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6 Lake Street, Lawrence, MA 01841
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TECHNICAL DATA SHEET

400W Transient Voltage Suppressor

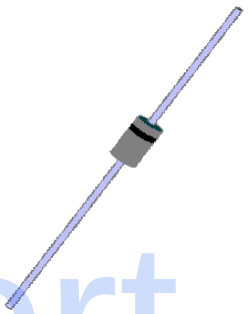
- **High Reliability controlled devices**
- **Economical series for thru hole mounting**
- **Unidirectional (A) and Bidirectional (CA) construction**
- **Selections for 5.8 to 342 V standoff voltages (V_{WM})**
- **Fast response**

DEVICES **MP4KE6.8A thru MP4KE400CA, 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.
- 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



DO-41 (DO-204AL)

APPLICATIONS / BENEFITS

- Suppresses transients up to 400 watts @ 10/1000 μs (see Figure 1)
- 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 IEC 61000-4-5 with 42 Ohms source impedance:
  - Class 1: MP4KE5.0A to MP4KE91CA
  - Class 2: MP4KE5.0A to MP4KE47ACA
  - Class 3: MP4KE5.0A to MP4KE24CA
  - Class 4: MP4KE5.0A to MP4KE12CA
- Secondary lightning protection per IEC 61000-4-5 with 12 Ohms source impedance:
  - Class 1: MP4KE5.0A to MP4KE30CA
  - Class 2: MP4KE5.0A to MP4KE15CA

MAXIMUM RATINGS

- Operating and Storage Temperature: -65 °C to +150 °C
- Peak Pulse Power: 400 Watts at 10/1000 μs (see Figures 1, 2 and 3 for t_W, waveform and derating effects) with impulse repetition rate (duty factor) of 0.01 % or less
- Thermal Resistance: 50 °C /W junction to leads @ 3/8 inch (10 mm) from body, or 110 °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: 2.5 Watts @ TL=25 °C at 3/8 inch (10 mm) from body, or 1.13 W at TA = 25 ºC on FR4 PC board described for thermal resistance
- Forward Voltage at 25 °C: 3.5 V @ 30 A with 8.3 ms half-sine wave (unidirectional only
- Solder temperatures: 260 °C for 10 s (maximum)

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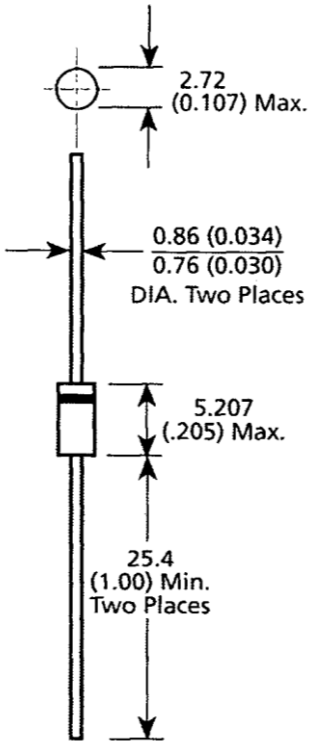
MECHANICAL AND PACKAGING

- 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: 0.3 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 (Note 2)	REVERSE STAND-OFF VOLTAGE V_{WM}	BREAKDOWN VOLTAGE V_{BR} @ I_{BR}			MAXIMUM CLAMPING VOLTAGE V_C@ I_{PP}	MAXIMUM STANDBY CURRENT I_D @ V_{WM}	PEAK PULSE CURRENT (see Fig. 2) I_{PP}	MAXIMUM TEMPERATURE COEFFICIENT of V_{BR} $\alpha_{V(BR)}$
	V	V_{MIN}	V_{MAX}	mA	V	µA	A	% / °C
MP4KE6.8A	5.80	6.45	7.14	10	10.5	500	38	.057
MP4KE7.5A	6.40	7.13	7.88	10	11.3	200	35	.061
MP4KE8.2A	7.02	7.79	8.61	10	12.1	100	33	.065
MP4KE9.1A	7.78	8.65	9.55	1	13.4	20	30	.068
MP4KE10A	8.55	9.50	10.5	1	14.5	5	28	.073
MP4KE11A	9.40	10.5	11.6	1	15.6	2	26	.075
MP4KE12A	10.2	11.4	12.6	1	16.7	1	24	.078
MP4KE13A	11.1	12.4	13.7	1	18.2	1	22	.081
MP4KE15A	12.8	14.3	15.8	1	21.2	1	19	.084
MP4KE16A	13.6	15.2	16.8	1	22.5	1	18	.086
MP4KE18A	15.3	17.1	18.0	1	25.2	1	16	.088
MP4KE20A	17.1	19.0	21.0	1	27.7	1	14.5	.090
MP4KE22A	18.8	20.9	23.1	1	30.6	1	13	.092
MP4KE24A	20.5	22.8	25.2	1	33.2	1	12	.094
MP4KE27A	23.1	25.7	28.4	1	37.5	1	11	.096
MP4KE30A	25.6	28.5	31.5	1	41.4	1	9.5	.097
MP4KE33A	28.2	31.4	34.7	1	45.7	1	9.0	.098
MP4KE36A	30.8	34.2	37.8	1	49.9	1	8.0	.099
MP4KE39A	33.3	37.1	41.0	1	53.9	1	7.5	.100
MP4KE43A	36.8	40.9	45.2	1	59.3	1	7.0	.101
MP4KE47A	40.2	44.7	49.4	1	64.8	1	6.2	.101
MP4KE51A	43.6	48.5	53.6	1	70.1	1	5.7	.102
MP4KE56A	47.8	53.2	58.8	1	77.0	1	5.2	.103
MP4KE62A	53.0	58.9	65.1	1	85.0	1	4.7	.104
MP4KE68A	58.1	64.6	71.4	1	92.0	1	4.4	.104
MP4KE75A	64.1	71.3	78.8	1	103.0	1	3.9	.105
MP4KE82A	70.1	77.9	86.1	1	113.0	1	3.5	.105
MP4KE91A	77.8	86.5	95.5	1	125.0	1	3.2	.106
MP4KE100A	85.5	95.0	105.0	1	137.0	1	2.9	.106
MP4KE110A	94.0	105.0	116.0	1	152.0	1	2.6	.107
MP4KE120A	102.0	114.0	126.0	1	165.0	1	2.4	.107
MP4KE130A	111.0	124.0	137.0	1	179.0	1	2.2	.107
MP4KE150A	128.0	143.0	158.0	1	207.0	1	1.95	.108
MP4KE160A	136.0	152.0	168.0	1	219.0	1	1.8	.108
MP4KE170A	145.0	162.0	179.0	1	234.0	1	1.7	.108
MP4KE180A	154.0	171.0	189.0	1	246.0	1	1.6	.108
MP4KE200A	171.0	190.0	210.0	1	274.0	1	1.5	.108
MP4KE220A	185.0	209.0	231.0	1	328.0	1	1.0	.110
MP4KE250A	214.0	237.0	263.0	1	344.0	1	1.0	.110
MP4KE300A	256.0	285.0	315.0	1	414.0	1	1.0	.110
MP4KE350A	300.0	333.0	368.0	1	482.0	1	1.0	.110
MP4KE400A	342.0	380.0	420.0	1	548.0	1	1.0	.110

