MPLAD18KP7.0A – MPLAD18KP200CA

RoHS Available

Surface Mount 18,000 Watt Transient Voltage Suppressor

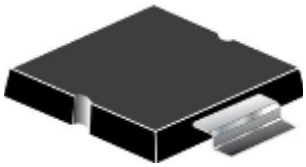
High-Reliability screening available in reference to MIL-PRF-19500

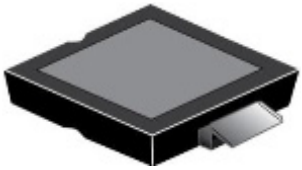
Tested in accordance with the requirements of AEC-Q101

DESCRIPTION

These high power 18 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 7 volts to 200 volts in either unidirectional or bidirectional construction.

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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 for more details on the screening options.
- Suppresses transients up to 18,000 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: MPLAD18KP7.0A to 200CA
- Secondary lightning protection per IEC 61000-4-5 with 12 ohms source impedance:
  Class 1,2,3,4: MPLAD18KP7.0A to 200CA
- Secondary lightning protection per IEC 61000-4-5 with 2 ohms source impedance:
  Class 2,3: MPLAD18KP7.0A to 200CA
  Class 4: MPLAD18KP5.0 to 64CA
- Pin injection protection per RTCA/DO-160F for Waveform 4 (6.4/69 µs at 25 ºC)*:
  Level 4: MPLAD18KP7.0A to 200CA
  Level 5: MPLAD18KP7.0A to 130CA
- Pin injection protection per RTCA/DO-160F for Waveform 5A (40/120 µs at 25 ºC)*:
  Level 4: MPLAD18KP7.0A to 36CA

*See MicroNote 132 for further temperature derating selection.

MPLAD18KP7.0A – MPLAD18KP200CA

MAXIMUM RATINGS @ 25°C unless otherwise specified

Symbol	Parameters / Test Conditions		Value	Unit
T_J and T_{STG}	Junction and Storage Temperature		-55 to +150	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient (1)		50	
$R_{\theta JC}$	Thermal Resistance Junction-to-Case		0.7	
P_{PP}	Peak Pulse Power @ 10/1000 µs (2)		18,000	W
	$t_{clamping}$ (0 volts to $V_{(BR\ min)}$	Undirectional Bidirectional	<100 <5	ps ns
V_{FS}	Forward Clamping Voltage @ 500 Amps (3)		2.0	V
I_{FSM}	Forward Surge Current (3)		1500	A
T_{SP}	Solder Temperature @ 10s		260	°C
P_D	Steady-State Power dissipation (5)	T_A=25°C T_C=100°C	2.5(1) 71(1)	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 gram
- See Package Dimensions on last page.

PART NOMENCLATURE

M PLAD 18K P 7.0 CA (e3)

Reliability Level*
M
MA
MX
MXL
*(see Hirel Non-Hermetic Product Portfolio)

Package Designation

P_{PP} Rating (W)

Plastic

Reverse Standoff Voltage

Polarity
A = Unidirectional CA
= Bidirectional

RoHS Compliance
e3 = RoHS compliant
Blank = non-RoHS compliant

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}	Related 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 temperature.

