

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

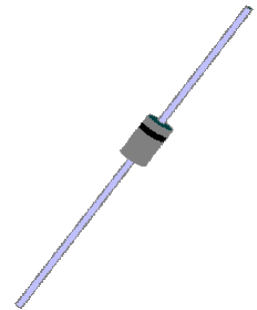
- High reliability controlled devices with wafer fabrication and assembly lot traceability
- 100 % surge tested devices
- Optional upscreening available by replacing the M prefix with MA, MX or MXL. These prefixes specify various screening and conformance inspection options based on MIL-PRF-19500. Refer 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

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 μ 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 mm² 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)

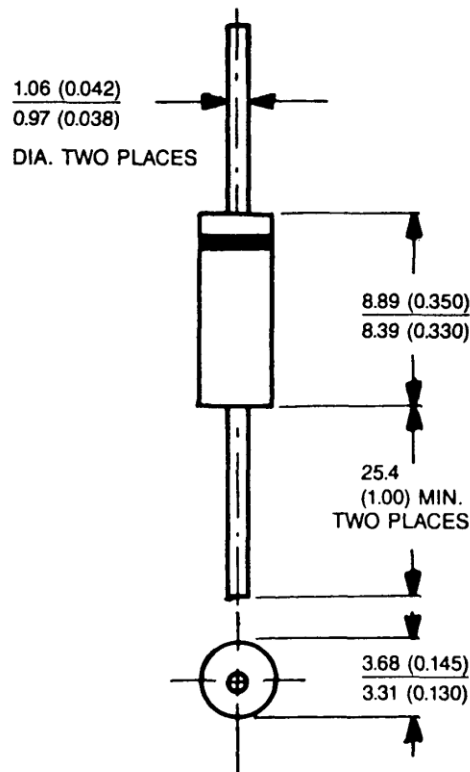


T-18

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 | μA | 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

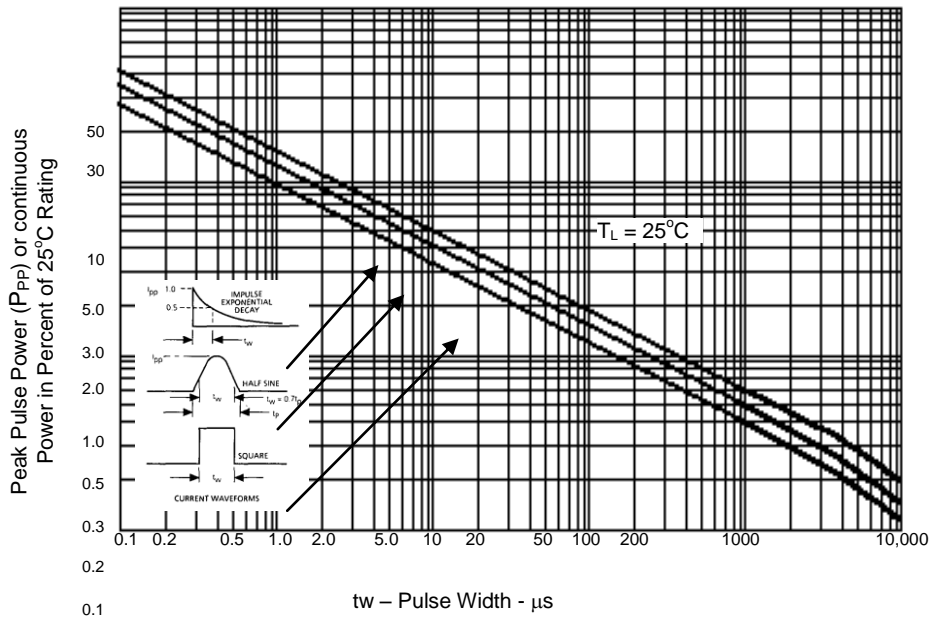
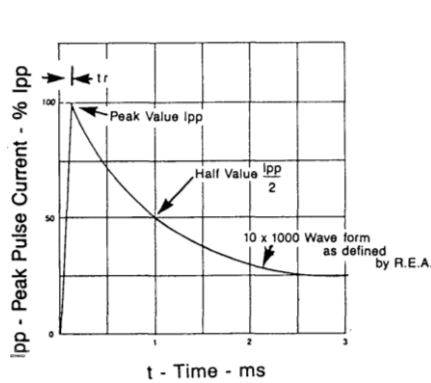


FIGURE 1 – Peak Pulse Power vs. Pulse Time



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

FIGURE 2 – Pulse waveform for exponential surge

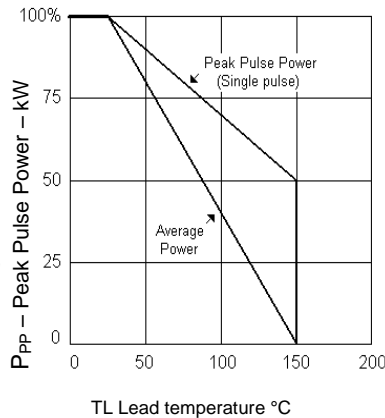


FIGURE 3 – Derating curve

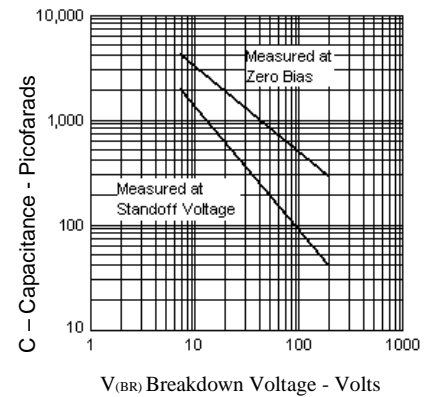


FIGURE 4 – P6KE Typical Capacitance vs. Breakdown Voltage