

# TVS Diodes



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## Transient Voltage Suppression Diodes

World Products, LLC is committed to providing the optimum products for your transient/surge protection problems. Our TVS Diode satisfies the toughest requirements for a low clamping device and provides superior performance in all applications.

**World Products expands your options . . .** Large selection of equivalents to essentially all TVS Diodes. World Products specifications are designed to provide all of the necessary physical and electrical parameters required for proper component selection.

**Discover why the first choice in TVS Diodes is WPI.**



## General Information

### TVS Diode Technology

World Products Transient Voltage Suppression (TVS) Diodes are silicon avalanche devices designed, manufactured, specified and tested according to voltage suppression applications.

These devices, with their fast response and low clamping characteristics, protect all MOS technology based devices, hybrids, and other voltage sensitive components. The low clamping factor and pico-second response time of World Products TVS Diodes clamps transient pulses early and maintains them at an acceptable level for their entire duration. In other overvoltage protection devices, response times are delayed by 24nS to 2 $\mu$ s allowing transients to reach dangerous levels. World Products TVS Diodes are designed to meet a 1.30 maximum clamping factor at their rated peak impulse current. This can be compared to clamping factors of 2 to 5 found in other protection devices.

### TVS Diode Applications

TVS Diodes are the optimum choice in protecting computer or data processor circuits and power supplies, airframe avionics and controls, numerically controlled machines, telecom circuits, and many other applications. These devices are designed to protect against transient voltages generated by lightning, electro-static discharge (ESD), and inductive switching.

### TVS Diode RoHS Compliance

All axial TVS Diodes (no suffix code required) and SMD TVS Diodes (denoted by suffix "F") products purchased from World Products, LLC comply to a maximum concentration value of 0.1% by weight in homogeneous materials for lead (Pb), mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) and of 0.01% weight in homogeneous materials for cadmium and are in compliance with Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive).

Note: Lead(Pb) in high-melting point solder for internal connections is not inhibited by RoHS. (i.e. tin-lead solder alloys containing more than 85%)

### Selecting the Correct Part Type

The following guidelines should be observed in selecting the correct diode:

#### TVS Parameters Application Parameters

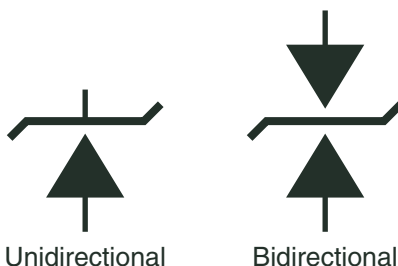
|                       |        |    |                          |       |
|-----------------------|--------|----|--------------------------|-------|
| 1. Stand-off Voltage  | (VWM)  | >= | Operating Voltage        | (VOP) |
| 2. Peak Pulse Current | (IPPM) | >= | Source Transient Current | (IS)  |
| 3. Clamping Voltage   | (VC)   | =< | Voltage Withstand        | (VWS) |

1. If the stand-off voltage is less than the operating voltage of the application, the diode will continually clamp the circuit voltage.
2. The Peak Pulse Current (IPPM) is the maximum current the TVS can handle. The source transient current is determined by dividing the peak transient voltage by the source impedance — this is often difficult to determine. In many cases, however, this may be obtained from industry standard documents, customer requirements, etc.
3. Determine the maximum voltage level that the protected device can withstand (VWS). Select a suppressor which will clamp the transient at a lower level (VC).

Consider the transient source: lightning, electro-static discharge, inductive switching or nuclear explosion (NEMP). Often, a 1500 watt peak pulse rated device will protect against transients due to secondary lightning effects or inductive switching on power, data and telephone lines. A 500 watt device is sufficient to protect sensitive components against transients generated by electro-static discharge.

## General Information (continued)

### Schematic Symbols



### Definitions of Terms

#### V<sub>C</sub> Clamping Voltage:

Peak voltage across the suppressor measured at a specific I<sub>PPM</sub>. (Note: due to thermal, reactive or other effects, peak voltage and peak current are not necessarily coincident in time.)

#### I<sub>PP</sub> Peak Impulse Current:

Peak current measured using a specified waveform.

#### I<sub>PPM</sub> Rated Peak Impulse Current:

Rated maximum value of peak impulse current (I<sub>PP</sub>) applied using a 10 x 1000μs waveform. (Minimum of 10 pulses applied.)

#### V<sub>WM</sub> Rated Standoff Voltage:

Maximum working (continuous) DC or peak voltage which may be applied over the standard operating temperature range. (Note: V<sub>WM</sub> of a selected device must be greater than or equal to the maximum operating voltage of the line to be protected.)

#### I<sub>D</sub> Stand-By Current:

Maximum current that flows through the suppressor at rated standoff voltage (V<sub>WM</sub>) at a specified temperature.

#### V<sub>BR</sub> Breakdown Voltage:

The voltage measured across the suppressor at a specified DC test current (I<sub>T</sub>).

#### I<sub>T</sub> Test Current:

The specific DC current applied to the suppressor used to determine breakdown voltage (V<sub>BR</sub>).

#### V<sub>br</sub> Temperature Coefficient:

The ratio of change in breakdown voltage (V<sub>br</sub>) to changes in temperature. Expressed either as millivolts per degree centigrade (mV/°C) or percent change in breakdown voltage per degree centigrade (%V<sub>BR</sub>/°C).

#### CF Clamping Factor:

Ratio of the measured clamping voltage (V<sub>C</sub>) at specified peak pulse current (I<sub>PP</sub>) to breakdown voltage (V<sub>BR</sub>) on a specific device.

$$CF = \frac{V_C}{V_{BR}}$$

#### C Capacitance:

Capacitance between the two terminals of a suppressor measured at a specific frequency and bias voltage.

#### PPM Rated Multiple Peak Pulse Power:

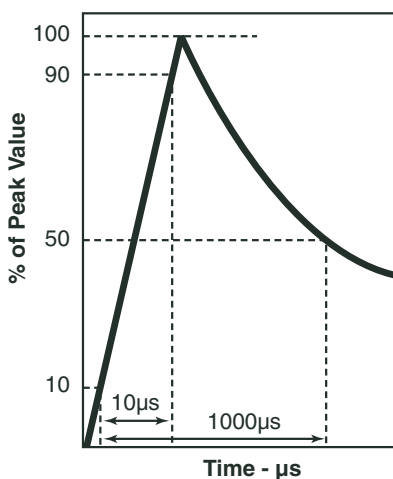
Derived by multiplying the maximum clamping voltage (V<sub>C</sub>) times the Rated Peak Impulse Current (I<sub>PPM</sub>).

#### IFSM Rated Forward Surge Current:

Unidirectional devices only. Maximum forward current during a 8.3ms half sine wave of AC line frequency (60Hz).

## General Information (continued)

### Impulse Current Waveform



### Mechanical Characteristics

Case: UL94V-0 Molded Epoxy  
Leads: Tinned Copper

#### Bending Terminal Leads (Through-hole) Types

When bending the leads, in order to avoid stress to the area where the leads enter the resinous body, use a tool that clamps the point between the package and the bending point. Improper bending will damage the die or separate the resin from the mounting frame, resulting in a degradation in electrical characteristics or a reliability problem such as poor resistance to moisture.

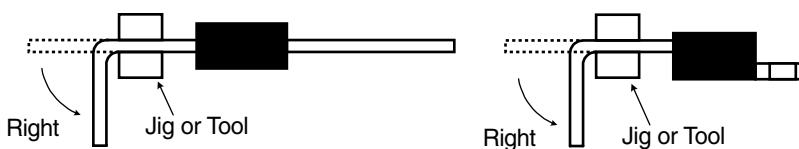
The leads must be bent only once and they should not be bent at an angle of more than 90°C. Leads must be formed before fixing them to a printed circuit board. Never form the leads after soldering.

Recommended distances are:

2mm for P4KE and SA series.

3mm for 1.5KE series.

4mm for 3KP, 5KP, 15KP, 20KP and 30KP series.



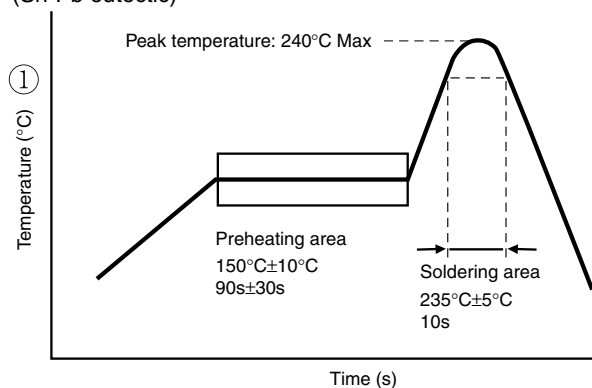
## General Information (continued)

### Solderability

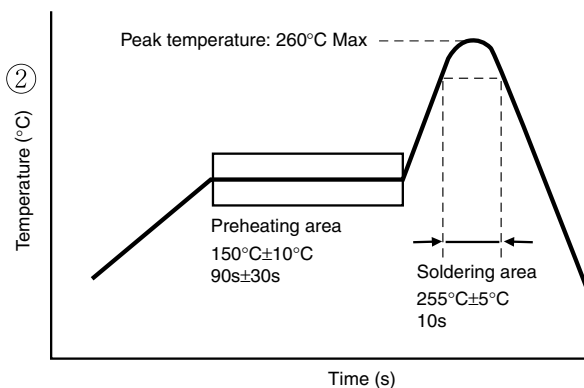
Military Standard 202G Method 208H

### Heat Resistance of Solder

Standard Temperature Profile for Lead Solder  
(Sn-Pb eutectic)



Standard Temperature Profile for Lead-free Solder



Note: For Lead-free solder, the maximum temperature during mounting processes will be 260°C for both re-flow and flow soldering processes.

### Soldering of Through-hole Mounting Devices

Resistance to soldering heat test is carried out under the condition shown below. Soldering should be completed at a lowest possible temperature for a shortest period.

Temp. 260 ± 5°C

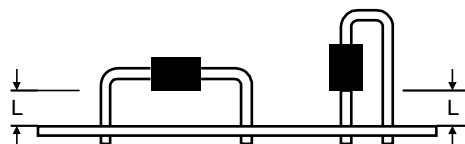
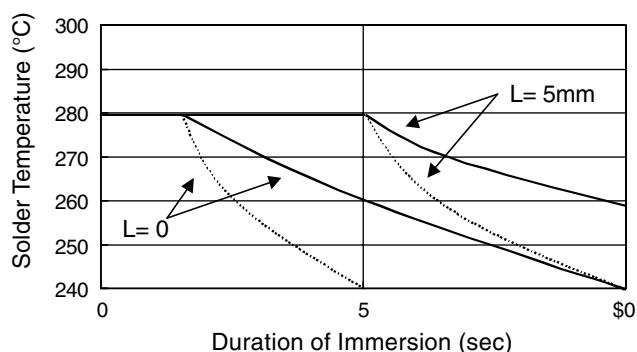
Duration 10 ± 1s

General requirements for manual soldering are as follows:

- Use a soldering iron of 30 watts maximum, that is grounded or with a high insulation resistance.
- The iron tip is kept away from any resinous body.
- Attachment should be achieved in not more than 3 seconds.

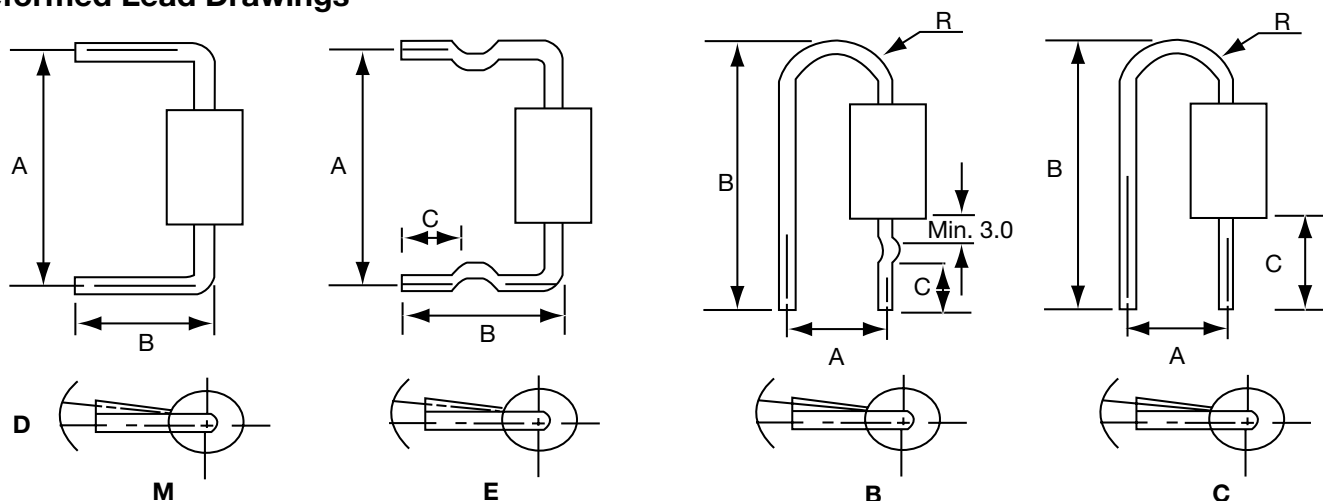
Be sure again not to put an excessive mechanical stress on devices, such as a rough insertion of device into a throughhole, or manual reforming of leads after soldering.

Axial Lead Devices



## General Information (continued)

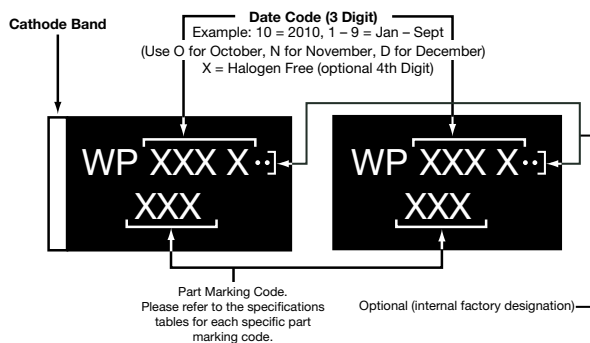
## Preformed Lead Drawings



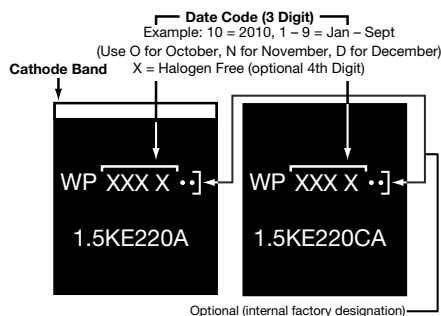
| Case type                                                     | Preformed type | A (mm) |           | B (mm) |           | C (mm) |           | D (mm) |           | R (mm) |           |
|---------------------------------------------------------------|----------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|
|                                                               |                | Range  | Tolerance | Range  | Tolerance | Range  | Tolerance | Range  | Tolerance | Range  | Tolerance |
| <b>DO-41 package</b><br>P4KE Series                           | M              | 11~20  | ±0.5      | 8~20   | ±0.5      | ---    | ---       | 1.5    | max.      | ---    | ---       |
|                                                               | E              | 11~20  | ±0.5      | 11~16  | ±1.0      | 4~5    | ±0.5      | 1.5    | max.      | ---    | ---       |
|                                                               | B              | 7.5    | ±0.5      | 19~22  | ±0.5      | 7.5    | ±0.5      | 1.5    | max.      | 2.5~4  | typ.      |
|                                                               | C              | 4.5    | ±0.8      | 18~19  | ±0.5      | 9.0    | ±0.5      | 1.5    | max.      | 2.5~4  | typ.      |
| <b>DO-15 package</b><br>SA Series<br>P6KE Series              | M              | 13~20  | ±0.5      | 8~22   | ±0.5      | ---    | ---       | 1.5    | max.      | ---    | ---       |
|                                                               | E              | 13~20  | ±0.5      | 11~16  | ±1.0      | 4~5    | ±0.5      | 1.5    | max.      | ---    | ---       |
| <b>DO-201AD package</b><br>1.5KE Series                       | M              | 15~20  | ±1.0      | 8~22   | ±1.0      | ---    | ---       | 2.0    | max.      | ---    | ---       |
|                                                               | E              | 15~20  | ±1.0      | 10~22  | ±1.0      | 3~5    | ±0.5      | 2.0    | max.      | ---    | ---       |
| <b>R-6 package</b><br>3KP Series<br>5KP Series<br>15KP Series | M              | 15~20  | ±1.0      | 8~22   | ±1.0      | ---    | ---       | 2.0    | max.      | ---    | ---       |
| 20KP Series<br>30KP Series                                    | M              | 15~20  | ±1.0      | 8~22   | ±1.0      | ---    | ---       | 2.0    | max.      | ---    | ---       |

## Part Marking

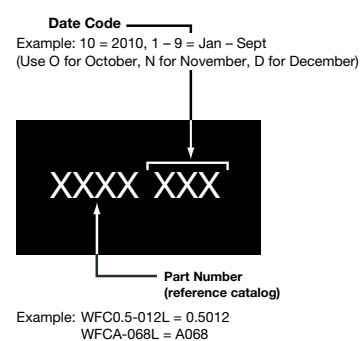
## For Surface Mount Devices



## For Axial Lead



## For WFC Series Types



## General Information (continued)

### Part Numbering System

#### Axial Type

Example Part Number:

| <u>P4KE</u> | <u>20</u> | <u>C</u> | <u>A</u> | <u>Z</u> | <u>TR</u> | <u>-</u> | <u>X</u> |
|-------------|-----------|----------|----------|----------|-----------|----------|----------|
| (1)         | (2)       | (3)      | (4)      | (5)      | (6)       |          | (7)      |

- (1) Series:** P4KE = 400 Watt  
SA = 500 Watt  
P6KE = 600 Watt  
1.5KE = 1500 Watt  
3KP = 3000 Watt  
5KP = 5000 Watt  
15KP = 15000 Watt  
20KP = 20000 Watt  
30KP = 30000 Watt
- (2) Voltage:** 20 = 20V  
Nominal Breakdown Voltage For P4KE, P6KE, 1.5KE  
Rated Standoff Voltage For SA, 3KP, 5KP, 15KP, 20KP, 30KP
- (3) Polarity:** Blank = Unidirectional  
C = Bidirectional
- (4) Tolerance:** Blank = 10%  
A = 5%
- (5) AEC-Q101:** Z (where applicable)
- (6) Packaging:** Blank = Bulk  
TR = Tape and Reel
- (7) Halogen Free** X = Halogen Free

**Note:** All Axial Types are RoHS compliant.

#### Surface Mount Type

Example Part Number:

| <u>P4SMAJ</u> | <u>20</u> | <u>C</u> | <u>A</u> | <u>Z</u> | <u>F</u> | <u>-</u> | <u>X</u> |
|---------------|-----------|----------|----------|----------|----------|----------|----------|
| (1)           | (2)       | (3)      | (4)      | (5)      | (6)      |          | (7)      |

- (1) Series:** P4SMAJ = 400 Watt Surface Mount  
**(6) Halogen Free**  
P6SMBJ = 600 Watt Surface Mount  
X = Halogen Free  
1.5SMCJ = 1500 Watt Surface Mount  
3.0SMCJ = 3000 Watt Surface Mount  
5.0SMCJ = 5000 Watt Surface Mount
- (2) Rated Stand-Off Voltage:** 20 = 20V
- (3) Polarity:** Blank = Unidirectional  
C = Bidirectional
- (4) Tolerance:** Blank = 10%  
A = 5%
- (5) AEC-Q101:** Z (where applicable)
- (6) RoHS Compliance:** Blank: No Compliance  
F: RoHS Compliance
- (7) Halogen Free** X = Halogen Free

**Note:** Surface mount packaging is tape and reel.

#### WFC Type

Refer to complete part number as stated in this catalog on pages 44 - 48.

