$	V_{DC}	V_P	I_P	I_{MAX}	W_{MAX}	P	C_P
	(V)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(μ F)
221	220 (198~242)	140	180	360	10	1200	18.0	0.25	180
241	240 (216~264)	150	200	395	10	1200	18.5	0.25	170
271	270 (243~297)	175	225	455	10	1200	21.0	0.25	150
301	300 (270~330)	195	250	500	10	1200	21.5	0.25	140
331	330 (297~363)	215	275	550	10	1200	22.0	0.25	120
361	360 (324~396)	230	300	595	10	1200	23.0	0.25	115
391	390 (351~429)	250	320	650	10	1200	25.0	0.25	105
431	430 (387~473)	275	350	710	10	1200	29.0	0.25	95
471	470 (423~517)	300	385	775	10	1200	30.0	0.25	90
511	510 (459~561)	320	410	845	10	1200	33.0	0.25	85
561	560 (504~616)	350	450	930	10	1200	33.0	0.25	80
621	620 (558~682)	395	510	1020	10	1200	35.0	0.25	60
681	680 (612~748)	420	560	1120	10	1200	35.0	0.25	55
751	750 (675~825)	460	615	1235	10	1200	50.5	0.25	55

MAX. SURGE CURRENT DERATING CURVES

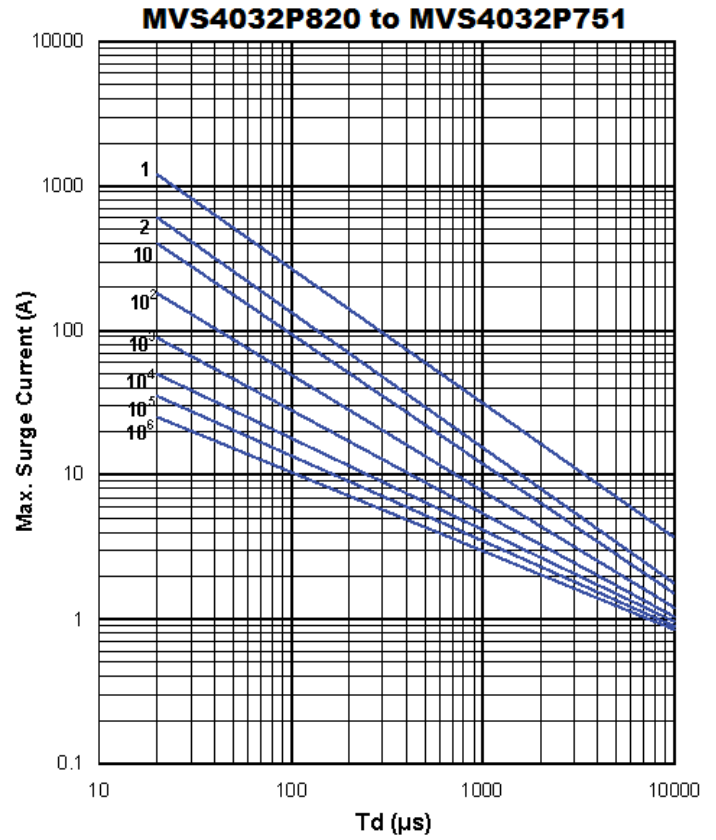
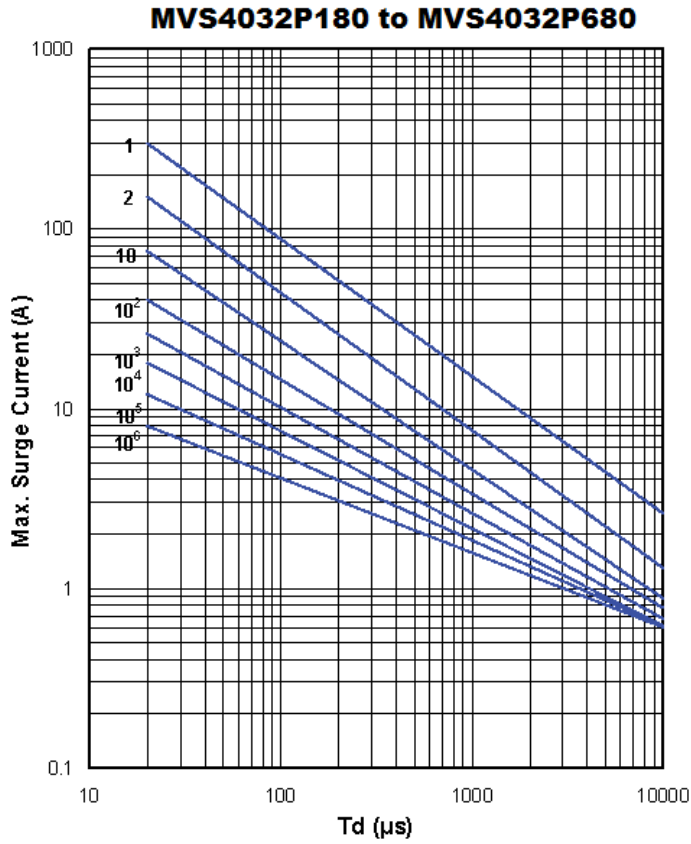


