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TECHNICAL DATA SHEET

SURFACE MOUNT
500 Watt Low Capacitance
Transient Voltage Suppressor

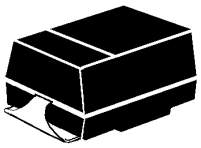
- **High Reliability controlled devices**
- **Unidirectional construction**
- **Available J-bend termination**
- **Selections for 5.0 to 75 V standoff voltages (V_{WM})**

DEVICES **MSMBJSAC5.0 thru MSMBJSAC75, e3**

LEVELS
M, MA, MX, MXL

FEATURES

- High reliability controlled devices with wafer fabrication and assembly lot traceability
- 100 % surge tested devices
- Optional up screening available by replacing the M prefix with MA, MX or MXL. These prefixes specify various screening and conformance inspection options based on MIL-PRF-19500. Refer to MicroNote 129 for more details on the screening options
- Low capacitance performance of 30pF
- Suppresses transients up to 500 W Peak Pulse Power @ 10/1000
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- RoHS compliant devices available by adding an “e3” suffix
- 3σ lot norm screening performed on Standby Current I_D



DO-214AA

APPLICATIONS / BENEFITS

- Low Capacitance for data-line protection to 10 MHz
- Protection for aircraft fast data rate lines per select waveforms in RTCA/DO-160F (see MicroNote 130 for Waveform 4 and 5A capability) & ARINC 429 with bit rates of 100 kb/s (per ARINC 429, Part 1, par. 2.4.1.1)
- ESD and EFT protection per IEC61000-4-2 and IEC61000-4-4 respectively
- Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance:
  - Class 1: MSMBJSAC5.0 to MSMBJSAC75
  - Class 2: MSMBJSAC5.0 to MSMBJSAC45
  - Class 3: MSMBJSAC5.0 to MSMBJSAC22
  - Class 4: MSMBJSAC5.0 to MSMBJSAC10
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance
  - Class 1: MSMBJSAC5.0 to MSMBJSAC26
  - Class 2: MSMBJSAC5.0 to MSMBJSAC15
  - Class 3: MSMBJSAC5.0 to MSMBJSAC7.0

MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25 ºC: 500 watts at 10/1000 µs with impulse repetition rate (duty factor) of 0.01 % or less*
- $t_{clamping}$ (0 volts to V_{BR} min.): < 5 ns theoretical for unidirectional
- Operating and Storage temperature: -65 °C to +150 °C
- Steady-State Power dissipation*: 2.5 watts at TL = +75 ºC
- Solder temperatures: 260 ºC for 10 s (maximum)

** TVS devices are not typically used for dc power dissipation and are instead operated ≤ V_{WM} (rated standoff voltage) except for transients that briefly drive the device into avalanche breakdown (V_{BR} to V_C region) of the TVS element. Also see Figures 5 and 6 for further protection details in rated peak pulse power for unidirectional and bidirectional configurations respectively.*

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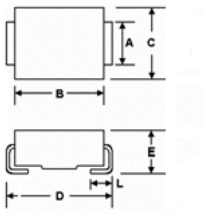
MECHANICAL AND PACKAGING

- Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- J-bend tin-lead (90 % Sn, 10 % Pb) or RoHS (100 % Sn) compliant annealed matte-tin plating solderable per MIL-STD-750, method 2026
- Cathode indicated by band
- Part number marked on package
- Available in Bulk or Custom Tape & Reel packaging
- Weight: 0.1 gram (approximately)

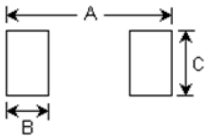
PACKAGE DIMENSIONS



SMBJ
(DO-214AA)

DIMENSIONS IN INCHES						
	A	B	C	D	E	L
MIN	.077	.160	.130	.205	.077	.030
MAX	.083	.180	.155	.220	.104	.060
DIMENSIONS IN MILLIMETERS						
MIN	1.96	4.06	3.30	5.21	1.95	.760
MAX	2.10	4.57	3.94	5.59	2.65	1.520

PAD LAYOUT



SMBJ (DO-214AA)