All WFC Series parts are RoHS compliant and Halogen Free.

## P4KE Series – 400 Watt



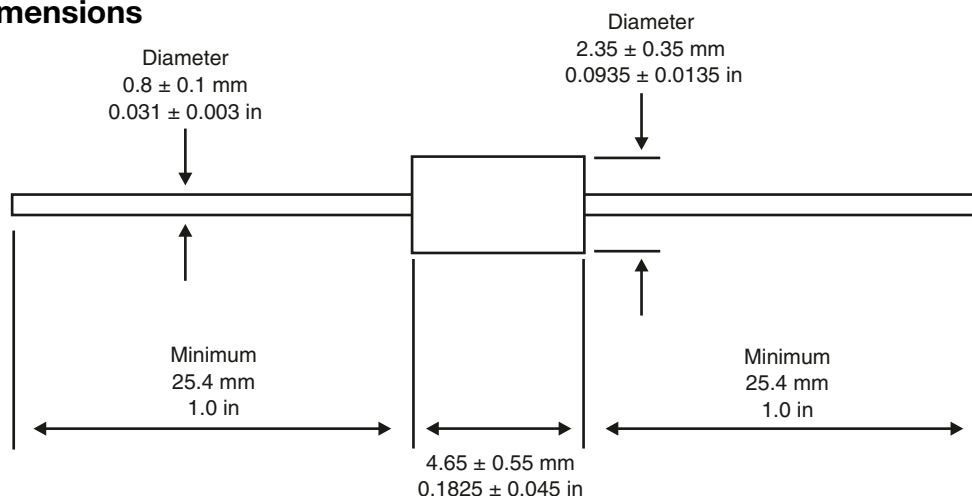
### P4KE Series Features

- RoHS Compliance Standard
- 400 watt peak pulse power dissipation
- Available in voltages from 6.8V to 550V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Available in bulk or tape and reel (Reel quantity = 5,000 pieces)
- Each device 100% surge tested
- Tape and Reel to EIA Standard RS-296-E
- UL 497B Recognized, File #E135015
- AEC-Q101 Qualified (11A & 11CA – 550A & 550CA) types. (When ordering ADD suffix “Z” to end of part number.)

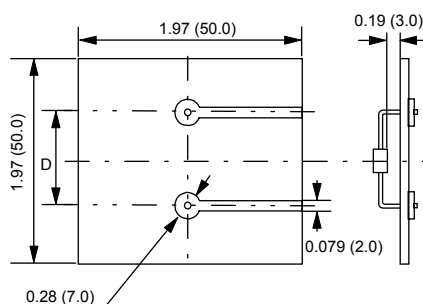
### Absolute Maximum Ratings

| Parameter                                                                            | Value            |
|--------------------------------------------------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 400W             |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 1W               |
| Operating and storage temperatures                                                   | -65°C to + 175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



**NOTE: Dimension D**

- a.) P4KE (DO-41 Package) - 0.362 (9.2)
- b.) SA / P6KE (DO-15 Package) - 0.437 (11.6)

**Hole Diameter**

- a.) 0.044 (1.1)

All dimensions in inches and (millimeters)

**P4KE Series — 400 Watt (continued)****Electrical Characteristics**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| P4KE6.8      | 5.50                   | 6.12              | 7.48  | 10   | 1000                              | 10.8                                             | 38.0                                       |
| P4KE6.8A     | 5.80                   | 6.45              | 7.14  | 10   | 1000                              | 10.5                                             | 39.0                                       |
| P4KE7.5      | 6.05                   | 6.75              | 8.25  | 10   | 500                               | 11.7                                             | 36.0                                       |
| P4KE7.5A     | 6.40                   | 7.13              | 7.88  | 10   | 500                               | 11.3                                             | 36.3                                       |
| P4KE8.2      | 6.63                   | 7.38              | 9.02  | 10   | 200                               | 12.5                                             | 33.0                                       |
| P4KE8.2A     | 7.02                   | 7.79              | 8.61  | 10   | 200                               | 12.1                                             | 33.9                                       |
| P4KE9.1      | 7.37                   | 8.19              | 10.00 | 1    | 50                                | 13.8                                             | 30.0                                       |
| P4KE9.1A     | 7.78                   | 8.65              | 9.55  | 1    | 50                                | 13.4                                             | 30.6                                       |
| P4KE10       | 8.10                   | 9.00              | 11.00 | 1    | 10                                | 15.0                                             | 28.0                                       |
| P4KE10A      | 8.55                   | 9.50              | 10.50 | 1    | 10                                | 14.5                                             | 28.3                                       |
| P4KE11       | 8.92                   | 9.90              | 12.10 | 1    | 5                                 | 16.2                                             | 26.0                                       |
| P4KE11A      | 9.40                   | 10.50             | 11.60 | 1    | 5                                 | 15.6                                             | 26.3                                       |
| P4KE12       | 9.72                   | 10.80             | 13.20 | 1    | 5                                 | 17.3                                             | 24.0                                       |
| P4KE12A      | 10.20                  | 11.40             | 12.60 | 1    | 5                                 | 16.7                                             | 24.6                                       |
| P4KE13       | 10.50                  | 11.70             | 14.30 | 1    | 1                                 | 19.0                                             | 22.0                                       |
| P4KE13A      | 11.10                  | 12.40             | 13.70 | 1    | 1                                 | 18.2                                             | 22.5                                       |
| P4KE15       | 12.10                  | 13.50             | 16.50 | 1    | 1                                 | 22.0                                             | 19.0                                       |
| P4KE15A      | 12.80                  | 14.30             | 15.80 | 1    | 1                                 | 21.2                                             | 19.3                                       |
| P4KE16       | 12.90                  | 14.40             | 17.60 | 1    | 1                                 | 23.5                                             | 18.0                                       |
| P4KE16A      | 13.60                  | 15.20             | 16.80 | 1    | 1                                 | 22.5                                             | 18.2                                       |
| P4KE18       | 14.50                  | 16.20             | 19.80 | 1    | 1                                 | 26.5                                             | 16.0                                       |
| P4KE18A      | 15.30                  | 17.10             | 18.90 | 1    | 1                                 | 25.2                                             | 16.1                                       |
| P4KE20       | 16.20                  | 18.00             | 22.00 | 1    | 1                                 | 29.1                                             | 14.0                                       |
| P4KE20A      | 17.10                  | 19.00             | 21.00 | 1    | 1                                 | 27.7                                             | 14.8                                       |
| P4KE22       | 17.80                  | 19.80             | 24.20 | 1    | 1                                 | 31.9                                             | 13.0                                       |
| P4KE22A      | 18.80                  | 20.90             | 23.10 | 1    | 1                                 | 30.6                                             | 13.4                                       |
| P4KE24       | 19.40                  | 21.60             | 26.40 | 1    | 1                                 | 34.7                                             | 12.0                                       |
| P4KE24A      | 20.50                  | 22.80             | 25.20 | 1    | 1                                 | 33.2                                             | 12.3                                       |
| P4KE27       | 21.80                  | 24.30             | 29.70 | 1    | 1                                 | 39.1                                             | 11.0                                       |
| P4KE27A      | 23.10                  | 25.70             | 28.40 | 1    | 1                                 | 37.5                                             | 10.9                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**P4KE Series — 400 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |        |        | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|--------|--------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |        | @It    |                                   |                                                  |                                            |
|              |                        | Vwm (Volts)       | Min    | Max    | (mA)                              | (µA)                                             | (Volts)                                    |
| P4KE30       | 24.30                  |                   | 27.00  | 33.00  | 1                                 | 1                                                | 43.5                                       |
| P4KE30A      | 25.60                  |                   | 28.50  | 31.50  | 1                                 | 1                                                | 41.4                                       |
| P4KE33       | 26.80                  |                   | 29.70  | 36.30  | 1                                 | 1                                                | 47.7                                       |
| P4KE33A      | 28.20                  |                   | 31.40  | 34.70  | 1                                 | 1                                                | 45.7                                       |
| P4KE36       | 29.10                  |                   | 32.40  | 39.60  | 1                                 | 1                                                | 52.0                                       |
| P4KE36A      | 30.80                  |                   | 34.20  | 37.80  | 1                                 | 1                                                | 49.9                                       |
| P4KE39       | 31.60                  |                   | 35.10  | 42.90  | 1                                 | 1                                                | 56.4                                       |
| P4KE39A      | 33.30                  |                   | 37.10  | 41.00  | 1                                 | 1                                                | 53.9                                       |
| P4KE43       | 34.80                  |                   | 38.70  | 47.30  | 1                                 | 1                                                | 61.9                                       |
| P4KE43A      | 36.80                  |                   | 40.90  | 45.20  | 1                                 | 1                                                | 59.3                                       |
| P4KE47       | 38.10                  |                   | 42.30  | 51.70  | 1                                 | 1                                                | 67.8                                       |
| P4KE47A      | 40.20                  |                   | 44.70  | 49.40  | 1                                 | 1                                                | 64.8                                       |
| P4KE51       | 41.30                  |                   | 45.90  | 56.10  | 1                                 | 1                                                | 73.5                                       |
| P4KE51A      | 43.60                  |                   | 48.50  | 53.60  | 1                                 | 1                                                | 70.1                                       |
| P4KE56       | 45.60                  |                   | 50.40  | 61.60  | 1                                 | 1                                                | 80.5                                       |
| P4KE56A      | 47.80                  |                   | 53.20  | 58.80  | 1                                 | 1                                                | 77.0                                       |
| P4KE62       | 50.20                  |                   | 55.80  | 68.20  | 1                                 | 1                                                | 89.0                                       |
| P4KE62A      | 53.00                  |                   | 58.90  | 65.10  | 1                                 | 1                                                | 85.0                                       |
| P4KE68       | 55.10                  |                   | 61.20  | 74.80  | 1                                 | 1                                                | 98.0                                       |
| P4KE68A      | 58.10                  |                   | 64.60  | 71.40  | 1                                 | 1                                                | 92.0                                       |
| P4KE75       | 60.70                  |                   | 67.50  | 82.50  | 1                                 | 1                                                | 108.0                                      |
| P4KE75A      | 64.10                  |                   | 71.30  | 78.80  | 1                                 | 1                                                | 103.0                                      |
| P4KE82       | 66.40                  |                   | 73.80  | 90.20  | 1                                 | 1                                                | 118.0                                      |
| P4KE82A      | 70.10                  |                   | 77.90  | 86.10  | 1                                 | 1                                                | 113.0                                      |
| P4KE91       | 73.70                  |                   | 81.90  | 100.00 | 1                                 | 1                                                | 131.0                                      |
| P4KE91A      | 77.80                  |                   | 86.50  | 95.50  | 1                                 | 1                                                | 125.0                                      |
| P4KE100      | 81.00                  |                   | 90.00  | 110.00 | 1                                 | 1                                                | 144.0                                      |
| P4KE100A     | 85.50                  |                   | 95.00  | 105.00 | 1                                 | 1                                                | 137.0                                      |
| P4KE110      | 89.20                  |                   | 99.90  | 121.00 | 1                                 | 1                                                | 158.0                                      |
| P4KE110A     | 94.00                  |                   | 105.00 | 116.00 | 1                                 | 1                                                | 152.0                                      |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**P4KE Series — 400 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |        |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|--------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |        | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max    | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| P4KE120      | 97.20                  | 108.00            | 132.00 | 1    | 1                                 | 173.0                                            | 2.4                                        |
| P4KE120A     | 102.00                 | 114.00            | 126.00 | 1    | 1                                 | 165.0                                            | 2.5                                        |
| P4KE130      | 105.00                 | 117.00            | 143.00 | 1    | 1                                 | 187.0                                            | 2.2                                        |
| P4KE130A     | 111.00                 | 124.00            | 137.00 | 1    | 1                                 | 179.0                                            | 2.3                                        |
| P4KE150      | 121.00                 | 135.00            | 165.00 | 1    | 1                                 | 215.0                                            | 2.0                                        |
| P4KE150A     | 128.00                 | 143.00            | 158.00 | 1    | 1                                 | 207.0                                            | 2.0                                        |
| P4KE160      | 130.00                 | 144.00            | 176.00 | 1    | 1                                 | 230.0                                            | 1.8                                        |
| P4KE160A     | 136.00                 | 152.00            | 168.00 | 1    | 1                                 | 219.0                                            | 1.9                                        |
| P4KE170      | 138.00                 | 153.00            | 187.00 | 1    | 1                                 | 244.0                                            | 1.7                                        |
| P4KE170A     | 145.00                 | 162.00            | 179.00 | 1    | 1                                 | 234.0                                            | 1.8                                        |
| P4KE180      | 146.00                 | 162.00            | 198.00 | 1    | 1                                 | 258.0                                            | 1.6                                        |
| P4KE180A     | 154.00                 | 171.00            | 189.00 | 1    | 1                                 | 246.0                                            | 1.7                                        |
| P4KE200      | 162.00                 | 180.00            | 220.00 | 1    | 1                                 | 287.0                                            | 1.5                                        |
| P4KE200A     | 171.00                 | 190.00            | 210.00 | 1    | 1                                 | 274.0                                            | 1.5                                        |
| P4KE220      | 175.00                 | 198.00            | 242.00 | 1    | 1                                 | 344.0                                            | 1.16                                       |
| P4KE220A     | 185.00                 | 209.00            | 231.00 | 1    | 1                                 | 328.0                                            | 1.3                                        |
| P4KE250      | 202.00                 | 225.00            | 275.00 | 1    | 1                                 | 360.0                                            | 1.10                                       |
| P4KE250A     | 214.00                 | 237.00            | 263.00 | 1    | 1                                 | 344.0                                            | 1.2                                        |
| P4KE300      | 243.00                 | 270.00            | 330.00 | 1    | 1                                 | 430.0                                            | 0.93                                       |
| P4KE300A     | 256.00                 | 285.00            | 315.00 | 1    | 1                                 | 414.0                                            | 1.0                                        |
| P4KE350      | 284.00                 | 315.00            | 385.00 | 1    | 1                                 | 504.0                                            | 0.79                                       |
| P4KE350A     | 300.00                 | 332.00            | 368.00 | 1    | 1                                 | 482.0                                            | 0.85                                       |
| P4KE400      | 324.00                 | 360.00            | 440.00 | 1    | 1                                 | 574.0                                            | 0.70                                       |
| P4KE400A     | 342.00                 | 380.00            | 420.00 | 1    | 1                                 | 548.0                                            | 0.75                                       |
| P4KE440      | 356.00                 | 396.00            | 484.00 | 1    | 1                                 | 631.0                                            | 0.66                                       |
| P4KE440A     | 376.00                 | 418.00            | 462.00 | 1    | 1                                 | 602.0                                            | 0.68                                       |
| P4KE480A     | 408.00                 | 456.00            | 504.00 | 1    | 1                                 | 658.0                                            | 0.61                                       |
| P4KE510A     | 434.00                 | 485.00            | 535.00 | 1    | 1                                 | 698.0                                            | 0.57                                       |
| P4KE530A     | 450.00                 | 503.50            | 556.50 | 1    | 1                                 | 725.0                                            | 0.55                                       |
| P4KE540A     | 459.00                 | 513.00            | 567.00 | 1    | 1                                 | 740.0                                            | 0.54                                       |
| P4KE550A     | 467.00                 | 522.50            | 577.50 | 1    | 1                                 | 760.0                                            | 0.52                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

## SA Series – 500 Watt



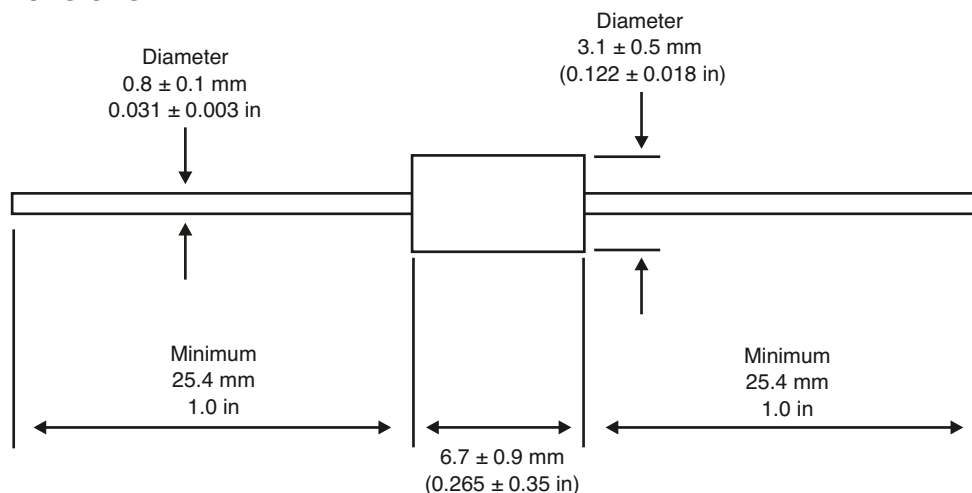
### SA Series Features

- RoHS Compliance Standard
- 500 watt peak pulse power dissipation
- Available in voltages from 5.0V to 170V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Available in bulk or tape and reel (Reel quantity = 4,000 pieces)
- Each device 100% surge tested
- Tape and Reel to EIA Standard RS-296-E
- UL 497B Recognized, File #E135015

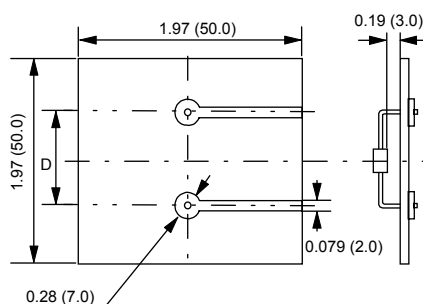
### Absolute Maximum Ratings

| Parameter                                                                            | Value            |
|--------------------------------------------------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 500W             |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 1W               |
| Operating and storage temperatures                                                   | -55°C to + 175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



