

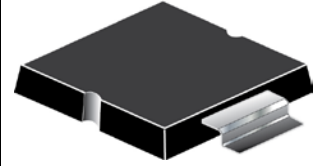


## SURFACE MOUNT 15,000 WATT TRANSIENT VOLTAGE SUPPRESSOR

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

### DESCRIPTION

These high power 15 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 7 volt to 200 volts in either unidirectional or bidirectional construction.




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

**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 [Upscreened Plastic Products](#) brochure on our web site 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 versions are available.
- $3\sigma$  lot norm screening performed on standby current ( $I_b$ ).

Also available:

**PLAD30KP**  
(30,000 watts)  
 [MPLAD30KP14A thru](#)  
[MPLAD30KP400CA](#)

### 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-160F for Waveform 4 (6.4/69  $\mu$ s at 25 °C)\*:  
Level 4: MPLAD15KP7.0A to 200CA  
Level 5: MPLAD15KP7.0A to 100CA
- Pin injection protection per RTCA/DO-160F for Waveform 5A (40/120  $\mu$ s at 25 °C)\*:  
Level 4: MPLAD15KP7.0A to 28CA

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

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**MAXIMUM RATINGS @ 25 °C unless otherwise specified**

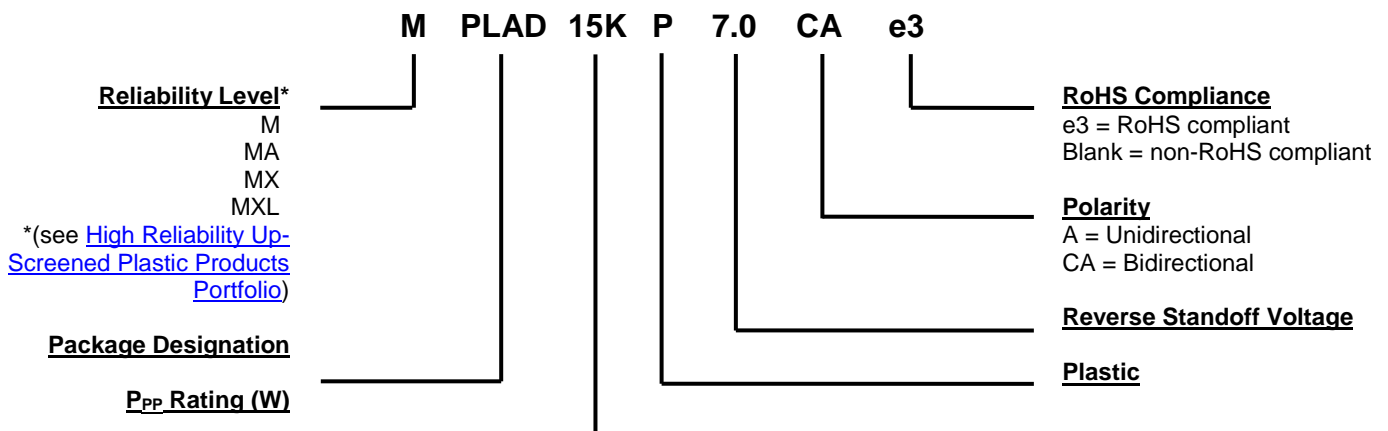
Parameters/Test Conditions	Symbol	Value	Unit	
Junction and Storage Temperature	T <sub>J</sub> and T <sub>STG</sub>	-55 to +150	°C/W	
Thermal Resistance Junction-to-Ambient <sup>(1)</sup>	R <sub>θJA</sub>	50	°C/W	
Thermal Resistance Junction-to-Case	R <sub>θJC</sub>	0.7	°C/W	
Peak Pulse Power @ 10/1000 μs <sup>(2)</sup>	P <sub>PP</sub>	15,000	W	
t <sub>clamping</sub> (0 volts to V <sub>(BR)</sub> min)	Unidirectional	<100	ps	
	Bidirectional	<5	ns	
Forward Clamping Voltage @ 500 Amps <sup>(3)</sup>	V <sub>FS</sub>	2.0	V	
Forward Surge Current <sup>(3)</sup>	I <sub>FSM</sub>	1500	A	
Solder Temperature @ 10 s	T <sub>SP</sub>	260	°C	
Steady-State Power dissipation <sup>(5)</sup>	T <sub>A</sub> = 25 °C	P <sub>D</sub>	2.5 <sup>(1)</sup>	W
	T <sub>C</sub> = 100 °C		71 <sup>(4)</sup>	W

- 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<sub>PP</sub> 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 gram (approximate).
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**