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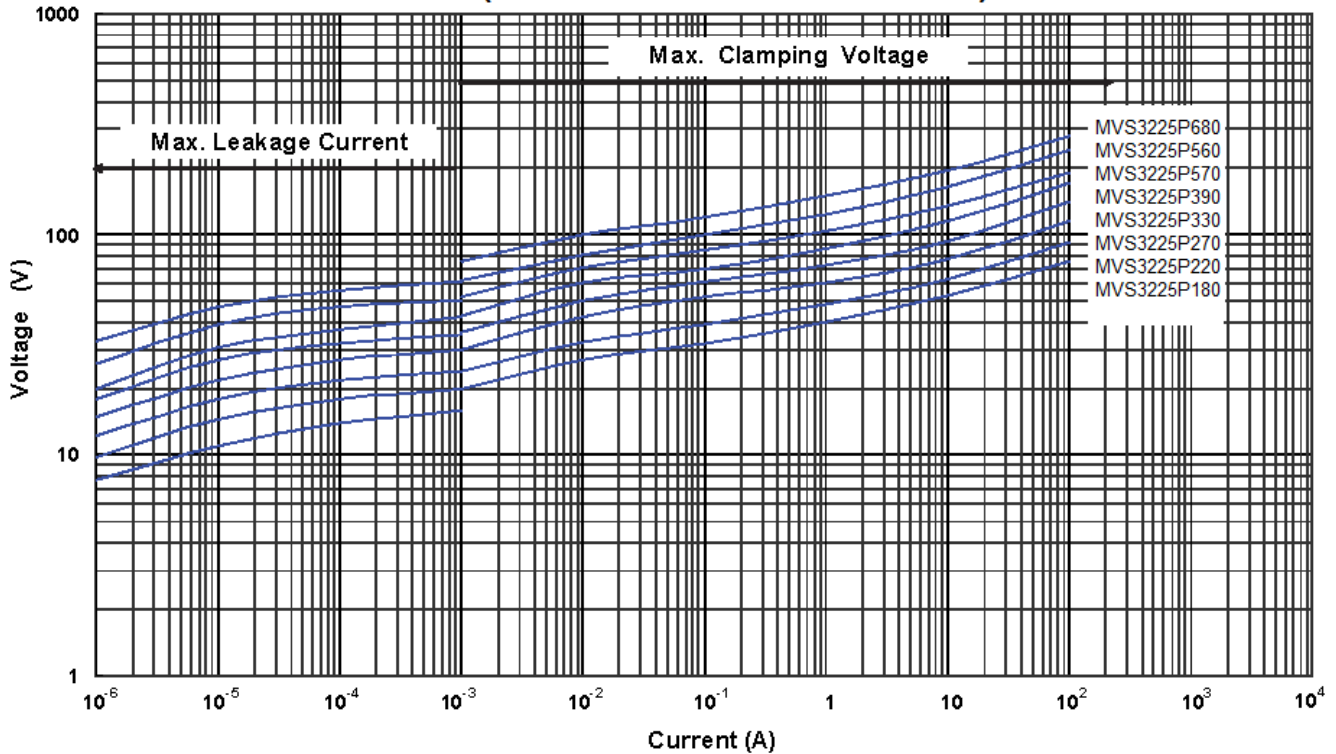
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MAX. SURGE CURRENT DERATING CURVES (CONTINUED)



