RoHS Available

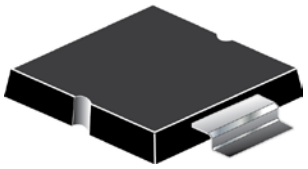
SURFACE MOUNT 30,000 WATT TRANSIENT VOLTAGE SUPPRESSOR

High-Reliability screening available in reference to MIL-PRF-19500

DESCRIPTION

These high power 30 kW rated transient voltage suppressors in a surface mount package are provided with design features to minimize thermal resistance and cumulative heating. They are particularly effective at meeting the multi-stroke lightning standard RTCA DO-160, section 22 for aircraft design. This efficient low profile package design is offered in standoff voltage selections (V_{WM}) of 14 volt to 400 volts in either unidirectional or bidirectional construction.

Important: For the latest information, visit our website http://www.microsemi.com.



PLAD
(The cathode is the metal base under the body of this device.)

FEATURES

- Available in both unidirectional and bidirectional construction (bidirectional with CA suffix).
- High reliability with wafer fabrication and assembly lot traceability.
- All parts surge tested.
- Low profile surface mount package.
- Optional upscreening is available with various screening and conformance inspection options based on MIL-PRF-19500. Refer to Upscreened Plastic Products brochure on our web site for more details on the screening options.
- Suppresses transients up to 30,000 W @ 10/1000 µs (see figure 1).
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B.
- RoHS compliant versions are available.
- 3σ lot norm screening performed on standby current (I_D).

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: MPLAD30KP14A to 400CA
  - Class 5: MPLAD30KP14A to 400CA (short distance)
  - Class 5: MPLAD30KP14A to 220CA (long distance)
- Secondary lightning protection per IEC 61000-4-5 with 12 ohms source impedance:
  - Class 1,2,3: MPLAD30KP14A to 400CA
  - Class 4: MPLAD30KP14A to 220CA
- Secondary lightning protection per IEC 61000-4-5 with 2 ohms source impedance:
  - Class 2: MPLAD30KP10A to 400CA
  - Class 3: MPLAD30KP14A to 220CA
  - Class 4: MPLAD30KP14A to 110CA
- Pin injection protection per RTCA/DO-160F for Waveform 4 (6.4/69 µs @ 25°C)*:
  - Level 4: MPLAD30KP14A to 400CA
  - Level 5: MPLAD30KP14A to 260CA
- Pin injection protection per RTCA/DO-160F for Waveform 5A (40/120 µs @25°C)*:
  - Level 4: MPLAD30KP14A to 64CA
  - Level 5: MPLAD30KP14A to 26CA

*See MicroNote 132 for further temperature derating selection.

Also available:

PLAD15KP
(15,000 watts)
MPLAD15KP7.0A thru MPLAD15KP200CA

MSC – Lawrence
6 Lake Street,
Lawrence, MA 01841
Tel: 1-800-446-1158 or
(978) 620-2600
Fax: (978) 689-0803

