

## 600W Transient Voltage Suppressor

- High Reliability controlled devices
- Economical series for thru hole mounting
- Unidirectional (A) and Bidirectional (CA) construction
- Selections for 5.8 to 171 V standoff voltages ( $V_{WM}$ )

### DEVICES

**MP6KE6.8A thru MP6KE200CA, e3**

### LEVELS

M, MA, MX, MXL

### FEATURES

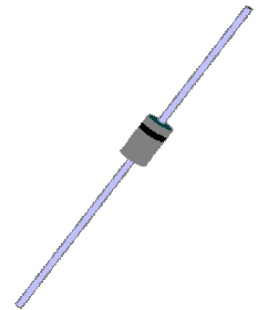
- High reliability controlled devices with wafer fabrication and assembly lot traceability
- 100 % surge tested devices
- Optional upscreening available by replacing the M prefix with MA, MX or MXL. These prefixes specify various screening and conformance inspection options based on MIL-PRF-19500. Refer to [MicroNote 129](#) for more details on the screening options.
- Surface mount equivalents available as MSMBJ5.0A to MSMBJ170CA
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- RoHS Compliant devices available by adding "e3" suffix
- $3\sigma$  lot norm screening performed on Standby Current  $I_D$

### APPLICATIONS / BENEFITS

- Economical TVS series for thru-hole mounting
- Protects sensitive components such as IC's, CMOS, Bipolar, BiCMOS, ECL, DTL,  $T^2L$ , etc.
- Protection from switching transients & induced RF
- Compliant to IEC 61000-4-2 and IEC 61000-4-4 for ESD and EFT protection respectively
- Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance:
  - Class 1: MP6KE6.8A to MP6KE130A or CA
  - Class 2: MP6KE6.8A to MP6KE68A or CA
  - Class 3: MP6KE6.8A to MP6KE36A or CA
  - Class 4: MP6KE6.8A to MP6KE18A or CA
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  - Class 1: MP6KE6.8A to MP6KE43A or CA
  - Class 2: MP6KE6.8A to MP6KE22A or CA

### MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25 °C: 600 watts at 10/1000  $\mu$ s (also see Figures 1,2, and 3) with impulse repetition rate (duty factor) of 0.01 % or less
- $t_{clamping}$  (0 V to  $V_{(BR)}$  min.): < 100 ps theoretical for unidirectional and < 5 ns for bidirectional
- Operating and Storage temperature: -65 °C to +150 °C
- Thermal Resistance: 25 °C/W at 3/8 inch (10 mm) lead length from body, or 85 °C/W junction to ambient when mounted on FR4 PC board with 4 mm<sup>2</sup> copper pads (1 oz) and track width 1 mm, length 25 mm
- Steady-State Power: 5 watts @  $T_L=25$  °C 3/8 inch (10 mm) from body, or 1.47 W when mounted on FR4 PC board described for thermal resistance
- Forward Voltage at 25 °C: 3.5 Volts maximum @ 100 Amp peak impulse of 8.3 ms half-sine wave (unidirectional only)
- Solder temperatures: 260 °C for 10 s (maximum)

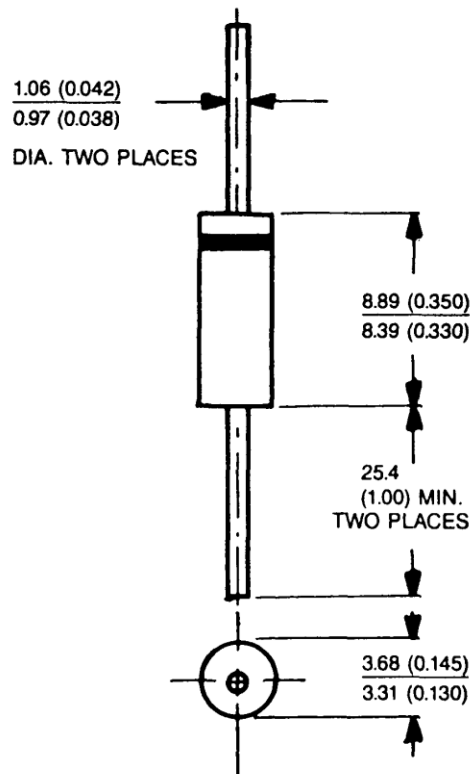


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## MECHANICAL AND PACKAGING

- Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- 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 indicated by band. No cathode band on bi-directional devices.
- Available in bulk or custom tape-and-reel packaging
- TAPE-AND-REEL standard per EIA-296 (add "TR" suffix to part number)
- Weight: 0.7 gram (approximately)

