

**Surface Mount 2 kW  
 Transient Voltage Suppressor**

- High Reliability controlled devices
- Unidirectional construction
- Available in both J-bend and Gull-wing terminations
- Selections for 3 V to 5 V standoff voltages ( $V_{WM}$ )

**DEVICES**

**MSMBJ2K3.0 thru MSMBJ2K5.0, e3  
 MSMBG2K3.0 thru MSMBG2K5.0,e3**

**LEVELS**

**M, MA, MX, MXL**

**FEATURES**

- High reliability controlled devices with wafer fabrication and assembly lot traceability
- 100 % surge tested devices
- Suppresses transients up to 2 kW @ 8/20  $\mu$ s
- Optional upscreening 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.
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- 3 $\sigma$  lot norm screening performed on Standby Current  $I_D$



**APPLICATIONS / BENEFITS**

- Voltage and reverse (leakage) current lowest available
- Protects sensitive components such as IC's, CMOS, Bipolar, BiCMOS, ECL, DTL, T2L, etc.
- Protection from switching transients & induced RF
- Compliant to IEC61000-4-2 and IEC61000-4-4 for ESD and EFT protection respectively
- Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance for Class 1

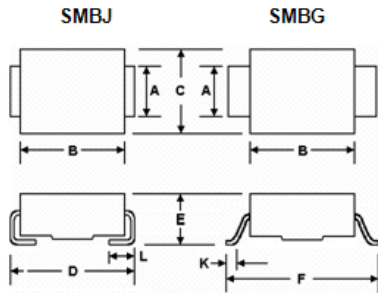
**MAXIMUM RATINGS**

- Peak Pulse Power dissipation at 25 °C: 2000 W @ 8/20  $\mu$ s or 300 W @ 10/1000  $\mu$ s with impulse repetition rate (duty factor) of 0.01 maximum (also see Figure 1 and 4)
- Steady-state power dissipation: 5 Watts @  $T_L \leq 25$  °C or 1.38 Watts at  $T_A = 25$  °C when mounted on FR4 PC board with recommended footprint
- $T_{clamping}$  (0 Volts to  $V_{BR}$  min.): <100 ps
- Operating and Storage temperatures: -65°C to +150°C
- Forward Voltage @ 25 °C: 3.5 Volts maximum @ 30 Amp peak impulse of 8.3 ms half-sine wave (unidirectional only)
- Solder temperatures: 260 °C for 10 s (maximum)

## MECHANICAL AND PACKAGING

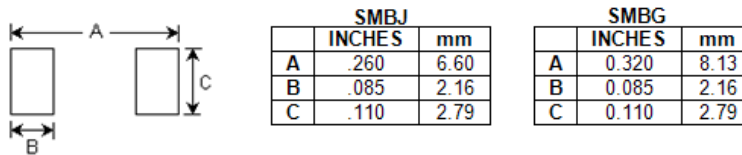
- Void-free transfer molded thermosetting epoxy body meeting UL94V-0 requirements
- Tin-Lead (90 % Sn, 10 % Pb) or RoHS (100% Sn) compliant annealed matte-tin plating readily solderable per MIL-STD-750, method 2026
- Body marked with part number
- Cathode end banded
- Weight: 0.1 grams (approximate)
- Available in bulk or custom tape-and-reel packaging
- TAPE-AND-REEL standard per EIA-296 (add "TR" suffix to part number)

## PACKAGE DIMENSIONS



	A	B	C	D	E	F	K	L
MIN	.077	.160	.130	.205	.077	.235	.015	.030
MAX	.083	.180	.155	.220	.104	.255	.030	.060
DIMENSIONS IN MILLIMETERS								
MIN	1.96	4.06	3.30	5.21	1.95	5.97	.381	.760
MAX	2.10	4.57	3.94	5.59	2.65	6.48	.762	1.520