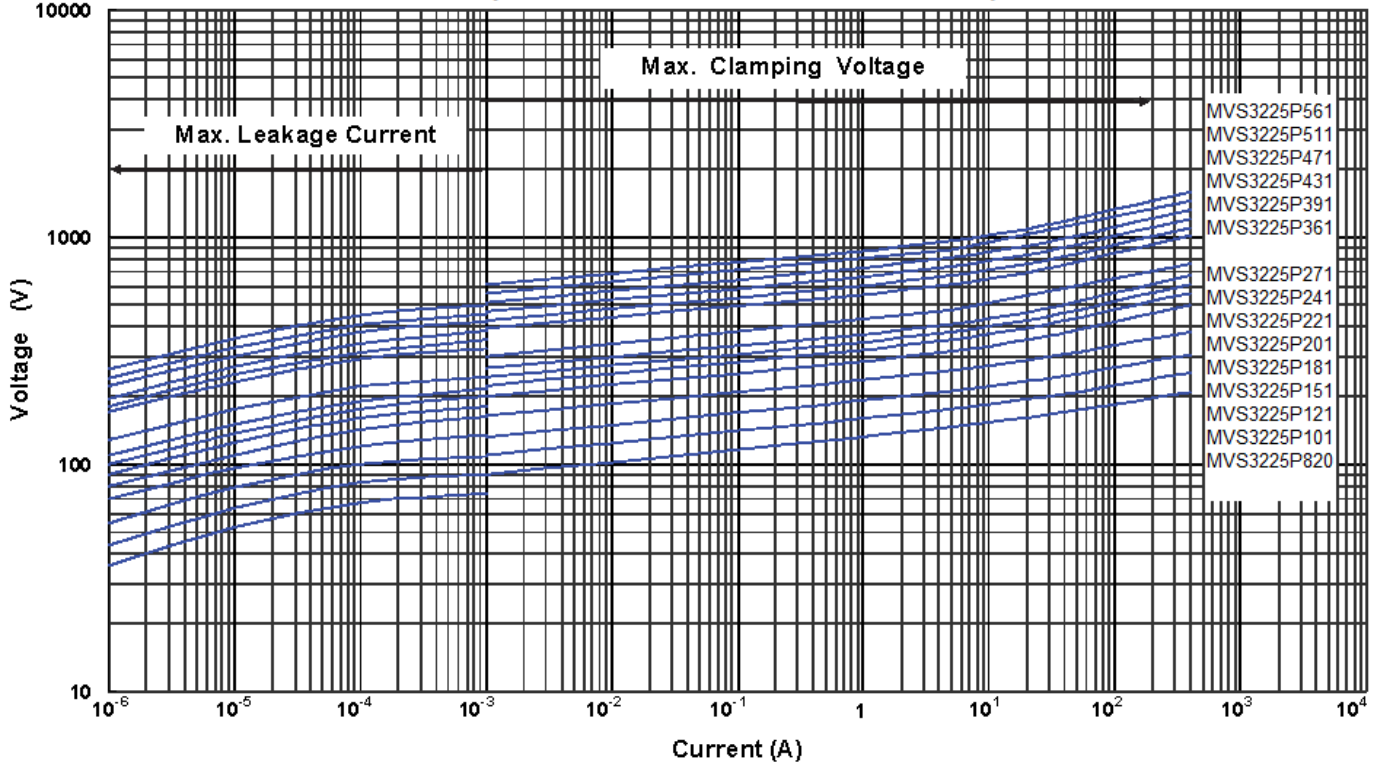
MAX. LEAKAGE CURRENT & MAX. CLAMPING VOLTAGE CURVES

MAX. LEAKAGE CURRENT & MAX. CLAMPING VOLTAGE CURVES (MVS3225P180 to MVS3225P680)

