

# MPLAD18KP7.0A – MPLAD18KP200CA



## Surface Mount 18,000 Watt Transient Voltage Suppressor

### 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.

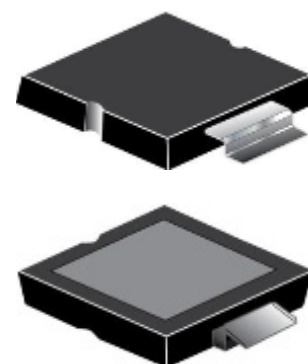
**Important:** For the latest information, visit our website <http://www.microsemi.com>.

### 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 upscreaming 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  $\mu$ s (see [Figure 1](#))
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- RoHS compliant versions are available
- $3\sigma$  lot norm screening performed on standby current ( $I_b$ )

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

*Tested in accordance with the requirements of AEC-Q101*



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

### 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  $\mu$ s at 25 °C)\*:  
Level 4: MPLAD18KP7.0A to 200CA  
Level 5: MPLAD18KP7.0A to 130CA
- Pin injection protection per RTCA/DO-160F for Waveform 5A (40/120  $\mu$ s at 25 °C)\*:  
Level 4: MPLAD18KP7.0A to 36CA

\*See [MicroNote 132](#) for further temperature derating selection.

# MPLAD18KP7.0A – MPLAD18KP200CA

## MAXIMUM RATINGS @ 25°C unless otherwise specified

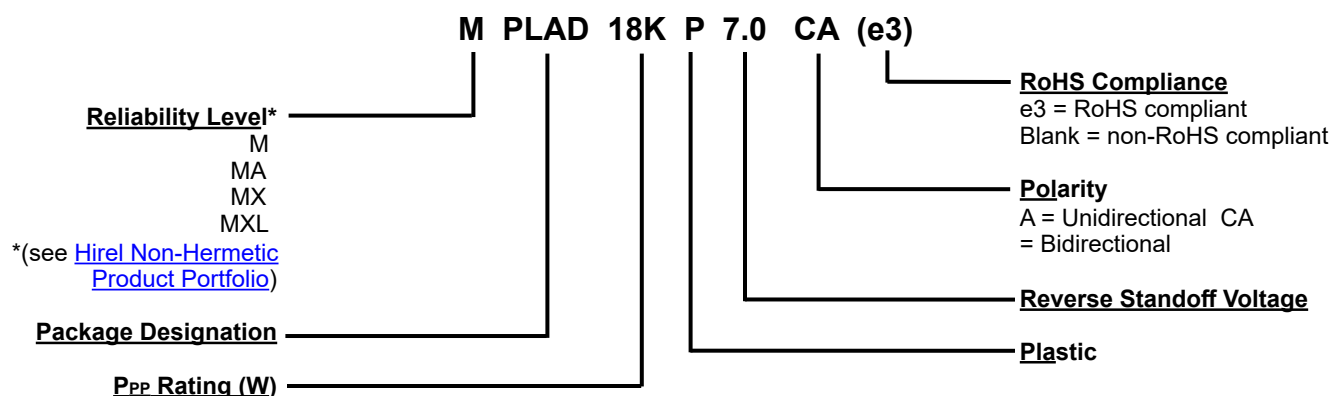
Symbol	Parameters / Test Conditions	Value	Unit	
$T_J$ and $T_{STG}$	Junction and Storage Temperature	-55 to +150	°C/W	
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient <sup>(1)</sup>	50		
$R_{\theta JC}$	Thermal Resistance Junction-to-Case	0.7		
$P_{PP}$	Peak Pulse Power @ 10/1000 $\mu$ s <sup>(2)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

- Notes:**
- When mounted on FR4 PC board with recommended mounting pad (see [pad layout](#)).
  - Also see [Figures 1 and 2](#). With impulse repetition rate (duty factor) of 0.05% or less.
  - At 8.3 ms half-sine wave (unidirectional devices only).
  - Case temperature controlled on heat sink as specified.
  - 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



