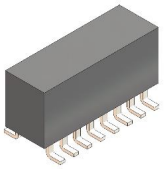
MDA3KP6.0A to MDA3KP40A

Surface Mount 3000W Vertical Transient Voltage Suppressor Array

Product Overview

The MDA series of 3000 W Transient Voltage Suppressors (TVSs) protects a variety of voltage-sensitive components from destruction or degradation. They can protect from secondary lightning effects per IEC61000-4-5 and class levels defined herein, or for inductive switching environments and induced RF protection. Since their response time is virtually instantaneous, they can also be used in protection from ESD and EFT per IEC61000-4-2 and IEC61000-4-4



Features

The following are key features of the MDA3KP6.0A to MDA3KP40A device:

- Available in both unidirectional and bidirectional construction
- Selections for 6.0 V to 40 V standoff voltages (V_{WM})
- Optional upscreening is available with various screening and conformance inspection options based on MIL-PRF-19500. Refer to Micronote 129 for more details on the screening options.
- High reliability with wafer fabrication and assembly lot traceability
- All parts surge tested
- Suppresses transients up to 3,000 W at 10/1000 µs
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- 3σ lot norm screening performed on standby current (I_D)

Applications and Benefits

The following are applications and benefits of the MDA3KP6.0A to MDA3KP40A device:

- Suppresses transients up to 3000 watts at 10/1000 µs
- 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 IEC61000-4-5 with 42 Ohms source impedance:
  - Class 1 – 4: MDA3KP6.0A to MDA3KP40A
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  - Class 1 – 3: MDA3KP6.0A to MDA3KP40A
  - Class 4: : MDA3KP6.0CA to MDA3KP18A
- Secondary lightning protection per IEC61000-4-5 with 2 Ohms source impedance:
  - Class 2: MDA3KP6.0A to MDA3KP40A
  - Class 3: MDA3KP6.0A to MDA3KP18A
  - Class 4: MDA3KP6.0A to MDA3KP9.0A

Table of Contents

1. Electrical Specifications

This section shows the specifications of the MDA3KP6.0A to MDA3KP40A device.

1.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings of the MDA3KP6.0A to MDA3KP40A device.

Table 1-1. Absolute Maximum Ratings

Parameters/Test Conditions		Symbol	Value	Unit
Junction and storage temperature		T_J and T_{STG}	–55 to 150	°C
Peak pulse power at 10/1000 µs[1]		P_{PP}	3,000	W
$t_{clamping}$ (0 V to $V_{(BR)min}$)	Unidirectional		<100	ps
	Bidirectional		<5	ns
Forward clamping voltage at 500 A[2]		V_{FS}	4.0	V
Forward surge current[2]		I_{FSM}	200	A
Solder temperature at 10 s		T_{SP}	260	°C

Notes:

1. See Figures 1 and 2. With impulse repetition rate (duty factor) of 0.05% or less.
2. At 8.3 ms half-sine wave (unidirectional devices only).

1.2 Electrical Characteristics

The following table shows the symbols and definitions of the MDA3KP6.0A to MDA3KP40A device.

Table 1-2. Symbols and 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.

The following table shows the electrical characteristics of the MDA3KP6.0A to MDA3KP40A device. All ratings taken at 25 °C unless otherwise specified.

Table 1-3. Electrical Characteristics

MCHP Part Number[1]	Reverse Standoff Voltage V_{WM}	Breakdown Voltage		Maximum Clamping Voltage V_C at I_{PP}	Maximum Standby Current I_D at V_{WM}	Maximum Peak Pulse Current I_{PP}
		$V_{(BR)}$ (min. – max.)	At $I_{(BR)}$			
	V	**V**	**mA**	**V**	**µA**	**A**
MDA3KP6.0A	6	6.67 – 7.37	10	10.3	1000	291.3
MDA3KP6.5A	6.5	7.22 – 7.98	10	11.2	500	267.9
MDA3KP7.0A	7	7.78 – 8.6	10	12.0	200	250
MDA3KP7.5A	7.5	8.33 – 9.21	1	12.9	100	232.6
MDA3KP8.0A	8	8.89 – 9.83	1	13.6	50	220.6
MDA3KP8.5A	8.5	9.44 – 10.4	1	14.4	25	208.4
MDA3KP9.0A	9	10.0 – 11.1	1	15.4	10	194.8
MDA3KP10A	10	11.1 – 12.3	1	17.0	5	176.4
MDA3KP11A	11	12.2 – 13.5	1	18.2	5	164.8
MDA3KP12A	12	13.3 – 14.7	1	19.9	5	150.6
MDA3KP13A	13	14.4 – 15.9	1	21.5	5	139.4
MDA3KP14A	14	15.6 – 17.2	1	23.2	2	129.4
MDA3KP15A	15	16.7 – 18.5	1	24.4	2	123
MDA3KP16A	16	17.8 – 19.7	1	26.0	2	115.4
MDA3KP17A	17	18.9 – 20.9	1	27.6	2	106.6
MDA3KP18A	18	20.0 – 22.1	1	29.2	2	102.8
MDA3KP20A	20	22.2 – 24.5	1	32.4	2	92.6
MDA3KP22A	22	24.4 – 26.9	1	35.5	2	84.4
MDA3KP24A	24	26.7 – 29.5	1	38.9	2	77.2
MDA3KP26A	26	28.9 – 31.9	1	42.1	2	71.2
MDA3KP28A	28	31.1 – 34.4	1	45.4	2	66
MDA3KP30A	30	33.3 – 36.8	1	48.4	2	62
MDA3KP33A	33	36.7 – 40.6	1	53.3	2	56.2
MDA3KP36A	36	40.0 – 44.2	1	58.1	2	51.6
MDA3KP40A	40	44.4 – 49.1	1	64.5	2	46.4