NOTE: **Dimension D**  
a.) P4KE (DO-41 Package) - 0.362 (9.2)  
b.) SA / P6KE (DO-15 Package) - 0.437 (11.6)  
**Hole Diameter**  
a.) 0.044 (1.1)

All dimensions in inches and (millimeters)

## SA Series — 500 Watt (continued)

## Electrical Characteristics

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| SA5.0        | 5.0                    | 6.40              | 7.30 | 10   | 600                               | 9.6                                              | 52.0                                       |
| SA5.0A       | 5.0                    | 6.40              | 7.00 | 10   | 600                               | 9.2                                              | 55.4                                       |
| SA6.0        | 6.0                    | 6.67              | 8.15 | 10   | 600                               | 11.4                                             | 43.9                                       |
| SA6.0A       | 6.0                    | 6.67              | 7.37 | 10   | 600                               | 10.3                                             | 49.5                                       |
| SA6.5        | 6.5                    | 7.22              | 8.82 | 10   | 400                               | 12.3                                             | 40.7                                       |
| SA6.5A       | 6.5                    | 7.22              | 7.98 | 10   | 400                               | 11.2                                             | 45.5                                       |
| SA7.0        | 7.0                    | 7.78              | 9.51 | 10   | 150                               | 13.3                                             | 37.8                                       |
| SA7.0A       | 7.0                    | 7.78              | 8.60 | 10   | 150                               | 12.0                                             | 42.5                                       |
| SA7.5        | 7.5                    | 8.33              | 10.2 | 1    | 50                                | 14.3                                             | 35.0                                       |
| SA7.5A       | 7.5                    | 8.33              | 9.21 | 1    | 50                                | 12.9                                             | 39.5                                       |
| SA8.0        | 8.0                    | 8.89              | 10.9 | 1    | 25                                | 15.0                                             | 33.3                                       |
| SA8.0A       | 8.0                    | 8.89              | 9.83 | 1    | 25                                | 13.6                                             | 37.5                                       |
| SA8.5        | 8.5                    | 9.44              | 11.5 | 1    | 10                                | 15.9                                             | 31.4                                       |
| SA8.5A       | 8.5                    | 9.44              | 10.4 | 1    | 10                                | 14.4                                             | 35.4                                       |
| SA9.0        | 9.0                    | 10.0              | 12.2 | 1    | 5                                 | 16.9                                             | 29.5                                       |
| SA9.0A       | 9.0                    | 10.0              | 11.1 | 1    | 5                                 | 15.4                                             | 33.1                                       |
| SA10         | 10                     | 11.1              | 13.6 | 1    | 3                                 | 18.8                                             | 26.6                                       |
| SA10A        | 10                     | 11.1              | 12.3 | 1    | 3                                 | 17.0                                             | 30.0                                       |
| SA11         | 11                     | 12.2              | 14.9 | 1    | 1                                 | 20.1                                             | 24.9                                       |
| SA11A        | 11                     | 12.2              | 13.5 | 1    | 1                                 | 18.2                                             | 28.0                                       |
| SA12         | 12                     | 13.3              | 16.3 | 1    | 1                                 | 22.0                                             | 22.7                                       |
| SA12A        | 12                     | 13.3              | 14.7 | 1    | 1                                 | 19.9                                             | 25.6                                       |
| SA13         | 13                     | 14.4              | 17.6 | 1    | 1                                 | 23.8                                             | 21.0                                       |
| SA13A        | 13                     | 14.4              | 15.9 | 1    | 1                                 | 21.5                                             | 23.7                                       |
| SA14         | 14                     | 15.6              | 19.1 | 1    | 1                                 | 25.8                                             | 19.4                                       |
| SA14A        | 14                     | 15.6              | 17.2 | 1    | 1                                 | 23.2                                             | 22.0                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM <= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

## SA Series — 500 Watt (continued)

## Electrical Characteristics (continued)

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| SA15         | 15                     | 16.7              | 20.4 | 1    | 1                                 | 26.9                                             | 18.8                                       |
| SA15A        | 15                     | 16.7              | 18.5 | 1    | 1                                 | 24.4                                             | 20.9                                       |
| SA16         | 16                     | 17.8              | 21.8 | 1    | 1                                 | 28.8                                             | 17.6                                       |
| SA16A        | 16                     | 17.8              | 19.7 | 1    | 1                                 | 26.0                                             | 19.6                                       |
| SA17         | 17                     | 18.9              | 23.1 | 1    | 1                                 | 30.5                                             | 16.4                                       |
| SA17A        | 17                     | 18.9              | 20.9 | 1    | 1                                 | 27.6                                             | 18.5                                       |
| SA18         | 18                     | 20.0              | 24.4 | 1    | 1                                 | 32.2                                             | 15.5                                       |
| SA18A        | 18                     | 20.0              | 22.1 | 1    | 1                                 | 29.2                                             | 17.5                                       |
| SA20         | 20                     | 22.2              | 27.1 | 1    | 1                                 | 35.8                                             | 13.9                                       |
| SA20A        | 20                     | 22.2              | 24.5 | 1    | 1                                 | 32.4                                             | 15.7                                       |
| SA22         | 22                     | 24.4              | 29.8 | 1    | 1                                 | 39.4                                             | 12.7                                       |
| SA22A        | 22                     | 24.4              | 26.9 | 1    | 1                                 | 35.5                                             | 14.4                                       |
| SA24         | 24                     | 26.7              | 32.6 | 1    | 1                                 | 43.0                                             | 11.6                                       |
| SA24A        | 24                     | 26.7              | 29.5 | 1    | 1                                 | 38.9                                             | 13.1                                       |
| SA26         | 26                     | 28.9              | 35.3 | 1    | 1                                 | 46.6                                             | 10.7                                       |
| SA26A        | 26                     | 28.9              | 31.9 | 1    | 1                                 | 42.1                                             | 12.1                                       |
| SA28         | 28                     | 31.1              | 38.0 | 1    | 1                                 | 50.0                                             | 9.9                                        |
| SA28A        | 28                     | 31.1              | 34.4 | 1    | 1                                 | 45.4                                             | 11.2                                       |
| SA30         | 30                     | 33.3              | 40.7 | 1    | 1                                 | 53.5                                             | 9.3                                        |
| SA30A        | 30                     | 33.3              | 36.8 | 1    | 1                                 | 48.4                                             | 10.5                                       |
| SA33         | 33                     | 36.7              | 44.9 | 1    | 1                                 | 59.0                                             | 8.5                                        |
| SA33A        | 33                     | 36.7              | 40.6 | 1    | 1                                 | 53.3                                             | 9.6                                        |
| SA36         | 36                     | 40.0              | 48.9 | 1    | 1                                 | 64.3                                             | 7.8                                        |
| SA36A        | 36                     | 40.0              | 44.2 | 1    | 1                                 | 58.1                                             | 8.8                                        |
| SA40         | 40                     | 44.4              | 54.3 | 1    | 1                                 | 71.4                                             | 7.0                                        |
| SA40A        | 40                     | 44.4              | 49.1 | 1    | 1                                 | 64.5                                             | 7.9                                        |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

## SA Series — 500 Watt (continued)

## Electrical Characteristics (continued)

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| SA43         | 43                     | 47.8              | 58.4  | 1    | 1                                 | 76.7                                             | 6.5                                        |
| SA43A        | 43                     | 47.8              | 52.8  | 1    | 1                                 | 69.4                                             | 7.3                                        |
| SA45         | 45                     | 50.0              | 61.1  | 1    | 1                                 | 80.3                                             | 6.2                                        |
| SA45A        | 45                     | 50.0              | 55.3  | 1    | 1                                 | 72.7                                             | 7.0                                        |
| SA48         | 48                     | 53.3              | 65.1  | 1    | 1                                 | 85.5                                             | 5.8                                        |
| SA48A        | 48                     | 53.3              | 58.9  | 1    | 1                                 | 77.4                                             | 6.6                                        |
| SA51         | 51                     | 56.7              | 69.3  | 1    | 1                                 | 91.1                                             | 5.5                                        |
| SA51A        | 51                     | 56.7              | 62.7  | 1    | 1                                 | 82.4                                             | 6.2                                        |
| SA54         | 54                     | 60.0              | 73.3  | 1    | 1                                 | 96.3                                             | 5.2                                        |
| SA54A        | 54                     | 60.0              | 66.3  | 1    | 1                                 | 87.1                                             | 5.9                                        |
| SA58         | 58                     | 64.4              | 78.7  | 1    | 1                                 | 103.0                                            | 4.9                                        |
| SA58A        | 58                     | 64.4              | 71.2  | 1    | 1                                 | 93.6                                             | 5.4                                        |
| SA60         | 60                     | 66.7              | 81.5  | 1    | 1                                 | 107.0                                            | 4.7                                        |
| SA60A        | 60                     | 66.7              | 73.7  | 1    | 1                                 | 96.8                                             | 5.3                                        |
| SA64         | 64                     | 71.1              | 86.9  | 1    | 1                                 | 114.0                                            | 4.4                                        |
| SA64A        | 64                     | 71.1              | 78.6  | 1    | 1                                 | 103.0                                            | 5.0                                        |
| SA70         | 70                     | 77.8              | 95.1  | 1    | 1                                 | 125.0                                            | 4.0                                        |
| SA70A        | 70                     | 77.8              | 86.0  | 1    | 1                                 | 113.0                                            | 4.5                                        |
| SA75         | 75                     | 83.3              | 102.0 | 1    | 1                                 | 134.0                                            | 3.7                                        |
| SA75A        | 75                     | 83.3              | 92.1  | 1    | 1                                 | 121.0                                            | 4.2                                        |
| SA78         | 78                     | 86.7              | 106.0 | 1    | 1                                 | 139.0                                            | 3.6                                        |
| SA78A        | 78                     | 86.7              | 95.8  | 1    | 1                                 | 126.0                                            | 4.0                                        |
| SA85         | 85                     | 94.4              | 115.0 | 1    | 1                                 | 151.0                                            | 3.3                                        |
| SA85A        | 85                     | 94.4              | 104.0 | 1    | 1                                 | 137.0                                            | 3.7                                        |
| SA90         | 90                     | 100               | 122.0 | 1    | 1                                 | 160.0                                            | 3.1                                        |
| SA90A        | 90                     | 100               | 111.0 | 1    | 1                                 | 146.0                                            | 3.5                                        |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

## SA Series — 500 Watt (continued)

## Electrical Characteristics (continued)

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| SA100        | 100                    | 111               | 136.0 | 1    | 1                                 | 179.9                                            | 2.8                                        |
| SA100A       | 100                    | 111               | 123.0 | 1    | 1                                 | 162.0                                            | 3.1                                        |
| SA110        | 110                    | 122               | 149.0 | 1    | 1                                 | 196.0                                            | 2.6                                        |
| SA110A       | 110                    | 122               | 135.0 | 1    | 1                                 | 177.0                                            | 2.9                                        |
| SA120        | 120                    | 133               | 163.0 | 1    | 1                                 | 214.0                                            | 2.3                                        |
| SA120A       | 120                    | 133               | 147.0 | 1    | 1                                 | 193.0                                            | 2.6                                        |
| SA130        | 130                    | 144               | 176.0 | 1    | 1                                 | 231.0                                            | 2.2                                        |
| SA130A       | 130                    | 144               | 159.0 | 1    | 1                                 | 209.0                                            | 2.4                                        |
| SA150        | 150                    | 167               | 204.0 | 1    | 1                                 | 268.0                                            | 1.9                                        |
| SA150A       | 150                    | 167               | 185.0 | 1    | 1                                 | 243.0                                            | 2.1                                        |
| SA160        | 160                    | 178               | 218.0 | 1    | 1                                 | 287.0                                            | 1.7                                        |
| SA160A       | 160                    | 178               | 197.0 | 1    | 1                                 | 259.0                                            | 2.0                                        |
| SA170        | 170                    | 189               | 231.0 | 1    | 1                                 | 304.0                                            | 1.6                                        |
| SA170A       | 170                    | 189               | 209.0 | 1    | 1                                 | 275.0                                            | 1.9                                        |
| SA180A       | 180                    | 201               | 222.0 | 1    | 1                                 | 292.0                                            | 1.7                                        |
| SA190A       | 190                    | 211               | 233.0 | 1    | 1                                 | 308.0                                            | 1.6                                        |
| SA200A       | 200                    | 224               | 247.0 | 1    | 1                                 | 324.0                                            | 1.5                                        |
| SA210A       | 210                    | 237               | 263.0 | 1    | 1                                 | 340.0                                            | 1.5                                        |
| SA220A       | 220                    | 246               | 272.0 | 1    | 1                                 | 356.0                                            | 1.4                                        |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.



## P6KE Series — 600 Watt



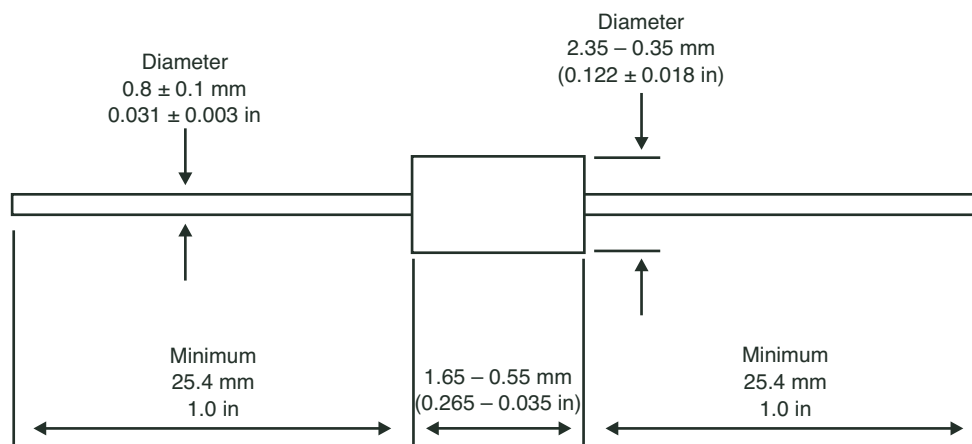
### P6KE Series Features

- RoHS Compliance Standard
- 600 watt peak pulse power dissipation
- Available in voltages from 6.8V to 600V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Available in bulk or tape and reel (Reel quantity = 4,000 pieces)
- Each device 100% surge tested
- Tape and Reel to EIA Standard RS-296-E
- UL 497B Recognized, File # E135015
- AEC-Q101 Qualified (11A & 11CA – 600A & 600CA) types. (When ordering ADD suffix “Z” to end of part number.)

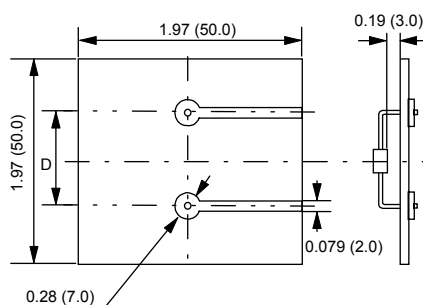
### Absolute Maximum Ratings

| Parameter                                                                            | Value            |
|--------------------------------------------------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 600W             |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 5W               |
| Operating and storage temperatures                                                   | -55°C to + 175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



NOTE: **Dimension D**  
a.) P4KE (DO-41 Package) - 0.362 (9.2)  
b.) SA / P6KE (DO-15 Package) - 0.437 (11.6)  
**Hole Diameter**  
a.) 0.044 (1.1)

All dimensions in inches and (millimeters)