**SYMBOLS & DEFINITIONS**

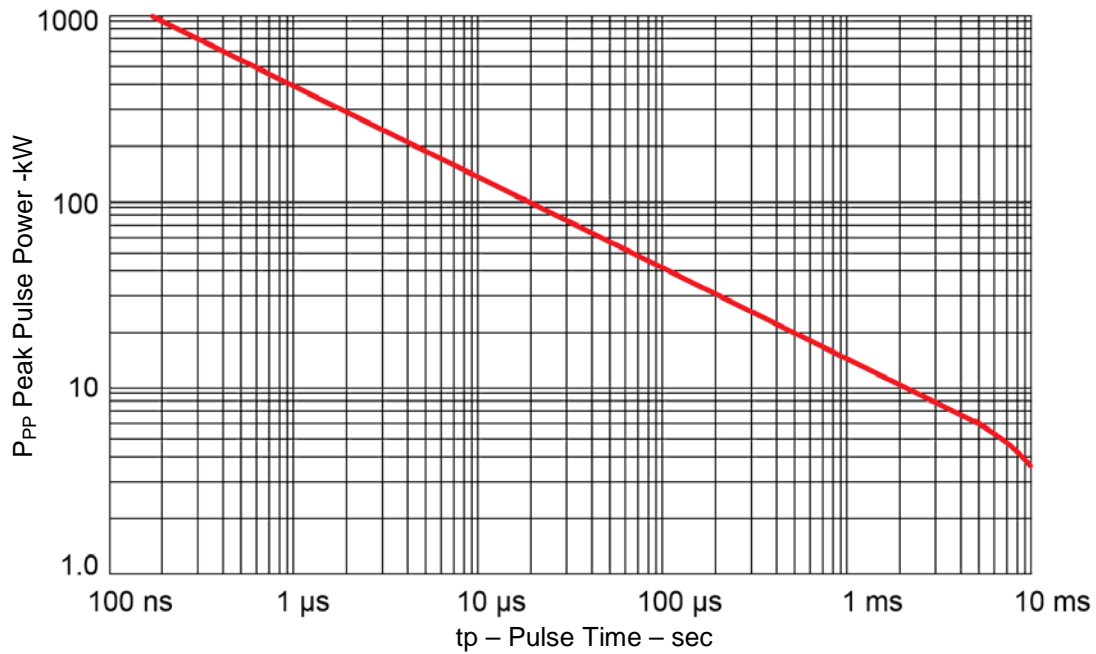
Symbol	Definition
$I_{(BR)}$	Breakdown Current: The current used for measuring breakdown voltage $V_{(BR)}$ .
$I_D$	Standby Current: The current at the rated standoff voltage $V_{WM}$ .
$I_{PP}$	Peak Impulse Current: The peak current during the impulse.
$V_{(BR)}$	Breakdown Voltage: The minimum voltage 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 °C unless otherwise stated**

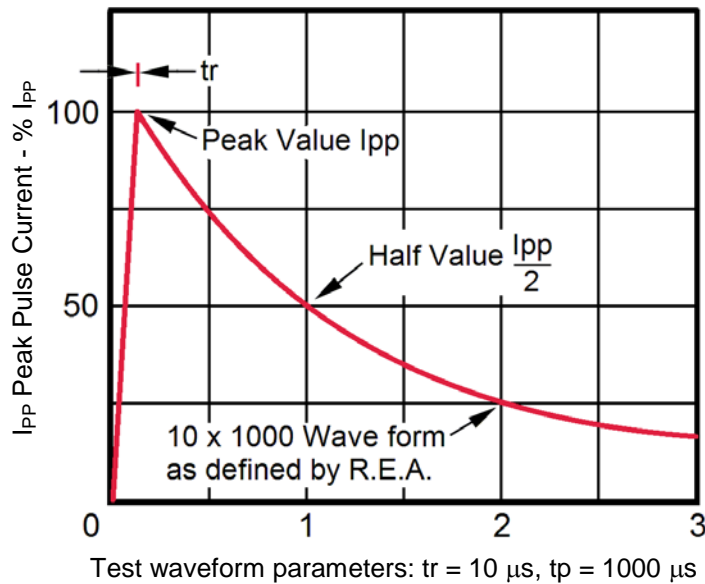
MICROSEMI PART NUMBER		REVERSE STANDOFF VOLTAGE $V_{WM}$ (Note 1)	BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_{(BR)}$		MAXIMUM CLAMPING VOLTAGE $V_C$ @ $I_{PP}$	MAXIMUM STANDBY CURRENT $I_D$ @ $V_{WM}$	MAXIMUM PEAK PULSE CURRENT $I_{PP}$ (FIG. 3)	MAXIMUM TEMPERATURE COEFFICIENT $\alpha_{V(BR)}$
Unidirectional	Bidirectional	Volts	Volts	mA	Volts	$\mu A$	A	mV/°C
MPLAD15KP7.0A	MPLAD15KP7.0CA	7.0	7.78 – 8.60	150	12.0	3000	1251	5.0
MPLAD15KP7.5A	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	MPLAD15KP10CA	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	618	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
MPLAD15KP26A	<b>MPLAD15KP26CA</b>	26	28.9 – 31.9	5	42.1	10	357	29
<b>MPLAD15KP28A</b>	MPLAD15KP28CA	28	31.1 – 34.4	5	45.5	10	330	30
MPLAD15KP30A	MPLAD15KP30CA	30	33.3 – 36.8	5	48.4	10	309	35
MPLAD15KP33A	<b>MPLAD15KP33CA</b>	33	36.7 – 40.6	5	53.3	10	282	38
<b>MPLAD15KP36A</b>	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	MPLAD15KP43CA	43	47.8 – 52.8	5	69.4	10	216	49
MPLAD15KP45A	MPLAD15KP45CA	45	50.0 – 55.3	5	72.7	10	207	51
MPLAD15KP48A	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	<b>MPLAD15KP58CA</b>	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
<b>MPLAD15KP64A</b>	MPLAD15KP64CA	64	71.1 – 78.6	5	103	10	147	75
MPLAD15KP70A	MPLAD15KP70CA	70	77.8 – 86.0	5	113	10	132	84
MPLAD15KP75A	<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>	<b>MPLAD15KP85CA</b>	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
MPLAD15KP110A	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
MPLAD15KP200A	MPLAD15KP200CA	200	222 – 245	5	322	10	47	243

