

**DESCRIPTION**

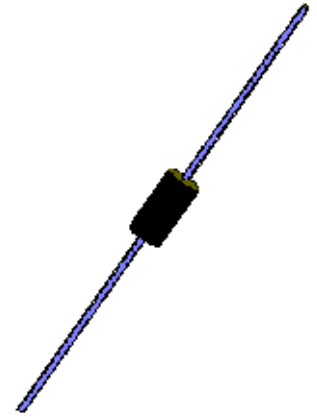
The MSV series consists of a matched set of silicon p-n junctions configured for bidirectional application. They can be used in telephone equipment, replacing copper-oxide varistors, fractional voltage regulators, negative-temperature-coefficient resistors, signal limiters and expanders. They are ideally suited for meter/galvanometer protection, wave shaping, threshold limiters and zener diode compensation.

The MSV varistor uses two or more forward biased matched silicon diodes in anti-parallel legs in a two-electrode device configuration. It provides a voltage-dependent nonlinear resistance that drops markedly as the applied voltage is increased similar to a TVS except it offers lower voltage features.

MSV devices are designed for controlled protection at various current levels and are rated at various peak pulse currents.

These varistors are supplied in Microsemi's cost-effective, highly reliable, molded axial-leaded package. Non-standard voltages are also available. Devices in this series with  $V_{C2}$  clamping are rated to U.L.497B requirements. (See table).

**APPEARANCE**



**DO-201AA**

**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

**FEATURES**

- Bidirectional low voltage clamping 1.5 V to 9.0 V using forward biased diodes in series and antiparallel
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, and JANS are available by adding MQ, MX, MV, or MSP prefixes respectively to part numbers
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- Negative temperature coefficient (see Figure 2)

**MAXIMUM RATINGS**

- Steady State Power: 1.0 Watt at 50°C.
- Operating and Storage temperatures: -65°C to +150°C.
- Surge: 30 Amps, 8.4 ms @ 25°C.
- Pulse: 1.0 ms @ 25°C for  $V_{C1}$  clamping\*.
- $t_{clamping}$  (0 volts to  $V_{BR}$  min.): Less than  $1 \times 10^{-8}$  seconds (theoretical)
- Solder temperatures: 260°C for 10 s (maximum)

**APPLICATIONS / BENEFITS**

- Low voltage clamping protection well be low conventional TVS components
- Telephone equipment protection
- Protects from switching transients
- Protection from ESD and EFT per IEC 61000-4-2 and IEC61000-4-4
- Secondary lightning protection
- Clamping voltages also specified per U.L. 497B with 100 V/ $\mu$ s rise time

**MECHANICAL AND PACKAGING**

- CASE: Void free molded thermosetting epoxy body meeting UL94V-0
- FINISH: Tin-lead plated copper readily solderable per MIL-STD-750, method 2026
- POLARITY: Not marked for Bidirectional
- MARKING: Part Number
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- WEIGHT: 1.5 gram (approx.)
- See package dimensions on last page

