

Metal Oxide Varistor SMD 125°C

MVS-H Series

MERITEK

FEATURE

- Operating Temperature: -55°C ~ +125°C
- Operating Voltage: 5.5vdc ~ 85 Vdc
- High Surge Suppress Capability
- Bidirectional And Symmetrical V/I Characteristics
- Multilayer Ceramic Construction Technology
- Variable Capacitance
- Applications: Power System, Motherboard/Notebook Computer, Scanner, Handheld Devices, Digital Video, Set-Top Box



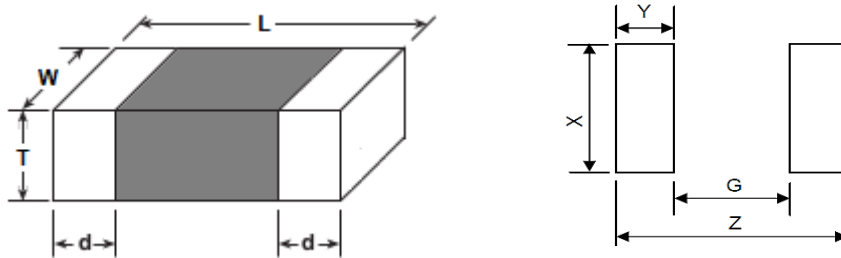
PART NUMBERING SYSTEM



MVS 0402 H 080 M
(1) (2) (3) (4) (5)

No	Item	Code	Description	Series Reference
(1)	Meritek Series	MVS	Metal Oxide Varistor	Surface Mount type
(2)	Size Code	0402	1.00x0.50x0.60 (mm)	EIA Size 0402~2220
(3)	Product Code	H	H: 125°C	Operating Temp: -55°C ~ +125°C
(4)	Varistor Voltage	080	080: 8V	First two significant, Third: Multiplier
(5)	Varistor Tolerance	M	±20%	L: ±15%, K: ±10%

DIMENSION AND SOLDERING PAD



Unit: mm

Part Series	EIA	L1	W	T max	d	Z	G	X	Y
MVS0402H	0402	1.00±0.15	0.50±0.10	0.6	0.20±0.10	1.7	0.5	0.6	0.6
MVS0603H	0603	1.60±0.15	0.80±0.15	0.95	0.35±0.15	2.8	0.8	1.0	1.0
MVS0805H	0805	2.00±0.20	1.25±0.20	1.0	0.40±0.20	3.4	1.0	1.4	1.2
MVS1206H	1206	3.20±0.30	1.60±0.20	1.5	0.50±0.20	4.5	2.1	1.8	1.2
MVS1210H	1210	3.20±0.30	2.50±0.25	1.5	0.50±0.20	4.5	2.1	2.8	1.2
MVS1812H	1812	4.50±0.40	3.20±0.30	1.5	0.60±0.30	6.0	3.0	3.6	1.5
MVS2220H	2220	5.70±0.40	5.00±0.30	2.0	0.60±0.30	7.2	4.2	5.5	1.5

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ELECTRICAL CHARACTERISTICS

MVS0402H Series	Varistor Voltage		Max Allowable Voltage		Max Clamping Voltage		Surge Current	Max Energy	Rate Power	Typical Capacitance
	V _{1mA}	ΔV _{1mA}	V _{ACrm}	V _{DC}	V _p	I _p	8/20 μs	10/1kμs	P	At 1KHz
	(V)	(±%)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
MVS0402H080M	8	20	4	5.5	19	1	10	0.05	0.003	230
MVS0402H110M	11	20	6	8	27	1	10	0.05	0.003	160
MVS0402H125M	12.5	20	7	9	30	1	10	0.05	0.003	140
MVS0402H150L	15	15	8	11	33	1	10	0.05	0.003	120
MVS0402H180K	18	10	11	14	35	1	10	0.05	0.003	80
MVS0402H220K	22	10	14	18	44	1	10	0.05	0.003	60
MVS0402H270K	27	10	17	22	55	1	10	0.05	0.003	50
MVS0402H330K	33	10	20	26	63	1	10	0.05	0.003	40