MSC – Ireland
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

Website:
www.microsemi.com

MAXIMUM RATINGS @ 25 °C unless otherwise specified

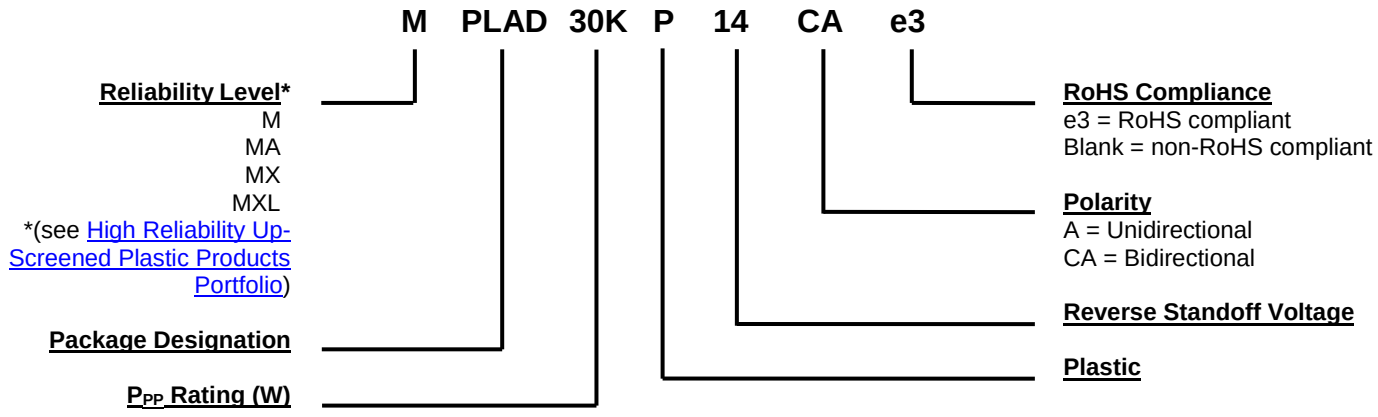
Parameters/Test Conditions		Symbol	Value	Unit
Junction and Storage Temperature		T_J and T_{STG}	-55 to +150	°C/W
Thermal Resistance Junction-to-Ambient (1)		$R_{\Theta JA}$	50	°C/W
Thermal Resistance Junction-to-Case		$R_{\Theta JC}$	1.0	°C/W
Peak Pulse Power @ 10/1000 µs (2)		P_{PP}	30,000	W
$t_{clamping}$ (0 volts to $V_{(BR)}$ min)	Unidirectional Bidirectional		<100 <5	ps ns
Forward Clamping Voltage @ 500 Amps (3)		V_{FS}	4.0	V
Forward Surge Current (3)		I_{FSM}	1500	A
Solder Temperature @ 10 s		T_{SP}	260	°C
Steady-State Power dissipation (5)	T_A = 25 °C T_C = 100 °C	P_D	2.5 (1) 50 (4)	W W

Notes:
1. When mounted on FR4 PC board with recommended mounting pad (see pad layout).
2. Also see figures 1 and 2. With impulse repetition rate (duty factor) of 0.05% or less.
3. At 8.3 ms half-sine wave (unidirectional devices only).
4. Case temperature controlled on heat sink as specified.
5. See MicroNote 134 for derating P_{PP} when also applying steady-state power.

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). Consult factory for quantities.
- WEIGHT: 1.7 – 2.0 grams (approximate).
- See Package Dimensions on last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS	
Symbol	**Definition**
$I_{(BR)}$	Breakdown Current: The current used for measuring breakdown voltage $V_{(BR)}$.
I_D	Standby Current: The current at the rated standoff voltage V_{WM}.
I_{PP}	Peak Impulse Current: The peak current during the impulse.
$V_{(BR)}$	Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.
V_C	Clamping Voltage: Clamping voltage at I_{PP} (peak pulse current) at the specified pulse conditions (typically shown as maximum value).
V_{WM}	Rated Working Standoff Voltage: The maximum peak voltage that can be applied over the operating temperature range.
$\alpha_{V(BR)}$	Temperature Coefficient of Breakdown Voltage: The change in breakdown voltage divided by change in temperature.

