


## 5000W Transient Voltage Suppressor

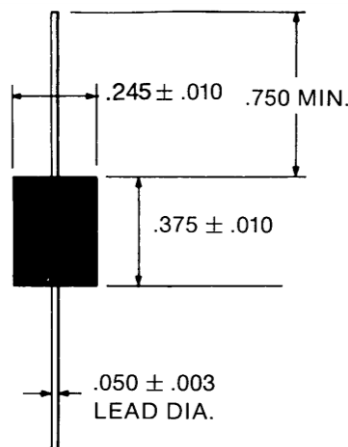
- High Reliability controlled devices
- Unidirectional (A) and Bidirectional (CA) construction
- Plastic encapsulated TVS series for Thru Hole mounting
- Selections for 5.0 to 110 V standoff voltages ( $V_{WM}$ )

DEVICES	M5KP5.0A thru M5KP110CA, e3	LEVELS M, MA, MX, MXL
<b>FEATURES</b>		 <p><b>CASE 5A (DO-204AR)</b></p>
<ul style="list-style-type: none"> <li>▪ High reliability controlled devices with wafer fabrication and assembly lot traceability</li> <li>▪ 100 % surge tested devices</li> <li>▪ Suppresses transients up to 5000 watts @ 10/1000 <math>\mu</math>s and 34000 watts @ 8/20 <math>\mu</math>s (see Figure 1)</li> <li>▪ Optional upscreening available by replacing M prefix with MA, MX or MXL prefixes. These prefixes specify various screening and conformance inspection options based on MIL-PRF-19500. Refer to <a href="#">MicroNote 129</a> for more details on the screening options.</li> <li>▪ Metal hermetically sealed DO-13 axial-leaded equivalents available in the LC6.5A - LC170A series in separate data sheet</li> <li>▪ Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B</li> <li>▪ RoHS Compliant devices available by adding "e3" suffix</li> <li>▪ 3<math>\sigma</math> lot norm screening performed on Standby Current <math>I_b</math></li> </ul>		
<b>APPLICATIONS / BENEFITS</b>		
<ul style="list-style-type: none"> <li>▪ Protection from switching transients and induced RF</li> <li>▪ Fast response</li> <li>▪ Protection from ESD, and EFT per IEC 61000-4-2 and IEC 61000-4-4</li> <li>▪ Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance: <ul style="list-style-type: none"> <li>▪ Class 1,2,3,4: M5KP5.0A to M5KP110CA</li> <li>▪ Class 5: M5KP5.0A to M5KP110CA (short distance)</li> <li>▪ Class 5: M5KP5.0A to M5KP36CA (long distance)</li> </ul> </li> <li>▪ Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance: <ul style="list-style-type: none"> <li>○ Class 1 &amp; 2: M5KP5.0A to M5KP110CA</li> <li>○ Class 3: M5KP5.0A to M5KP78CA</li> <li>○ Class 4: M5KP5.0A to M5KP40CA</li> </ul> </li> <li>▪ Secondary lightning protection per IEC61000-4-5 with 2 Ohms source impedance: <ul style="list-style-type: none"> <li>▪ Class 2: M5KP5.0A to M5KP70CA</li> <li>▪ Class 3: M5KP5.0 to M5KP36CA</li> <li>▪ Class 4: M5KP5.0 to M5KP18CA</li> </ul> </li> </ul>		
<b>MAXIMUM RATINGS</b>		
<ul style="list-style-type: none"> <li>▪ Peak Pulse Power dissipation at 25 °C: 5000 watts at 10/1000 <math>\mu</math>s (also see Figures 1 and 2) with impulse repetition rate (duty factor) of 0.05 % or less</li> <li>▪ <math>t_{clamping}</math> (0 volts to <math>V_{BR}</math> min.): &lt; 100 ps theoretical for unidirectional and &lt; 5 ns for bidirectional</li> <li>▪ Operating and Storage temperature: -65 °C to +150 °C</li> <li>▪ Thermal resistance: 20°C/W junction to lead, or 80°C/W junction to ambient when mounted on FR4 PC board with 4 mm<sup>2</sup> copper pads (1oz) and track width 1 mm, length 25 mm</li> <li>▪ Steady-State Power dissipation: 6 watts at TL = 30 °C, or 1.56 watts at TA = 25 °C when mounted on FR4 PC board described for thermal resistance</li> <li>▪ Forward Surge Voltage: 3.5 V maximum @ 100 Amps 8.3 ms half-sine wave (unidirectional devices only)</li> <li>▪ Solder temperatures: 260 °C for 10 s (maximum)</li> </ul>		