## PAD LAYOUT



SMBJ			SMBG		
	INCHES	mm		INCHES	mm
A	.260	6.60	A	0.320	8.13
B	.085	2.16	B	0.085	2.16
C	.110	2.79	C	0.110	2.79

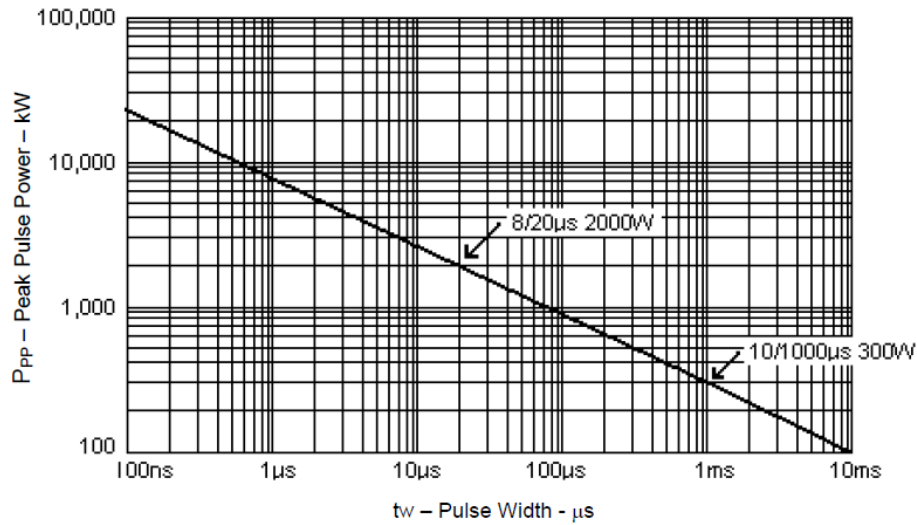
## SYMBOLS & DEFINITIONS

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		

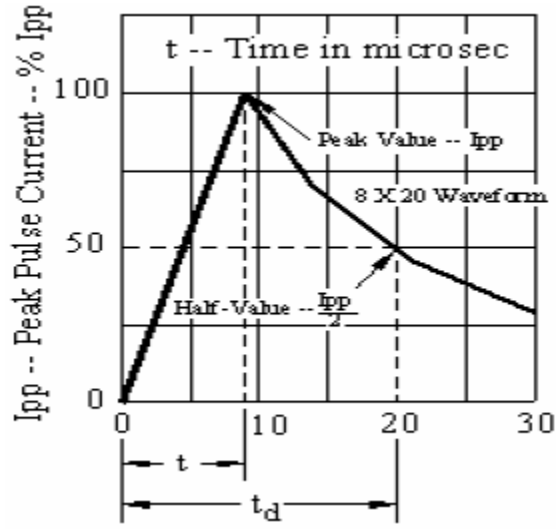
## ELECTRICAL CHARACTERISTICS @ 25°C

MICROSEMI PART NUMBER	BREAKDOWN VOLTAGE Minimum	BREAKDOWN CURRENT	RATED STANDOFF VOLTAGE	MAX STANDBY CURRENT	MAX CLAMPING VOLTAGE	PEAK PULSE CURRENT	TEMPERATURE COEFFICIENT of $V_{BR}$
	$V_{BR}$	$I_{BR}$	$V_{WM}$	$I_D @ V_{WM}$	$V_C @ I_{PP}$	$I_{PP}$	$\alpha_{V(BR)}$
	V	mA	V	$\mu A$	V	A	% / °C
MSMB(J)(G)2K3.0	4.3	50	3.0	1500	5.4	10	+0/-0.05
MSMB(J)(G)2K3.3	4.6	50	3.3	700	5.8	10	$\pm 0.025$
MSMB(J)(G)2K4.0	5.0	50	4.0	400	6.3	10	$\pm 0.030$
MSMB(J)(G)2K4.5	5.4	50	4.5	50	6.6	10	$\pm 0.040$
MSMB(J)(G)2K5.0	5.9	50	5.0	5	7.6	10	+0.050

## GRAPHS

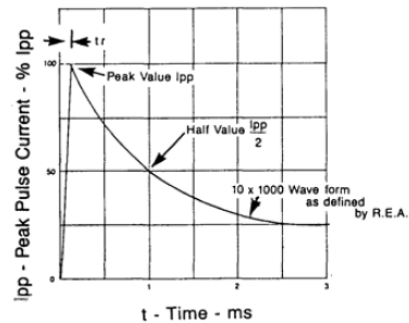


**FIGURE 1**  
 Peak Pulse Power vs. Pulse Time

**GRAPHS Contd.**


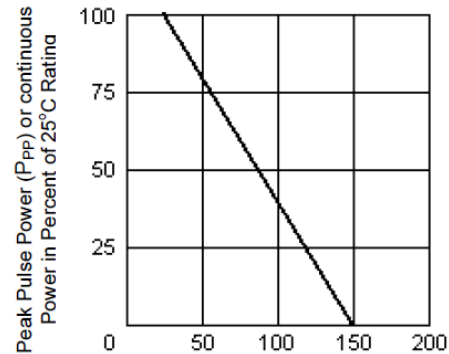
Test waveform parameters:  $t_r=8 \mu s$ ,  $t_p=20 \mu s$

**FIGURE 2**  
 Pulse Waveform for  
 8/20  $\mu s$  Exponential Surge



Test waveform parameters:  $t_r=10 \mu s$ ,  $t_p=1000 \mu s$

**FIGURE 3**  
 Pulse Waveform for  
 10/1000  $\mu s$  Exponential Surge



$T_L$  Lead Temperature  $^{\circ}C$   
**FIGURE 4 - Derating Curve**