**ELECTRICAL CHARACTERISTICS**

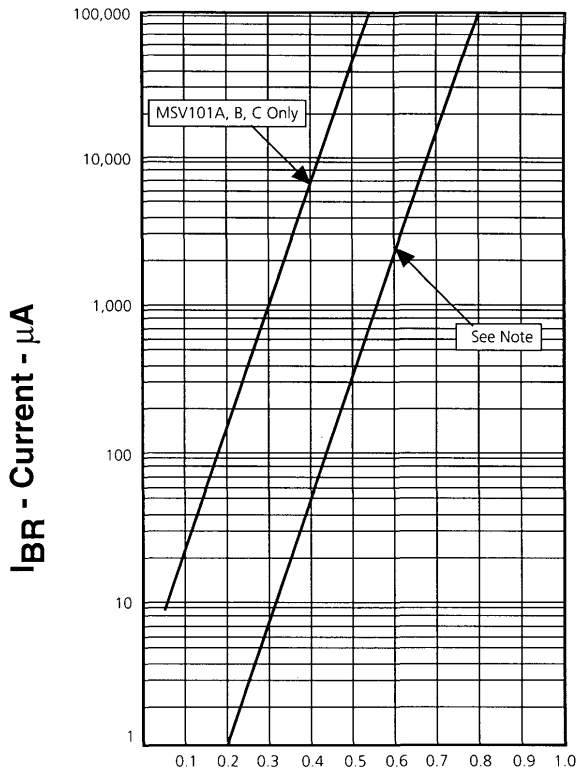
MICROSEMI PART NUMBER	V <sub>BR</sub> @ I <sub>BR</sub> V / μA Minimum	V <sub>BR</sub> @ I <sub>BR</sub> V / mA Maximum	V <sub>C1</sub> @ I <sub>PP</sub> * V / A Maximum	C <sub>J</sub> @ 0 VOLTS f = 1 MHz pF Maximum	V <sub>C2</sub> ** V Maximum
MSV101A	.05 / 10 .14 / 100	- .51 / 1,000	- -	200	-
MSV101B	.05 / 10 .14 / 100	- .66 / 1,000	- -	200	-
MSV101C	.05 / 10 .14 / 100	- .50 / 1,000	- -	200	-
MSV101D	.43 / 100 .56 / 1,000	.72 / 10 -	1.5 / 50 -	1500	3.8
MSV101E	.43 / 100 .56 / 1,000	.90 / 100 -	1.5 / 50 -	1500	3.8
MSV101F	.20 / 10 .56 / 1,000	.90 / 100 -	1.5 / 50 -	1500	3.8
MSV101G	.20 / 10 .56 / 1,000	.90 / 100 -	1.5 / 50 -	1500	3.8
MSV201A	.86 / 100 1.10 / 1,000	1.48 / 10 -	3.0 / 45 -	750	4.4
MSV301A	- 1.60 / 1,000	- 2.40 / 50	4.5 / 40 -	500	5.4
MSV401A	1.72 / 100 2.20 / 1,000	2.92 / 10 -	4.5 / 35 -	400	6.4
MSV401B	1.30 / 10 2.20 / 1,000	2.92 / 10 -	5.5 / 35 -	400	6.4
MSV401C	- 2.20 / 1,000	- 3.10 / 50	5.5 / 35 -	400	6.4
MSV501A	1.70 / 10 2.80 / 1,000	5.00 / 100 -	6.5 / 30 -	300	7.4
MSV601A	1.30 / 10 2.20 / 1,000	4.60 / 100 -	8.0 / 30 -	250	8.4
MSV701A	- 2.20 / 1,000	5.00 / 5.0 -	9.0 / 30 -	220	9.4

\* Conditions: Pulse is 10/1000 μs wave shape.

\*\* Per U.L.497B with 100 V/μs rise time.

- 10 μs rise, 1000 μs triangle fall to ½ amplitude.
- Voltage limits measured at I<sub>PP</sub> peak pulse current.

**GRAPHS**

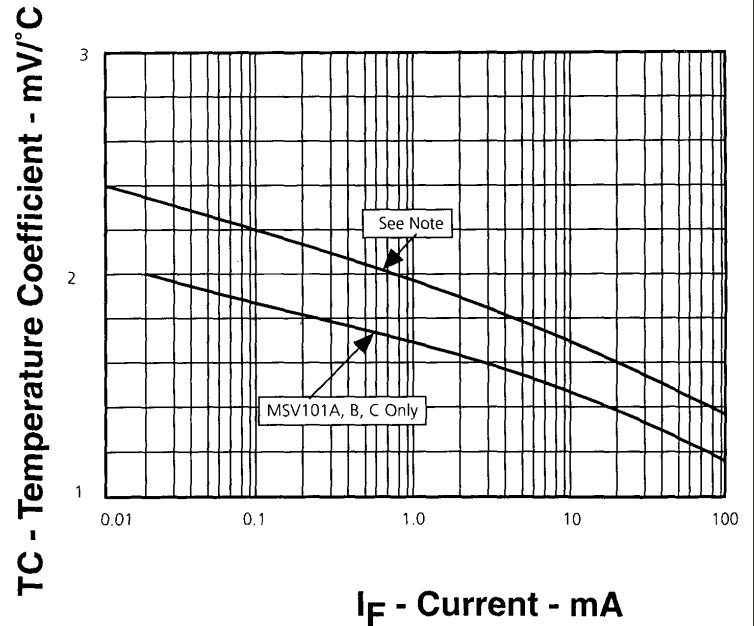


**V<sub>BR</sub> - Voltage - Volts**

**FIGURE 1**

Typical Current vs. Voltage †

† **NOTE:** In Figures 1 & 2, multiply applicable V<sub>BR</sub> voltage or TC by 2 for MSV201, by 3 for MSV301, by 4 for MSV401, by 5 for MSV501, by 6 for MSV601, and by 7 for MSV701.



**FIGURE 2**  
Temperature Coefficient (TC)  
of Voltage vs. Current †

**PACKAGE DIMENSIONS & SCHEMATIC**