MVS0603H Series	Varistor Voltage		Max Allowable Voltage		Max Clamping Voltage		Surge Current	Max Energy	Rate Power	Typical Capacitance
	V _{1mA}	ΔV _{1mA}	V _{ACrms}	V _{DC}	V _p	I _p	8/20 μs	10/1kμs	P	At 1KHz
	(V)	(±%)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
MVS0603H080M	8	20	4	5.5	19	1	30	0.1	0.003	950
MVS0603H110M	11	20	6	8	27	1	30	0.1	0.003	600
MVS0603H125M	12.5	20	7	9	30	1	30	0.1	0.003	570
MVS0603H150L	15	15	8	11	33	1	30	0.1	0.003	520
MVS0603H180K	18	10	11	14	35	1	30	0.2	0.003	420
MVS0603H220K	22	10	14	18	40	1	30	0.2	0.003	300
MVS0603H270K	27	10	17	22	46	1	30	0.2	0.003	180
MVS0603H330K	33	10	20	26	56	1	30	0.3	0.003	150
MVS0603H390K	39	10	25	31	67	1	30	0.3	0.003	100

MVS0805H Series	Varistor Voltage		Max Allowable Voltage		Max Clamping Voltage		Surge Current	Max Energy	Rate Power	Typical Capacitance
	V _{1mA}	ΔV _{1mA}	V _{ACrm}	V _{DC}	V _p	I _p	8/20 μs	10/1kμs	P	At 1KHz
	(V)	(±%)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
MVS0805H080M	8	20	4	5.5	19	1	60	0.1	0.005	1500
MVS0805H110M	11	20	6	8	27	1	60	0.2	0.005	1400
MVS0805H125M	12.5	20	7	9	29	1	60	0.2	0.005	1100
MVS0805H150L	15	15	8	11	33	1	60	0.2	0.005	950
MVS0805H180K	18	10	11	14	35	1	60	0.2	0.005	670
MVS0805H220K	22	10	14	18	40	1	60	0.3	0.005	430
MVS0805H270K	27	10	17	22	46	1	60	0.3	0.005	330
MVS0805H330K	33	10	20	26	56	1	60	0.3	0.005	300
MVS0805H390K	39	10	25	31	67	1	60	0.3	0.005	180
MVS0805H470K	47	10	30	38	77	1	60	0.3	0.005	150
MVS0805H560K	56	10	35	45	85	1	60	0.3	0.005	200

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ELECTRICAL CHARACTERISTICS

MVS1206H Series	Varistor Voltage		Max Allowable Voltage		Max Clamping Voltage		Surge Current	Max Energy	Rate Power	Typical Capacitance
	V_{1mA}	ΔV_{1mA}	V_{ACRm}	V_{DC}	V_p	I_p	8/20 μs	10/1k μs	P	At 1KHz
	(V)	($\pm\%$)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
MVS1206H080M	8	20	4	5.5	17	1	150	0.3	0.008	4800
MVS1206H110M	11	20	6	8	25	1	200	0.4	0.008	3900
MVS1206H150L	15	15	8	11	30	1	200	0.5	0.008	2500
MVS1206H180K	18	10	11	14	33	1	200	0.5	0.008	1500
MVS1206H220K	22	10	14	18	42	1	200	0.5	0.008	1200
MVS1206H270K	27	10	17	22	48	1	200	0.6	0.008	1000
MVS1206H330K	33	10	20	26	54	1	200	0.7	0.008	800
MVS1206H390K	39	10	25	31	65	1	200	1.0	0.008	650
MVS1206H470K	47	10	30	38	77	1	200	1.1	0.008	380
MVS1206H560K	56	10	35	45	90	1	100	0.4	0.008	300
MVS1206H680K	68	10	40	56	110	1	100	0.5	0.008	250
MVS1206H820K	82	10	50	65	135	1	100	0.6	0.008	180
MVS1206H101K	100	10	60	85	146	1	100	0.7	0.008	150