Note:

1. For bidirectional types, indicate a C suffix as shown in Part Nomenclature section. Transient Voltage Suppressors are normally selected with reverse standoff voltage V_{WM}, which should be equal to or greater than peak operating voltage.

1.3 Typical Performance Curves

This section shows the typical performance curves of the MDA3KP6.0A to MDA3KP40A device.

Figure 1-1. Peak Pulse Power vs. Pulse Time

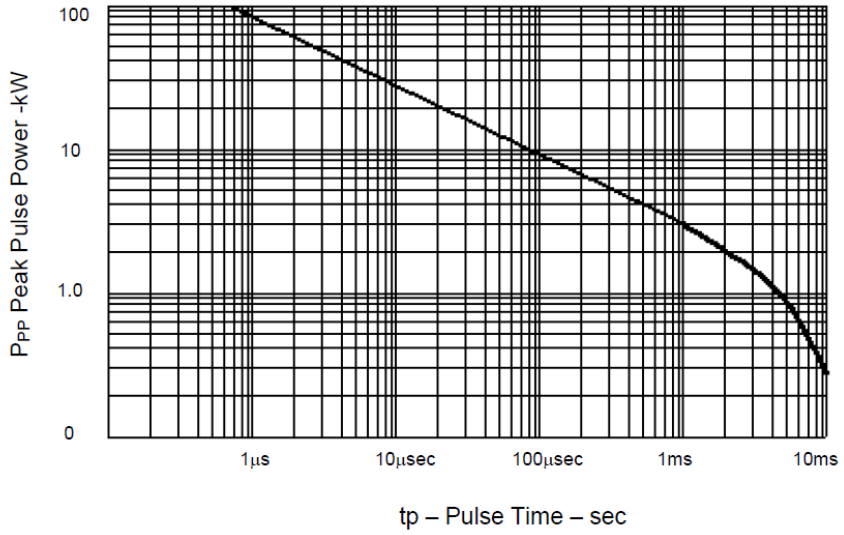


Figure 1-2. Pulse Waveform

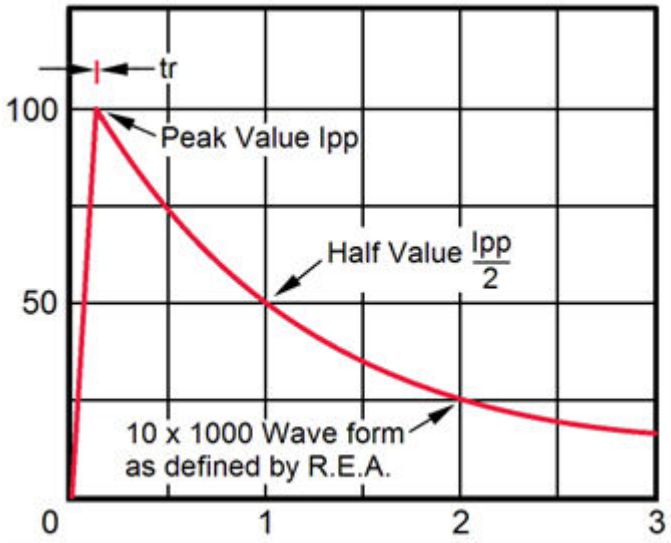
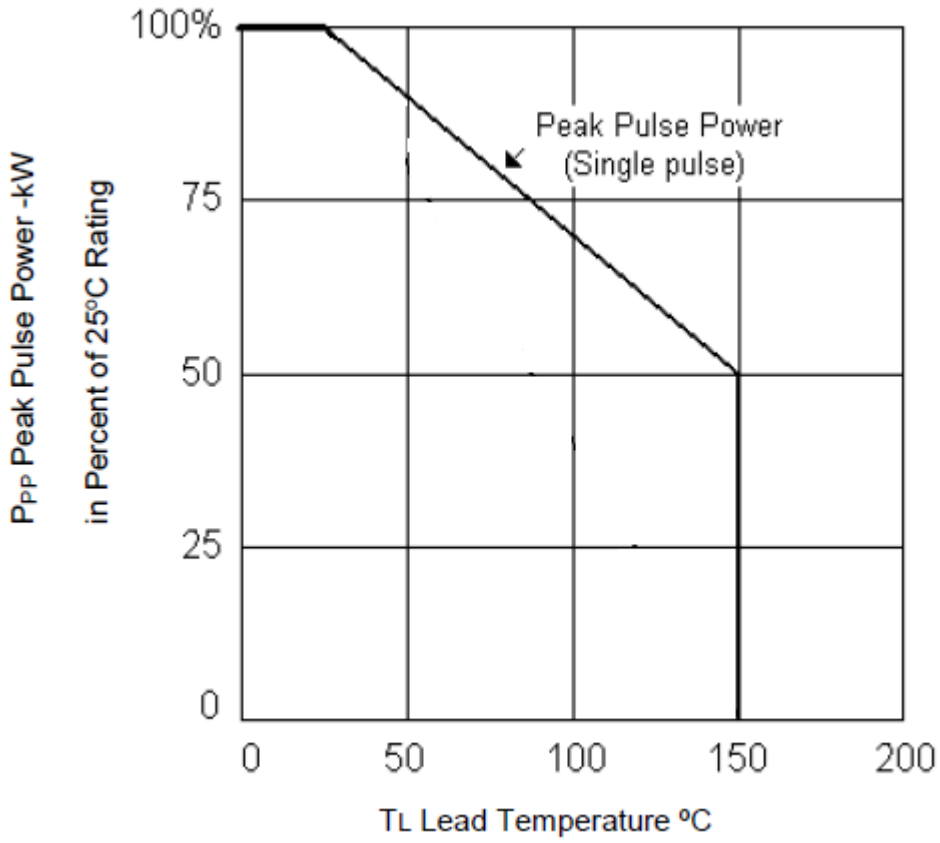