# MPLAD18KP7.0A – MPLAD18KP200CA

## 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

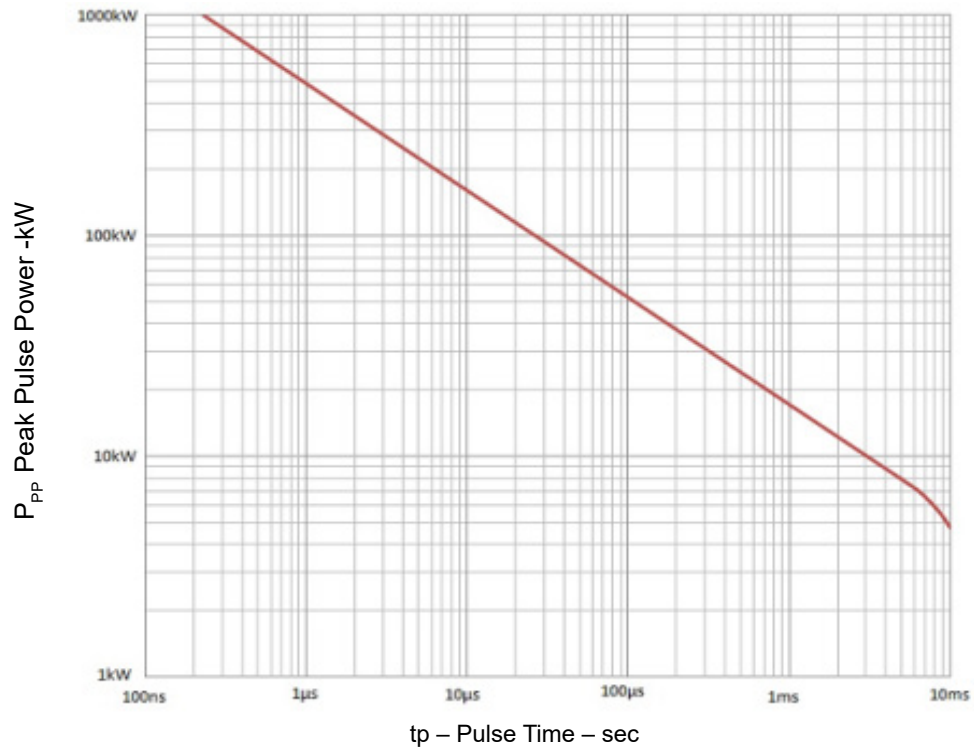
MICROSEMI PART NUMBER		REVERSE STANDOFF VOLTAGE V <sub>WM</sub> (Note 1)	BREAKDOWN VOLTAGE V <sub>(BR)</sub> @ I <sub>(BR)</sub>		MAXIMUM CLAMPING VOLTAGE V <sub>c</sub> @ I <sub>PP</sub>	MAXIMUM STANDBY CURRENT I <sub>d</sub> @ V <sub>WM</sub>	MAXIMUM PEAK PULSE CURRENT I <sub>PP</sub> (FIG. 3)	MAXIMUM TEMPERATURE COEFFICIENT α <sub>V(BR)</sub>
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	MPLAD18KP7.5CA	7.5	8.33 – 9.21	5	12.9	750	1396*	6.0
MPLAD18KP8.0A	MPLAD18KP8.0CA	8.0	8.89 – 9.83	5	13.6	450	1324*	6.0
MPLAD18KP8.5A	MPLAD18KP8.5CA	8.5	9.44 – 10.4	5	14.4	150	1250*	7.0
MPLAD18KP9.0A	MPLAD18KP9.0CA	9.0	10.0 – 11.1	5	15.4	60	1169*	8.0
MPLAD18KP10A	MPLAD18KP10CA	10	11.1 – 12.3	5	17.0	45	1059*	9.0
MPLAD18KP11A	MPLAD18KP11CA	11	12.2 – 13.5	5	18.2	10	989	10
MPLAD18KP12A	MPLAD18KP12CA	12	13.3 – 14.7	5	19.9	10	905	11
MPLAD18KP13A	MPLAD18KP13CA	13	14.4 – 15.9	5	21.5	10	838	12
MPLAD18KP14A	MPLAD18KP14CA	14	15.6 – 17.2	5	23.2	10	776	13
MPLAD18KP15A	MPLAD18KP15CA	15	16.7 – 18.5	5	24.4	10	738	15
MPLAD18KP16A	MPLAD18KP16CA	16	17.8 – 19.7	5	26.0	10	693	16
MPLAD18KP17A	MPLAD18KP17CA	17	18.9 – 20.9	5	27.6	10	653	18
MPLAD18KP18A	MPLAD18KP18CA	18	20.0 – 22.1	5	29.2	10	617	19
MPLAD18KP20A	MPLAD18KP20CA	20	22.2 – 24.5	5	32.4	10	556	22
MPLAD18KP22A	MPLAD18KP22CA	22	24.4 – 26.9	5	35.5	10	508	24
MPLAD18KP24A	MPLAD18KP24CA	24	26.7 – 29.5	5	38.9	10	463	27
MPLAD18KP26A	MPLAD18KP26CA	26	28.9 – 31.9	5	42.1	10	428	29