NOTE 1: Forward Voltage (Vf) @ 30 amps peak, 8.3 ms sine wave equal to 3.5 volts maximum for MP4KE6.8A TO 200A (excluding bidirectional).

NOTE 2: For bidirectional construction, indicate a CA suffix after part number, e.g. MP4KE170CA. Bidirectional capacitance is half that shown in Figure 4 at zero volts.

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GRAPHS

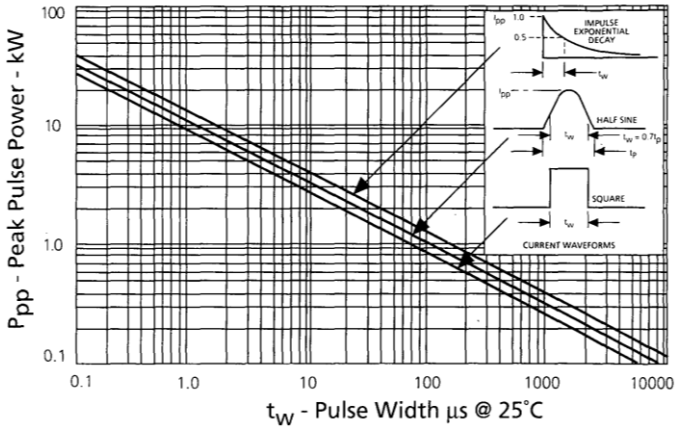
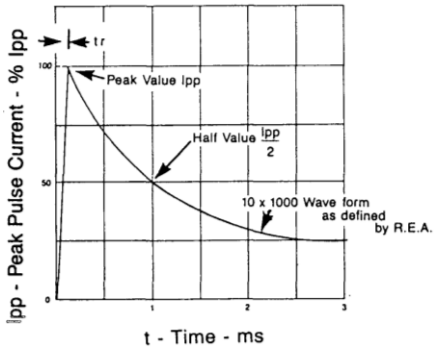


FIGURE 1 Peak Pulse Power vs. Pulse Time



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

FIGURE 2 Pulse Waveform for Exponential Surge

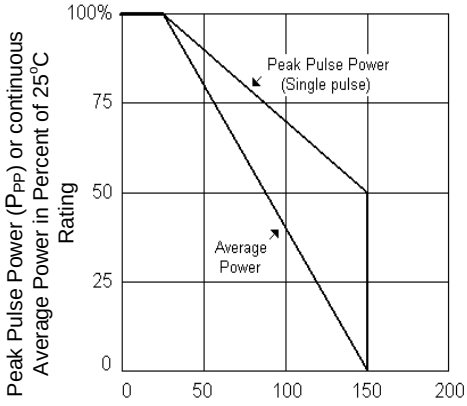


FIGURE 3 Derating Curve

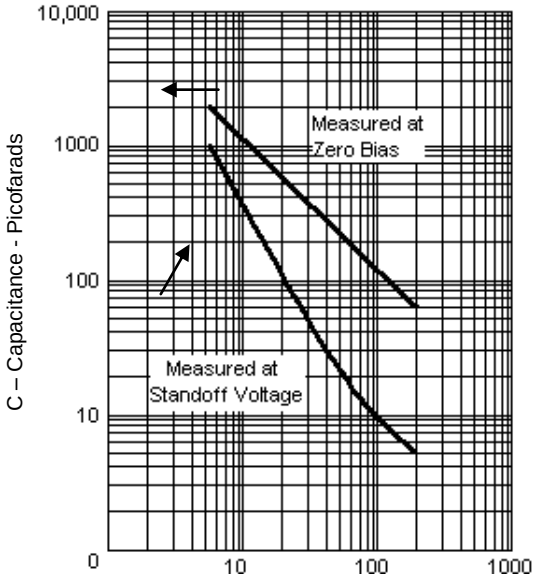


FIGURE 4 MP4KE Typical Capacitance vs. Breakdown Voltage (Unipolar)