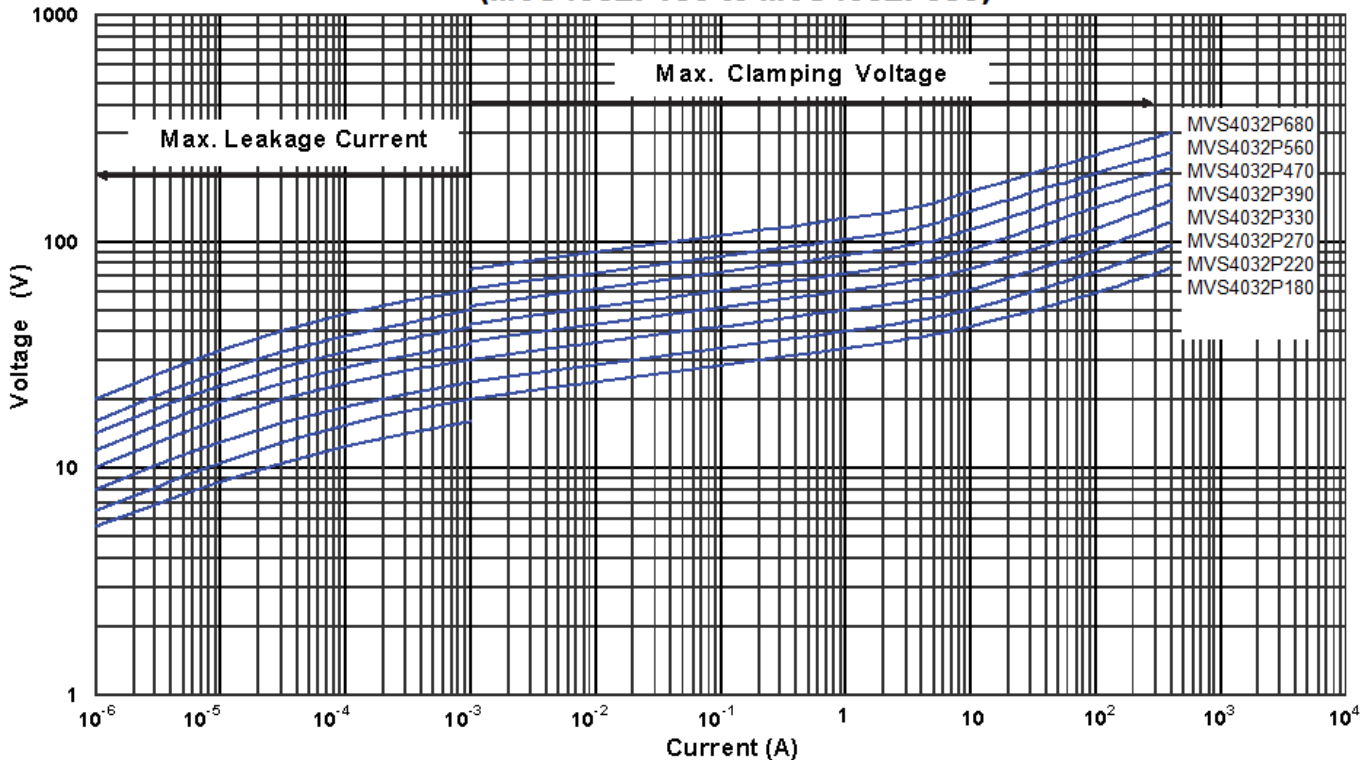


MAX. LEAKAGE CURRENT & MAX. CLAMPING VOLTAGE CURVES (CONTINUED)