MPLAD18KP28A	MPLAD18KP28CA	28	31.1 – 34.4	5	45.5	10	396	30
MPLAD18KP30A	MPLAD18KP30CA	30	33.3 – 36.8	5	48.4	10	372	35
MPLAD18KP33A	MPLAD18KP33CA	33	36.7 – 40.6	5	53.3	10	338	38
MPLAD18KP36A	MPLAD18KP36CA	36	40.0 – 44.2	5	58.1	10	310	40
MPLAD18KP40A	MPLAD18KP40CA	40	44.4 – 49.1	5	64.5	10	280	45
MPLAD18KP43A	MPLAD18KP43CA	43	47.8 – 52.8	5	69.4	10	260	49
MPLAD18KP45A	MPLAD18KP45CA	45	50.0 – 55.3	5	72.7	10	248	51
MPLAD18KP48A	MPLAD18KP48CA	48	53.3 – 58.9	5	77.4	10	233	55
MPLAD18KP51A	MPLAD18KP51CA	51	56.7 – 62.7	5	82.4	10	219	60
MPLAD18KP54A	MPLAD18KP54CA	54	60.0 – 66.3	5	87.1	10	183 207	64
MPLAD18KP58A	MPLAD18KP58CA	58	64.4 – 71.2	5	93.6	10	193	69
MPLAD18KP60A	MPLAD18KP60CA	60	66.7 – 73.7	5	96.8	10	186	70
MPLAD18KP64A	MPLAD18KP64CA	64	71.1 – 78.6	5	103	10	175	75
MPLAD18KP70A	MPLAD18KP70CA	70	77.8 – 86.0	5	113	10	160	84
MPLAD18KP75A	MPLAD18KP75CA	75	83.3 – 92.1	5	121	10	149	90
MPLAD18KP78A	MPLAD18KP78CA	78	86.7 – 95.8	5	126	10	143	94
MPLAD18KP85A	MPLAD18KP85CA	85	94.4 – 104.0	5	137	10	132	102
MPLAD18KP90A	MPLAD18KP90CA	90	100 – 111	5	146	10	124	109
MPLAD18KP100A	MPLAD18KP100CA	100	111 – 123	5	162	10	112	122
MPLAD18KP110A	MPLAD18KP110CA	110	122 – 135	5	177	10	102	132
MPLAD18KP120A	MPLAD18KP120CA	120	133 – 147	5	193	10	94	145
MPLAD18KP130A	MPLAD18KP130CA	130	144 – 159	5	209	10	87	157
MPLAD18KP150A	MPLAD18KP150CA	150	167 – 185	5	243	10	75	183
MPLAD18KP160A	MPLAD18KP160CA	160	178 – 197	5	259	10	70	195
MPLAD18KP170A	MPLAD18KP170CA	170	189 – 209	5	275	10	66	207
MPLAD18KP180A	MPLAD18KP180CA	180	200 – 221	5	291	10	62	219
MPLAD18KP200A	MPLAD18KP200CA	200	222 – 245	5	322	10	56	243