## PACKAGE DIMENSIONS



**NOTE:** Cathode indicated by band.  
 All dimensions in millimeters (inches)

## 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 $V_{BR} @ I_{BR}$				RATED STANDOFF VOLTAGE $V_{WM}$	MAX STANDBY CURRENT $I_D @ V_{WM}$	MAX CLAMPING VOLTAGE $V_C @ I_{PP}$	PEAK PULSE CURRENT (see Fig. 2) $I_{PP}$	TEMPERATURE COEFFICIENT of $V_{BR}$ $\alpha_{V(BR)}$					
	$V_{MIN}$	$V_{NOM}$	$V_{MAX}$	mA						V	$\mu A$	V	A	% / °C
	MP6KE6.8A	6.45	6.8	7.14						10	5.8	1000	10.5	57
MP6KE7.5A	7.13	7.5	7.88	10	6.4	500	11.3	53	.061					
MP6KE8.2A	7.79	8.2	8.61	10	7.02	200	12.1	50	.065					
MP6KE9.1A	8.65	9.1	9.55	1	7.78	50	13.4	45	.068					
MP6KE10A	9.5	10	10.5	1	8.55	10	14.5	41	.073					
MP6KE11A	10.5	11	11.6	1	9.4	5	15.6	38	.075					
MP6KE12A	11.4	12	12.6	1	10.2	5	16.7	36	.078					
MP6KE13A	12.4	13	13.7	1	11.1	5	18.2	33	.081					
MP6KE15A	14.3	15	15.8	1	12.8	1	21.2	28	.084					
MP6KE16A	15.2	16	16.8	1	13.6	1	22.5	27	.086					
MP6KE18A	17.1	18	18.9	1	15.3	1	25.2	24	.088					
MP6KE20A	19	20	21	1	17.1	1	27.7	22	.090					
MP6KE22A	20.9	22	23.1	1	18.8	1	30.6	20	.092					
MP6KE24A	22.8	24	25.2	1	20.5	1	33.2	18	.094					
MP6KE27A	25.7	27	28.4	1	23.1	1	37.5	16	.096					
MP6KE30A	28.5	30	31.5	1	25.6	1	41.4	14.4	.097					
MP6KE33A	31.4	33	34.7	1	28.2	1	45.7	13.2	.098					
MP6KE36A	34.2	36	37.8	1	30.8	1	49.9	12	.099					
MP6KE39A	37.1	39	41	1	33.3	1	53.9	11.2	.100					
MP6KE43A	40.9	43	45.2	1	36.8	1	59.3	10.1	.101					
MP6KE47A	44.7	47	49.4	1	40.2	1	64.8	9.3	.101					
MP6KE51A	48.5	51	53.6	1	43.6	1	70.1	8.6	.102					
MP6KE56A	53.2	56	58.8	1	47.8	1	77	7.8	.103					
MP6KE62A	58.9	62	65.1	1	53	1	85	7.1	.104					
MP6KE68A	64.6	68	71.4	1	58.1	1	92	6.5	.104					
MP6KE75A	71.3	75	78.8	1	64.1	1	103	5.8	.105					
MP6KE82A	77.9	82	86.1	1	70.1	1	113	5.3	.105					
MP6KE91A	86.5	91	95.5	1	77.8	1	125	4.8	.106					
MP6KE100A	95	100	105	1	85.5	1	137	4.4	.106					
MP6KE110A	105	110	116	1	94	1	152	3.4	.107					
MP6KE120A	114	120	126	1	102	1	165	3.6	.107					
MP6KE130A	124	130	137	1	111	1	179	3.3	.107					
MP6KE150A	143	150	158	1	128	1	207	2.9	.108					
MP6KE160A	152	160	168	1	136	1	219	2.7	.108					
MP6KE170A	161	170	179	1	145	1	234	2.6	.108					
MP6KE180A	171	180	189	1	154	1	246	2.4	.108					
MP6KE200A	190	200	210	1	171	1	274	2.2	.108					

**NOTE 1:** Consult factory for higher voltages.

**NOTE 2:** For bidirectional construction, indicate a CA suffix after part number, i.e. MP6KE200CA. Bidirectional capacitance is half that shown in Figure 4 at zero volts.

