RoHS Available

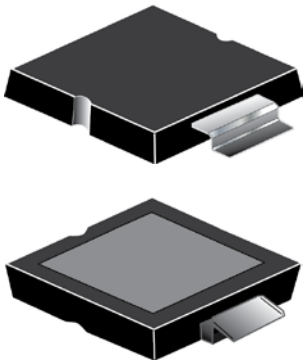
Surface Mount 30,000 Watt Transient Voltage Suppressor

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. Typical applications include lightning and automotive load dump protection. 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 volts 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 Hirel Non-Hermetic Product Portfolio 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 RFI
- 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

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MAXIMUM RATINGS @ 25 °C unless otherwise specified

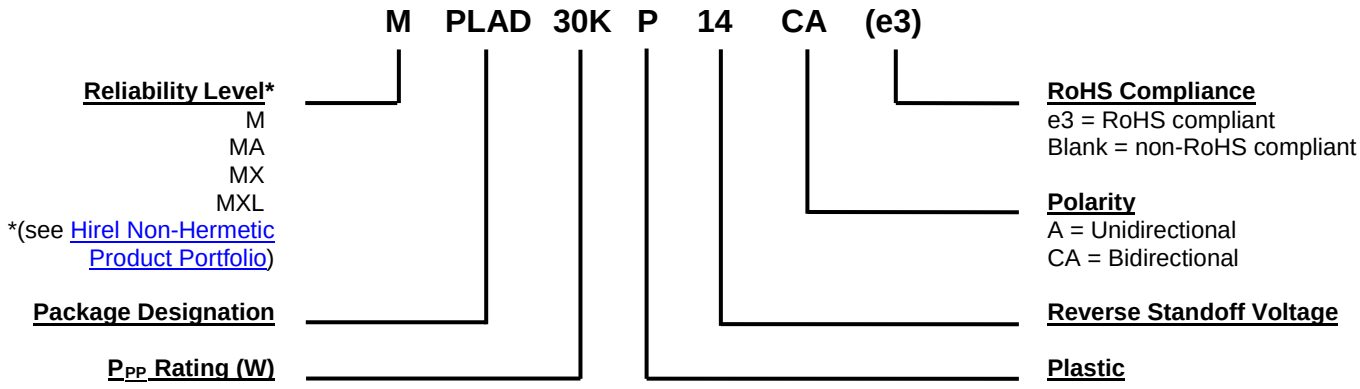
Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-55 to +150	ºC/W
Thermal Resistance Junction-to-Ambient (1)	$R_{\Theta JA}$	50	ºC/W
Thermal Resistance Junction-to-Case	$R_{\Theta JC}$	1.0	ºC/W
Peak Pulse Power @ 10/1000 µs (2)	P_{PP}	30,000	W
$t_{clamping}$ (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	ºC
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 or RoHS 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: Approximately 1.7 – 2.0 grams
- See Package Dimensions on last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS

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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.

* Surge Testing is performed to 1000Amps due to Equipment limitations

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GRAPHS

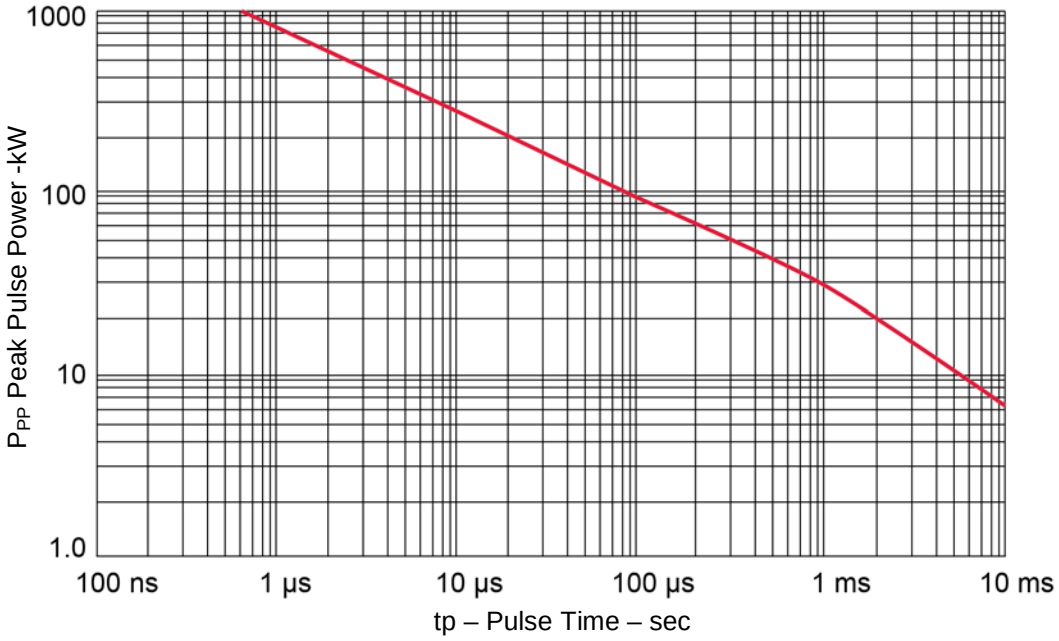
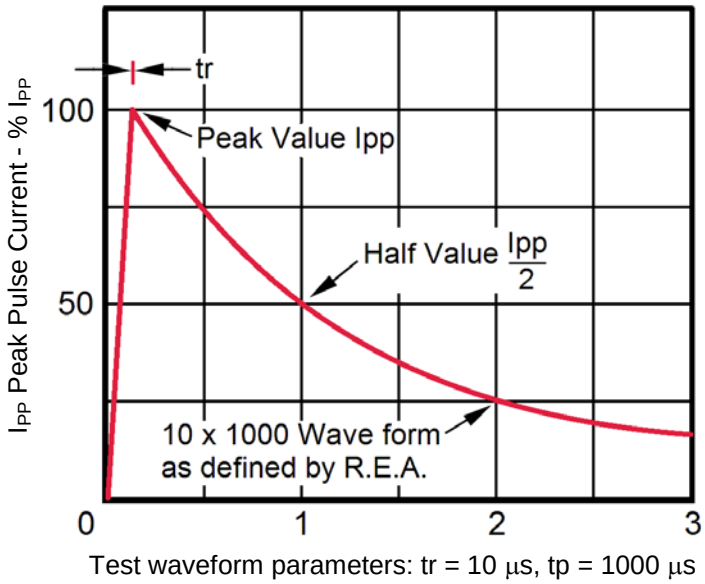