**NOTE 1:** Transient Voltage Suppressors are normally selected with reverse standoff voltage V<sub>WM</sub>, which should be equal to or greater than the peak operating voltage.

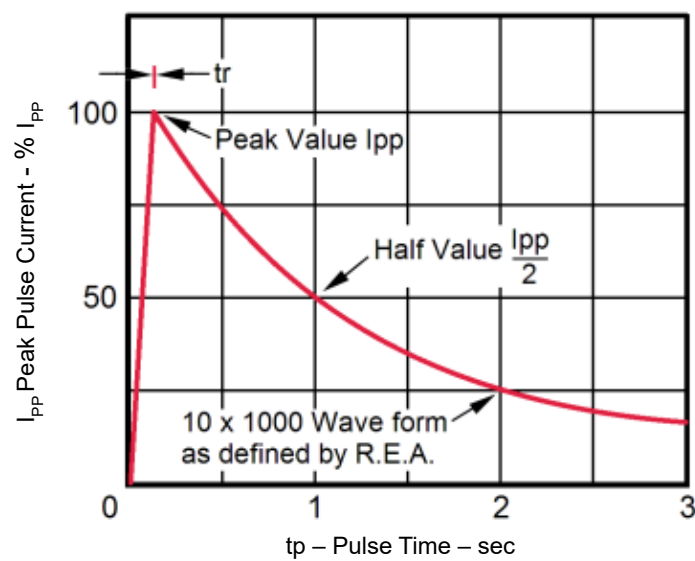
\* Surge Testing is performed to 1000Amps due to equipment limitations.

# MPLAD18KP7.0A – MPLAD18KP200CA

## GRAPHS



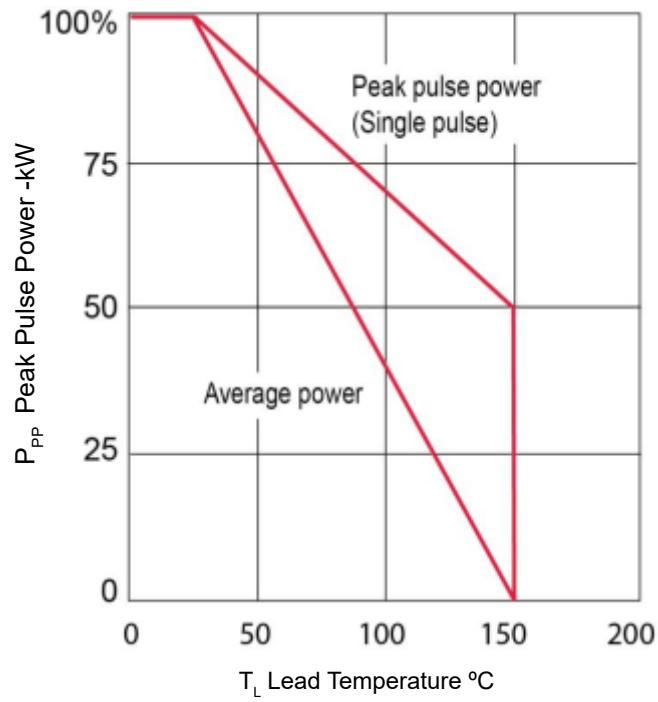
**Figure 1**  
Peak Pulse Power vs. Pulse Time  
(to 50% of exponentially decaying pulse)