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

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

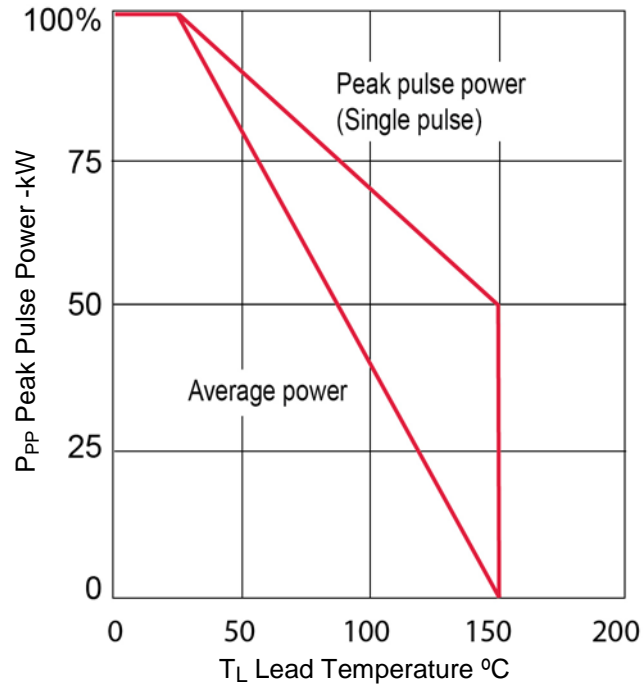
**GRAPHS**


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

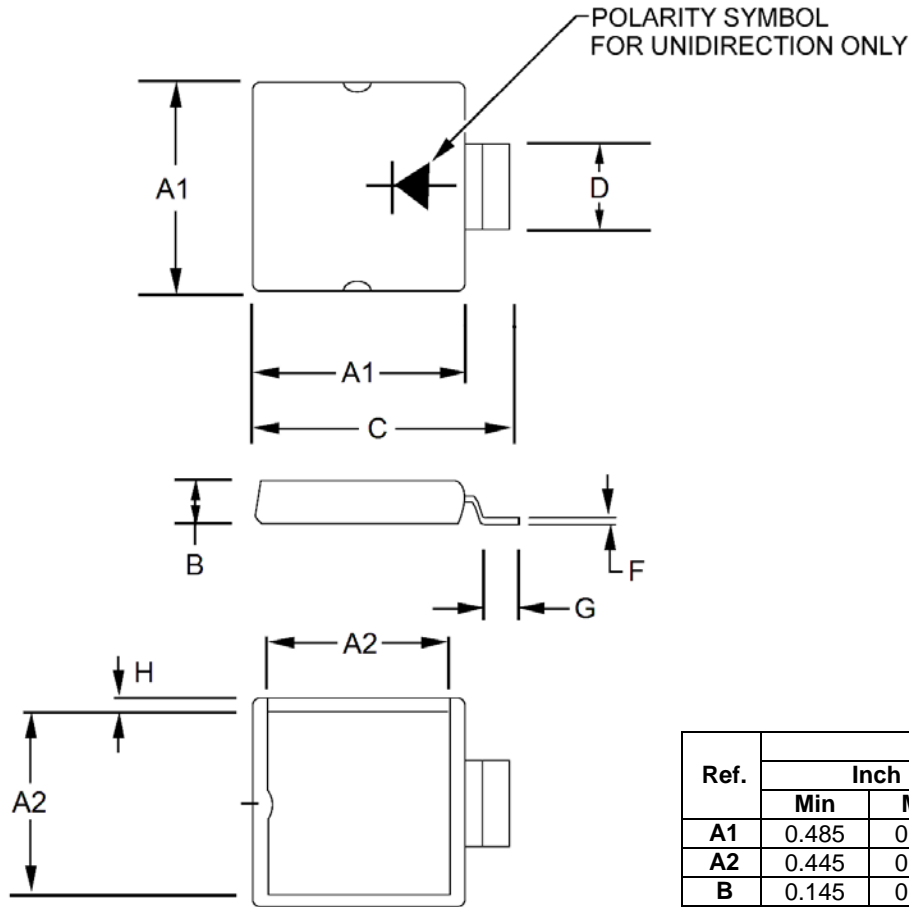


**Figure 2**  
Pulse Waveform

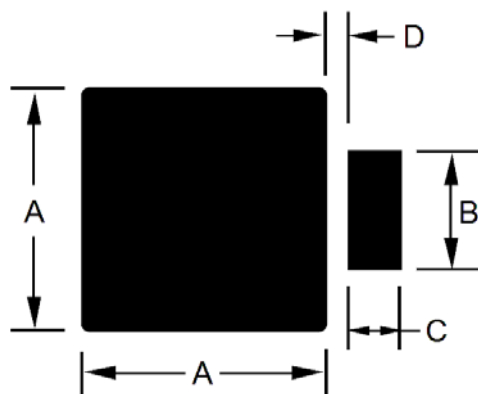
GRAPHS (continued)



**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

**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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[MXLPLAD15KP15A](#) [MXLPLAD15KP90A](#) [MXLPLAD15KP130A](#) [MXLPLAD15KP60CA](#) [MXLPLAD15KP11A](#)  
[MXLPLAD15KP7.5CA](#) [MXLPLAD15KP51CA](#) [MXLPLAD15KP75A](#) [MXLPLAD15KP51A](#) [MXLPLAD15KP170A](#)  
[MXLPLAD15KP64CA](#) [MXLPLAD15KP70CA](#) [MXLPLAD15KP33CA](#) [MXLPLAD15KP43A](#) [MXLPLAD15KP18CA](#)  
[MXLPLAD15KP48CA](#) [MXLPLAD15KP160A](#) [MXLPLAD15KP200CA](#) [MXLPLAD15KP110CA](#) [MXLPLAD15KP54CA](#)  