## 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 for axial package (add "TR" suffix to part number)
- Weight: 1.4 gram (approximately)

## PACKAGE DIMENSIONS



### CASE 5A

Dimensions in inches

## SYMBOLS & DEFINITIONS

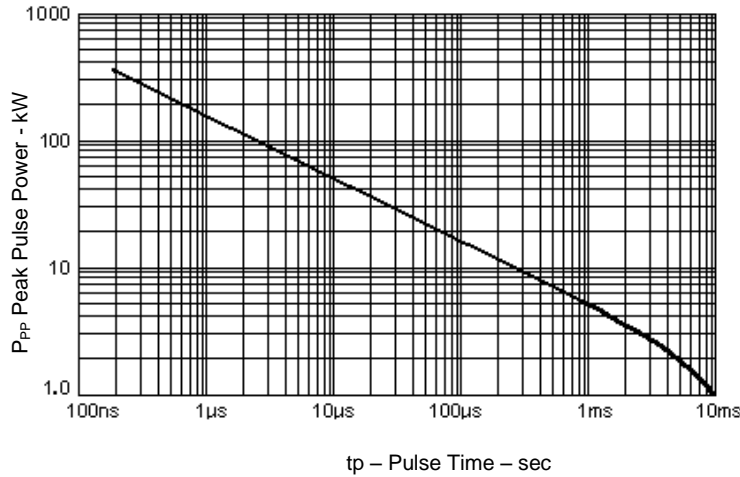
Symbol	Definition	Symbol	Definition
$V_{WM}$	Working Peak (Standoff) Voltage	$I_{PP}$	Peak Pulse Current
$P_{PP}$	Peak Pulse Power	$V_C$	Clamping Voltage
$V_{BR}$	Breakdown Voltage	$I_{BR}$	Breakdown Current for $V_{BR}$
$I_D$	Standby Current		