**P6KE Series — 600 Watt (continued)****Electrical Characteristics**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| P6KE6.8      | 5.50                   | 6.12              | 7.48 | 10   | 1000                              | 10.8                                             | 56                                         |
| P6KE6.8A     | 5.80                   | 6.45              | 7.14 | 10   | 1000                              | 10.5                                             | 58.1                                       |
| P6KE7.5      | 6.05                   | 6.75              | 8.25 | 10   | 500                               | 11.7                                             | 51                                         |
| P6KE7.5A     | 6.40                   | 7.13              | 7.88 | 10   | 500                               | 11.3                                             | 54                                         |
| P6KE8.2      | 6.63                   | 7.38              | 9.02 | 10   | 200                               | 12.5                                             | 48                                         |
| P6KE8.2A     | 7.02                   | 7.79              | 8.61 | 10   | 200                               | 12.1                                             | 50.4                                       |
| P6KE9.1      | 7.37                   | 8.19              | 10.0 | 1    | 50                                | 13.8                                             | 44                                         |
| P6KE9.1A     | 7.78                   | 8.65              | 9.55 | 1    | 50                                | 13.4                                             | 45.5                                       |
| P6KE10       | 8.10                   | 9.00              | 11.0 | 1    | 10                                | 15.0                                             | 40                                         |
| P6KE10A      | 8.55                   | 9.5               | 10.5 | 1    | 10                                | 14.5                                             | 42.1                                       |
| P6KE11       | 8.92                   | 9.9               | 12.1 | 1    | 5                                 | 16.2                                             | 37                                         |
| P6KE11A      | 9.40                   | 10.5              | 11.6 | 1    | 5                                 | 15.6                                             | 39.1                                       |
| P6KE12       | 9.72                   | 10.8              | 13.2 | 1    | 5                                 | 17.3                                             | 35                                         |
| P6KE12A      | 10.2                   | 11.4              | 12.6 | 1    | 5                                 | 16.7                                             | 36.5                                       |
| P6KE13       | 10.5                   | 11.7              | 14.3 | 1    | 1                                 | 19.0                                             | 32                                         |
| P6KE13A      | 11.1                   | 12.4              | 13.7 | 1    | 1                                 | 18.2                                             | 33.5                                       |
| P6KE15       | 12.1                   | 13.5              | 16.5 | 1    | 1                                 | 22.0                                             | 27                                         |
| P6KE15A      | 12.8                   | 14.3              | 15.8 | 1    | 1                                 | 21.2                                             | 28.8                                       |
| P6KE16       | 12.9                   | 14.4              | 17.6 | 1    | 1                                 | 23.5                                             | 26                                         |
| P6KE16A      | 13.6                   | 15.2              | 16.8 | 1    | 1                                 | 22.5                                             | 27.1                                       |
| P6KE18       | 14.5                   | 16.2              | 19.8 | 1    | 1                                 | 26.5                                             | 23                                         |
| P6KE18A      | 15.3                   | 17.1              | 18.9 | 1    | 1                                 | 25.2                                             | 24.2                                       |
| P6KE20       | 16.2                   | 18.0              | 22.0 | 1    | 1                                 | 29.1                                             | 21                                         |
| P6KE20A      | 17.1                   | 19.0              | 21.0 | 1    | 1                                 | 27.7                                             | 22                                         |
| P6KE22       | 17.8                   | 19.8              | 24.2 | 1    | 1                                 | 31.9                                             | 19                                         |
| P6KE22A      | 18.8                   | 20.9              | 23.1 | 1    | 1                                 | 30.6                                             | 19.9                                       |
| P6KE24       | 19.4                   | 21.6              | 26.4 | 1    | 1                                 | 34.7                                             | 17                                         |
| P6KE24A      | 20.5                   | 22.8              | 25.2 | 1    | 1                                 | 33.2                                             | 18.4                                       |
| P6KE27       | 21.8                   | 24.3              | 29.7 | 1    | 1                                 | 39.1                                             | 15                                         |
| P6KE27A      | 23.1                   | 25.7              | 28.4 | 1    | 1                                 | 37.5                                             | 16.3                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**P6KE Series — 600 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| P6KE30       | 24.3                   | 27.0              | 33.0  | 1    | 1                                 | 43.5                                             | 14                                         |
| P6KE30A      | 25.6                   | 28.5              | 31.5  | 1    | 1                                 | 41.4                                             | 14.7                                       |
| P6KE33       | 26.8                   | 29.7              | 36.3  | 1    | 1                                 | 47.7                                             | 12.6                                       |
| P6KE33A      | 28.2                   | 31.4              | 34.7  | 1    | 1                                 | 45.7                                             | 13.3                                       |
| P6KE36       | 29.1                   | 32.4              | 39.6  | 1    | 1                                 | 52.0                                             | 11.6                                       |
| P6KE36A      | 30.8                   | 34.2              | 37.8  | 1    | 1                                 | 49.9                                             | 12.2                                       |
| P6KE39       | 31.6                   | 35.1              | 42.9  | 1    | 1                                 | 56.4                                             | 10.5                                       |
| P6KE39A      | 33.3                   | 37.1              | 41.0  | 1    | 1                                 | 53.9                                             | 11.3                                       |
| P6KE43       | 34.8                   | 38.7              | 47.3  | 1    | 1                                 | 61.9                                             | 9.6                                        |
| P6KE43A      | 36.8                   | 40.9              | 45.2  | 1    | 1                                 | 59.3                                             | 10.3                                       |
| P6KE47       | 38.1                   | 42.3              | 51.7  | 1    | 1                                 | 67.8                                             | 8.9                                        |
| P6KE47A      | 40.2                   | 44.7              | 49.4  | 1    | 1                                 | 64.8                                             | 9.4                                        |
| P6KE51       | 41.3                   | 45.9              | 56.1  | 1    | 1                                 | 73.5                                             | 8.2                                        |
| P6KE51A      | 43.6                   | 48.5              | 53.6  | 1    | 1                                 | 70.1                                             | 8.7                                        |
| P6KE56       | 45.4                   | 50.4              | 61.6  | 1    | 1                                 | 80.5                                             | 7.4                                        |
| P6KE56A      | 47.8                   | 53.2              | 58.8  | 1    | 1                                 | 77.0                                             | 7.9                                        |
| P6KE62       | 50.2                   | 55.8              | 68.2  | 1    | 1                                 | 89.0                                             | 6.8                                        |
| P6KE62A      | 53.0                   | 58.9              | 65.1  | 1    | 1                                 | 85.0                                             | 7.2                                        |
| P6KE68       | 55.1                   | 61.2              | 74.8  | 1    | 1                                 | 98.0                                             | 6.1                                        |
| P6KE68A      | 58.1                   | 64.6              | 71.4  | 1    | 1                                 | 92.0                                             | 6.6                                        |
| P6KE75       | 60.7                   | 67.5              | 82.5  | 1    | 1                                 | 108.0                                            | 5.5                                        |
| P6KE75A      | 64.1                   | 71.3              | 78.8  | 1    | 1                                 | 103.0                                            | 5.9                                        |
| P6KE82       | 66.4                   | 73.8              | 90.2  | 1    | 1                                 | 118.0                                            | 5.1                                        |
| P6KE82A      | 70.1                   | 77.9              | 86.1  | 1    | 1                                 | 113.0                                            | 5.4                                        |
| P6KE91       | 73.7                   | 81.9              | 100.0 | 1    | 1                                 | 131.0                                            | 4.5                                        |
| P6KE91A      | 77.8                   | 86.5              | 95.5  | 1    | 1                                 | 125.0                                            | 4.9                                        |
| P6KE100      | 81.0                   | 90.0              | 110.0 | 1    | 1                                 | 144.0                                            | 4.2                                        |
| P6KE100A     | 85.5                   | 95.0              | 105.0 | 1    | 1                                 | 137.0                                            | 4.5                                        |
| P6KE110      | 89.2                   | 99.0              | 121.0 | 1    | 1                                 | 158.0                                            | 3.8                                        |
| P6KE110A     | 94.0                   | 105.0             | 116.0 | 1    | 1                                 | 152.0                                            | 4.0                                        |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**P6KE Series — 600 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |        |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|--------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |        | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max    | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| P6KE120      | 97.2                   | 108.0             | 132.0  | 1    | 1                                 | 173.0                                            | 3.5                                        |
| P6KE120A     | 102.0                  | 114.0             | 126.0  | 1    | 1                                 | 165.0                                            | 3.7                                        |
| P6KE130      | 105.0                  | 117.0             | 143.0  | 1    | 1                                 | 187.0                                            | 3.2                                        |
| P6KE130A     | 111.0                  | 124.0             | 137.0  | 1    | 1                                 | 179.0                                            | 3.4                                        |
| P6KE150      | 121.0                  | 135.0             | 165.0  | 1    | 1                                 | 215.0                                            | 2.8                                        |
| P6KE150A     | 128.0                  | 143.0             | 158.0  | 1    | 1                                 | 207.0                                            | 2.9                                        |
| P6KE160      | 130.0                  | 144.0             | 176.0  | 1    | 1                                 | 230.0                                            | 2.6                                        |
| P6KE160A     | 136.0                  | 152.0             | 168.0  | 1    | 1                                 | 219.0                                            | 2.8                                        |
| P6KE170      | 138.0                  | 153.0             | 187.0  | 1    | 1                                 | 244.0                                            | 2.5                                        |
| P6KE170A     | 145.0                  | 162.0             | 179.0  | 1    | 1                                 | 234.0                                            | 2.6                                        |
| P6KE180      | 146.0                  | 162.0             | 198.0  | 1    | 1                                 | 258.0                                            | 2.3                                        |
| P6KE180A     | 154.0                  | 171.0             | 189.0  | 1    | 1                                 | 246.0                                            | 2.5                                        |
| P6KE200      | 162.0                  | 180.0             | 220.0  | 1    | 1                                 | 287.0                                            | 2.1                                        |
| P6KE200A     | 171.0                  | 190.0             | 210.0  | 1    | 1                                 | 274.0                                            | 2.2                                        |
| P6KE220      | 175.0                  | 198.0             | 242.0  | 1    | 1                                 | 344.0                                            | 1.75                                       |
| P6KE220A     | 185.0                  | 209.0             | 231.0  | 1    | 1                                 | 328.0                                            | 1.9                                        |
| P6KE250      | 202.0                  | 225.0             | 275.0  | 1    | 1                                 | 360.0                                            | 1.67                                       |
| P6KE250A     | 214.0                  | 237.0             | 263.0  | 1    | 1                                 | 344.0                                            | 1.8                                        |
| P6KE300      | 243.0                  | 270.0             | 330.0  | 1    | 1                                 | 430.0                                            | 1.40                                       |
| P6KE300A     | 256.0                  | 285.0             | 315.0  | 1    | 1                                 | 414.0                                            | 1.5                                        |
| P6KE350      | 284.0                  | 315.0             | 385.0  | 1    | 1                                 | 504.0                                            | 1.20                                       |
| P6KE350A     | 300.0                  | 332.0             | 368.0  | 1    | 1                                 | 482.0                                            | 1.3                                        |
| P6KE400      | 324.0                  | 360.0             | 440.0  | 1    | 1                                 | 574.0                                            | 1.05                                       |
| P6KE400A     | 342.0                  | 380.0             | 420.0  | 1    | 1                                 | 548.0                                            | 1.10                                       |
| P6KE440      | 356.0                  | 396.0             | 484.0  | 1    | 1                                 | 631.0                                            | 0.99                                       |
| P6KE440A     | 376.0                  | 418.0             | 462.0  | 1    | 1                                 | 602.0                                            | 1.04                                       |
| P6KE480A     | 408.0                  | 456.0             | 504.0  | 1    | 1                                 | 658.0                                            | 0.90                                       |
| P6KE510A     | 434.0                  | 485.0             | 535.0  | 1    | 1                                 | 698.0                                            | 0.90                                       |
| P6KE530A     | 450.0                  | 503.5             | 556.50 | 1    | 1                                 | 725.0                                            | 0.80                                       |
| P6KE540A     | 459.0                  | 513.0             | 567.0  | 1    | 1                                 | 740.0                                            | 0.80                                       |
| P6KE550A     | 467.5                  | 522.5             | 577.5  | 1    | 1                                 | 760.0                                            | 0.80                                       |
| P6KE600A     | 512.0                  | 570.0             | 630.0  | 1    | 1                                 | 828.0                                            | 0.75                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

## 1.5KE Series – 1500 Watt



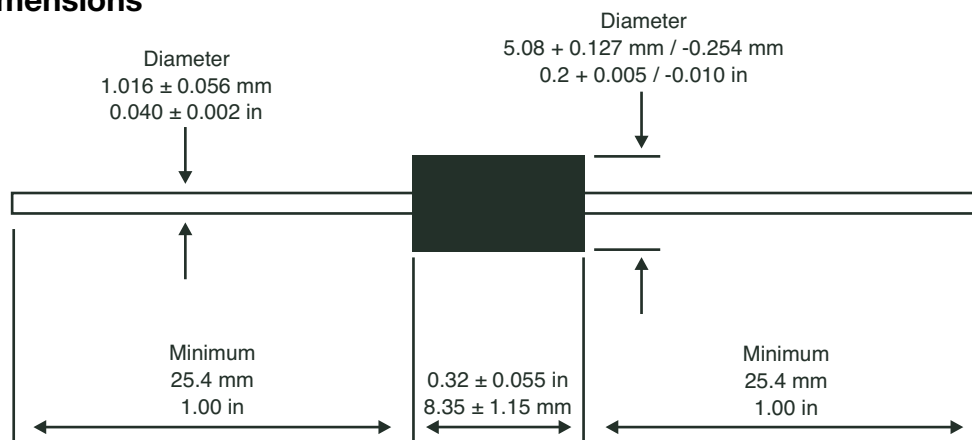
### 1.5KE Series Features

- RoHS Compliance Standard
- 1500 watt peak pulse power dissipation
- Available in voltages from 6.8V to 550V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Available in bulk or tape and reel (Reel quantity = 1,200 pieces)
- Each device 100% surge tested
- Metal hermetically sealed (DO13) version of this diode is available upon request
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS-296-E
- AEC-Q101 Qualified (11A & 11CA – 500A & 550CA) types. (When ordering ADD suffix “Z” to end of part number.)

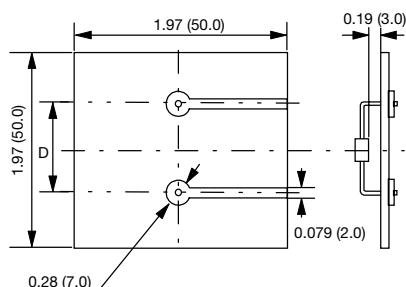
### Absolute Maximum Ratings

| Parameter                                                                            | Value            |
|--------------------------------------------------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 1500W            |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 5W               |
| Operating and storage temperatures                                                   | -55°C to + 175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



#### NOTE: Dimension D

- 1.5KE (DO-201 Package) - 0.611 (15.5)
- 3KP / 5KP / 15KP (P600 Package) - 0.673 (17.1)

#### Hole Diameter

- 0.059 (1.5)

All dimensions in inches and (millimeters)

**1.5KE Series — 1500 Watt (continued)****Electrical Characteristics**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 1.5KE6.8     | 5.50                   | 6.12              | 7.48 | 10   | 1000                              | 10.8                                             | 139.0                                      |
| 1.5KE6.8A    | 5.80                   | 6.4               | 7.14 | 10   | 1000                              | 10.5                                             | 144.8                                      |
| 1.5KE7.5     | 6.05                   | 6.75              | 8.25 | 10   | 500                               | 11.7                                             | 128.0                                      |
| 1.5KE7.5A    | 6.40                   | 7.13              | 7.88 | 10   | 500                               | 11.3                                             | 134.5                                      |
| 1.5KE8.2     | 6.63                   | 7.38              | 9.02 | 10   | 200                               | 12.5                                             | 120.0                                      |
| 1.5KE8.2A    | 7.02                   | 7.79              | 8.61 | 10   | 200                               | 12.1                                             | 125.6                                      |
| 1.5KE9.1     | 7.37                   | 8.19              | 10.0 | 1    | 50                                | 13.8                                             | 109.0                                      |
| 1.5KE9.1A    | 7.78                   | 8.65              | 9.55 | 1    | 50                                | 13.4                                             | 113.4                                      |
| 1.5KE10      | 8.10                   | 9.00              | 11.0 | 1    | 10                                | 15.0                                             | 100.0                                      |
| 1.5KE10A     | 8.55                   | 9.5               | 10.5 | 1    | 10                                | 14.5                                             | 104.8                                      |
| 1.5KE11      | 8.92                   | 9.9               | 12.1 | 1    | 5                                 | 16.2                                             | 93.0                                       |
| 1.5KE11A     | 9.40                   | 10.5              | 11.6 | 1    | 5                                 | 15.6                                             | 97.4                                       |
| 1.5KE12      | 9.72                   | 10.8              | 13.2 | 1    | 5                                 | 17.3                                             | 87.0                                       |
| 1.5KE12A     | 10.2                   | 11.4              | 12.6 | 1    | 5                                 | 16.7                                             | 91.0                                       |
| 1.5KE13      | 10.5                   | 11.7              | 14.3 | 1    | 1                                 | 19.0                                             | 79.0                                       |
| 1.5KE13A     | 11.1                   | 12.4              | 13.7 | 1    | 1                                 | 18.2                                             | 83.5                                       |
| 1.5KE15      | 12.1                   | 13.5              | 16.5 | 1    | 1                                 | 22.0                                             | 68.0                                       |
| 1.5KE15A     | 12.8                   | 14.3              | 15.8 | 1    | 1                                 | 21.2                                             | 71.7                                       |
| 1.5KE16      | 12.9                   | 14.4              | 17.6 | 1    | 1                                 | 23.5                                             | 64.0                                       |
| 1.5KE16A     | 13.6                   | 15.2              | 16.8 | 1    | 1                                 | 22.5                                             | 67.6                                       |
| 1.5KE18      | 14.5                   | 16.2              | 19.8 | 1    | 1                                 | 26.5                                             | 56.5                                       |
| 1.5KE18A     | 15.3                   | 17.1              | 18.9 | 1    | 1                                 | 25.2                                             | 60.3                                       |
| 1.5KE20      | 16.2                   | 18.0              | 22.0 | 1    | 1                                 | 29.1                                             | 51.5                                       |
| 1.5KE20A     | 17.1                   | 19.0              | 21.0 | 1    | 1                                 | 27.7                                             | 54.9                                       |
| 1.5KE22      | 17.8                   | 19.8              | 24.2 | 1    | 1                                 | 31.9                                             | 47.0                                       |
| 1.5KE22A     | 18.8                   | 20.9              | 23.1 | 1    | 1                                 | 30.6                                             | 49.7                                       |
| 1.5KE24      | 19.4                   | 21.6              | 26.4 | 1    | 1                                 | 34.7                                             | 43.0                                       |
| 1.5KE24A     | 20.5                   | 22.8              | 25.2 | 1    | 1                                 | 33.2                                             | 45.8                                       |
| 1.5KE27      | 21.8                   | 24.3              | 29.7 | 1    | 1                                 | 39.1                                             | 38.5                                       |

Metal hermetically sealed (DO13) version of this diode is available upon request.

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM <= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**1.5KE Series — 1500 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 1.5KE27A     | 23.1                   | 25.7              | 28.4  | 1    | 1                                 | 37.5                                             | 40.5                                       |
| 1.5KE30      | 24.3                   | 27.0              | 33.0  | 1    | 1                                 | 43.5                                             | 34.5                                       |
| 1.5KE30A     | 25.6                   | 28.5              | 31.5  | 1    | 1                                 | 41.4                                             | 36.7                                       |
| 1.5KE33      | 26.8                   | 29.7              | 36.3  | 1    | 1                                 | 47.7                                             | 31.5                                       |
| 1.5KE33A     | 28.2                   | 31.4              | 34.7  | 1    | 1                                 | 45.7                                             | 33.3                                       |
| 1.5KE36      | 29.1                   | 32.4              | 39.6  | 1    | 1                                 | 52.0                                             | 29.0                                       |
| 1.5KE36A     | 30.8                   | 34.2              | 37.8  | 1    | 1                                 | 49.9                                             | 30.5                                       |
| 1.5KE39      | 31.6                   | 35.1              | 42.9  | 1    | 1                                 | 56.4                                             | 26.5                                       |
| 1.5KE39A     | 33.3                   | 37.1              | 41.0  | 1    | 1                                 | 53.9                                             | 28.2                                       |
| 1.5KE43      | 34.8                   | 38.7              | 47.3  | 1    | 1                                 | 61.9                                             | 24.0                                       |
| 1.5KE43A     | 36.8                   | 40.9              | 45.2  | 1    | 1                                 | 59.3                                             | 25.6                                       |
| 1.5KE47      | 38.1                   | 42.3              | 51.7  | 1    | 1                                 | 67.8                                             | 22.2                                       |
| 1.5KE47A     | 40.2                   | 44.7              | 49.4  | 1    | 1                                 | 64.8                                             | 23.5                                       |
| 1.5KE51      | 41.3                   | 45.9              | 56.1  | 1    | 1                                 | 73.5                                             | 20.4                                       |
| 1.5KE51A     | 43.6                   | 48.5              | 53.6  | 1    | 1                                 | 70.1                                             | 21.7                                       |
| 1.5KE56      | 45.4                   | 50.4              | 61.6  | 1    | 1                                 | 80.5                                             | 18.6                                       |
| 1.5KE56A     | 47.8                   | 53.2              | 58.8  | 1    | 1                                 | 77.0                                             | 19.7                                       |
| 1.5KE62      | 50.2                   | 55.8              | 68.2  | 1    | 1                                 | 89.0                                             | 16.9                                       |
| 1.5KE62A     | 53.0                   | 58.9              | 65.1  | 1    | 1                                 | 85.0                                             | 17.9                                       |
| 1.5KE68      | 55.1                   | 61.2              | 74.8  | 1    | 1                                 | 98.0                                             | 15.3                                       |
| 1.5KE68A     | 58.1                   | 64.6              | 71.4  | 1    | 1                                 | 92.0                                             | 16.5                                       |
| 1.5KE75      | 60.7                   | 67.5              | 82.5  | 1    | 1                                 | 108.0                                            | 13.9                                       |
| 1.5KE75A     | 64.1                   | 71.3              | 78.8  | 1    | 1                                 | 103.0                                            | 14.8                                       |
| 1.5KE82      | 66.4                   | 73.8              | 90.2  | 1    | 1                                 | 118.0                                            | 12.7                                       |
| 1.5KE82A     | 70.1                   | 77.9              | 86.1  | 1    | 1                                 | 113.0                                            | 13.5                                       |
| 1.5KE91      | 73.7                   | 81.9              | 100.0 | 1    | 1                                 | 131.0                                            | 11.4                                       |
| 1.5KE91A     | 77.8                   | 86.5              | 95.5  | 1    | 1                                 | 125.0                                            | 12.2                                       |
| 1.5KE100     | 81.0                   | 90.0              | 110.0 | 1    | 1                                 | 144.0                                            | 10.4                                       |
| 1.5KE100A    | 85.5                   | 95.0              | 105.0 | 1    | 1                                 | 137.0                                            | 11.1                                       |

Metal hermetically sealed (DO13) version of this diode is available upon request.

