

Website: <http://www.microsemi.com>

**SURFACE MOUNT 15,000 W  
Transient Voltage Suppressor**

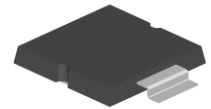
- High Reliability controlled devices
- Unidirectional (A) and Bidirectional (CA) construction
- Selections for 7.0 to 200 V standoff voltages ( $V_{WM}$ )
- Fast response

**DEVICES MPLAD15KP7.0A thru MPLAD15KP200CA, e3**

**LEVELS  
M, MA, MX, MXL**

## FEATURES

- High reliability controlled devices with wafer fabrication and assembly lot traceability
- 100 % surge tested devices
- Low profile surface mount
- Optional up screening 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
- Suppresses transients up to 15,000 W @ 10/1000  $\mu$ s (see Figure 1)
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- RoHS compliant devices available by adding an "e3" suffix
- 3 $\sigma$  lot norm screening performed on Standby Current  $I_b$



## APPLICATIONS / BENEFITS

- Protection from switching transients and induced RF
- Protection from ESD, and EFT per IEC 61000-4-2 and IEC 61000-4-4
- Secondary lightning protection per IEC 61000-4-5 with 42 Ohms source impedance:
  - Class 1,2,3,4,5: MPLAD15KP7.0A to 200CA
- Secondary lightning protection per IEC 61000-4-5 with 12 Ohms source impedance:
  - Class 1,2,3,4: MPLAD15KP7.0A to 200CA
- Secondary lightning protection per IEC 61000-4-5 with 2 Ohms source impedance:
  - Class 2,3: MPLAD15KP7.0A to 200CA
  - Class 4: MPLAD15KP5.0 to 54CA
- Pin injection protection per RTCA/DO-160D for Waveform 4 (6.4/69  $\mu$ s):
  - Level 4: MPLAD15KP7.0A to 200CA
  - Level 5: MPLAD15KP7.0A to 100CA
- Pin injection protection per RTCA/DO-160D for Waveform 5A (40/120  $\mu$ s):
  - Level 4: MPLAD15KP7.0A to 28CA

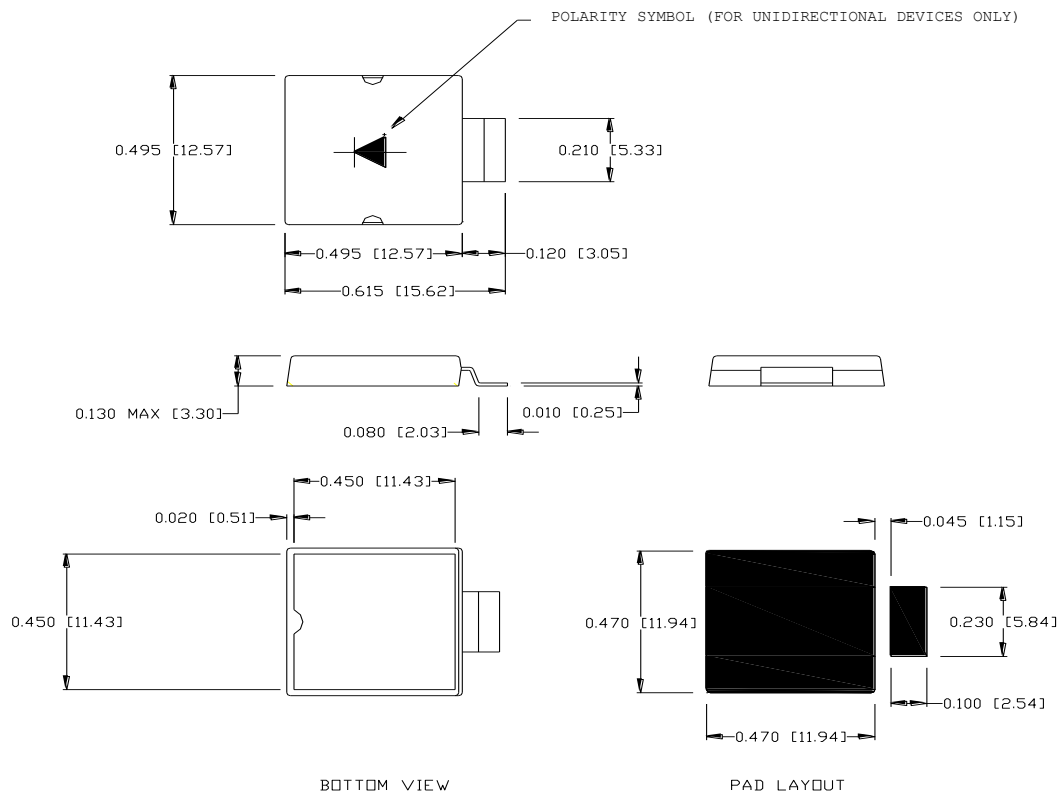
## MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25 °C: 15,000 watts at 10/1000  $\mu$ s (also see Figures 1 and 2) with impulse repetition rate (duty factor) of 0.05% or less
- $t_{clamping}$  (0 volts to VBR min.): < 100 ps theoretical for unidirectional and < 5 ns for bidirectional
- Operating and Storage temperature: -55 °C to +150 °C
- Thermal resistance: 0.2 °C/W junction to case or 50 °C/W junction to ambient when mounted on FR4 PC board with recommended mounting pad (see page 2)
- Steady-State Power dissipation: 50 watts at TC = 100 °C with good heat sink, or 2.5 watts at TA = 25 °C if mounted on FR4 PC board as described for thermal resistance
- Forward Surge Voltage: 3.5 V maximum @ 500 Amps 8.3 ms half-sine wave (unidirectional devices only)
- Solder temperatures: 260 °C for 10 s (maximum)