ELECTRICAL CHARACTERISTICS @ 25 ºC unless otherwise stated

MICROSEMI PART NUMBER		REVERSE STANDOFF 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. 3)	MAXIMUM TEMPERATURE COEFFICIENT $\alpha_{V(BR)}$
Unidirectional	**Bidirectional**	**Volts**	**Volts**	**mA**	**Volts**	**µA**	**A**	**mV/ ºC**
MPLAD30KP14A	MPLAD30KP14CA	14	15.6 – 17.2	150	24.0	3000	1251	10
MPLAD30KP15A	MPLAD30KP15CA	15	16.7 – 18.5	5	25.8	750	1164	12
MPLAD30KP16A	MPLAD30KP16CA	16	17.8 – 19.7	5	27.2	450	1101	12
MPLAD30KP17A	MPLAD30KP17CA	17	18.9 – 20.9	5	28.8	150	1041	14
MPLAD30KP18A	MPLAD30KP18CA	18	20.0 – 22.1	5	30.8	60	975	16
MPLAD30KP20A	MPLAD30KP20CA	20	22.2 – 24.5	5	34.0	45	882	18
MPLAD30KP22A	MPLAD30KP22CA	22	24.4 – 26.9	5	36.4	10	822	20
MPLAD30KP24A	MPLAD30KP24CA	24	26.7 – 29.5	5	39.8	10	753	22
MPLAD30KP26A	MPLAD30KP26CA	26	28.9 – 31.9	5	43.0	10	696	24
MPLAD30KP28A	MPLAD30KP28CA	28	31.1 – 34.4	5	46.4	10	645	26
MPLAD30KP30A	**MPLAD30KP30CA**	30	33.3 – 36.8	5	48.8	10	618	30
MPLAD30KP33A	MPLAD30KP33CA	33	36.7 – 40.6	5	53.3	10	564	35
MPLAD30KP36A	**MPLAD30KP36CA**	36	40.0 – 44.2	5	58.1	10	516	38
MPLAD30KP40A	MPLAD30KP40CA	40	44.4 – 49.1	5	64.5	10	468	44
MPLAD30KP43A	MPLAD30KP43CA	43	47.8 – 52.8	5	69.4	10	432	50
MPLAD30KP45A	MPLAD30KP45CA	45	50.0 – 55.3	5	72.7	10	414	51
MPLAD30KP48A	MPLAD30KP48CA	48	53.3 – 58.9	5	77.4	10	390	54
MPLAD30KP51A	**MPLAD30KP51CA**	51	56.7 – 62.7	5	82.4	10	366	58
MPLAD30KP54A	MPLAD30KP54CA	54	60.0 – 66.3	5	87.1	10	342	64
MPLAD30KP58A	MPLAD30KP58CA	58	64.4 – 71.2	5	93.6	10	318	70
MPLAD30KP60A	MPLAD30KP60CA	60	66.7 – 73.7	5	96.8	10	312	72
MPLAD30KP64A	MPLAD30KP64CA	64	71.1 – 78.6	5	103.0	10	294	75
MPLAD30KP70A	MPLAD30KP70CA	70	77.8 – 86.0	5	113	10	264	84
MPLAD30KP75A	**MPLAD30KP75CA**	75	83.3 – 92.1	5	121	10	246	90
MPLAD30KP78A	MPLAD30KP78CA	78	86.7 – 95.8	5	126	10	240	95
MPLAD30KP85A	MPLAD30KP85CA	85	94.4 - 104.0	5	137	10	216	104
MPLAD30KP90A	MPLAD30KP90CA	90	100 – 111	5	146	10	204	109
MPLAD30KP100A	MPLAD30KP100CA	100	111 – 123	5	162	10	186	122
MPLAD30KP110A	MPLAD30KP110CA	110	122 – 135	5	177	10	168	132
MPLAD30KP120A	MPLAD30KP120CA	120	133 – 147	5	193	10	156	145
MPLAD30KP130A	MPLAD30KP130CA	130	144 – 159	5	209	10	142	157
MPLAD30KP150A	MPLAD30KP150CA	150	167 – 185	5	243	10	124	183
MPLAD30KP160A	MPLAD30KP160CA	160	178 – 197	5	259	10	116	195
MPLAD30KP170A	**MPLAD30KP170CA**	170	189 – 209	5	275	10	110	207
MPLAD30KP180A	MPLAD30KP180CA	180	200 – 221	5	291	10	104	219
MPLAD30KP200A	MPLAD30KP200CA	200	222 – 245	5	322	10	94	243
MPLAD30KP220A	MPLAD30KP220CA	220	245 – 271	5	356	10	84	269
MPLAD30KP260A	**MPLAD30KP260CA**	260	289 – 320	5	419	10	71	318
MPLAD30KP280A	MPLAD30KP280CA	280	311 – 345	5	451	10	66	344
MPLAD30KP300A	MPLAD30KP300CA	300	333 – 369	5	483	10	62	368
MPLAD30KP350A	MPLAD30KP350CA	350	389 – 431	5	564	10	53	430
MPLAD30KP400A	MPLAD30KP400CA	400	444 – 492	5	644	10	46	490

NOTE 1: Transient Voltage Suppressors are normally selected with reverse standoff voltage V_{WM}, which should be equal to or greater than peak operating voltage.

NOTE 2: Items listed in bold above are available ex-stock or with a short lead-time.

