Microsemi

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TECHNICAL DATA SHEET

600W Transient Voltage Suppressor

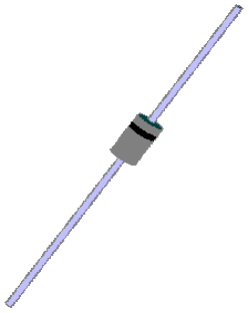
- **High Reliability controlled devices**
- **Economical series for thru hole mounting**
- **Unidirectional (A) and Bidirectional (CA) construction**
- **Selections for 5.8 to 171 V standoff voltages (V_{WM})**

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
- 3σ lot norm screening performed on Standby Current I_D



T-18

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 µs (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^2 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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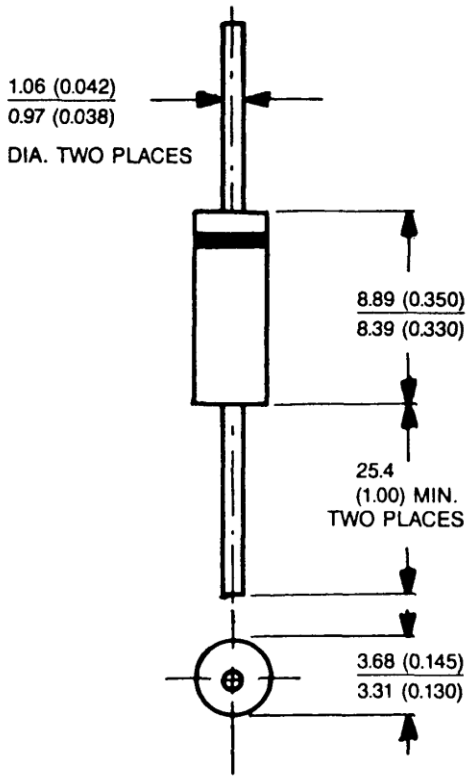
MECHANICAL AND PACKAGING

- 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		

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TECHNICAL DATA SHEET

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 COEFFICIANT of V_{BR} $\alpha_{V(BR)}$
	V_{MIN}	V_{NOM}	V_{MAX}	mA	V	µA	V	A	% / °C
MP6KE6.8A	6.45	6.8	7.14	10	5.8	1000	10.5	57	.057
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.

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GRAPHS

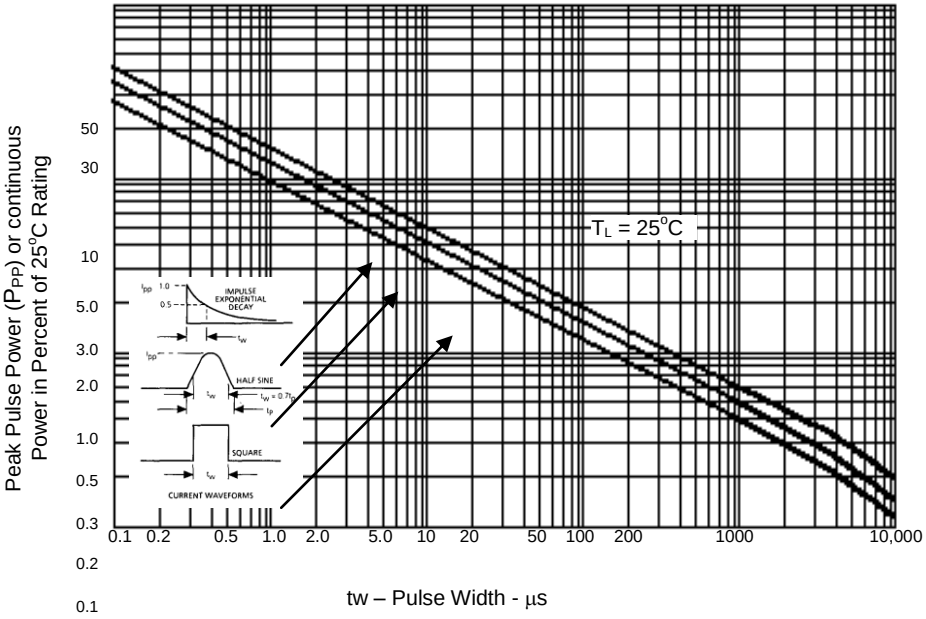
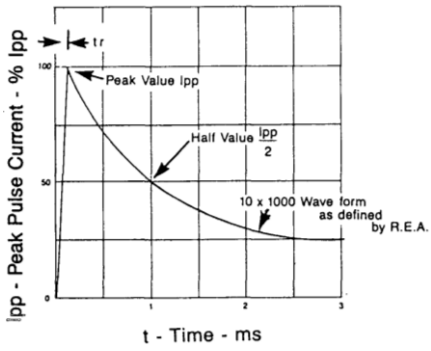


FIGURE 1 – Peak Pulse Power vs. Pulse Time



Test waveform parameters:
tr=10 μs, tw=1000 μs

FIGURE 2 – Pulse waveform for exponential surge

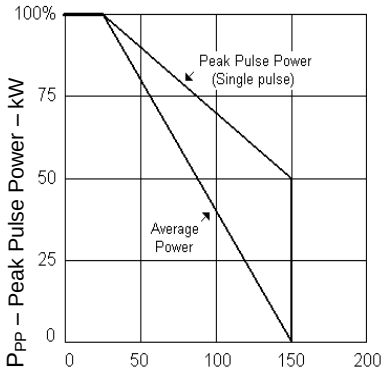


FIGURE 3 – Derating curve

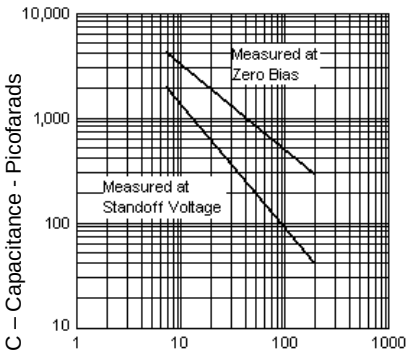


FIGURE 4 – P6KE Typical Capacitance vs. Breakdown Voltage