**MAX. LEAKAGE CURRENT & MAX. CLAMPING VOLTAGE CURVES
(MVS3225P820 to MVS3225P561)**

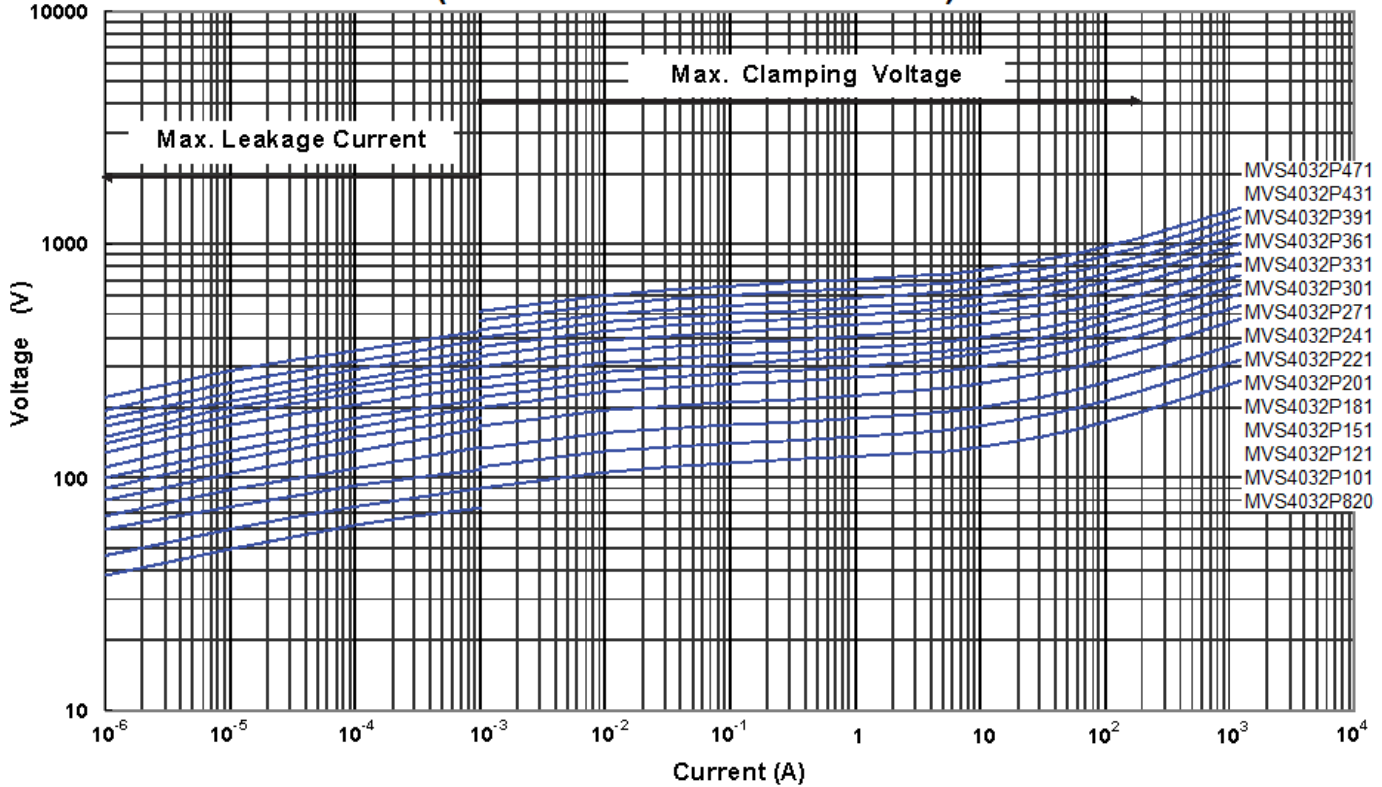


**MAX. LEAKAGE CURRENT & MAX. CLAMPING