**Figure 2**  
Pulse Waveform  
Test waveform parameters:  $t_r = 10 \mu s$ ,  $t_p = 1000 \mu s$

# MPLAD18KP7.0A – MPLAD18KP200CA

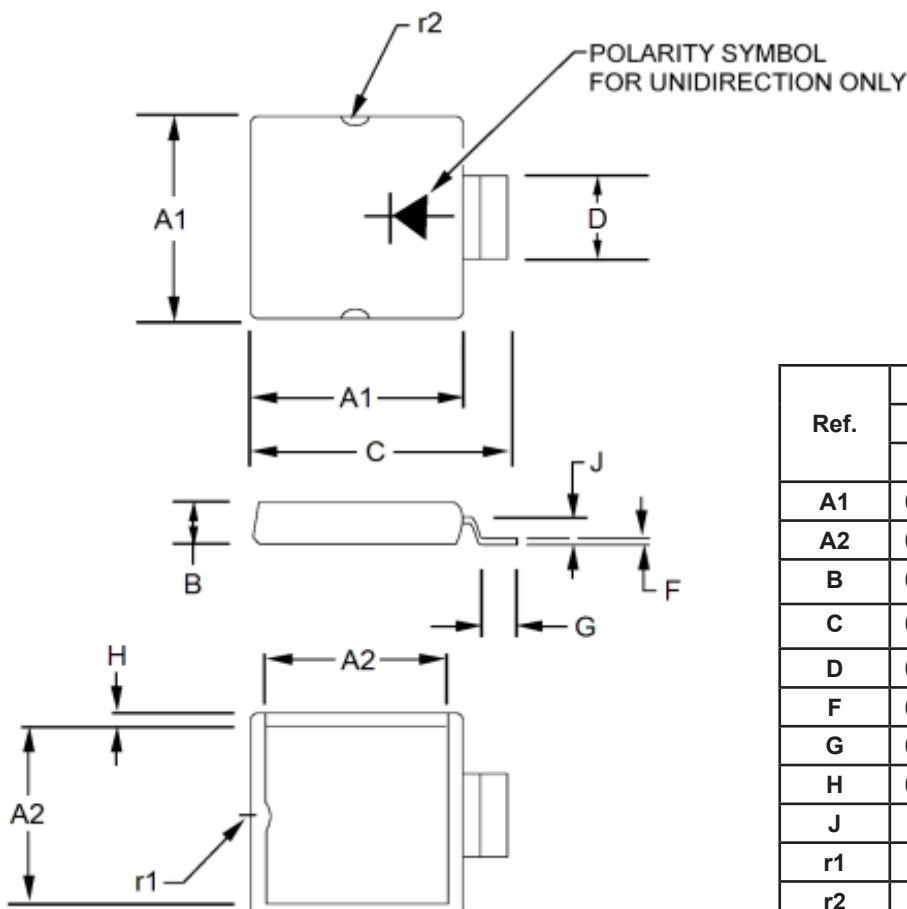
## GRAPHS (continued)



**Figure 3**  
Derating Curve

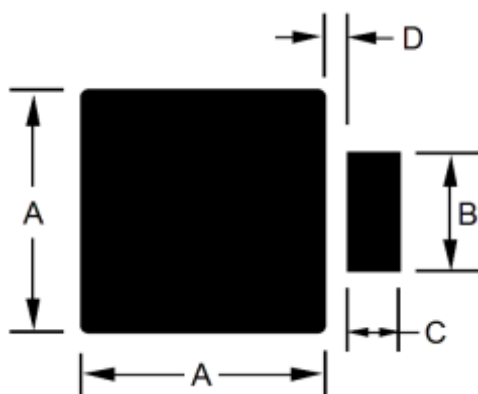
# MPLAD18KP7.0A – MPLAD18KP200CA

## 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

# MPLAD18KP7.0A – MPLAD18KP200CA



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