	INCHES	mm
A	.260	6.60
B	.085	2.16
C	.110	2.79

SYMBOLS & DEFINITIONS

Symbol	Definition	Symbol	Definition
V_{WM}	Working Peak (Standoff) Voltage	I_{PP}	Peak Pulse Current
P_{PP}	Peak Pulse Power	V_C	Clamping Voltage
V_{BR}	Breakdown Voltage	I_{BR}	Breakdown Current for V_{BR}
I_D	Standby Current		

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ELECTRICAL CHARACTERISTICS @ 25°C

MICROSEMI PART NUMBER	REVERSE STAND-OFF VOLTAGE (Note 1) V_{WM} Volts	BREAKDOWN VOLTAGE @ $I_{(BR)}$ 1.0mA $V_{(BR)}$ Volts Min.	MAXIMUM STANDBY CURRENT @V_{WM} I_D µA	MAXIMUM CLAMPING VOLTAGE I_P = 5.0A* V_C Volts	MAXIMUM PEAK PULSE CURRENT* RATING I_{PP} Amps	MAXIMUM CAPACITANCE @ O Volts, f=1 MHz pF	WORKING INVERSE BLOCKING VOLTAGE V_{WIB} Volts	INVERSE BLOCKING LEAKAGE CURRENT I_{IB} @ V_{WIB} µA	PEAK INVERSE BLOCKING VOLTAGE V_{PIB} Volts
MSMBJSAC5.0	5.0	7.60	300	10.0	44	30	75	10	100
MSMBJSAC6.0	6.0	7.90	300	11.2	41	30	75	10	100
MSMBJSAC7.0	7.0	8.33	300	12.6	38	30	75	10	100
MSMBJSAC8.0	8.0	8.89	100	13.4	36	30	75	10	100
MSMBJSAC8.5	8.5	9.44	50	14.0	34	30	75	10	100
MSMBJSAC10	10	11.10	5.0	16.3	29	30	75	10	100
MSMBJSAC12	12	13.30	5.0	19.0	25	30	75	10	100
MSMBJSAC15	15	16.70	5.0	23.6	20	30	75	10	100
MSMBJSAC18	18	20.00	5.0	28.8	15	30	75	10	100
MSMBJSAC22	22	24.40	5.0	35.4	14	30	75	10	100
MSMBJSAC26	26	28.90	5.0	42.3	11.1	30	75	10	100
MSMBJSAC36	36	40.0	5.0	60.0	8.6	30	75	10	100
MSMBJSAC45	45	50.00	5.0	77.0	6.8	30	150	10	200
MSMBJSAC50	50	55.50	5.0	88.0	5.8	30	150	10	200
MSMBJSAC75	75	83.3	5.0	121	4.1	30	150	10	200

*See Figure 3. For the MSMBJSAC75, the maximum clamping voltage V_C is at the maximum rated Peak Pulse Current (I_{PP}) of 4.1 Amps.

Clamping Factor: The ratio of the numerical value of V_C to $V_{(BR)}$ is typically 1.4 @ full rated power, 1.20 @ 50% rated power. Also see MicroNote 108.

Note 1: A transient voltage suppressor is normally selected according to voltage (V_{WM}), that should be equal to or greater than the dc or continuous peak operating voltage level.

Note 2: When pulse testing, test in TVS avalanche direction. Do not pulse in "forward" direction. See section for "Schematic Applications" herein.