FIGURE 1
Peak Pulse Power vs. Pulse Time



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

Figure 2
Pulse Waveform

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GRAPHS (continued)

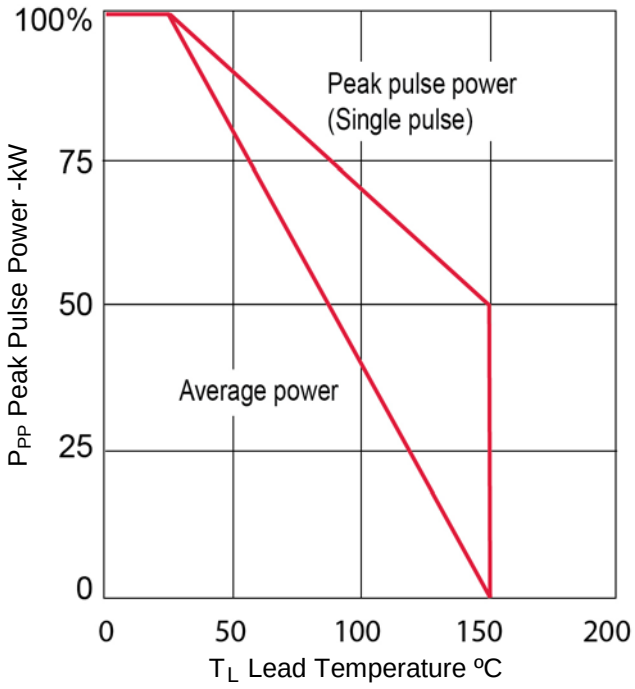

FIGURE 3
Derating Curve

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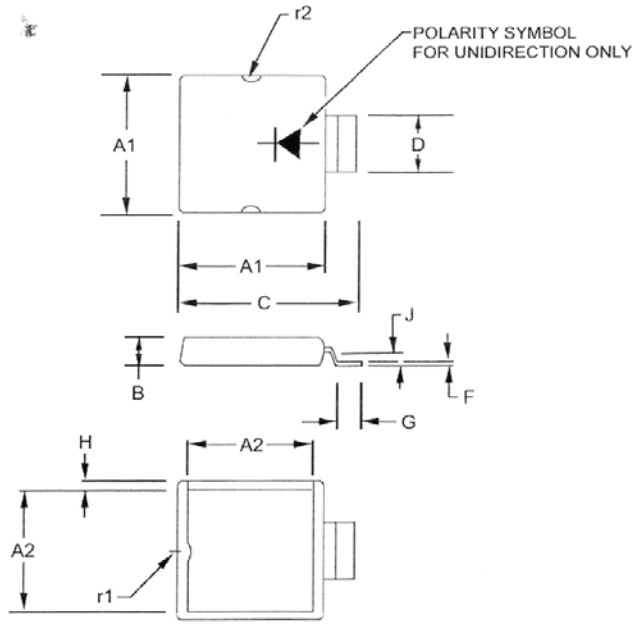
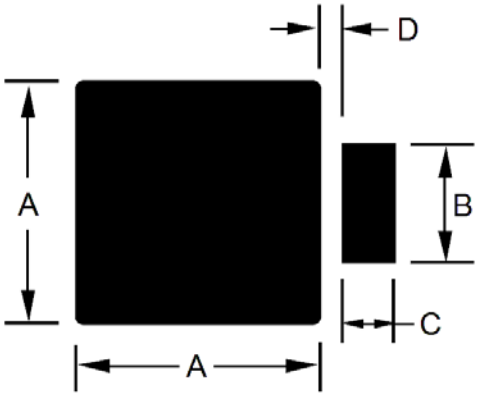
PACKAGE DIMENSIONS



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.	
r1	0.030 TYP.		0.76 TYP.	
r2	0.045 TYP.		1.14 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

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