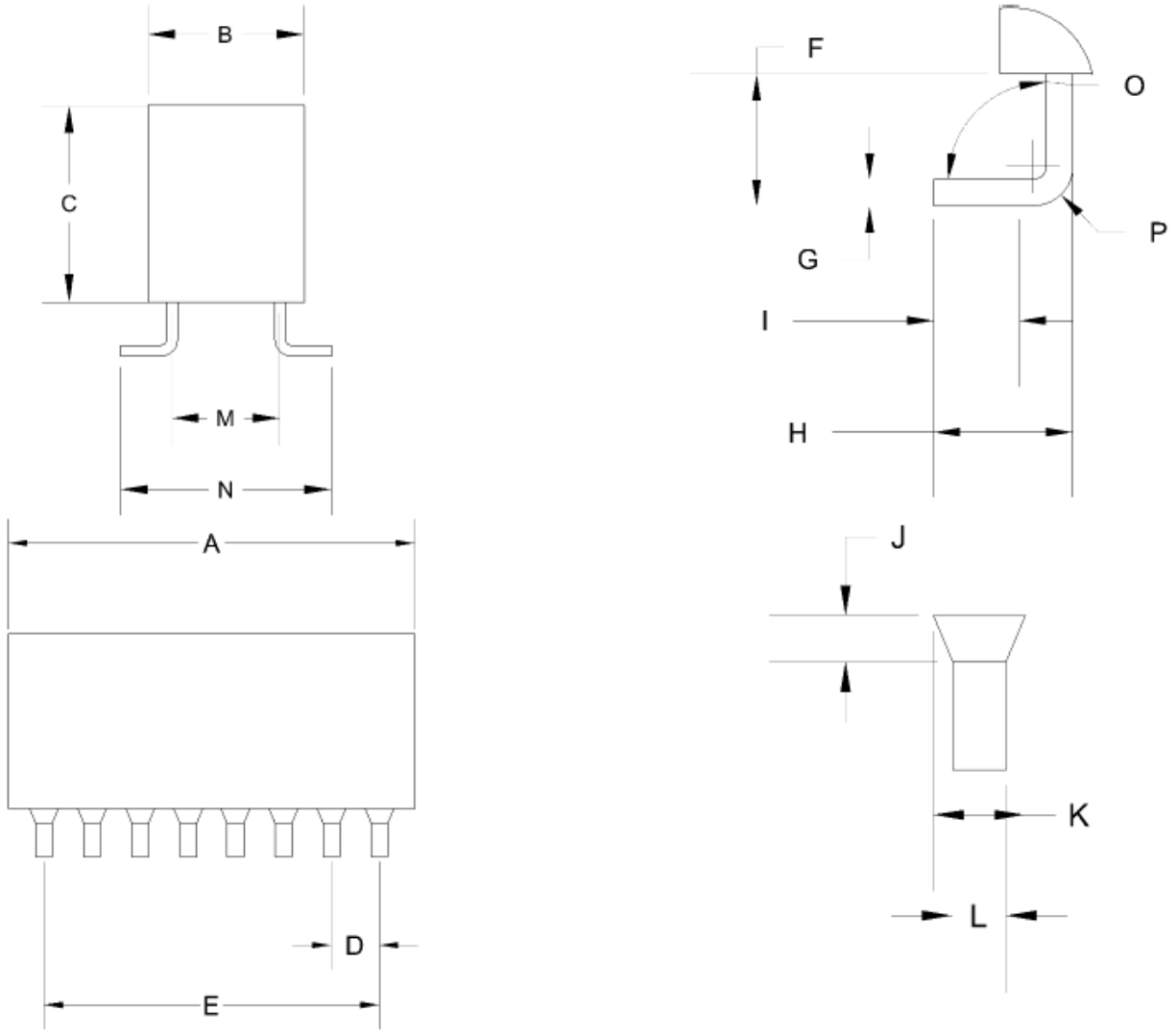
Figure 1-3. Derating Curve



2. Package Dimensions

This section shows the package dimensions of the MDA3KP6.0A to MDA3KP40A device.

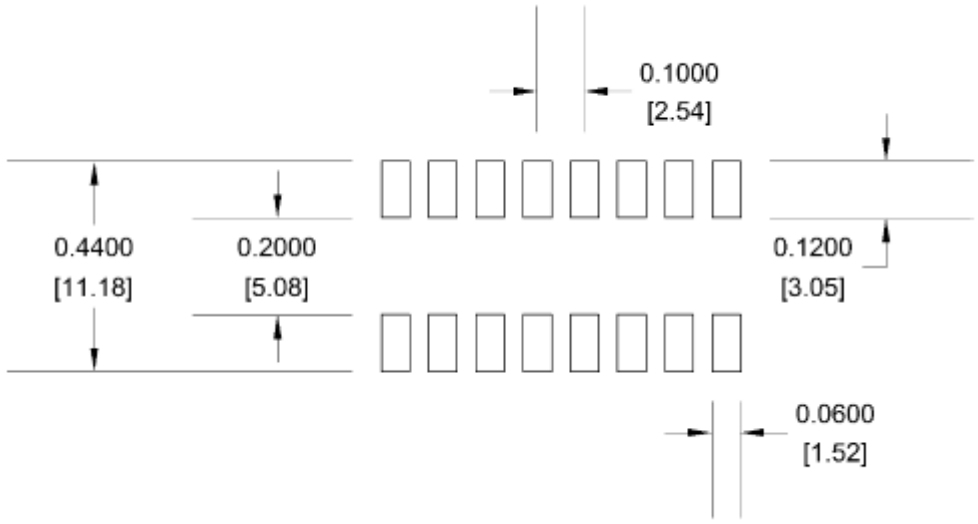
Figure 2-1. Package Dimensions



Ref.	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
A	0.828	0.868	21.03	22.05
B	0.270	0.310	6.86	7.87
C	0.340	0.380	8.64	9.65
D	0.100 (typ)		2.54 (typ)	
E	0.700 (typ)		17.78 (typ)	
F	0.095	0.105	2.41	2.67
G	0.015	0.025	0.38	0.64
H	0.105 (typ)		2.67 (typ)	
I	0.065 (typ)		1.65 (typ)	
J	0.025	0.035	0.64	0.89
K	0.055	0.065	1.40	1.65
L	0.030	0.040	0.76	1.02
M	0.195	0.205	4.95	5.21
N	0.370	0.410	9.40	10.41
O	89°	94°	89°	94°
P	0.025	0.035	0.64	0.89