[MXLPLAD15KP17A](#) [MXLPLAD15KP33A](#) [MXLPLAD15KP8.5A](#) [MXLPLAD15KP7.5A](#) [MXLPLAD15KP120A](#)  
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[MXLPLAD15KP85A](#) [MXLPLAD15KP30CA](#) [MXLPLAD15KP13A](#) [MXLPLAD15KP12CA](#) [MXLPLAD15KP12A](#)  
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[MXLPLAD15KP40A](#) [MXLPLAD15KP45CA](#) [MXLPLAD15KP64A](#) [MXLPLAD15KP180A](#) [MXLPLAD15KP14CA](#)  
[MXLPLAD15KP180CA](#) [MXLPLAD15KP16A](#) [MXLPLAD15KP85CA](#) [MXLPLAD15KP10CA](#) [MXLPLAD15KP75CA](#)  
[MXLPLAD15KP48A](#) [MXLPLAD15KP24A](#) [MXLPLAD15KP22A](#) [MXLPLAD15KP78A](#) [MXLPLAD15KP8.0CA](#)  
[MXLPLAD15KP26CA](#) [MXLPLAD15KP54A](#) [MXLPLAD15KP17CA](#) [MXLPLAD15KP40CA](#) [MXLPLAD15KP30A](#)  
[MXLPLAD15KP90CA](#) [MXLPLAD15KP78CA](#) [MXLPLAD15KP13CA](#) [MXLPLAD15KP70A](#) [MXLPLAD15KP14A](#)  
[MXLPLAD15KP22CA](#) [MXLPLAD15KP10A](#) [MXLPLAD15KP20CA](#) [MXLPLAD15KP11CA](#) [MXLPLAD15KP58A](#)  
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