## ELECTRICAL CHARACTERISTICS @ 25°C

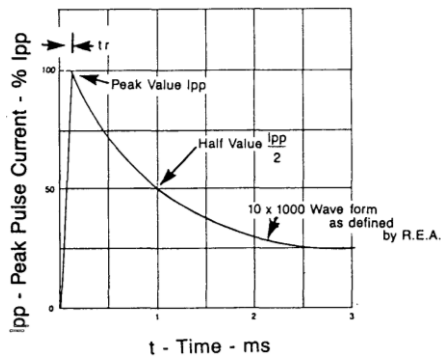
MICROSEMI PART NUMBER (Note 2)	REVERSE STAND-OFF VOLTAGE $V_{WM}$ (Note 1)	BREAKDOWN VOLTAGE $V_{BR}$ @ $I_{BR}$		MAXIMUM CLAMPING VOLTAGE $V_C$ @ $I_{PP}$	MAXIMUM STANDBY CURRENT $I_D$ @ $V_{WM}$	MAXIMUM PEAK PULSE CURRENT $I_{PP}$ (FIG. 2)	MAXIMUM TEMPERATURE COEFFICIENT OF $V_{BR}$ $\alpha_{V(BR)}$
	V	V	mA	V	$\mu A$	A	mV/°C
M5KP5.0A	5.0	6.40 – 7.00	50	9.2	2000*	543	4.0
M5KP6.0A	6.0	6.67 – 7.37	50	10.3	5000	485	4.0
M5KP6.5A	6.5	7.22 – 7.98	50	11.2	2000	447	4.0
M5KP7.0A	7.0	7.78 – 8.60	50	12.0	1000	417	5.0
M5KP7.5A	7.5	8.33 – 9.21	5	12.9	250	388	6.0
M5KP8.0A	8.0	8.89 – 9.83	5	13.6	150	367	6.0
M5KP8.5A	8.5	9.44 – 10.4	5	14.4	50	347	7.0
M5KP9.0A	9.0	10.0 – 11.1	5	15.4	20	325	8.0
M5KP10A	10	11.1 – 12.3	5	17.0	15	294	9.0
M5KP11A	11	12.2 – 13.5	5	18.2	10	274	10
M5KP12A	12	13.3 – 14.7	5	19.9	10	251	11
M5KP13A	13	14.4 – 15.9	5	21.5	10	232	12
M5KP14A	14	15.6 – 17.2	5	23.2	10	215	13
M5KP15A	15	16.7 – 18.5	5	24.4	10	206	15
M5KP16A	16	17.8 – 19.7	5	26.0	10	192	16
M5KP17A	17	18.9 – 20.9	5	27.6	10	181	18
M5KP18A	18	20.0 – 22.1	5	29.2	10	172	19
M5KP20A	20	22.2 – 24.5	5	32.4	10	154	22
M5KP22A	22	24.4 – 26.9	5	35.5	10	141	24
M5KP24A	24	26.7 – 29.5	5	38.9	10	128	27
M5KP26A	26	28.9 – 31.9	5	42.1	10	119	29
M5KP28A	28	31.1 – 34.4	5	45.5	10	110	30
M5KP30A	30	33.3 – 36.8	5	48.4	10	103	35
M5KP33A	33	36.7 – 40.6	5	53.3	10	94	38
M5KP36A	36	40.0 – 44.2	5	58.1	10	86	40
M5KP40A	40	44.4 – 49.1	5	64.5	10	78	45
M5KP43A	43	47.8 – 52.8	5	69.4	10	72	49
M5KP45A	45	50.0 – 55.3	5	72.7	10	69	51
M5KP48A	48	53.3 – 58.9	5	77.4	10	65	55
M5KP51A	51	56.7 – 62.7	5	82.4	10	61	60
M5KP54A	54	60.0 – 66.3	5	87.1	10	57	64
M5KP58A	58	64.4 – 71.2	5	93.6	10	53	69
M5KP60A	60	66.7 – 73.7	5	96.8	10	52	70
M5KP64A	64	71.1 – 78.6	5	103.0	10	49	75
M5KP70A	70	77.8 – 86.0	5	113	10	44	84
M5KP75A	75	83.3 – 92.1	5	121	10	41	90
M5KP78A	78	86.7 – 95.8	5	126	10	40	94
M5KP85A	85	94.4 – 104.0	5	137	10	36	102
M5KP90A	90	100 – 111	5	146	10	34	109
M5KP100A	100	111 – 123	5	162	10	31	122
M5KP110A	110	122 - 135	5	177	10	28	132

**NOTE 1:** Transient Voltage Suppressors are normally selected with reverse "Stand Off Voltage"  $V_{WM}$  which should be equal to or greater than the dc or continuous peak operating voltage level

**NOTE 2:** For bidirectional construction, indicate a CA suffix after the part number  
\* For the 5KP5.0CA double the  $I_D$  Maximum Standby Current to 4000  $\mu A$

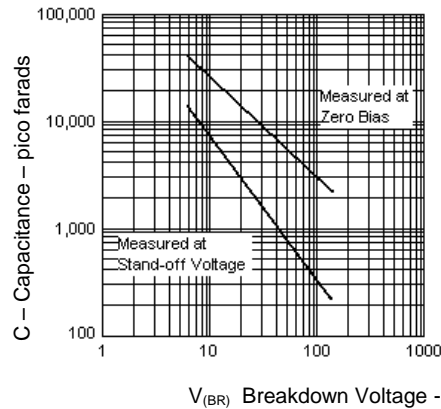
**GRAPHS**


**FIGURE 1** - Peak Pulse Power vs. Pulse Time to 50% of Exponentially Decaying Pulse



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

**FIGURE 2** - Pulse Waveform



**FIGURE 3** Typical Capacitance vs Breakdown Voltage