## MECHANICAL AND PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINALS: Tin-Lead (90 % Sn, 10 % Pb) or RoHS (100 % Sn) Compliant annealed matte-Tin plating readily solderable per MIL-STD-750, method 2026
- MARKING: Body marked with part number
- POLARITY: For unidirectional devices, the cathode is on the metal backside (package bottom)
- Available in bulk or custom tape-and-reel packaging
- TAPE-AND-REEL: Standard per EIA-481-B (add "TR" suffix to part number)
- WEIGHT: 1 gram (approximately)

## PACKAGE AND MOUNTING PAD DIMENSIONS Inches [mm]



## 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		

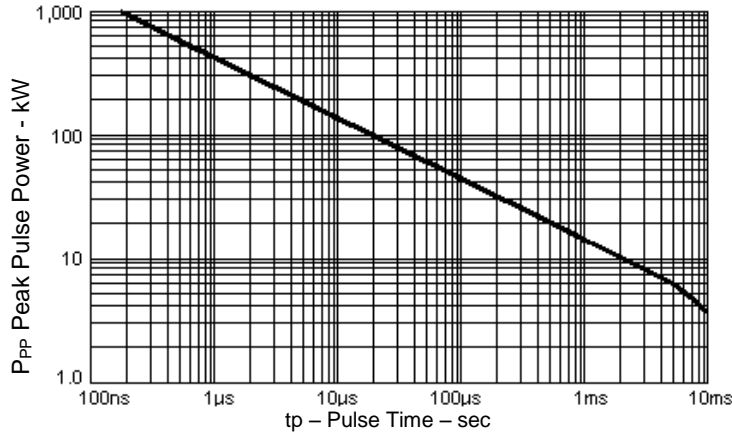
## ELECTRICAL CHARACTERISTICS @ 25°C

MICROSEMI PART NUMBER (Note 2)		REVERSE STAND-OFF VOLTAGE $V_{WM}$ (Note 1)	BREAKDOWN VOLTAGE		MAXIMUM CLAMPING VOLTAGE $V_C @ I_{PP}$	MAXIMUM STANDBY CURRENT $I_D @ V_{WM}$	MAXIMUM PEAK PULSE CURRENT $I_{PP}$ (FIG. 3)	MAXIMUM TEMPERATURE COEFFICIENT OF $V_{BR}$  ( $\alpha_{V(BR)}$ )
			$V_{BR} @ I_{BR}$					
		VOLTS	VOLTS		VOLTS	$\mu A$	A	mV/°C
MPLAD15KP7.0A	MPLAD15KP7.0CA	7.0	7.78 – 8.60	150	12.0	3000	1251	5.0
<b>MPLAD15KP7.5A</b>	MPLAD15KP7.5CA	7.5	8.33 – 9.21	5	12.9	750	1164	6.0
MPLAD15KP8.0A	MPLAD15KP8.0CA	8.0	8.89 – 9.83	5	13.6	450	1101	6.0
MPLAD15KP8.5A	MPLAD15KP8.5CA	8.5	9.44 – 10.4	5	14.4	150	1041	7.0
MPLAD15KP9.0A	MPLAD15KP9.0CA	9.0	10.0 – 11.1	5	15.4	60	975	8.0
MPLAD15KP10A	<b>MPLAD15KP10CA</b>	10	11.1 – 12.3	5	17.0	45	882	9.0
MPLAD15KP11A	MPLAD15KP11CA	11	12.2 – 13.5	5	18.2	10	822	10
<b>MPLAD15KP12A</b>	MPLAD15KP12CA	12	13.3 – 14.7	5	19.9	10	753	11
MPLAD15KP13A	MPLAD15KP13CA	13	14.4 – 15.9	5	21.5	10	696	12
MPLAD15KP14A	MPLAD15KP14CA	14	15.6 – 17.2	5	23.2	10	645	13
MPLAD15KP15A	<b>MPLAD15KP15CA</b>	15	16.7 – 18.5	5	24.4	10	318	15
MPLAD15KP16A	MPLAD15KP16CA	16	17.8 – 19.7	5	26.0	10	576	16
MPLAD15KP17A	MPLAD15KP17CA	17	18.9 – 20.9	5	27.6	10	543	18
MPLAD15KP18A	MPLAD15KP18CA	18	20.0 – 22.1	5	29.2	10	516	19