VOLTAGE CURVES
(MVS4032P180 to MVS4032P680)**

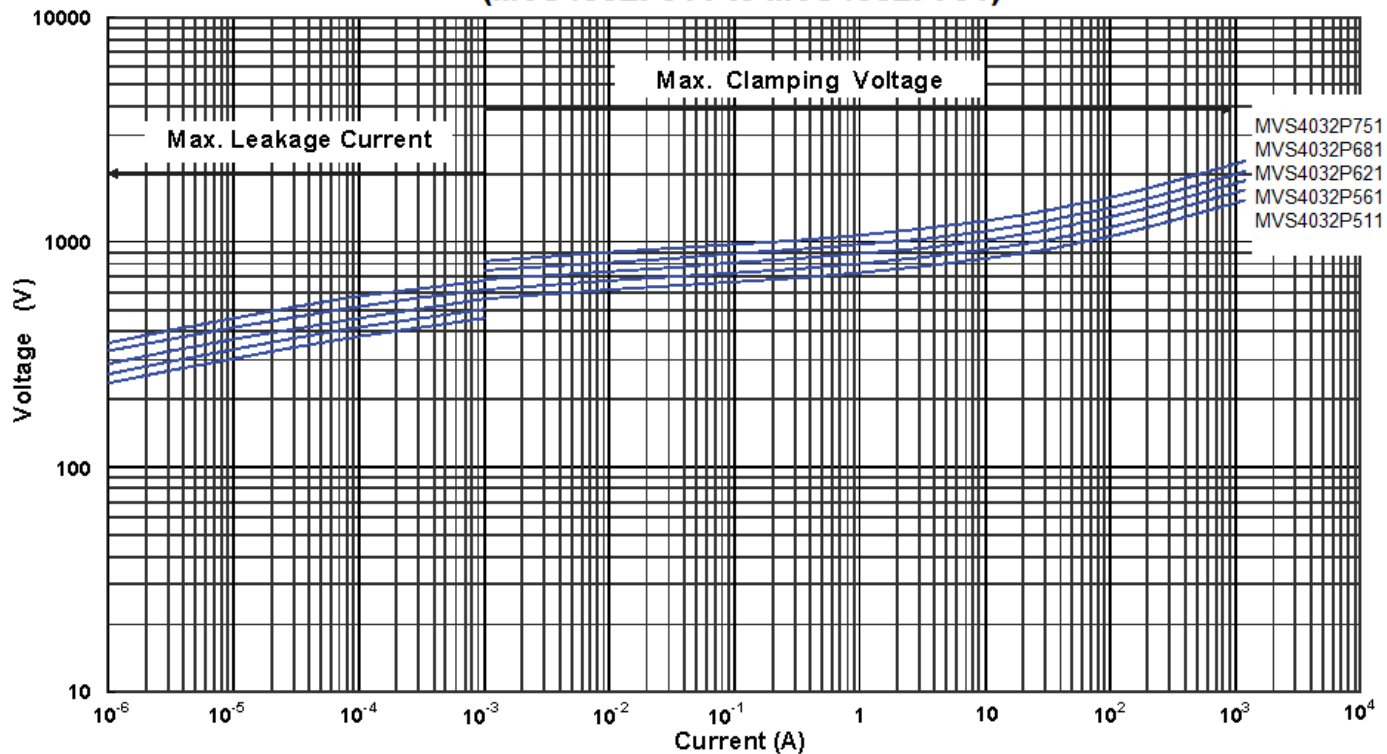


MAX. LEAKAGE CURRENT & MAX. CLAMPING VOLTAGE CURVES (CONTINUED)