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**1.5KE Series — 1500 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 1.5KE110     | 89.2                   | 99.0              | 121.0 | 1    | 1                                 | 158.0                                            | 9.5                                        |
| 1.5KE110A    | 94.0                   | 105.0             | 116.0 | 1    | 1                                 | 152.0                                            | 10.0                                       |
| 1.5KE120     | 97.2                   | 108.0             | 132.0 | 1    | 1                                 | 173.0                                            | 8.7                                        |
| 1.5KE120A    | 102.0                  | 114.0             | 126.0 | 1    | 1                                 | 165.0                                            | 9.2                                        |
| 1.5KE130     | 105.0                  | 117.0             | 143.0 | 1    | 1                                 | 187.0                                            | 8.0                                        |
| 1.5KE130A    | 111.0                  | 124.0             | 137.0 | 1    | 1                                 | 179.0                                            | 8.5                                        |
| 1.5KE150     | 121.0                  | 135.0             | 165.0 | 1    | 1                                 | 215.0                                            | 7.0                                        |
| 1.5KE150A    | 128.0                  | 143.0             | 158.0 | 1    | 1                                 | 207.0                                            | 7.3                                        |
| 1.5KE160     | 130.0                  | 144.0             | 176.0 | 1    | 1                                 | 230.0                                            | 6.5                                        |
| 1.5KE160A    | 136.0                  | 152.0             | 168.0 | 1    | 1                                 | 219.0                                            | 6.9                                        |
| 1.5KE170     | 138.0                  | 153.0             | 187.0 | 1    | 1                                 | 244.0                                            | 6.2                                        |
| 1.5KE170A    | 145.0                  | 162.0             | 179.0 | 1    | 1                                 | 234.0                                            | 6.5                                        |
| 1.5KE180     | 146.0                  | 162.0             | 198.0 | 1    | 1                                 | 258.0                                            | 5.8                                        |
| 1.5KE180A    | 154.0                  | 171.0             | 189.0 | 1    | 1                                 | 246.0                                            | 6.2                                        |
| 1.5KE200     | 162.0                  | 180.0             | 220.0 | 1    | 1                                 | 287.0                                            | 5.2                                        |
| 1.5KE200A    | 171.0                  | 190.0             | 210.0 | 1    | 1                                 | 274.0                                            | 5.5                                        |
| 1.5KE220     | 175.0                  | 198.0             | 242.0 | 1    | 1                                 | 344.0                                            | 4.3                                        |
| 1.5KE220A    | 185.0                  | 209.0             | 231.0 | 1    | 1                                 | 328.0                                            | 4.6                                        |
| 1.5KE250     | 202.0                  | 225.0             | 275.0 | 1    | 1                                 | 360.0                                            | 5.0                                        |
| 1.5KE250A    | 214.0                  | 237.0             | 263.0 | 1    | 1                                 | 344.0                                            | 4.4                                        |
| 1.5KE300     | 243.0                  | 270.0             | 330.0 | 1    | 1                                 | 430.0                                            | 5.0                                        |
| 1.5KE300A    | 256.0                  | 285.0             | 315.0 | 1    | 1                                 | 414.0                                            | 3.7                                        |
| 1.5KE350     | 284.0                  | 315.0             | 385.0 | 1    | 1                                 | 504.0                                            | 4.0                                        |
| 1.5KE350A    | 300.0                  | 332.0             | 368.0 | 1    | 1                                 | 482.0                                            | 3.2                                        |
| 1.5KE400     | 324.0                  | 360.0             | 440.0 | 1    | 1                                 | 574.0                                            | 4.0                                        |
| 1.5KE400A    | 342.0                  | 380.0             | 420.0 | 1    | 1                                 | 548.0                                            | 2.8                                        |
| 1.5KE440     | 356.0                  | 396.0             | 484.0 | 1    | 1                                 | 631.0                                            | 2.4                                        |
| 1.5KE440A    | 376.0                  | 418.0             | 462.0 | 1    | 1                                 | 600.0                                            | 2.5                                        |
| 1.5KE480A    | 408.0                  | 456.0             | 504.0 | 1    | 1                                 | 658.0                                            | 2.3                                        |
| 1.5KE510A    | 434.0                  | 485.0             | 535.0 | 1    | 1                                 | 698.0                                            | 2.1                                        |
| 1.5KE530A    | 450.0                  | 503.5             | 556.5 | 1    | 1                                 | 725.0                                            | 2.1                                        |
| 1.5KE540A    | 459.0                  | 513.0             | 567.0 | 1    | 1                                 | 740.0                                            | 2.0                                        |
| 1.5KE550A    | 467.0                  | 522.5             | 577.5 | 1    | 1                                 | 760.0                                            | 2.0                                        |

Metal hermetically sealed (DO13) version of this diode is available upon request.

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM <= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

## 3KP Series — 3000 Watt



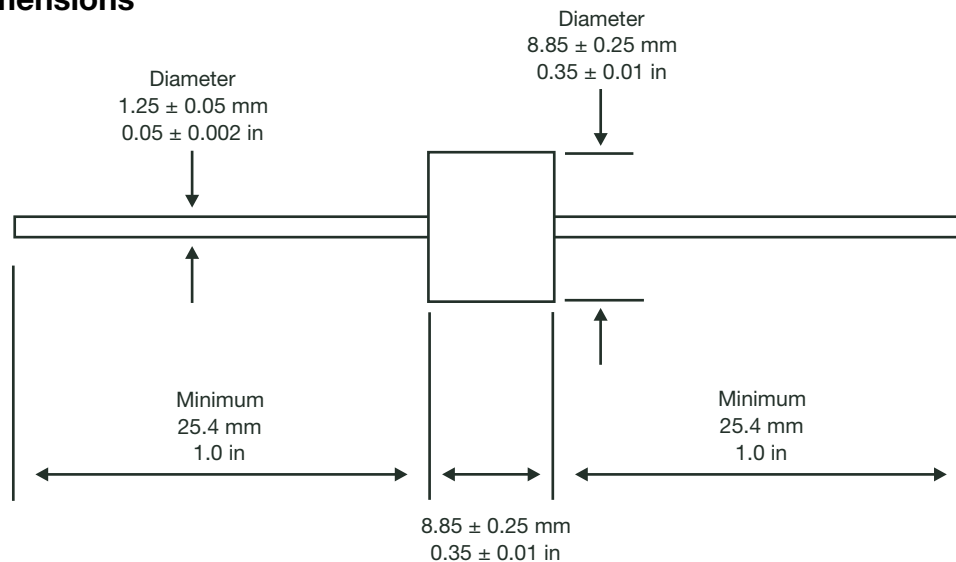
### 3KP Series Features

- RoHS Compliance Standard
- 3000 watt peak pulse power dissipation
- Available in voltages from 5V to 220V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Available in bulk or tape and reel (Reel quantity = 800 pieces)
- Each device 100% surge tested
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS-296-E
- AEC-Q101 Qualified (11A & 11CA – 220A & 220CA) types. (When ordering ADD suffix “Z” to end of part number.)

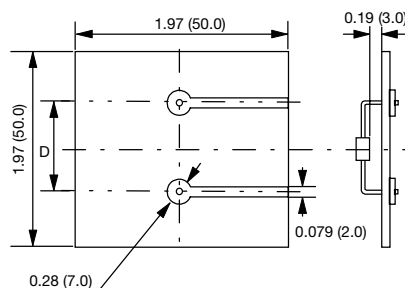
### Absolute Maximum Ratings

| Parameter                                                                            | Value            |
|--------------------------------------------------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 3000W            |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 8W               |
| Operating and storage temperatures                                                   | -55°C to + 175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



#### NOTE: Dimension D

- 1.5KE (DO-201 Package) - 0.611 (15.5)
- 3KP / 5KP / 15KP (P600 Package) - 0.673 (17.1)

#### Hole Diameter

- 0.059 (1.5)

All dimensions in inches and (millimeters)

**3KP Series — 3000 Watt (continued)****Electrical Characteristics**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 3KP5.0A      | 5.0                    | 6.40              | 7.00  | 10   | 5000                              | 9.2                                              | 326.1                                      |
| 3KP6.0A      | 6.0                    | 6.67              | 7.37  | 10   | 5000                              | 10.3                                             | 291.3                                      |
| 3KP6.5A      | 6.5                    | 7.22              | 7.98  | 10   | 2000                              | 11.2                                             | 267.9                                      |
| 3KP7.0A      | 7.0                    | 7.78              | 8.60  | 10   | 1000                              | 12.0                                             | 250.0                                      |
| 3KP7.5A      | 7.5                    | 8.33              | 9.21  | 1    | 250                               | 12.9                                             | 232.6                                      |
| 3KP8.0A      | 8.0                    | 8.89              | 9.83  | 1    | 150                               | 13.6                                             | 220.6                                      |
| 3KP8.5A      | 8.5                    | 9.44              | 10.40 | 1    | 50                                | 14.4                                             | 208.3                                      |
| 3KP9.0A      | 9.0                    | 10.00             | 11.10 | 1    | 20                                | 15.4                                             | 194.8                                      |
| 3KP10        | 10.00                  | 11.10             | 14.10 | 1    | 15                                | 18.8                                             | 159.6                                      |
| 3KP10A       | 10.00                  | 11.10             | 12.30 | 1    | 15                                | 17.0                                             | 176.5                                      |
| 3KP11        | 11.00                  | 12.20             | 15.40 | 1    | 2                                 | 20.1                                             | 149.2                                      |
| 3KP11A       | 11.00                  | 12.20             | 13.50 | 1    | 2                                 | 18.2                                             | 164.8                                      |
| 3KP12        | 12.00                  | 13.30             | 16.90 | 1    | 2                                 | 22.0                                             | 136.4                                      |
| 3KP12A       | 12.00                  | 13.30             | 14.70 | 1    | 2                                 | 19.9                                             | 150.8                                      |
| 3KP13        | 13.00                  | 14.40             | 18.20 | 1    | 2                                 | 23.8                                             | 126.0                                      |
| 3KP13A       | 13.00                  | 14.40             | 15.90 | 1    | 2                                 | 21.5                                             | 139.5                                      |
| 3KP14        | 14.00                  | 15.60             | 19.80 | 1    | 2                                 | 25.8                                             | 116.2                                      |
| 3KP14A       | 14.00                  | 15.60             | 17.20 | 1    | 2                                 | 23.2                                             | 129.3                                      |
| 3KP15        | 15.00                  | 16.70             | 21.10 | 1    | 2                                 | 26.9                                             | 111.6                                      |
| 3KP15A       | 15.00                  | 16.70             | 18.50 | 1    | 2                                 | 24.4                                             | 123.0                                      |
| 3KP16        | 16.00                  | 17.80             | 22.60 | 1    | 2                                 | 28.8                                             | 104.2                                      |
| 3KP16A       | 16.00                  | 17.80             | 19.70 | 1    | 2                                 | 26.0                                             | 115.4                                      |
| 3KP17        | 17.00                  | 18.90             | 23.90 | 1    | 2                                 | 30.5                                             | 98.4                                       |
| 3KP17A       | 17.00                  | 18.90             | 20.90 | 1    | 2                                 | 27.6                                             | 108.7                                      |
| 3KP18        | 18.00                  | 20.00             | 25.30 | 1    | 2                                 | 32.2                                             | 93.2                                       |
| 3KP18A       | 18.00                  | 20.00             | 22.10 | 1    | 2                                 | 29.2                                             | 102.7                                      |
| 3KP20        | 20.00                  | 22.20             | 28.10 | 1    | 2                                 | 35.8                                             | 83.8                                       |
| 3KP20A       | 20.00                  | 22.20             | 24.50 | 1    | 2                                 | 32.4                                             | 92.6                                       |
| 3KP22        | 22.00                  | 24.40             | 30.90 | 1    | 2                                 | 39.4                                             | 76.2                                       |
| 3KP22A       | 22.00                  | 24.40             | 26.90 | 1    | 2                                 | 35.5                                             | 84.5                                       |
| 3KP24        | 24.00                  | 26.70             | 33.80 | 1    | 2                                 | 43.0                                             | 69.8                                       |
| 3KP24A       | 24.00                  | 26.70             | 29.50 | 1    | 2                                 | 38.9                                             | 77.1                                       |
| 3KP26        | 26.00                  | 28.90             | 36.60 | 1    | 2                                 | 46.6                                             | 64.4                                       |
| 3KP26A       | 26.00                  | 28.90             | 31.90 | 1    | 2                                 | 42.1                                             | 71.3                                       |

Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**3KP Series — 3000 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |        |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|--------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |        | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max    | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 3KP28        | 28.00                  | 31.10             | 39.40  | 1    | 2                                 | 50.0                                             | 60.0                                       |
| 3KP28A       | 28.00                  | 31.10             | 34.40  | 1    | 2                                 | 45.4                                             | 66.1                                       |
| 3KP30        | 30.00                  | 33.30             | 42.20  | 1    | 2                                 | 53.5                                             | 56.0                                       |
| 3KP30A       | 30.00                  | 33.30             | 36.80  | 1    | 2                                 | 48.4                                             | 62.0                                       |
| 3KP33        | 33.00                  | 36.70             | 46.50  | 1    | 2                                 | 59.0                                             | 50.4                                       |
| 3KP33A       | 33.00                  | 36.70             | 40.60  | 1    | 2                                 | 53.3                                             | 56.3                                       |
| 3KP36        | 36.00                  | 40.00             | 50.70  | 1    | 2                                 | 64.3                                             | 46.6                                       |
| 3KP36A       | 36.00                  | 40.00             | 44.20  | 1    | 2                                 | 58.1                                             | 51.6                                       |
| 3KP40        | 40.00                  | 44.40             | 53.30  | 1    | 2                                 | 71.4                                             | 42.0                                       |
| 3KP40A       | 40.00                  | 44.40             | 49.10  | 1    | 2                                 | 64.5                                             | 46.5                                       |
| 3KP43        | 43.00                  | 47.80             | 60.50  | 1    | 2                                 | 76.7                                             | 39.2                                       |
| 3KP43A       | 43.00                  | 47.80             | 52.80  | 1    | 2                                 | 69.4                                             | 43.2                                       |
| 3KP45        | 45.00                  | 50.00             | 63.30  | 1    | 2                                 | 80.3                                             | 37.4                                       |
| 3KP45A       | 45.00                  | 50.00             | 55.30  | 1    | 2                                 | 72.7                                             | 41.3                                       |
| 3KP48        | 48.00                  | 53.30             | 67.50  | 1    | 2                                 | 85.5                                             | 35.0                                       |
| 3KP48A       | 48.00                  | 53.30             | 58.90  | 1    | 2                                 | 77.4                                             | 38.8                                       |
| 3KP51        | 51.00                  | 56.70             | 71.80  | 1    | 2                                 | 91.1                                             | 37.0                                       |
| 3KP51A       | 51.00                  | 56.70             | 62.70  | 1    | 2                                 | 82.4                                             | 36.4                                       |
| 3KP54        | 54.00                  | 60.00             | 76.00  | 1    | 2                                 | 96.3                                             | 31.2                                       |
| 3KP54A       | 54.00                  | 60.00             | 66.30  | 1    | 2                                 | 87.1                                             | 34.4                                       |
| 3KP58        | 58.00                  | 64.40             | 81.60  | 1    | 2                                 | 103.0                                            | 29.2                                       |
| 3KP58A       | 58.00                  | 64.40             | 71.20  | 1    | 2                                 | 93.6                                             | 32.1                                       |
| 3KP60        | 60.00                  | 66.70             | 84.50  | 1    | 2                                 | 107.0                                            | 28.0                                       |
| 3KP60A       | 60.00                  | 66.70             | 73.70  | 1    | 2                                 | 96.8                                             | 31.0                                       |
| 3KP64        | 64.00                  | 71.10             | 90.10  | 1    | 2                                 | 114.0                                            | 26.4                                       |
| 3KP64A       | 64.00                  | 71.10             | 78.60  | 1    | 2                                 | 103.0                                            | 29.1                                       |
| 3KP70        | 70.00                  | 77.80             | 98.60  | 1    | 2                                 | 125.0                                            | 24.0                                       |
| 3KP70A       | 70.00                  | 77.80             | 86.00  | 1    | 2                                 | 113.0                                            | 26.5                                       |
| 3KP75        | 75.00                  | 83.30             | 105.70 | 1    | 2                                 | 134.0                                            | 22.4                                       |
| 3KP75A       | 75.00                  | 83.30             | 92.10  | 1    | 2                                 | 121.0                                            | 24.8                                       |

Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**3KP Series — 3000 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |        |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|--------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |        | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max    | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 3KP78        | 78.00                  | 86.70             | 109.80 | 1    | 2                                 | 139.0                                            | 21.6                                       |
| 3KP78A       | 78.00                  | 86.70             | 95.80  | 1    | 2                                 | 126.0                                            | 23.8                                       |
| 3KP85        | 85.00                  | 94.40             | 119.20 | 1    | 2                                 | 151.0                                            | 19.8                                       |
| 3KP85A       | 85.00                  | 94.40             | 104.00 | 1    | 2                                 | 137.0                                            | 21.9                                       |
| 3KP90        | 90.00                  | 100.00            | 126.50 | 1    | 2                                 | 160.0                                            | 18.8                                       |
| 3KP90A       | 90.00                  | 100.00            | 111.00 | 1    | 2                                 | 146.0                                            | 20.5                                       |
| 3KP100       | 100.00                 | 111.00            | 141.00 | 1    | 2                                 | 179.0                                            | 16.6                                       |
| 3KP100A      | 100.00                 | 111.00            | 123.00 | 1    | 2                                 | 162.0                                            | 18.5                                       |
| 3KP110       | 110.00                 | 122.00            | 154.50 | 1    | 2                                 | 196.0                                            | 15.4                                       |
| 3KP110A      | 110.00                 | 122.00            | 135.00 | 1    | 2                                 | 177.0                                            | 16.9                                       |
| 3KP120       | 120.00                 | 133.00            | 169.00 | 1    | 2                                 | 214.0                                            | 14.0                                       |
| 3KP120A      | 120.00                 | 133.00            | 147.00 | 1    | 2                                 | 193.0                                            | 15.5                                       |
| 3KP130       | 130.00                 | 144.00            | 182.50 | 1    | 2                                 | 231.0                                            | 13.0                                       |
| 3KP130A      | 130.00                 | 144.00            | 159.00 | 1    | 2                                 | 209.0                                            | 14.4                                       |
| 3KP150       | 150.00                 | 167.00            | 211.50 | 1    | 2                                 | 268.0                                            | 11.2                                       |
| 3KP150A      | 150.00                 | 167.00            | 185.00 | 1    | 2                                 | 243.0                                            | 12.3                                       |
| 3KP160       | 160.00                 | 178.00            | 226.00 | 1    | 2                                 | 287.0                                            | 10.4                                       |
| 3KP160A      | 160.00                 | 178.00            | 197.00 | 1    | 2                                 | 259.0                                            | 11.6                                       |
| 3KP170       | 170.00                 | 189.00            | 239.50 | 1    | 2                                 | 304.0                                            | 9.8                                        |
| 3KP170A      | 170.00                 | 189.00            | 209.00 | 1    | 2                                 | 275.0                                            | 10.9                                       |
| 3KP180       | 180.00                 | 198.00            | 242.00 | 1    | 2                                 | 322.0                                            | 9.3                                        |
| 3KP180A      | 180.00                 | 201.00            | 222.00 | 1    | 2                                 | 292.0                                            | 10.3                                       |
| 3KP190       | 190.00                 | 209.00            | 255.40 | 1    | 2                                 | 340.0                                            | 8.8                                        |
| 3KP190A      | 190.00                 | 211.00            | 233.00 | 1    | 2                                 | 308.0                                            | 9.7                                        |
| 3KP200       | 200.00                 | 220.00            | 268.80 | 1    | 2                                 | 358.0                                            | 8.4                                        |
| 3KP200A      | 200.00                 | 224.00            | 247.00 | 1    | 2                                 | 324.0                                            | 9.3                                        |
| 3KP210       | 210.00                 | 231.00            | 282.20 | 1    | 2                                 | 376.0                                            | 8.0                                        |
| 3KP210A      | 210.00                 | 237.00            | 263.00 | 1    | 2                                 | 340.0                                            | 8.8                                        |
| 3KP220       | 220.00                 | 242.00            | 295.70 | 1    | 2                                 | 394.0                                            | 7.6                                        |
| 3KP220A      | 220.00                 | 246.00            | 272.00 | 1    | 2                                 | 356.0                                            | 8.4                                        |

Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

## 5KP Series —5000 Watt



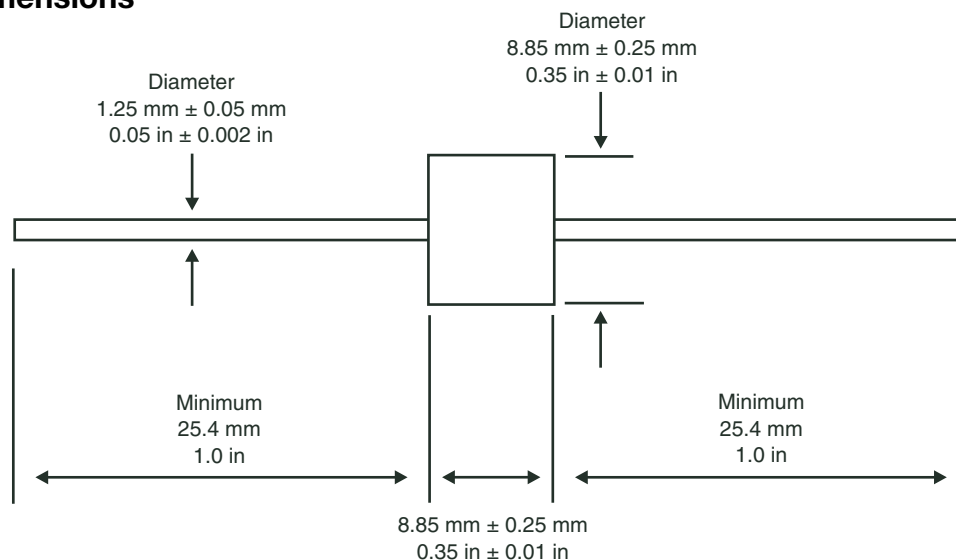
### 5KP Series Features

- RoHS Compliance Standard
- 5000 watt peak pulse power dissipation
- Available in voltages from 5V to 250V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Available in bulk or tape and reel (Reel quantity = 800 pieces)
- Each device 100% surge tested
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS-296-E
- AEC-Q101 Qualified (11A & 11CA – 250A & 250CA) types. (When ordering ADD suffix “Z” to end of part number.)

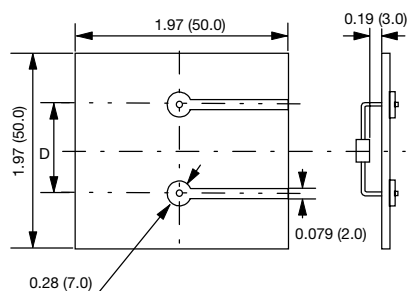
### Absolute Maximum Ratings

| Parameter                                                                            | Value            |
|--------------------------------------------------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 5000W            |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 8W               |
| Operating and storage temperatures                                                   | -55°C to + 175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



#### NOTE: Dimension D

- 1.5KE (DO-201 Package) - 0.611 (15.5)
- 3KP / 5KP / 15KP (P600 Package) - 0.673 (17.1)

#### Hole Diameter

- 0.059 (1.5)

All dimensions in inches and (millimeters)

**5KP Series — 5000 Watt (continued)****Electrical Characteristics**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 5KP5.0       | 5.0                    | 6.40              | 7.30  | 50   | 5000                              | 9.6                                              | 520.0                                      |
| 5KP5.0A      | 5.0                    | 6.40              | 7.00  | 50   | 5000                              | 9.2                                              | 554.3                                      |
| 5KP6.0       | 6.0                    | 6.67              | 8.15  | 50   | 5000                              | 11.4                                             | 439.0                                      |
| 5KP6.0A      | 6.0                    | 6.67              | 7.37  | 50   | 5000                              | 10.3                                             | 495.1                                      |
| 5KP6.5       | 6.5                    | 7.22              | 8.82  | 50   | 2000                              | 12.3                                             | 407.0                                      |
| 5KP6.5A      | 6.5                    | 7.22              | 7.98  | 50   | 2000                              | 11.2                                             | 455.4                                      |
| 5KP7.0       | 7.0                    | 7.78              | 9.51  | 50   | 1000                              | 13.3                                             | 378.0                                      |
| 5KP7.0A      | 7.0                    | 7.78              | 8.60  | 50   | 1000                              | 12.0                                             | 425.0                                      |
| 5KP7.5       | 7.5                    | 8.33              | 10.20 | 5.0  | 250                               | 14.3                                             | 350.0                                      |
| 5KP7.5A      | 7.5                    | 8.33              | 9.21  | 5.0  | 250                               | 12.9                                             | 395.3                                      |
| 5KP8.0       | 8.0                    | 8.89              | 10.90 | 5.0  | 150                               | 15.0                                             | 333.0                                      |
| 5KP8.0A      | 8.0                    | 8.89              | 9.83  | 5.0  | 150                               | 13.6                                             | 375.0                                      |
| 5KP8.5       | 8.5                    | 9.44              | 11.50 | 5.0  | 50                                | 15.9                                             | 314.0                                      |
| 5KP8.5A      | 8.5                    | 9.44              | 10.40 | 5.0  | 50                                | 14.4                                             | 354.2                                      |
| 5KP9.0       | 9.0                    | 10.00             | 12.20 | 5.0  | 20                                | 16.9                                             | 295.0                                      |
| 5KP9.0A      | 9.0                    | 10.00             | 11.10 | 5.0  | 20                                | 15.4                                             | 331.2                                      |
| 5KP10        | 10.0                   | 11.1              | 13.6  | 5.0  | 15                                | 18.8                                             | 266.0                                      |
| 5KP10A       | 10.0                   | 11.1              | 12.3  | 5.0  | 15                                | 17.0                                             | 300.0                                      |
| 5KP11        | 11.0                   | 12.2              | 14.9  | 5.0  | 2                                 | 20.1                                             | 249.0                                      |
| 5KP11A       | 11.0                   | 12.2              | 13.5  | 5.0  | 2                                 | 18.2                                             | 280.2                                      |
| 5KP12        | 12.0                   | 13.3              | 16.3  | 5.0  | 2                                 | 22.0                                             | 227.0                                      |
| 5KP12A       | 12.0                   | 13.3              | 14.7  | 5.0  | 2                                 | 19.9                                             | 256.3                                      |
| 5KP13        | 13.0                   | 14.4              | 17.6  | 5.0  | 2                                 | 23.8                                             | 210.0                                      |
| 5KP13A       | 13.0                   | 14.4              | 15.9  | 5.0  | 2                                 | 21.5                                             | 237.2                                      |
| 5KP14        | 14.0                   | 15.6              | 19.1  | 5.0  | 2                                 | 25.8                                             | 194.0                                      |
| 5KP14A       | 14.0                   | 15.6              | 17.2  | 5.0  | 2                                 | 23.2                                             | 219.8                                      |
| 5KP15        | 15.0                   | 16.7              | 20.4  | 5.0  | 2                                 | 26.9                                             | 188.0                                      |
| 5KP15A       | 15.0                   | 16.7              | 18.5  | 5.0  | 2                                 | 24.4                                             | 209.0                                      |
| 5KP16        | 16.0                   | 17.8              | 21.8  | 5.0  | 2                                 | 28.8                                             | 176.0                                      |
| 5KP16A       | 16.0                   | 17.8              | 19.7  | 5.0  | 2                                 | 26.0                                             | 196.2                                      |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform

**5KP Series — 5000 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 5KP17        | 17.0                   | 18.9              | 23.1 | 5.0  | 2                                 | 30.5                                             | 164.0                                      |
| 5KP17A       | 17.0                   | 18.9              | 20.9 | 5.0  | 2                                 | 27.6                                             | 184.8                                      |
| 5KP18        | 18.0                   | 20.0              | 24.4 | 5.0  | 2                                 | 32.2                                             | 155.0                                      |
| 5KP18A       | 18.0                   | 20.0              | 22.1 | 5.0  | 2                                 | 29.2                                             | 174.7                                      |
| 5KP20        | 20.0                   | 22.2              | 27.1 | 5.0  | 2                                 | 35.8                                             | 139.0                                      |
| 5KP20A       | 20.0                   | 22.2              | 24.5 | 5.0  | 2                                 | 32.4                                             | 157.4                                      |
| 5KP22        | 22.0                   | 24.4              | 29.8 | 5.0  | 2                                 | 39.4                                             | 127.0                                      |
| 5KP22A       | 22.0                   | 24.4              | 26.9 | 5.0  | 2                                 | 35.5                                             | 143.7                                      |
| 5KP24        | 24.0                   | 26.7              | 32.6 | 5.0  | 2                                 | 43.0                                             | 116.0                                      |
| 5KP24A       | 24.0                   | 26.7              | 29.5 | 5.0  | 2                                 | 38.9                                             | 131.1                                      |
| 5KP26        | 26.0                   | 28.9              | 35.3 | 5.0  | 2                                 | 46.6                                             | 107.0                                      |
| 5KP26A       | 26.0                   | 28.9              | 31.9 | 5.0  | 2                                 | 42.1                                             | 121.1                                      |
| 5KP28        | 28.0                   | 31.1              | 39.0 | 5.0  | 2                                 | 50.1                                             | 99.0                                       |
| 5KP28A       | 28.0                   | 31.1              | 34.4 | 5.0  | 2                                 | 45.4                                             | 112.3                                      |
| 5KP30        | 30.0                   | 33.3              | 40.7 | 5.0  | 2                                 | 53.5                                             | 93.0                                       |
| 5KP30A       | 30.0                   | 33.3              | 36.8 | 5.0  | 2                                 | 48.4                                             | 105.4                                      |
| 5KP33        | 33.0                   | 36.7              | 44.9 | 5.0  | 2                                 | 59.0                                             | 85.0                                       |
| 5KP33A       | 33.0                   | 36.7              | 40.6 | 5.0  | 2                                 | 53.3                                             | 95.7                                       |
| 5KP36        | 36.0                   | 40.0              | 48.9 | 5.0  | 2                                 | 64.3                                             | 78.0                                       |
| 5KP36A       | 36.0                   | 40.0              | 44.2 | 5.0  | 2                                 | 58.1                                             | 87.8                                       |
| 5KP40        | 40.0                   | 44.4              | 54.3 | 5.0  | 2                                 | 71.4                                             | 70.0                                       |
| 5KP40A       | 40.0                   | 44.4              | 49.1 | 5.0  | 2                                 | 64.5                                             | 79.1                                       |
| 5KP43        | 43.0                   | 47.8              | 58.4 | 5.0  | 2                                 | 76.7                                             | 65.0                                       |
| 5KP43A       | 43.0                   | 47.8              | 52.8 | 5.0  | 2                                 | 69.4                                             | 73.5                                       |
| 5KP45        | 45.0                   | 50.0              | 61.1 | 5.0  | 2                                 | 80.3                                             | 62.0                                       |
| 5KP45A       | 45.0                   | 50.0              | 55.3 | 5.0  | 2                                 | 72.7                                             | 70.2                                       |
| 5KP48        | 48.0                   | 53.3              | 65.2 | 5.0  | 2                                 | 85.5                                             | 58.0                                       |
| 5KP48A       | 48.0                   | 53.3              | 58.9 | 5.0  | 2                                 | 77.4                                             | 65.9                                       |
| 5KP51        | 51.0                   | 56.7              | 69.3 | 5.0  | 2                                 | 91.1                                             | 55.0                                       |
| 5KP51A       | 51.0                   | 56.7              | 62.7 | 5.0  | 2                                 | 82.4                                             | 61.9                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform

**5KP Series — 5000 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                        | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              | Vwm (Volts)            | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 5KP54        | 54.0                   | 60.0              | 73.3  | 5.0  | 2                                 | 96.3                                             | 52.0                                       |
| 5KP54A       | 54.0                   | 60.0              | 66.3  | 5.0  | 2                                 | 87.1                                             | 58.6                                       |
| 5KP58        | 58.0                   | 64.4              | 78.7  | 5.0  | 2                                 | 103.0                                            | 49.0                                       |
| 5KP58A       | 58.0                   | 64.4              | 71.2  | 5.0  | 2                                 | 93.6                                             | 54.5                                       |
| 5KP60        | 60.0                   | 66.7              | 81.5  | 5.0  | 2                                 | 107.0                                            | 47.0                                       |
| 5KP60A       | 60.0                   | 66.7              | 73.7  | 5.0  | 2                                 | 96.8                                             | 52.7                                       |
| 5KP64        | 64.0                   | 71.1              | 96.9  | 5.0  | 2                                 | 114.0                                            | 44.0                                       |
| 5KP64A       | 64.0                   | 71.1              | 78.6  | 5.0  | 2                                 | 103.0                                            | 49.5                                       |
| 5KP70        | 70.0                   | 77.8              | 95.1  | 5.0  | 2                                 | 125.0                                            | 40.0                                       |
| 5KP70A       | 70.0                   | 77.8              | 86.0  | 5.0  | 2                                 | 113.0                                            | 45.1                                       |
| 5KP75        | 75.0                   | 83.3              | 102.0 | 5.0  | 2                                 | 134.0                                            | 37.0                                       |
| 5KP75A       | 75.0                   | 83.3              | 92.1  | 5.0  | 2                                 | 121.0                                            | 42.1                                       |
| 5KP78        | 78.0                   | 86.7              | 106.0 | 5.0  | 2                                 | 139.0                                            | 36.0                                       |
| 5KP78A       | 78.0                   | 86.7              | 95.8  | 5.0  | 2                                 | 126.0                                            | 40.5                                       |
| 5KP85        | 85.0                   | 94.4              | 115.0 | 5.0  | 2                                 | 151.0                                            | 33.0                                       |
| 5KP85A       | 85.0                   | 94.4              | 104.0 | 5.0  | 2                                 | 137.0                                            | 37.2                                       |
| 5KP90        | 90.0                   | 100.0             | 122.0 | 5.0  | 2                                 | 160.0                                            | 31.0                                       |
| 5KP90A       | 90.0                   | 100.0             | 111.0 | 5.0  | 2                                 | 146.0                                            | 34.9                                       |
| 5KP100       | 100.0                  | 111.0             | 136.0 | 5.0  | 2                                 | 179.0                                            | 28.0                                       |
| 5KP100A      | 100.0                  | 110.0             | 123.0 | 5.0  | 2                                 | 162.0                                            | 31.5                                       |
| 5KP110       | 110.0                  | 122.0             | 149.0 | 5.0  | 2                                 | 196.0                                            | 26.0                                       |
| 5KP110A      | 110.0                  | 122.0             | 135.0 | 5.0  | 2                                 | 177.0                                            | 28.8                                       |
| 5KP120       | 120.0                  | 133.0             | 163.0 | 5.0  | 2                                 | 215.0                                            | 23.0                                       |
| 5KP120A      | 120.0                  | 133.0             | 147.0 | 5.0  | 2                                 | 193.0                                            | 26.4                                       |
| 5KP130A      | 130.0                  | 144.0             | 159.0 | 5.0  | 2                                 | 209.0                                            | 24.4                                       |
| 5KP150A      | 150.0                  | 167.0             | 185.0 | 5.0  | 2                                 | 243.0                                            | 21.0                                       |
| 5KP160A      | 160.0                  | 178.0             | 197.0 | 5.0  | 2                                 | 259.0                                            | 19.7                                       |
| 5KP170A      | 170.0                  | 189.0             | 209.0 | 5.0  | 2                                 | 275.0                                            | 18.5                                       |
| 5KP180A      | 180.0                  | 201.0             | 222.0 | 5.0  | 2                                 | 292.0                                            | 17.5                                       |
| 5KP190A      | 190.0                  | 211.0             | 233.0 | 5.0  | 2                                 | 310.0                                            | 16.5                                       |
| 5KP200A      | 200.0                  | 224.0             | 247.0 | 5.0  | 2                                 | 329.2                                            | 15.5                                       |
| 5KP210A      | 210.0                  | 237.0             | 263.0 | 5.0  | 2                                 | 349.5                                            | 14.6                                       |
| 5KP220A      | 220.0                  | 246.0             | 272.0 | 5.0  | 2                                 | 371.1                                            | 13.7                                       |
| 5KP250A      | 250.0                  | 277.0             | 306.0 | 5.0  | 2                                 | 425.0                                            | 12.0                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform

## 15KP Series –15000 Watt



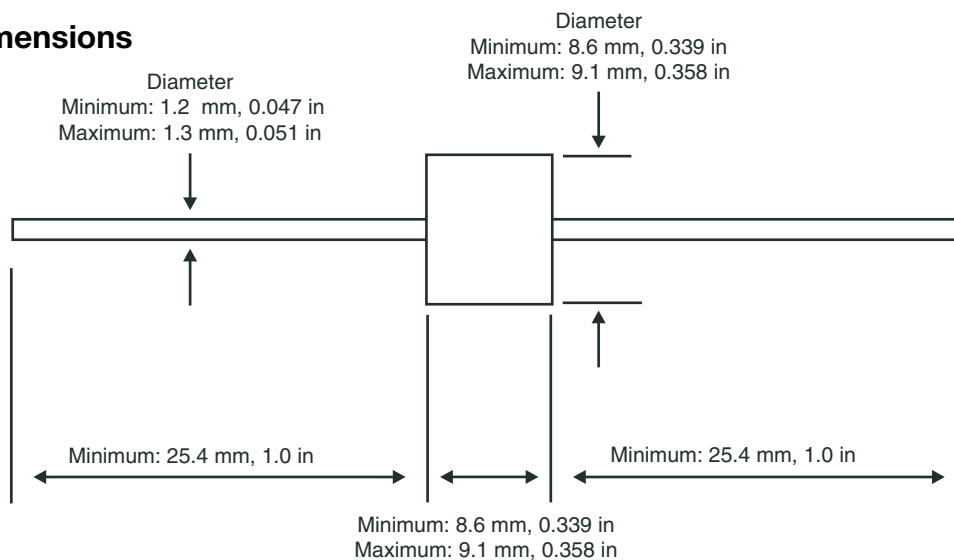
### 15KP Series Features

- RoHS Compliance Standard
- 15000 watt peak pulse power dissipation
- Available in voltages from 17V to 280V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Each device 100% surge tested
- Available in bulk or tape and reel (Reel quantity = 300 or 800 pieces)
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS-296-E
- AEC-Q101 (36A & 36CA) other values pending. (When ordering ADD suffix "Z" to end of part number)

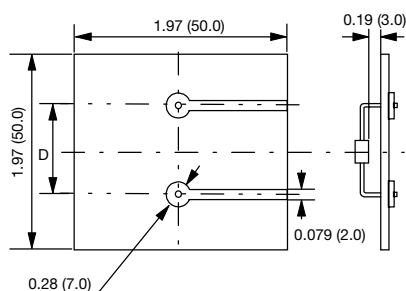
### Absolute Maximum Ratings

| Parameter                                                                            | Value           |
|--------------------------------------------------------------------------------------|-----------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 15000W          |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 8W              |
| Operating and storage temperatures                                                   | -55°C to +175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



#### NOTE: Dimension D

- 1.5KE (DO-201 Package) - 0.611 (15.5)
- 3KP / 5KP / 15KP (P600 Package) - 0.673 (17.1)

#### Hole Diameter

- 0.059 (1.5)

All dimensions in inches and (millimeters)

**15KP Series – 15000 Watt (continued)****Electrical Characteristics**

| Part Number* | Rated Standoff Voltage<br>V <sub>WM</sub> | Breakdown Voltage       |                 | Maximum Stand By Current<br>@V <sub>WM</sub> + I <sub>D</sub> | 10/1000µs Maximum Clamping Voltage<br>@I <sub>ppm</sub> #<br>V <sub>C</sub> Max | 10/1000µs Rated Peak Impulse Current I <sub>ppm</sub> # |
|--------------|-------------------------------------------|-------------------------|-----------------|---------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------|
|              |                                           | V <sub>BR</sub> (Volts) | @I <sub>T</sub> |                                                               |                                                                                 |                                                         |
|              | V <sub>WM</sub> (Volts)                   | Min                     | (mA)            | (µA)                                                          | (Volts)                                                                         | (Amperes)                                               |
| 15KP17A      | 17                                        | 18.99                   | 50              | 5000                                                          | 29.3                                                                            | 515.4                                                   |
| 15KP18A      | 18                                        | 20.11                   | 50              | 5000                                                          | 30.9                                                                            | 488.7                                                   |
| 15KP20A      | 20                                        | 22.34                   | 20              | 1500                                                          | 34.3                                                                            | 440.2                                                   |
| 15KP22A      | 22                                        | 24.57                   | 10              | 500                                                           | 37.1                                                                            | 407.0                                                   |
| 15KP24A      | 24                                        | 26.81                   | 5               | 150                                                           | 40.7                                                                            | 371.0                                                   |
| 15KP26A      | 26                                        | 29.04                   | 5               | 50                                                            | 44.0                                                                            | 343.2                                                   |
| 15KP28A      | 28                                        | 31.28                   | 5               | 25                                                            | 47.5                                                                            | 317.9                                                   |
| 15KP30       | 30                                        | 33.3                    | 5               | 15                                                            | 56.2                                                                            | 267.0                                                   |
| 15KP30A      | 30                                        | 33.51                   | 5               | 15                                                            | 50.7                                                                            | 297.8                                                   |
| 15KP33       | 33                                        | 36.7                    | 5               | 2                                                             | 60.6                                                                            | 248.0                                                   |
| 15KP33A      | 33                                        | 36.9                    | 5               | 2                                                             | 54.8                                                                            | 276.1                                                   |
| 15KP36       | 36                                        | 40.0                    | 5               | 2                                                             | 66.0                                                                            | 227.0                                                   |
| 15KP36A      | 36                                        | 40.2                    | 5               | 2                                                             | 59.8                                                                            | 252.5                                                   |
| 15KP40       | 40                                        | 44.4                    | 5               | 2                                                             | 72.8                                                                            | 206.0                                                   |
| 15KP40A      | 40                                        | 44.7                    | 5               | 2                                                             | 65.8                                                                            | 229.5                                                   |
| 15KP43       | 43                                        | 47.8                    | 5               | 2                                                             | 77.1                                                                            | 195.0                                                   |
| 15KP43A      | 43                                        | 48                      | 5               | 2                                                             | 69.8                                                                            | 216.3                                                   |
| 15KP45       | 45                                        | 50.0                    | 5               | 2                                                             | 80.7                                                                            | 186.0                                                   |
| 15KP45A      | 45                                        | 50.3                    | 5               | 2                                                             | 72.8                                                                            | 207.4                                                   |
| 15KP48       | 48                                        | 53.3                    | 5               | 2                                                             | 85.9                                                                            | 175.0                                                   |
| 15KP48A      | 48                                        | 53.6                    | 5               | 2                                                             | 77.7                                                                            | 194.3                                                   |
| 15KP51       | 51                                        | 56.7                    | 5               | 2                                                             | 91.5                                                                            | 164.0                                                   |
| 15KP51A      | 51                                        | 57.0                    | 5               | 2                                                             | 82.9                                                                            | 182.1                                                   |
| 15KP54       | 54                                        | 60.0                    | 5               | 2                                                             | 96.8                                                                            | 155.0                                                   |
| 15KP54A      | 54                                        | 60.3                    | 5               | 2                                                             | 87.7                                                                            | 172.2                                                   |
| 15KP58       | 58                                        | 64.4                    | 5               | 2                                                             | 104.0                                                                           | 144.0                                                   |
| 15KP58A      | 58                                        | 64.8                    | 5               | 2                                                             | 93.8                                                                            | 161.0                                                   |
| 15KP60       | 60                                        | 66.7                    | 5               | 2                                                             | 107.0                                                                           | 140.0                                                   |
| 15KP60A      | 60                                        | 67                      | 5               | 2                                                             | 97.4                                                                            | 155.0                                                   |
| 15KP64       | 64                                        | 71.1                    | 5               | 2                                                             | 115.0                                                                           | 130.0                                                   |
| 15KP64A      | 64                                        | 71.5                    | 5               | 2                                                             | 104.2                                                                           | 144.9                                                   |
| 15KP70       | 70                                        | 77.8                    | 5               | 2                                                             | 126.0                                                                           | 119.0                                                   |
| 15KP70A      | 70                                        | 78.2                    | 5               | 2                                                             | 113.6                                                                           | 132.9                                                   |
| 15KP75       | 75                                        | 83.3                    | 5               | 2                                                             | 135.0                                                                           | 111.0                                                   |
| 15KP75A      | 75                                        | 83.8                    | 5               | 2                                                             | 122.0                                                                           | 123.8                                                   |
| 15KP78       | 78                                        | 86.7                    | 5               | 2                                                             | 140.0                                                                           | 107.0                                                   |
| 15KP78A      | 78                                        | 87.1                    | 5               | 2                                                             | 126.1                                                                           | 119.7                                                   |

\* = Add "C" or "CA" suffix for bidirectional device types.

# = See General Information for Impulse Current Waveform

**15KP Series – 15000 Watt (continued)****Electrical Characteristics (continued)**

| Part Number* | Rated Standoff Voltage<br>V <sub>wm</sub> | Breakdown Voltage       |                 | Maximum Stand By Current<br>@V <sub>WM</sub> + I <sub>d</sub> | 10/1000µs Maximum Clamping Voltage<br>@I <sub>ppm</sub> #<br>V <sub>c</sub> Max | 10/1000µs Rated Peak Impulse Current I <sub>ppm</sub> # |
|--------------|-------------------------------------------|-------------------------|-----------------|---------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------|
|              |                                           | V <sub>br</sub> (Volts) | @I <sub>t</sub> |                                                               |                                                                                 |                                                         |
|              | V <sub>wm</sub> (Volts)                   | Min                     | (mA)            | (µA)                                                          | (Volts)                                                                         | (Amperes)                                               |
| 15KP85       | 85                                        | 94.4                    | 5               | 2                                                             | 152.0                                                                           | 99.0                                                    |
| 15KP85A      | 85                                        | 94.9                    | 5               | 2                                                             | 137.6                                                                           | 109.7                                                   |
| 15KP90       | 90                                        | 100.0                   | 5               | 2                                                             | 160.0                                                                           | 94.0                                                    |
| 15KP90A      | 90                                        | 100.5                   | 5               | 2                                                             | 145.6                                                                           | 103.7                                                   |
| 15KP100      | 100                                       | 111.0                   | 5               | 2                                                             | 179.0                                                                           | 84.0                                                    |
| 15KP100A     | 100                                       | 111.7                   | 5               | 2                                                             | 161.3                                                                           | 93.6                                                    |
| 15KP110      | 110                                       | 122.0                   | 5               | 2                                                             | 196.0                                                                           | 77.0                                                    |
| 15KP110A     | 110                                       | 122.9                   | 5               | 2                                                             | 178.6                                                                           | 84.5                                                    |
| 15KP120      | 120                                       | 133.0                   | 5               | 2                                                             | 214.0                                                                           | 70.0                                                    |
| 15KP120A     | 120                                       | 134.0                   | 5               | 2                                                             | 192.3                                                                           | 78.5                                                    |
| 15KP130      | 130                                       | 144.0                   | 5               | 2                                                             | 231.0                                                                           | 65.0                                                    |
| 15KP130A     | 130                                       | 145.2                   | 5               | 2                                                             | 208.3                                                                           | 72.5                                                    |
| 15KP150      | 150                                       | 167.0                   | 5               | 2                                                             | 268.0                                                                           | 56.0                                                    |
| 15KP150A     | 150                                       | 167.6                   | 5               | 2                                                             | 241.9                                                                           | 62.4                                                    |
| 15KP160      | 160                                       | 178.0                   | 5               | 2                                                             | 287.0                                                                           | 52.0                                                    |
| 15KP160A     | 160                                       | 178.7                   | 5               | 2                                                             | 258.6                                                                           | 58.4                                                    |
| 15KP170      | 170                                       | 189.0                   | 5               | 2                                                             | 304.0                                                                           | 49.0                                                    |
| 15KP170A     | 170                                       | 189.9                   | 5               | 2                                                             | 272.7                                                                           | 55.4                                                    |
| 15KP180      | 180                                       | 200.0                   | 5               | 2                                                             | 321.0                                                                           | 47.0                                                    |
| 15KP180A     | 180                                       | 201.1                   | 5               | 2                                                             | 288.5                                                                           | 52.3                                                    |
| 15KP200      | 200                                       | 222.0                   | 5               | 2                                                             | 356.0                                                                           | 42.0                                                    |
| 15KP200A     | 200                                       | 223.4                   | 5               | 2                                                             | 319.1                                                                           | 47.3                                                    |
| 15KP220A     | 220                                       | 245.7                   | 5               | 2                                                             | 352.5                                                                           | 42.8                                                    |
| 15KP240A     | 240                                       | 268.1                   | 5               | 2                                                             | 384.5                                                                           | 39.3                                                    |
| 15KP260A     | 260                                       | 290.4                   | 5               | 2                                                             | 416.7                                                                           | 36.2                                                    |
| 15KP280A     | 280                                       | 312.8                   | 5               | 2                                                             | 454.5                                                                           | 33.2                                                    |

\* = Add "C" or "CA" suffix for bidirectional device types.

# = See General Information for Impulse Current Waveform



## 20KP Series – 20000 Watt



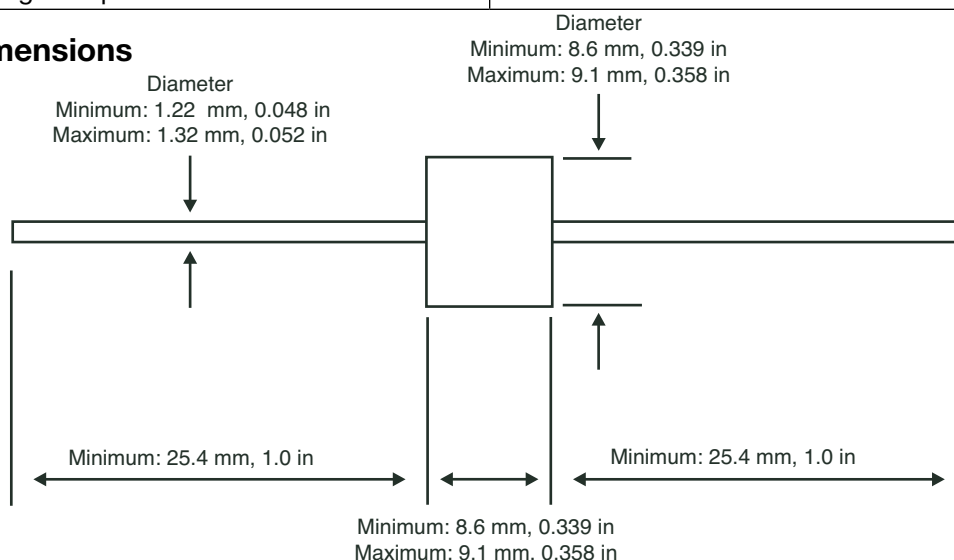
### 20KP Series Features

- RoHS Compliance Standard
- 20000 watt peak pulse power dissipation
- Available in voltages from 20V to 300V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Each device 100% surge tested
- Available in bulk or tape and reel (Reel quantity = 800 pieces)
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS-296-E

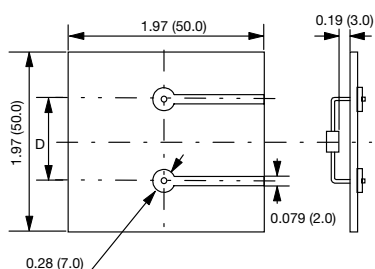
### Absolute Maximum Ratings

| Parameter                                                                            | Value           |
|--------------------------------------------------------------------------------------|-----------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 20000W          |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 8W              |
| Operating and storage temperatures                                                   | -55°C to +175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



#### NOTE: Dimension D

- 1.5KE (DO-201 Package) - 0.611 (15.5)
- 3KP / 5KP / 15KP / 20KP / 30KP (P600 Package) - 0.673 (17.1)

#### Hole Diameter

- 0.059 (1.5)

All dimensions in inches and (millimeters)