## GRAPHS

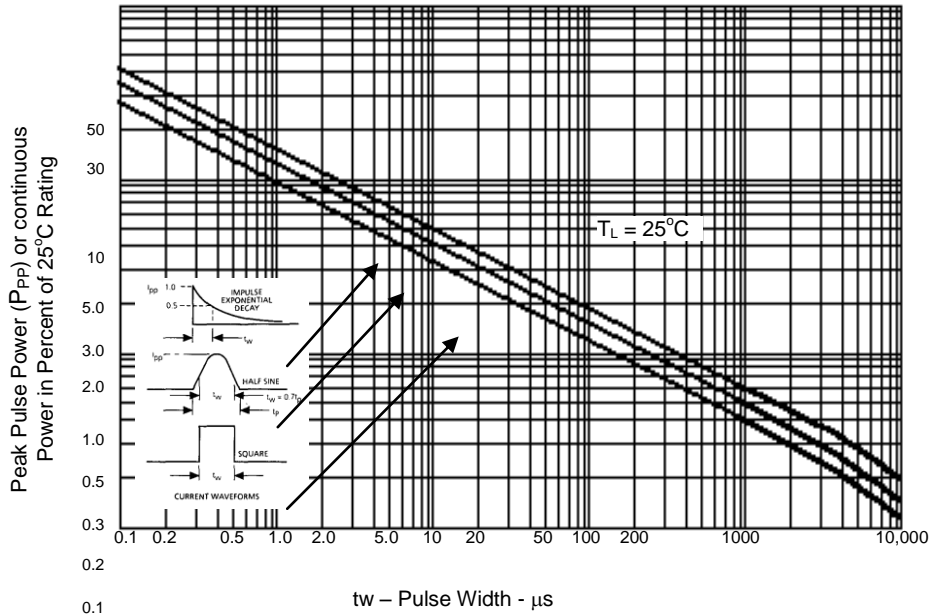
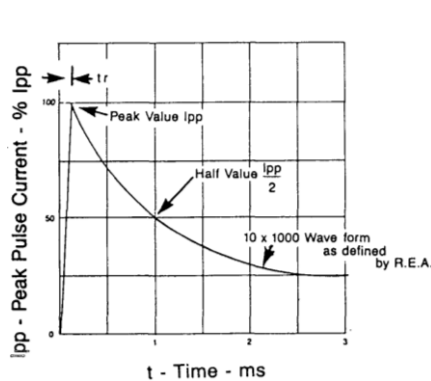


FIGURE 1 – Peak Pulse Power vs. Pulse Time



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

FIGURE 2 – Pulse waveform for exponential surge

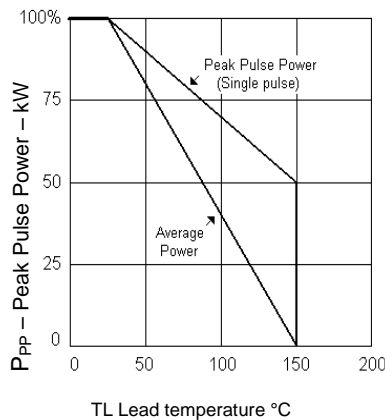


FIGURE 3 – Derating curve

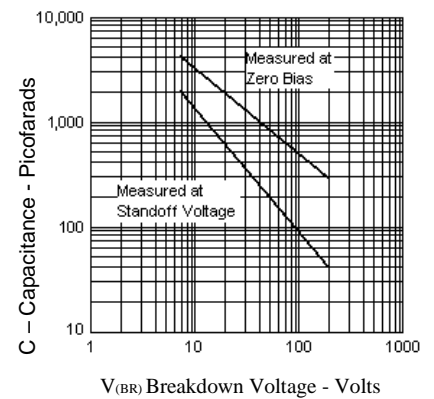


FIGURE 4 – P6KE Typical Capacitance vs. Breakdown Voltage