**Max. Leakage Current & Max. Clamping Voltage Curves
(MVS4032P820 to MVS4032P471)**

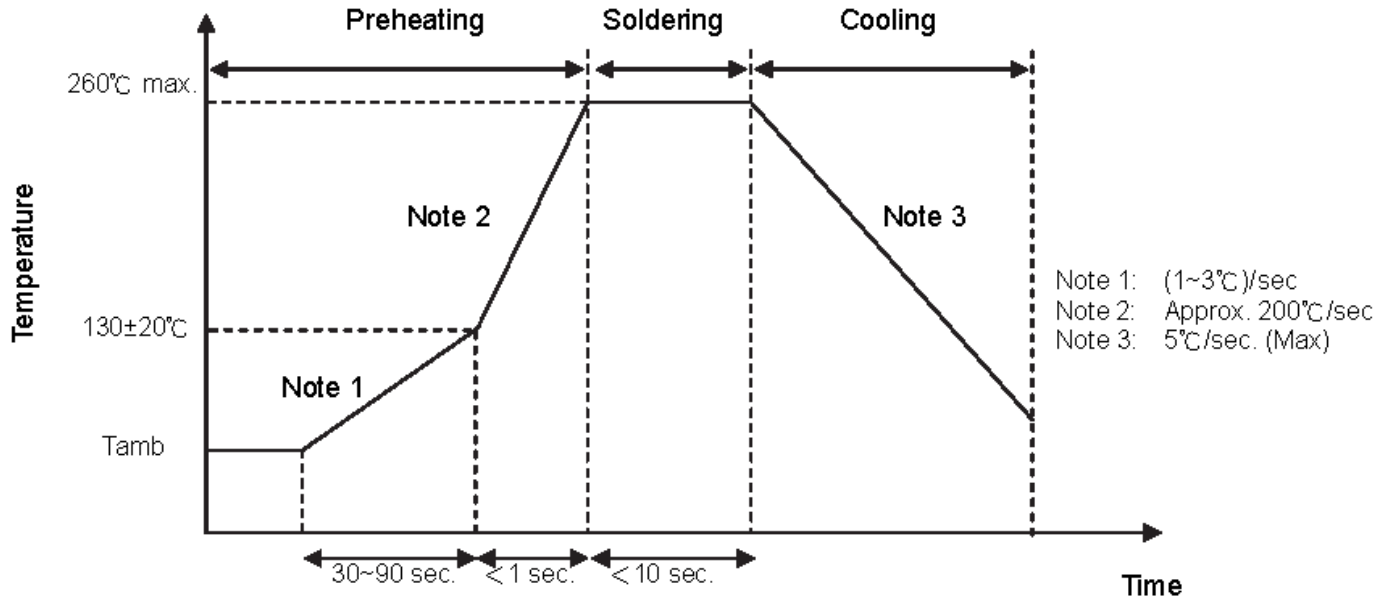


**Max. Leakage Current & Max. Clamping Voltage Curves
(MVS4032P511 to MVS4032P751)**

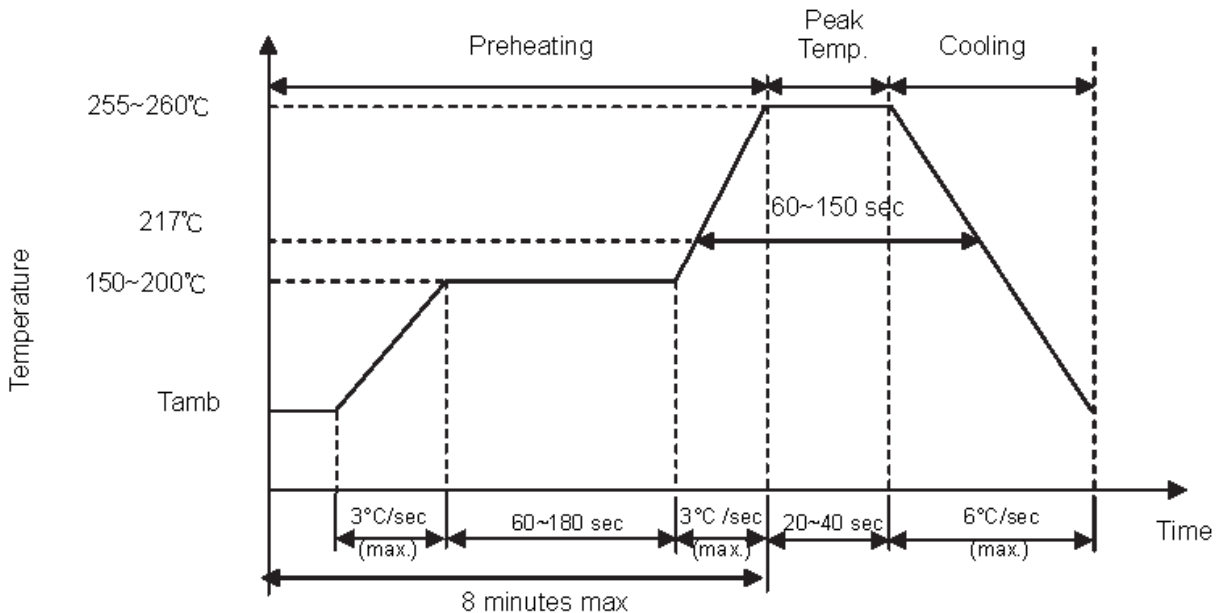


SOLDERING RECOMMENDATION

● Wave Soldering Profile



● IR-reflow Soldering Profile



Recommended Reworking Conditions with Soldering Iron

Item	Condition
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec. (max.)
Distance From Varistor	2 mm (min.)