MPLAD18KP7.0A – MPLAD18KP200CA

ELECTRICAL CHARACTERISTICS @ 25°C unless otherwise specified

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/ °C
MPLAD18KP7.0A	MPLAD18KP7.0CA	7.0	7.78 – 8.60	150	12.0	3000	1500*	5.0
MPLAD18KP7.5A MPLAD18KP8.0A	MPLAD18KP7.5CA MPLAD18KP8.0CA	7.5 8.0	8.33 – 9.21 8.89 – 9.83	5 5	12.9 13.6	750 450	1396* 1324*	6.0 6.0
MPLAD18KP8.5A MPLAD18KP9.0A	MPLAD18KP8.5CA MPLAD18KP9.0CA	8.5 9.0	9.44 – 10.4 10.0 – 11.1	5 5	14.4 15.4	150 60	1250* 1169*	7.0 8.0
MPLAD18KP10A MPLAD18KP11A	MPLAD18KP10CA MPLAD18KP11CA	10 11	11.1 – 12.3 12.2 – 13.5	5 5	17.0 18.2	45 10	1059* 989	9.0 10
MPLAD18KP12A MPLAD18KP13A	MPLAD18KP12CA MPLAD18KP13CA	12 13	13.3 – 14.7 14.4 – 15.9	5 5	19.9 21.5	10 10	905 838	11 12
MPLAD18KP14A MPLAD18KP15A	MPLAD18KP14CA MPLAD18KP15CA	14 15	15.6 – 17.2 16.7 – 18.5	5 5	23.2 24.4	10 10	776 738	13 15
MPLAD18KP16A MPLAD18KP17A	MPLAD18KP16CA MPLAD18KP17CA	16 17	17.8 – 19.7 18.9 – 20.9	5 5	26.0 27.6	10 10	693 653	16 18
MPLAD18KP18A MPLAD18KP20A	MPLAD18KP18CA MPLAD18KP20CA	18 20	20.0 – 22.1 22.2 – 24.5	5 5	29.2 32.4	10 10	617 556	19 22
MPLAD18KP22A MPLAD18KP24A	MPLAD18KP22CA MPLAD18KP24CA	22 24	24.4 – 26.9 26.7 – 29.5	5 5	35.5 38.9	10 10	508 463	24 27
MPLAD18KP26A MPLAD18KP28A	MPLAD18KP26CA MPLAD18KP28CA	26 28	28.9 – 31.9 31.1 – 34.4	5 5	42.1 45.5	10 10	428 396	29 30
MPLAD18KP30A MPLAD18KP33A	MPLAD18KP30CA MPLAD18KP33CA	30 33	33.3 – 36.8 36.7 – 40.6	5 5	48.4 53.3	10 10	372 338	35 38
MPLAD18KP36A MPLAD18KP40A	MPLAD18KP36CA MPLAD18KP40CA	36 40	40.0 – 44.2 44.4 – 49.1	5 5	58.1 64.5	10 10	310 280	40 45
MPLAD18KP43A MPLAD18KP45A	MPLAD18KP43CA MPLAD18KP45CA	43 45	47.8 – 52.8 50.0 – 55.3	5 5	69.4 72.7	10 10	260 248	49 51
MPLAD18KP48A MPLAD18KP51A	MPLAD18KP48CA MPLAD18KP51CA	48 51	53.3 – 58.9 56.7 – 62.7	5 5	77.4 82.4	10 10	233 219	55 60
MPLAD18KP54A MPLAD18KP58A	MPLAD18KP54CA MPLAD18KP58CA	54 58	60.0 – 66.3 64.4 – 71.2	5 5	87.1 93.6	10 10	183 207 193	64 69
MPLAD18KP60A MPLAD18KP64A	MPLAD18KP60CA MPLAD18KP64CA	60 64	66.7 – 73.7 71.1 – 78.6	5 5	96.8 103	10 10	186 175	70 75
MPLAD18KP70A MPLAD18KP75A	MPLAD18KP70CA MPLAD18KP75CA	70 75	77.8 – 86.0 83.3 – 92.1	5 5	113 121	10 10	160 149	84 90
MPLAD18KP78A MPLAD18KP85A	MPLAD18KP78CA MPLAD18KP85CA	78 85	86.7 – 95.8 94.4 – 104.0	5 5	126 137	10 10	143 132	94 102
MPLAD18KP90A MPLAD18KP100A	MPLAD18KP90CA MPLAD18KP100CA	90 100	100 – 111 111 – 123	5 5	146 162	10 10	124 112	109 122
MPLAD18KP110A MPLAD18KP120A	MPLAD18KP110CA MPLAD18KP120CA	110 120	122 – 135 133 – 147	5 5	177 193	10 10	102 94	132 145
MPLAD18KP130A MPLAD18KP150A	MPLAD18KP130CA MPLAD18KP150CA	130 150	144 – 159 167 – 185	5 5	209 243	10 10	87 75	157 183
MPLAD18KP160A MPLAD18KP170A	MPLAD18KP160CA MPLAD18KP170CA	160 170	178 – 197 189 – 209	5 5	259 275	10 10	70 66	195 207
MPLAD18KP180A MPLAD18KP200A	MPLAD18KP180CA MPLAD18KP200CA	180 200	200 – 221 222 – 245	5 5	291 322	10 10	62 56	219 243

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

* Surge Testing is performed to 1000Amps due to equipment limitations.