MPLAD15KP20A	MPLAD15KP20CA	20	22.2 – 24.5	5	32.4	10	462	22
MPLAD15KP22A	MPLAD15KP22CA	22	24.4 – 26.9	5	35.5	10	423	24
MPLAD15KP24A	MPLAD15KP24CA	24	26.7 – 29.5	5	38.9	10	384	27
<b>MPLAD15KP26A</b>	MPLAD15KP26CA	26	28.9 – 31.9	5	42.1	10	357	29
MPLAD15KP28A	MPLAD15KP28CA	28	31.1 – 34.4	5	45.5	10	330	30
MPLAD15KP30A	<b>MPLAD15KP30CA</b>	30	33.3 – 36.8	5	48.4	10	309	35
MPLAD15KP33A	MPLAD15KP33CA	33	36.7 – 40.6	5	53.3	10	282	38
MPLAD15KP36A	MPLAD15KP36CA	36	40.0 – 44.2	5	58.1	10	258	40
<b>MPLAD15KP40A</b>	MPLAD15KP40CA	40	44.4 – 49.1	5	64.5	10	234	45
MPLAD15KP43A	<b>MPLAD15KP43CA</b>	43	47.8 – 52.8	5	69.4	10	216	49
MPLAD15KP45A	<b>MPLAD15KP45CA</b>	45	50.0 – 55.3	5	72.7	10	207	51
<b>MPLAD15KP48A</b>	MPLAD15KP48CA	48	53.3 – 58.9	5	77.4	10	195	55
MPLAD15KP51A	MPLAD15KP51CA	51	56.7 – 62.7	5	82.4	10	183	60
MPLAD15KP54A	MPLAD15KP54CA	54	60.0 – 66.3	5	87.1	10	171	64
MPLAD15KP58A	MPLAD15KP58CA	58	64.4 – 71.2	5	93.6	10	159	69
MPLAD15KP60A	<b>MPLAD15KP60CA</b>	60	66.7 – 73.7	5	96.8	10	156	70
MPLAD15KP64A	MPLAD15KP64CA	64	71.1 – 78.6	5	103.0	10	147	75
MPLAD15KP70A	MPLAD15KP70CA	70	77.8 – 86.0	5	113	10	132	84
<b>MPLAD15KP75A</b>	<b>MPLAD15KP75CA</b>	75	83.3 – 92.1	5	121	10	123	90
<b>MPLAD15KP78A</b>	MPLAD15KP78CA	78	86.7 – 95.8	5	126	10	120	94
<b>MPLAD15KP85A</b>	MPLAD15KP85CA	85	94.4 – 104.0	5	137	10	108	102
MPLAD15KP90A	MPLAD15KP90CA	90	100 – 111	5	146	10	102	109
MPLAD15KP100A	MPLAD15KP100CA	100	111 – 123	5	162	10	93	122
<b>MPLAD15KP110A</b>	MPLAD15KP110CA	110	122 – 135	5	177	10	84	132
MPLAD15KP120A	MPLAD15KP120CA	120	133 – 147	5	193	10	78	145
MPLAD15KP130A	MPLAD15KP130CA	130	144 – 159	5	209	10	71	157
MPLAD15KP150A	MPLAD15KP150CA	150	167 – 185	5	243	10	62	183
MPLAD15KP160A	<b>MPLAD15KP160CA</b>	160	178 – 197	5	259	10	58	195
MPLAD15KP170A	MPLAD15KP170CA	170	189 – 209	5	275	10	55	207
MPLAD15KP180A	MPLAD15KP180CA	180	200 – 221	5	291	10	52	219
<b>MPLAD15KP200A</b>	MPLAD15KP200CA	200	222 – 245	5	322	10	47	243