MVS1210H Series	Varistor Voltage		Max Allowable Voltage		Max Clamping Voltage		Surge Current	Max Energy	Rate Power	Typical Capacitance
	V_{1mA}	ΔV_{1mA}	V_{ACRm}	V_{DC}	V_p	I_p	8/20 μs	10/1k μs	P	At 1KHz
	(V)	($\pm\%$)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
MVS1210H080M	8	20	4	5.5	17	2.5	250	0.4	0.01	8200
MVS1210H110M	11	20	6	8	25	2.5	300	0.7	0.01	7500
MVS1210H150L	15	15	8	11	30	2.5	400	1.0	0.01	4800
MVS1210H180K	18	10	11	14	33	2.5	400	1.2	0.01	2900
MVS1210H220K	22	10	14	18	38	2.5	400	1.5	0.01	2400
MVS1210H270K	27	10	17	22	44	2.5	400	1.7	0.01	2000
MVS1210H330K	33	10	20	26	54	2.5	400	1.9	0.01	1300
MVS1210H390K	39	10	25	31	65	2.5	300	1.7	0.01	1000
MVS1210H470K	47	10	30	38	77	2.5	300	2.0	0.01	900
MVS1210H560K	56	10	35	45	90	2.5	250	2.0	0.01	600
MVS1210H680K	68	10	40	56	110	2.5	250	2.3	0.01	450
MVS1210H820K	82	10	50	65	135	2.5	200	1.6	0.01	300
MVS1210H101K	100	10	60	85	165	2.5	200	2.0	0.01	160

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ELECTRICAL CHARACTERISTICS

MVS1812H Series	Varistor Voltage		Max Allowable Voltage		Max Clamping Voltage		Surge Current	Max Energy	Rate Power	Typical Capacitance
	V _{1mA}	ΔV _{1mA}	V _{ACRm}	V _{DC}	V _p	I _p	8/20 μs	10/1kμs	P	At 1KHz
	(V)	(±%)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
MVS1812H080M	8	20	4	5.5	17	5	500	0.8	0.015	18000
MVS1812H110M	11	20	6	8	25	5	500	1.0	0.015	15000
MVS1812H150L	15	15	8	11	30	5	800	1.8	0.015	10000
MVS1812H180K	18	10	11	14	33	5	800	1.9	0.015	5500
MVS1812H220K	22	10	14	18	38	5	800	2.3	0.015	5000
MVS1812H270K	27	10	17	22	44	5	800	2.7	0.015	4000
MVS1812H330K	33	10	20	26	54	5	800	3.0	0.015	3200
MVS1812H390K	39	10	25	31	65	5	800	3.7	0.015	2500
MVS1812H470K	47	10	30	38	77	5	800	4.2	0.015	2000
MVS1812H560K	56	10	35	45	90	5	500	4.0	0.015	1200
MVS1812H680K	68	10	40	56	110	5	500	4.8	0.015	1000
MVS1812H820K	82	10	50	65	135	5	400	4.5	0.015	600
MVS1812H101K	100	10	60	85	165	5	400	5.8	0.015	300

MVS2220H Series	Varistor Voltage		Max Allowable Voltage		Max Clamping Voltage		Surge Current	Max Energy	Rate Power	Typical Capacitance
	V _{1mA}	ΔV _{1mA}	V _{ACRm}	V _{DC}	V _p	I _p	8/20 μs	10/1kμs	P	At 1KHz
	(V)	(±%)	(V)	(V)	(V)	(A)	(A)	(J)	(W)	(pF)
MVS2220H080M	8	20	4	5.5	17	10	1000	1.4	0.02	29000
MVS2220H110M	11	20	6	8	25	10	1200	3.6	0.02	25000
MVS2220H150L	15	15	8	11	30	10	1200	4.2	0.02	18000
MVS2220H180K	18	10	11	14	33	10	1200	5.4	0.02	12000
MVS2220H220K	22	10	14	18	38	10	1200	5.8	0.02	10000
MVS2220H270K	27	10	17	22	44	10	1200	7.2	0.02	7700
MVS2220H330K	33	10	20	26	54	10	1200	7.8	0.02	5800
MVS2220H390K	39	10	25	31	65	10	1200	9.6	0.02	4100
MVS2220H470K	47	10	30	38	77	10	1200	12.0	0.02	3000
MVS2220H560K	56	10	35	45	90	10	1000	7.7	0.02	2000
MVS2220H680K	68	10	40	56	110	10	1000	9.0	0.02	1500
MVS2220H820K	82	10	50	65	135	10	800	5.6	0.02	1000
MVS2220H101K	100	10	60	85	165	10	800	6.8	0.02	600