GRAPHS

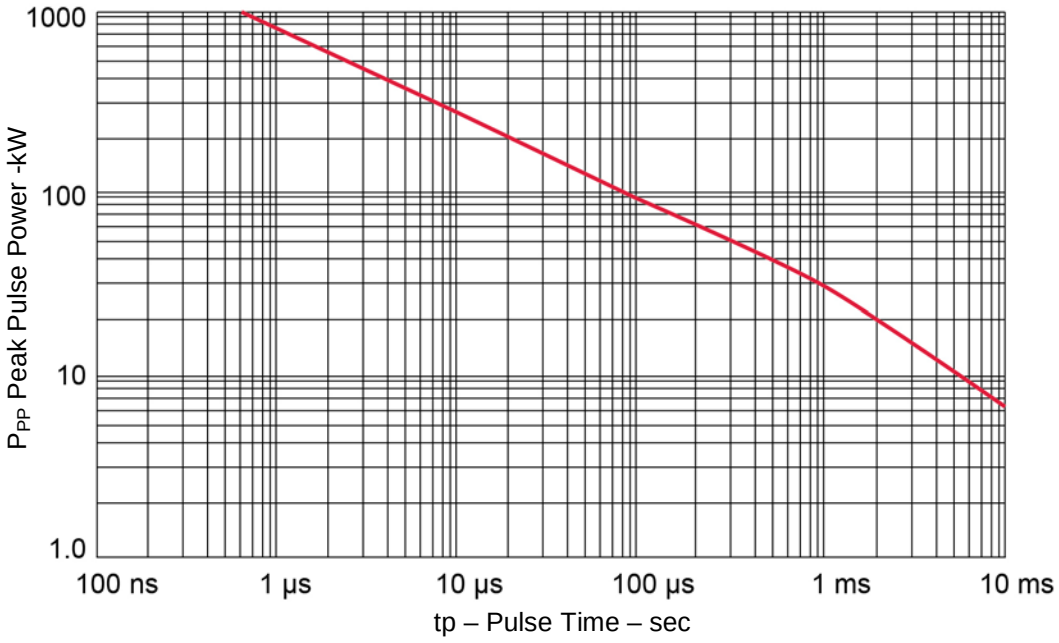
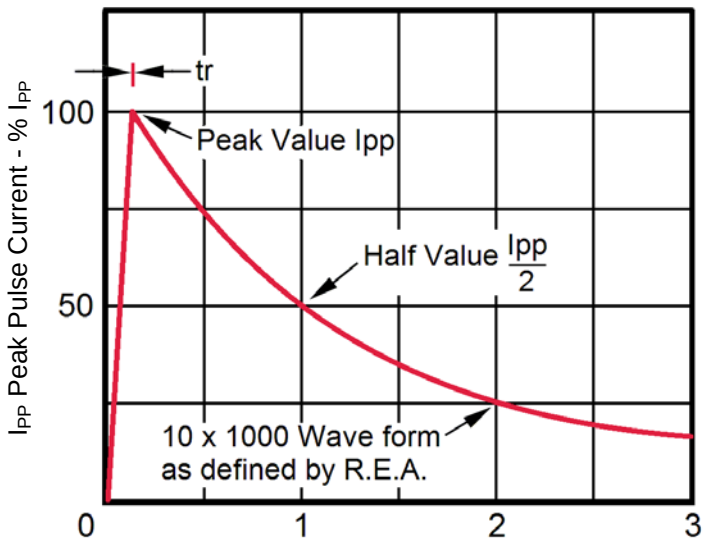


FIGURE 1
Peak Pulse Power vs. Pulse Time



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

Figure 2
Pulse Waveform

GRAPHS (continued)