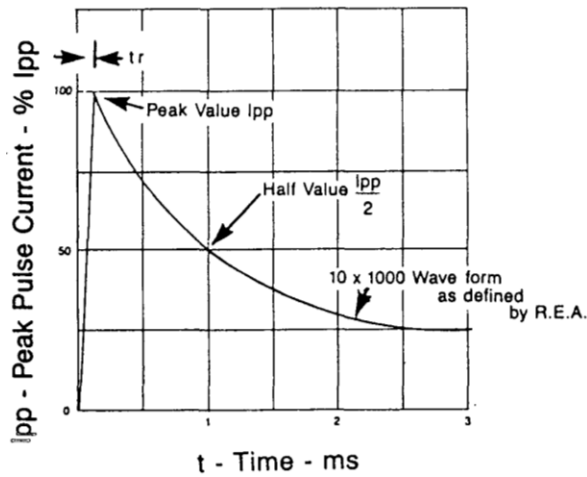
**NOTE 1:** Transient Voltage Suppressors are normally selected with reverse “Stand Off Voltage”  $V_{WM}$ , which should be equal to or greater than the dc or continuous peak operating voltage level

**NOTE 2:** For bidirectional construction, indicate a CA suffix after the part number

**NOTE 3:** Items listed in **Bold** above are available ex-stock or with a short lead-time

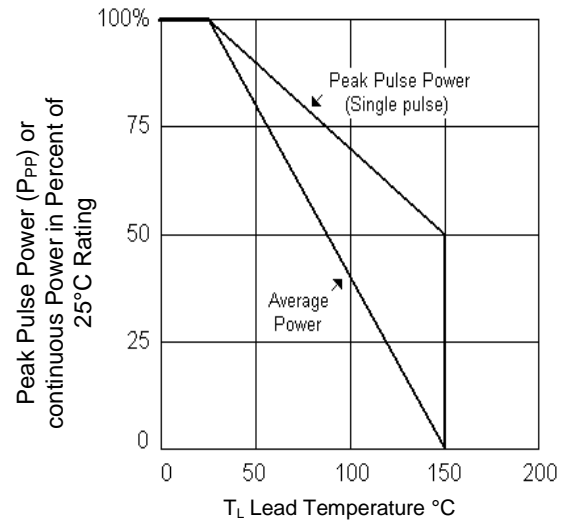
**GRAPHS**


**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**: Derating Curve