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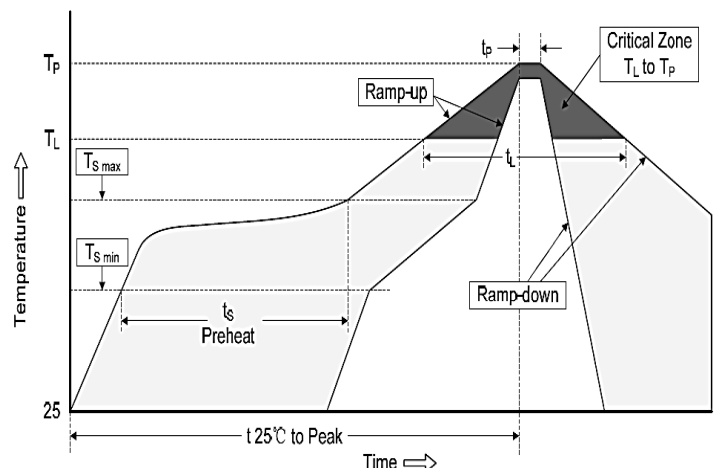
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RELIABILITY TEST CONDITON AND REQUIREMENT

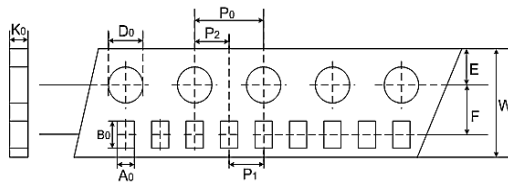
Item	Standard	Test conditions / Methods	Specifications															
Bending Strength	IEC 60068-2-21	Warp: 2mm ;Speed<0.5mm/sec Duration: 10 sec on PCB	$ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage															
Adhesion	IEC 60068-2-21	Speed<0.5mm/sec on PCB	$\geq 0.5\text{Kgf}$ the terminal electrode shall be break off not the chip element															
Damp Heat Load, Steady State	IEC 60068-2-78	40±2°C 90~95% RH , 500±24 hrs at VDC	$ \Delta V_{1mA} / V_{1mA} \leq 10\%$ No visible damage															
High Temp. Storage	IEC 60068-2-2	150±5 °C , 1000±24 hrs	$ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage															
Rapid Change of Temperature	IEC 60068-2-14	The conditions shown below shall be repeated 5 cycles on PCB. <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55±5</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>5±3</td> </tr> <tr> <td>3</td> <td>150±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	-55±5	30±3	2	Room temperature	5±3	3	150±2	30±3	4	Room temperature	5±3	$ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage
Step	Temperature (°C)	Period (minutes)																
1	-55±5	30±3																
2	Room temperature	5±3																
3	150±2	30±3																
4	Room temperature	5±3																
High Temp. Load	MIL-STD-202 Method 108	125±2 °C 1000±24 hrs at Vdc	$ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage															
Low Temp. Load	IEC 60068-2-1	-55±5 °C 1000±24 hrs at V	$ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage															
Max Energy	IEC 61051-14.6	10/1000µs Waveform, Wmax, 1 surge current	$ \Delta V_{1mA} / V_{1mA} \leq 10\%$ No visible damage															
Vibration	IEC 60068-2-6	Frequency range: 10~55Hz, Amplitude: 0.75mm or 98m/s ² , Direction: 3 mutually perpendicular directions, 2 hrs each	$ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage															
Varistor Voltage Temp. Coefficient	Specification Standard	Measure V _{1mA} at -40°C, 25°C, 125°C	$ T_c \leq 0.05 (\%/^{\circ}\text{C})$															
Climatic Sequence	IEC 61051-14.8	125°C x 16 hrs, 1st cycle : 55°C 93%RH x 24 hrs, -40°C x 2 hrs, 5 cycles : 55°C 93%RH x 24 hrs/cycle	$ \Delta V_{1mA} / V_{1mA} \leq 10\%$ No visible damage															
Solderability	IEC 60068-2-58	245±5°C 3±0.3 sec.	At least 95% of terminal electrode is covered															
Resistance to Soldering Heat	IEC 60068-2-20	260±5°C 10±1 sec.	$ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage															