GRAPHS

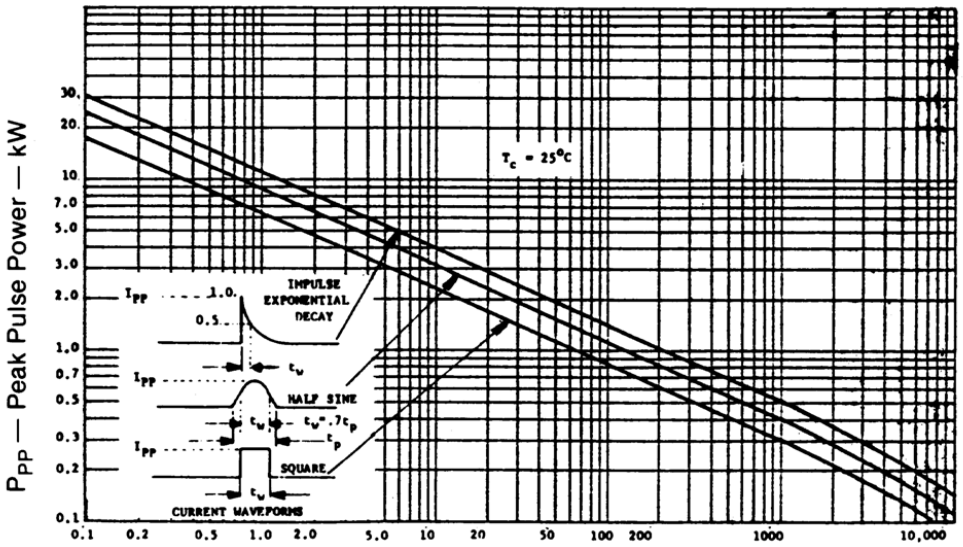

FIGURE 1

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GRAPHS Cont.

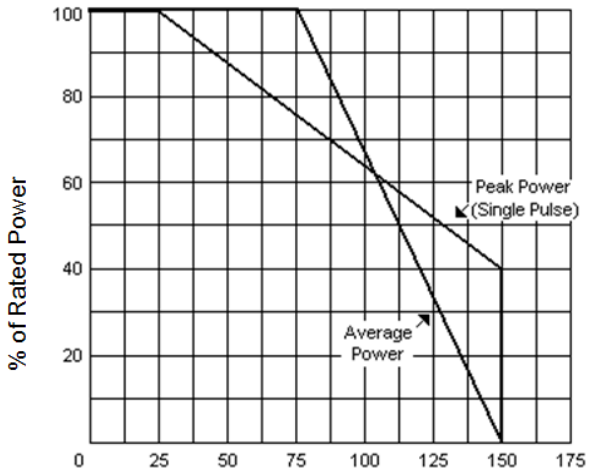

FIGURE 2
Lead Length = 3/8"

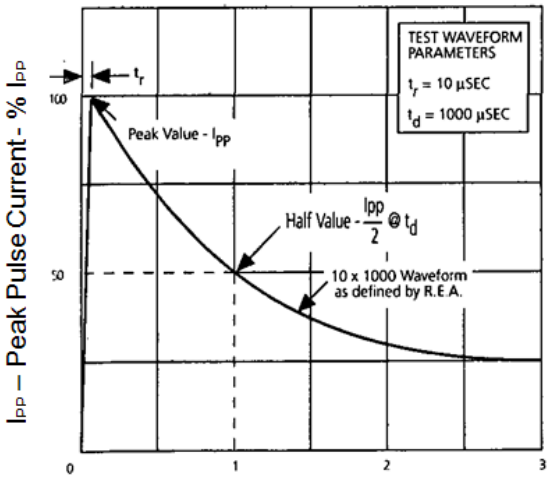

FIGURE 3

SCHEMATIC APPLICATIONS

The TVS low capacitance device configuration is shown in Figure 4. As a further option for unidirectional applications, an additional low capacitance rectifier diode may be used in parallel in the same polarity direction as the TVS as shown in Figure 5. In applications where random high voltage transients occur, this will prevent reverse transients from damaging the internal low capacitance rectifier diode and also provide a low voltage conducting direction. The added rectifier diode should be of similar low capacitance and also have a higher reverse voltage rating than the TVS clamping voltage V_C.
If using two (2) low capacitance TVS devices in anti-parallel for bidirectional applications, this added protective feature for both directions (including the reverse of each rectifier diode) is inherently provided in Figure 6. The unidirectional and bidirectional configurations in Figure 5 and 6 will both result in twice the capacitance of Figure 4.

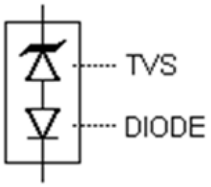

Figure 4
TVS with internal low capacitance diode

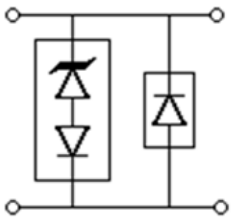

Figure 5
Optional Unidirectional configuration (TVS and separate rectifier diode in parallel

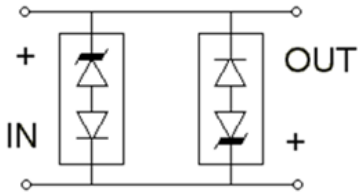

Figure 6
Optional Bidirectional configuration (two TVS devices in anti-parallel)