GRAPHS

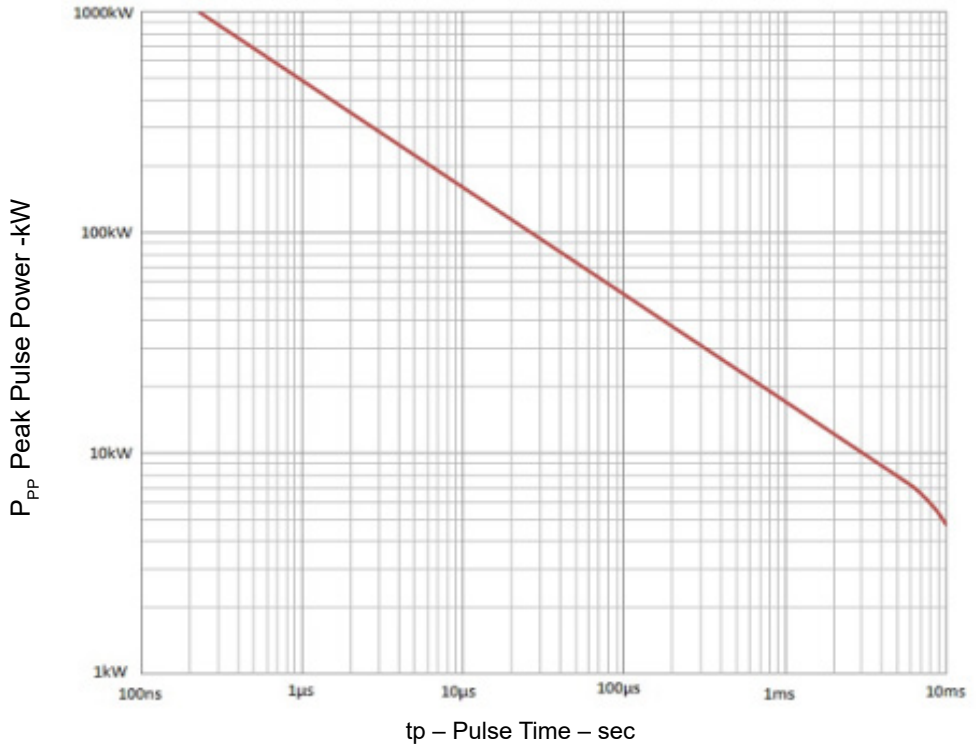


Figure 1
Peak Pulse Power vs. Pulse Time
(to 50% of exponentially decaying pulse)

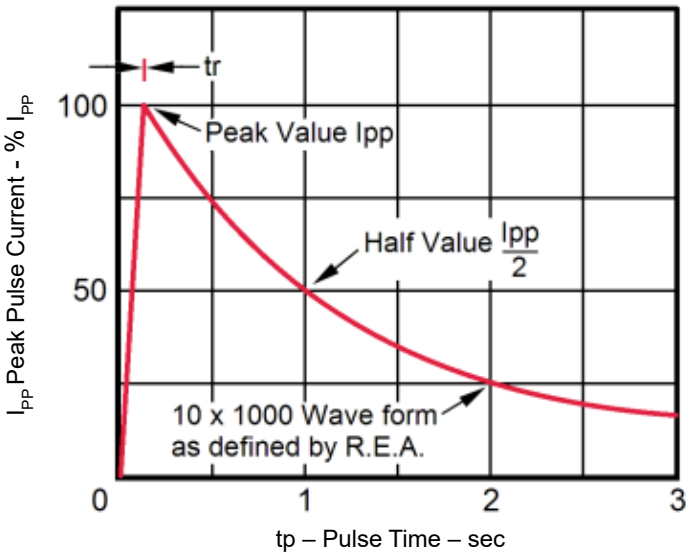


Figure 2
Pulse Waveform
Test waveform parameters: tr = 10 µs, tp = 1000 µs

GRAPHS (continued)