SOLDERING RECOMMENDATION

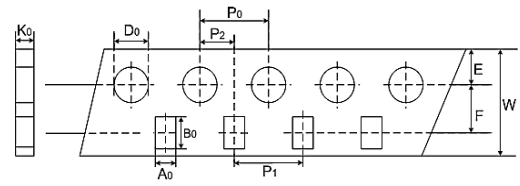
Reflow Condition		
Pre Heat	Temp. Min T _{s(min)}	150°C
	Temp. Max T _{s(max)}	200°C
	Time (min. to max.) (t _s)	60~180 seconds
Average ramp up rate (Liquids Temperature) (T _L) to peak		3°C/second max.
T _{s(max)} to T _L (Ramp-up rate)		3°C/second max.
Reflow	Temp. (T _L)	217°C
	Time (t _L) (min. to max.)	60~150 seconds
Peak Temperature (T _p)		260°C
Time within 5°C of actual peak Temperature (t _p)		40 seconds max
Ramp-down Rate		6°C/second max.



TAPING SPECIFICATION



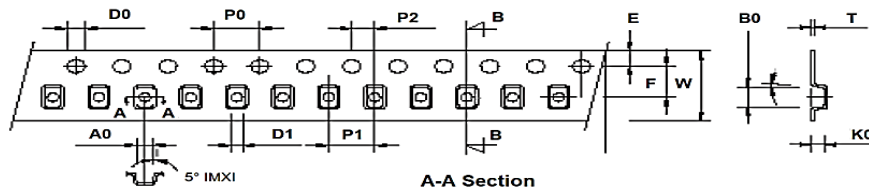
Size 0402



Size 0603, 0805

Unit: mm

Size	A ₀ ±0.05	B ₀ ±0.12	W ±0.2	E ±0.1	F ±0.05	P ₁ ±0.1	P ₂ ±0.05	P ₀ ±0.1	D ₀ ±0.1	K ₀ ±0.1
0402	0.62	1.12	8	1.75	3.5	2	2	4	1.55	0.6
0603	1.1	1.9	8	1.75	3.5	4	2	4	1.55	0.95
0805	1.5	2.3	8	1.75	3.5	4	2	4	1.55	1



A-A Section

Unit: mm

Size	A ₀ ±0.2	B ₀ ±0.2	W ±0.2	E ±0.1	F ±0.05	P ₁ ±0.1	P ₂ ±0.05	P ₀ ±0.1	D ₀ ±0.1	D ₁ ±0.1	T ±0.1
1206	1.85	3.45	8	1.75	3.5	4	2	4	1.55	1	0.25
1210	2.75	3.55	8	1.75	3.5	4	2	4	1.55	1	0.25
1812	3.65	4.96	12	1.75	5.5	8	2	4	1.55	1.5	0.25
2220	5.5	6.25	12	1.75	5.5	8	2	4	1.55	1.5	0.25

TAPE CARRIER SPECIFICATION AND QUANTITY

Unit: mm

Size	A ±1	B ±0.5	C ±0.2	E ±0.5	Quantity Reel
0402	178	60	13	9.0	10000
0603	178	60	13	9.0	4000
0805	178	60	13	9.0	3500
1206	178	60	13	9.0	2500
1210	178	60	13	13.2	2500
1812	178	60	13	13.2	1000
2220	178	60	13	13.2	1000

CARRIER TAPE REELS