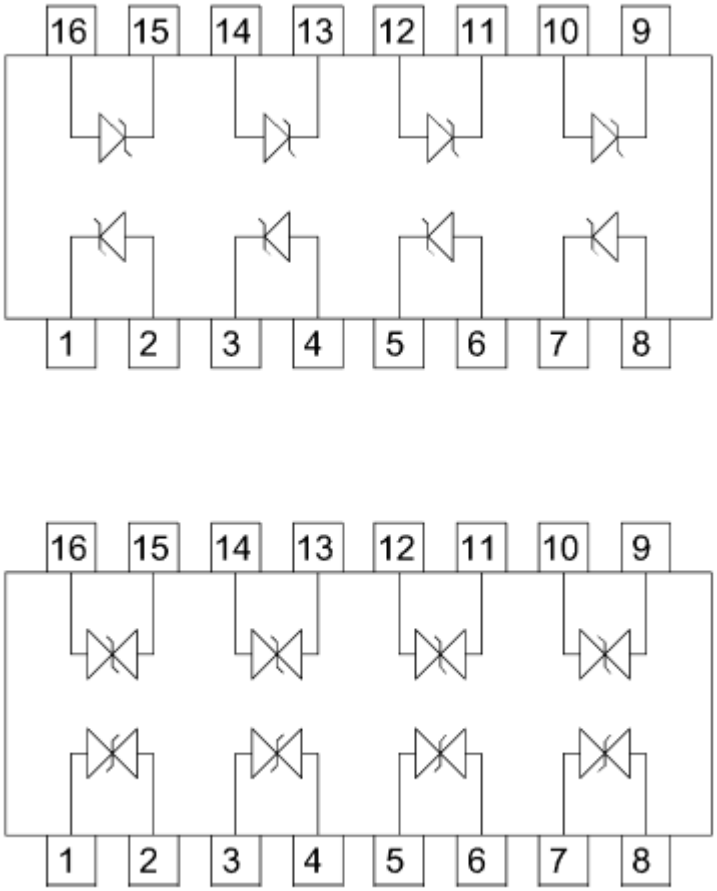
The following image shows the pad layout dimensions of the MDA3KP6.0A to MDA3KP40A device.

Figure 2-2. Pad Layout



The following image shows the diode layout dimensions of the MDA3KP6.0A to MDA3KP40A device.

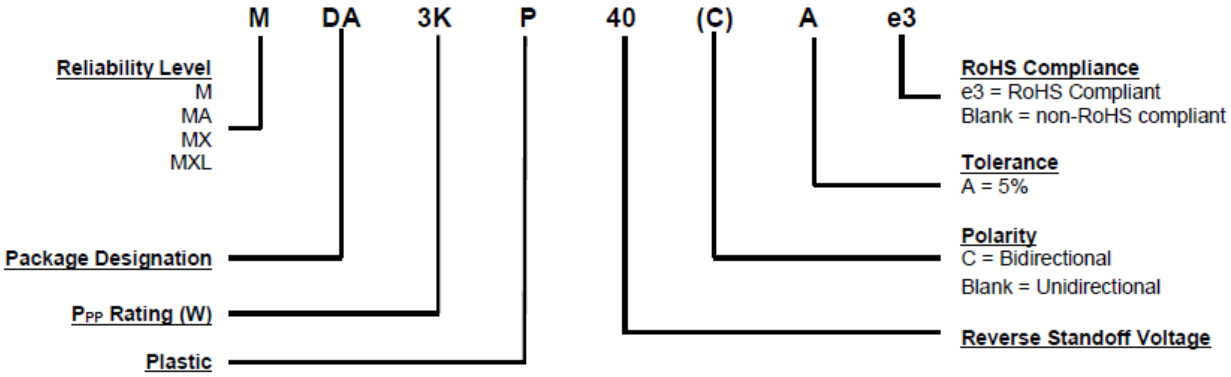
Figure 2-3. Diode Layout



3. Part Nomenclature

This section shows the part nomenclature methodology of the MDA3KP6.0A to MDA3KP40A device.

Figure 3-1. Part Nomenclature



- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINALS: Tin-lead or annealed matte-tin plating readily solderable per MIL-STD-750, method 2026
- MARKING: Body marked with date code and part number. Pin 1 defined by a DOT on top of the package
- POLARITY: Odd number pins are cathodes of each TVS
- TRAYS: Consult factory for quantities.
- WEIGHT: Approximately 5 grams
- See 2. Package Dimensions

4. Revision History

Table 4-1. Revision History

Revision	Date	Description
A	06/2022	Document migrated from Microsemi template to Microchip template; Assigned Microchip literature number DS00004582A,which replaces the previous Microsemi literature number RF01243.
Initial release (Microsemi Revision A)	2019	Document created.

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