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RELIABILITY

Item	Standard	Test Conditions / Method	Specifications															
Vibration	IEC 60068-2-6	Frequency range: 10 ~ 55 Hz Amplitude: 0.75mm or 98 m/s ² Direction: 3 mutually perpendicular directions, 2 hrs each.	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage															
Solderability	IEC 60068-2-20	245±3°C , 3±0.3 sec	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC 60068-2-20	260±3°C , 5±1 for 3225 Size, 10±1 sec for 4032 Size	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage															
High Temperature Storage	IEC 60068-2-2	125±5°C x 1000± 24 hrs	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage															
Damp Heat, Steady State	IEC 60068-2-78	a. 40±2°C, 90 ~ 95 % RH, 1344 hrs b. 40±2°C, 90 ~ 95 % RH, at 10%Vdc, 1344 hrs	$ \Delta V_{1mA}/V_{1mA} \leq 10\%$ No visible damage Insulation Resistance ≥ 100MΩ															
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles. <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>5±3</td> </tr> <tr> <td>3</td> <td>85±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>5±3</td> </tr> </tbody> </table>	Step	Temperature (°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	5±3	3	85±2	30±3	4	Room temperature	5±3	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage
Step	Temperature (°C)	Period (minutes)																
1	-40±3	30±3																
2	Room temperature	5±3																
3	85±2	30±3																
4	Room temperature	5±3																
High Temp. Load	MIL -STD-202 Method 108	85±2°C, 1000±24 hrs at VDC or V _{rms} (Max. Continuous Voltage)	$ \Delta V_{1mA}/V_{1mA} \leq 10\%$ No visible damage															
8/20μs Surge Life	IEC 61051-1	8/20μs waveform, 10 surge currents, unipolar, interval 30 secs, amplitude corresponding to max. Surge current derating curves for 20μs.	$ \Delta V_{1mA}/V_{1mA} \leq 10\%$ No visible damage															
10/1000μs Surge Life	IEC 61051-1	10/1000μs waveform, 10 surge currents, unipolar, interval 2 mins, amplitude corresponding to max. Surge current derating curves for 1000μs.	$ \Delta V_{1mA}/V_{1mA} \leq 10\%$ No visible damage															
Voltage Proof	IEC 61051-1	Metal balls method, 2500 Vac 1 min	No visible damage															
Varistor Voltage Temp. Coefficient	IEC 60068-2-6	$\frac{V_{1mA@85^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\% (\%/^{\circ}C),$ $\frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\% (\%/^{\circ}C)$	$ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage															

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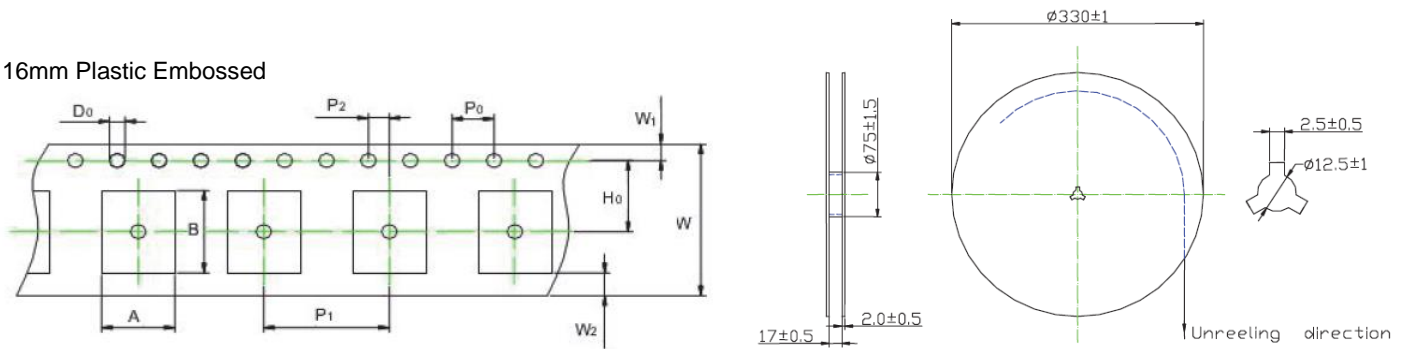
MVS-P Series

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PACKAGING SPECIFICATION

Taping Specification

16mm Plastic Embossed



Unit (mm)

Item	A*B	P ₀	P ₁	P ₂	H ₀	W	W ₁	W ₂	D ₀	Quantity(pcs/reel)	
Size	3225	7.0*8.7	4.0	12.0	2.0	7.5	16	1.75	0.75	1.5	1000
	4032	8.6*10.6									1000
Tolerance	±0.2	±0.1	±0.1	±0.05	±0.05	±0.3	±0.1	Min.	+0.1/-0	-	

WAREHOUSE STORAGE CONDITION SPECIFICATION

Storage Conditions:

1. Storage temperature: -10°C~+40°C
 2. Relative humidity: ≤75%RH
 3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year