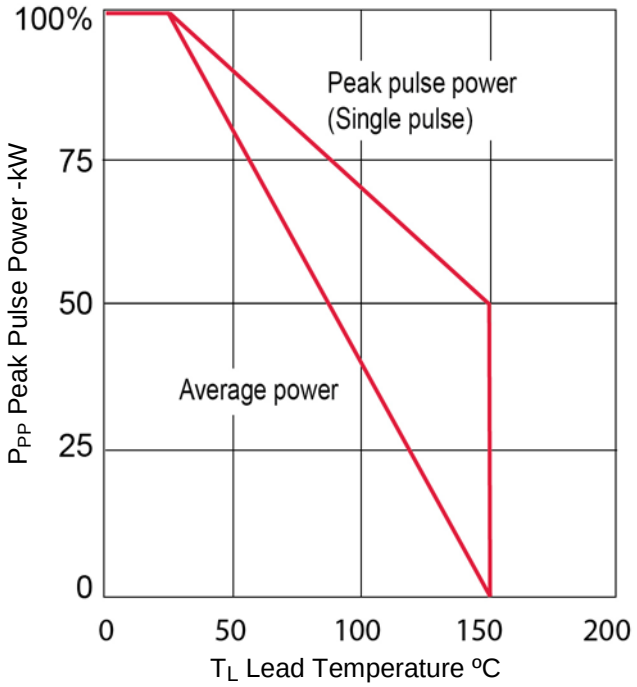
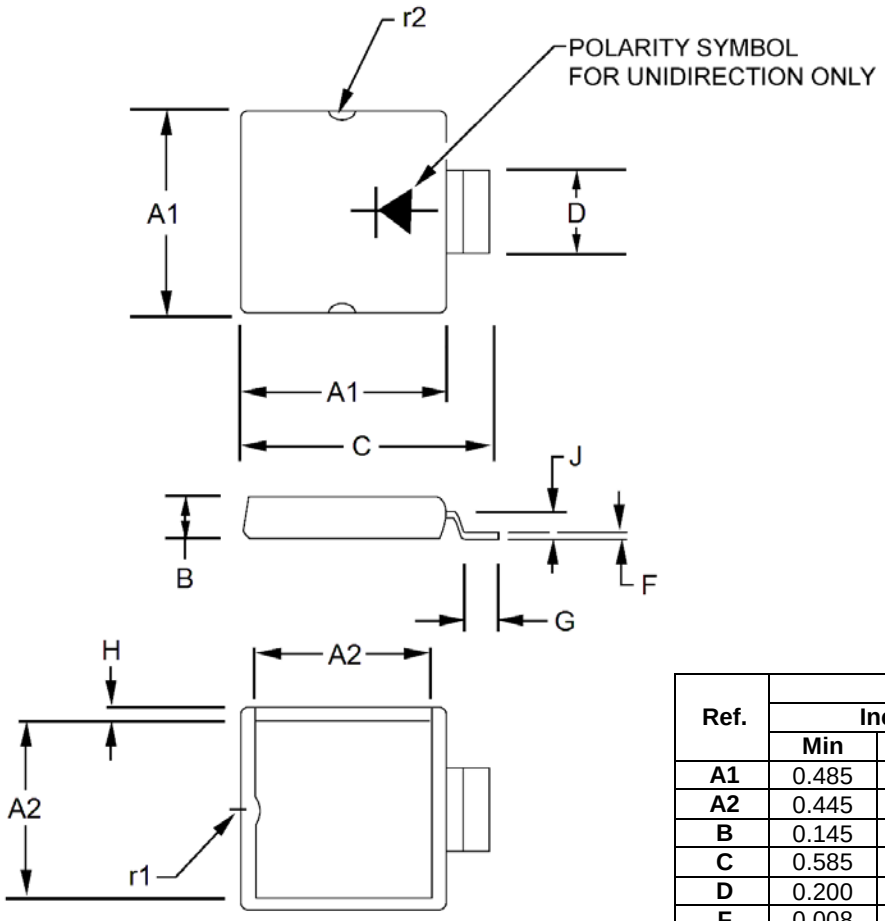


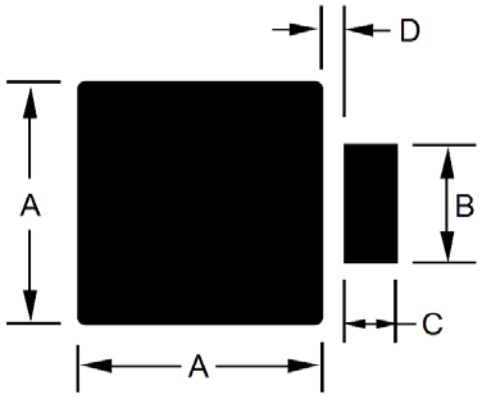
FIGURE 3
Derating Curve

PACKAGE DIMENSIONS



Ref.	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
A1	0.485	0.495	12.32	12.57
A2	0.445	0.455	11.30	11.56
B	0.145	0.155	3.68	3.94
C	0.585	0.595	14.86	15.11
D	0.200	0.210	5.08	5.33
F	0.008	0.013	0.20	0.33
G	0.055	0.065	1.40	1.65
H	0.015	0.025	0.38	0.64
J	0.062 TYP.		1.57 TYP.	
r2	0.045 TYP.		1.14 TYP.	
r3	0.030 TYP.		0.76 TYP.	

PAD LAYOUT



Ref.	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
A	0.465	0.475	11.81	12.07
B	0.225	0.235	5.72	5.97
C	0.095	0.105	2.41	2.67
D	0.04	0.05	1.02	1.27