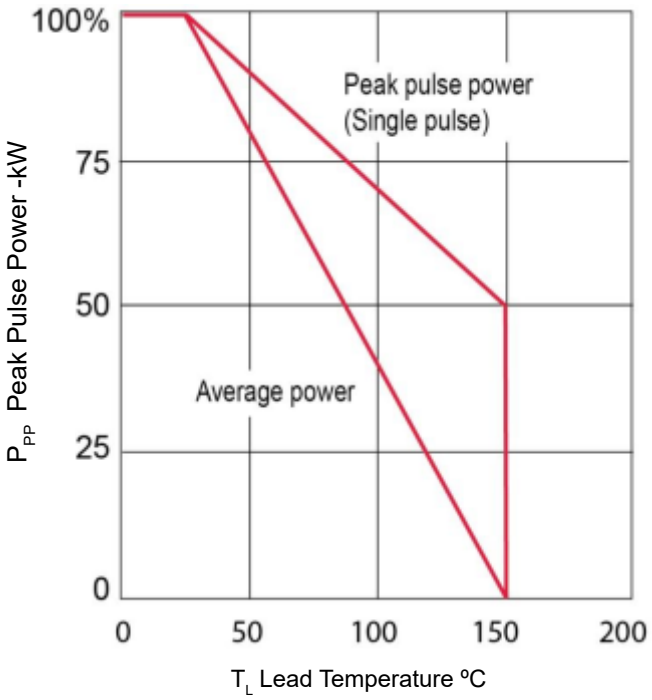
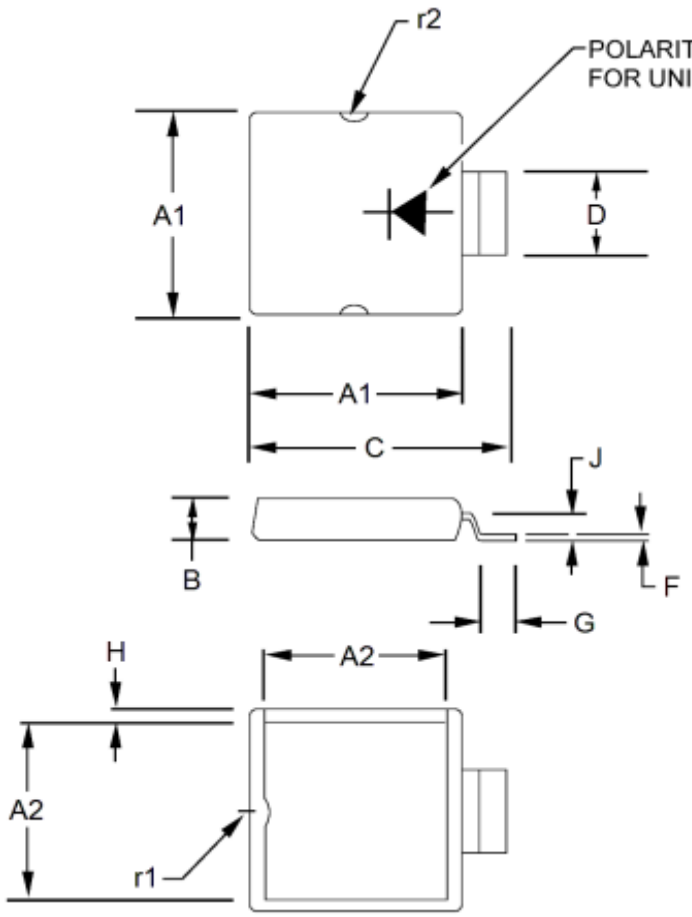


Figure 3
Derating Curve

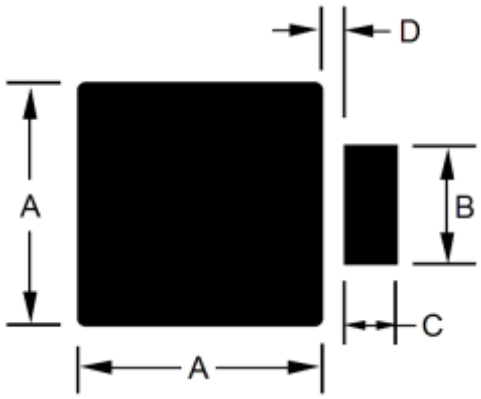
MPLAD18KP7.0A – MPLAD18KP200CA

PACKAGE DIMENSIONS



Ref.	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
A1	0.485	0.495	12.32	12.57
A2	0.415	0.425	10.54	10.80
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
	Typical	Typical
A	0.470	11.94
B	0.230	5.85
C	0.100	2.44
D	0.045	1.15

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