## 20KP Series – 20000 Watt

### Electrical Characteristics

| Part Number* | Rated Standoff Voltage<br>V <sub>wm</sub> | Breakdown Voltage       |                 | Maximum Stand By Current<br>@V <sub>WM</sub> + I <sub>d</sub> | 10/1000µs Maximum Clamping Voltage<br>@I <sub>ppm</sub> #<br>V <sub>c</sub> Max | 10/1000µs Rated Peak Impulse Current I <sub>ppm</sub> # |
|--------------|-------------------------------------------|-------------------------|-----------------|---------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------|
|              |                                           | V <sub>br</sub> (Volts) | @I <sub>t</sub> |                                                               |                                                                                 |                                                         |
|              | V <sub>wm</sub> (Volts)                   | Min                     | (mA)            | (µA)                                                          | (Volts)                                                                         | (Amperes)                                               |
| 20KP20A      | 20                                        | 22.34                   | 50              | 5000                                                          | 36.8                                                                            | 548.9                                                   |
| 20KP24A      | 24                                        | 26.81                   | 50              | 5000                                                          | 41.2                                                                            | 490.3                                                   |
| 20KP26A      | 26                                        | 29.04                   | 50              | 2000                                                          | 44.7                                                                            | 451.9                                                   |
| 20KP28A      | 28                                        | 31.28                   | 50              | 1000                                                          | 48.0                                                                            | 420.8                                                   |
| 20KP30A      | 30                                        | 33.51                   | 5               | 250                                                           | 51.5                                                                            | 392.2                                                   |
| 20KP32A      | 32                                        | 35.74                   | 5               | 50                                                            | 54.3                                                                            | 372.0                                                   |
| 20KP34A      | 34                                        | 38.00                   | 5               | 20                                                            | 57.5                                                                            | 351.3                                                   |
| 20KP36A      | 36                                        | 40.20                   | 5               | 15                                                            | 61.5                                                                            | 328.5                                                   |
| 20KP40A      | 40                                        | 44.70                   | 5               | 2                                                             | 67.8                                                                            | 297.9                                                   |
| 20KP44A      | 44                                        | 49.10                   | 5               | 2                                                             | 72.7                                                                            | 277.9                                                   |
| 20KP48A      | 48                                        | 53.60                   | 5               | 2                                                             | 79.4                                                                            | 254.4                                                   |
| 20KP52A      | 52                                        | 58.10                   | 5               | 2                                                             | 85.8                                                                            | 235.4                                                   |
| 20KP56A      | 56                                        | 62.60                   | 5               | 2                                                             | 92.6                                                                            | 218.1                                                   |
| 20KP60A      | 60                                        | 67.00                   | 5               | 2                                                             | 97.6                                                                            | 207.0                                                   |
| 20KP64A      | 64                                        | 71.50                   | 5               | 2                                                             | 104.0                                                                           | 194.2                                                   |
| 20KP68A      | 68                                        | 76.00                   | 5               | 2                                                             | 110.0                                                                           | 183.6                                                   |
| 20KP72A      | 72                                        | 80.40                   | 5               | 2                                                             | 116.0                                                                           | 174.1                                                   |
| 20KP80A      | 80                                        | 89.40                   | 5               | 2                                                             | 130.0                                                                           | 155.4                                                   |
| 20KP88A      | 88                                        | 98.30                   | 5               | 2                                                             | 142.0                                                                           | 142.3                                                   |
| 20KP96A      | 96                                        | 107.20                  | 5               | 2                                                             | 155.0                                                                           | 130.3                                                   |
| 20KP104A     | 104                                       | 116.20                  | 5               | 2                                                             | 168.0                                                                           | 120.2                                                   |
| 20KP112A     | 112                                       | 125.10                  | 5               | 2                                                             | 182.0                                                                           | 111.0                                                   |
| 20KP120A     | 120                                       | 134.00                  | 5               | 2                                                             | 194.0                                                                           | 104.1                                                   |
| 20KP132A     | 132                                       | 147.40                  | 5               | 2                                                             | 213.0                                                                           | 94.8                                                    |
| 20KP144A     | 144                                       | 160.80                  | 5               | 2                                                             | 232.0                                                                           | 87.1                                                    |
| 20KP160A     | 160                                       | 178.70                  | 5               | 2                                                             | 258.0                                                                           | 78.3                                                    |
| 20KP172A     | 172                                       | 192.10                  | 5               | 2                                                             | 277.0                                                                           | 72.9                                                    |
| 20KP180A     | 180                                       | 201.10                  | 5               | 2                                                             | 291.0                                                                           | 69.4                                                    |
| 20KP192A     | 192                                       | 214.50                  | 5               | 2                                                             | 309.0                                                                           | 65.4                                                    |
| 20KP204A     | 204                                       | 227.90                  | 5               | 2                                                             | 329.0                                                                           | 61.4                                                    |
| 20KP216A     | 216                                       | 241.30                  | 5               | 2                                                             | 348.0                                                                           | 58.0                                                    |
| 20KP232A     | 232                                       | 86.70                   | 5               | 2                                                             | 374.0                                                                           | 54.0                                                    |
| 20KP240A     | 240                                       | 268.10                  | 5               | 2                                                             | 387.0                                                                           | 52.2                                                    |
| 20KP256A     | 256                                       | 286.00                  | 5               | 2                                                             | 412.0                                                                           | 49.0                                                    |
| 20KP280A     | 280                                       | 312.80                  | 5               | 2                                                             | 451.0                                                                           | 44.8                                                    |
| 20KP300A     | 300                                       | 335.10                  | 5               | 2                                                             | 483.0                                                                           | 41.8                                                    |

\* = Add "CA" suffix for bidirectional device types.

# = See General Information for Impulse Current Waveform

## 30KP Series – 30000 Watt



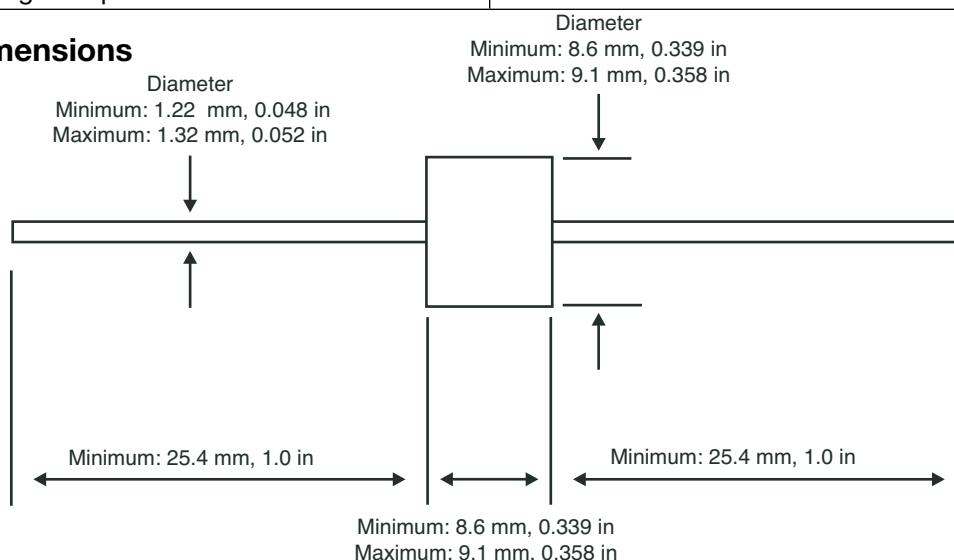
### 30KP Series Features

- RoHS Compliance Standard
- 30000 watt peak pulse power dissipation
- Available in voltages from 28V to 288V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Each device 100% surge tested
- Available in bulk or tape and reel (Reel quantity = 800 pieces)
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS-296-E

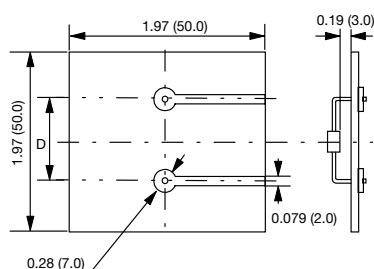
### Absolute Maximum Ratings

| Parameter                                                                            | Value           |
|--------------------------------------------------------------------------------------|-----------------|
| Peak pulse power dissipation (PPPM) at 25°C                                          | 30000W          |
| Steady state power dissipation at lead temperature = 75°C<br>(Lead length 3/8" min.) | 8W              |
| Operating and storage temperatures                                                   | -55°C to +175°C |

### Mechanical Dimensions



### Standard Mounting Pad Layout



#### NOTE: Dimension D

- 1.5KE (DO-201 Package) - 0.611 (15.5)
- 3KP / 5KP / 15KP / 20KP / 30KP (P600 Package) - 0.673 (17.1)

#### Hole Diameter

- 0.059 (1.5)

All dimensions in inches and (millimeters)

## 30KP Series – 30000 Watt

## Electrical Characteristics

| Part Number* | Rated Standoff Voltage<br>V <sub>wm</sub> | Breakdown Voltage       |                 | Maximum Stand By Current<br>@V <sub>WM</sub> +<br>I <sub>d</sub> | 10/1000µs Maximum Clamping Voltage<br>@I <sub>ppm</sub> #<br>V <sub>c</sub> Max | 10/1000µs Rated Peak Impulse Current I <sub>ppm</sub> # |
|--------------|-------------------------------------------|-------------------------|-----------------|------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------|
|              |                                           | V <sub>br</sub> (Volts) | @I <sub>t</sub> |                                                                  |                                                                                 |                                                         |
|              | V <sub>wm</sub> (Volts)                   | Min                     | (mA)            | (µA)                                                             | (Volts)                                                                         | (Amperes)                                               |
| 30KP28A      | 28                                        | 31.28                   | 50              | 5000                                                             | 50.0                                                                            | 606.0                                                   |
| 30KP30A      | 30                                        | 33.51                   | 50              | 5000                                                             | 55.2                                                                            | 548.9                                                   |
| 30KP33A      | 33                                        | 36.90                   | 50              | 5000                                                             | 58.5                                                                            | 517.9                                                   |
| 30KP36A      | 36                                        | 40.20                   | 50              | 5000                                                             | 61.8                                                                            | 490.3                                                   |
| 30KP39A      | 39                                        | 43.60                   | 20              | 2000                                                             | 67.2                                                                            | 450.9                                                   |
| 30KP42A      | 42                                        | 46.90                   | 10              | 1000                                                             | 72.0                                                                            | 420.8                                                   |
| 30KP43A      | 43                                        | 48.00                   | 10              | 1000                                                             | 73.0                                                                            | 415.1                                                   |
| 30KP45A      | 45                                        | 50.30                   | 5               | 250                                                              | 77.4                                                                            | 391.5                                                   |
| 30KP48A      | 48                                        | 53.60                   | 5               | 150                                                              | 81.6                                                                            | 371.3                                                   |
| 30KP51A      | 51                                        | 57.00                   | 5               | 50                                                               | 86.4                                                                            | 350.7                                                   |
| 30KP54A      | 54                                        | 60.30                   | 5               | 20                                                               | 91.4                                                                            | 331.5                                                   |
| 30KP58A      | 58                                        | 64.80                   | 5               | 20                                                               | 92.4                                                                            | 327.9                                                   |
| 30KP60A      | 60                                        | 67.00                   | 5               | 15                                                               | 102.0                                                                           | 297.1                                                   |
| 30KP64A      | 64                                        | 71.50                   | 5               | 10                                                               | 104.0                                                                           | 291.3                                                   |
| 30KP66A      | 66                                        | 73.70                   | 5               | 2                                                                | 107.0                                                                           | 283.2                                                   |
| 30KP70A      | 70                                        | 78.20                   | 5               | 2                                                                | 109.0                                                                           | 278.0                                                   |
| 30KP71A      | 71                                        | 79.30                   | 5               | 2                                                                | 111.5                                                                           | 271.7                                                   |
| 30KP72A      | 72                                        | 80.40                   | 5               | 2                                                                | 114.0                                                                           | 265.8                                                   |
| 30KP75A      | 75                                        | 83.80                   | 5               | 2                                                                | 119.4                                                                           | 253.8                                                   |
| 30KP78A      | 78                                        | 87.10                   | 5               | 2                                                                | 129.0                                                                           | 234.9                                                   |
| 30KP84A      | 84                                        | 93.80                   | 5               | 2                                                                | 139.2                                                                           | 217.7                                                   |
| 30KP90A      | 90                                        | 100.50                  | 5               | 2                                                                | 146.4                                                                           | 207.0                                                   |
| 30KP96A      | 96                                        | 107.20                  | 5               | 2                                                                | 156.0                                                                           | 194.2                                                   |
| 30KP102A     | 102                                       | 113.90                  | 5               | 2                                                                | 165.6                                                                           | 183.0                                                   |
| 30KP108A     | 108                                       | 120.60                  | 5               | 2                                                                | 175.2                                                                           | 172.9                                                   |
| 30KP120A     | 120                                       | 134.00                  | 5               | 2                                                                | 194.4                                                                           | 155.9                                                   |
| 30KP132A     | 132                                       | 147.40                  | 5               | 2                                                                | 213.0                                                                           | 142.3                                                   |
| 30KP144A     | 144                                       | 160.80                  | 5               | 2                                                                | 223.2                                                                           | 135.8                                                   |
| 30KP150A     | 150                                       | 167.60                  | 5               | 2                                                                | 233.4                                                                           | 129.8                                                   |
| 30KP158A     | 158                                       | 174.30                  | 5               | 2                                                                | 245.0                                                                           | 123.7                                                   |
| 30KP160A     | 160                                       | 178.70                  | 5               | 2                                                                | 252.6                                                                           | 120.0                                                   |
| 30KP168A     | 168                                       | 187.70                  | 5               | 2                                                                | 272.4                                                                           | 111.2                                                   |
| 30KP170A     | 170                                       | 189.90                  | 5               | 2                                                                | 275.0                                                                           | 110.2                                                   |
| 30KP180A     | 180                                       | 201.10                  | 5               | 2                                                                | 290.4                                                                           | 104.3                                                   |
| 30KP198A     | 198                                       | 221.20                  | 5               | 2                                                                | 319.8                                                                           | 94.7                                                    |
| 30KP216A     | 216                                       | 241.30                  | 5               | 2                                                                | 348.6                                                                           | 86.9                                                    |
| 30KP240A     | 240                                       | 268.10                  | 5               | 2                                                                | 387.0                                                                           | 78.3                                                    |
| 30KP258A     | 258                                       | 288.20                  | 5               | 2                                                                | 416.4                                                                           | 72.8                                                    |
| 30KP260A     | 260                                       | 290.40                  | 5               | 2                                                                | 416.0                                                                           | 72.8                                                    |
| 30KP270A     | 270                                       | 301.60                  | 5               | 2                                                                | 436.2                                                                           | 69.5                                                    |
| 30KP280A     | 280                                       | 312.80                  | 5               | 2                                                                | 464.0                                                                           | 65.3                                                    |
| 30KP288A     | 288                                       | 321.70                  | 5               | 2                                                                | 469.9                                                                           | 64.5                                                    |

\* = Add "CA" suffix for bidirectional device types.

# = See General Information for Impulse Current Waveform

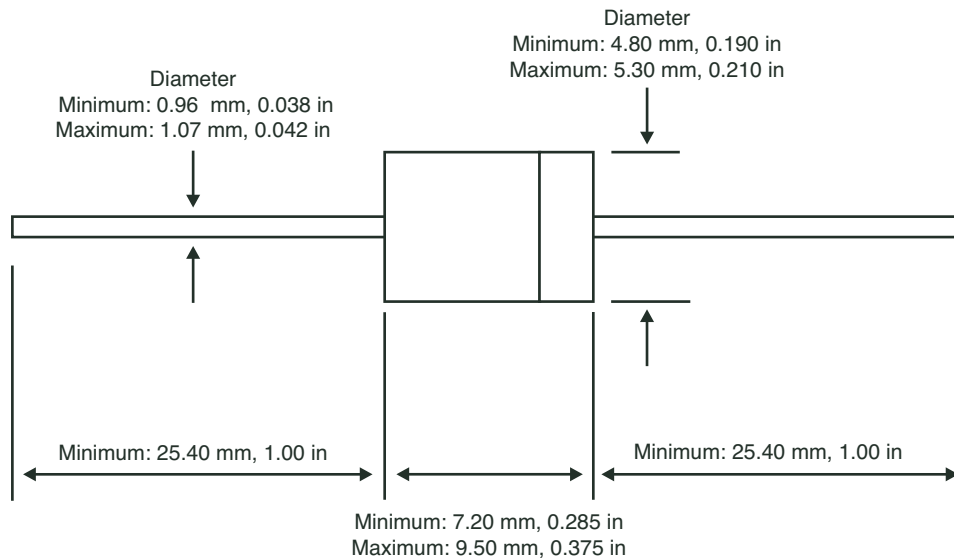
## WLCE Series – Low Capacitance



### WLCE Series Features

- RoHS Compliant
- 1500 WATT Peak Pulse Power capability at 10/1000 $\mu$ s waveform
- Available in voltages 6.5V to 28V
- Glass Passivated junction
- Low incremented surge resistance
- Fast response time: typically less than 5 $\mu$ s from 0 volts to VBR min
- Ideal for dataline applications
- JEDEC DO-201 Plastic molded case
- UL 497B Recognized, File #E135015
- Operating junction and storage temperature (-55°C to + 175°C)
- Tape and Reel to EIA Standard RS - 296 - E

### Package Dimensions



## WLCE Series – Low Capacitance

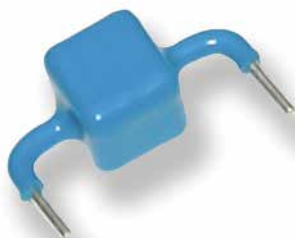
### Electrical Characteristics

| Part Number | Reverse Stand-Off Voltage<br>$V_{RWM}$ | Breakdown Voltage |              | Test Current | Maximum Reverse Leakage<br>@ $V_{RWM}$ | Maximum Peak Pulse Current | Maximum Clamping Voltage<br>@ $I_{PP}$ | Maximum Junction Capacitance<br>@ 0V | Working Inverse Blocking Voltage | Working Blocking Leaking Current | Peak Inverse Blocking Voltage |
|-------------|----------------------------------------|-------------------|--------------|--------------|----------------------------------------|----------------------------|----------------------------------------|--------------------------------------|----------------------------------|----------------------------------|-------------------------------|
|             |                                        | $V_{BR}$ (V)      | $V_{BR}$ (V) |              |                                        |                            |                                        |                                      |                                  |                                  |                               |
|             | $V_{RWM}$ (V)                          | Min. @ $I_T$      | Max. @ $I_T$ | $I_T$ (mA)   | $I_R$ ( $\mu$ A)                       | $I_{PP}$ (A)               | $V_C$ (C)                              | (pF)                                 | $V_{WIB}$ (V)                    | $I_{IB}$ (mA)                    | $V_{PIB}$ (V)                 |
| WLCE6.5A    | 6.5                                    | 7.22              | 7.98         | 10           | 1000                                   | 100                        | 11.2                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE7.0A    | 7.0                                    | 7.78              | 8.60         | 10           | 500                                    | 100                        | 12.0                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE7.5A    | 7.5                                    | 8.33              | 9.21         | 10           | 250                                    | 100                        | 12.9                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE8.0A    | 8.0                                    | 8.89              | 9.83         | 1            | 100                                    | 100                        | 13.6                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE8.5A    | 8.5                                    | 9.44              | 10.40        | 1            | 50                                     | 100                        | 14.4                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE9.0A    | 9.0                                    | 10.00             | 11.10        | 1            | 10                                     | 97                         | 15.4                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE10A     | 10.0                                   | 11.10             | 12.30        | 1            | 5                                      | 88                         | 17.0                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE11A     | 11.0                                   | 12.20             | 13.50        | 1            | 5                                      | 82                         | 18.2                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE12A     | 12.0                                   | 13.30             | 14.70        | 1            | 5                                      | 75                         | 19.9                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE13A     | 13.0                                   | 14.40             | 15.90        | 1            | 5                                      | 70                         | 21.5                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE14A     | 14.0                                   | 15.60             | 17.20        | 1            | 5                                      | 65                         | 23.2                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE15A     | 15.0                                   | 16.70             | 18.50        | 1            | 5                                      | 61                         | 24.4                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE16A     | 16.0                                   | 17.60             | 19.70        | 1            | 5                                      | 57                         | 26.0                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE17A     | 17.0                                   | 18.90             | 20.90        | 1            | 5                                      | 54                         | 27.6                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE18A     | 18.0                                   | 20.00             | 22.10        | 1            | 5                                      | 51                         | 29.2                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE20A     | 20.0                                   | 22.20             | 24.50        | 1            | 5                                      | 46                         | 32.4                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE22A     | 22.0                                   | 24.40             | 26.90        | 1            | 5                                      | 42                         | 35.5                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE24A     | 24.0                                   | 26.70             | 29.50        | 1            | 5                                      | 39                         | 38.9                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE26A     | 26.0                                   | 28.90             | 31.90        | 1            | 5                                      | 36                         | 42.1                                   | 100                                  | 75                               | 1.0                              | 100                           |
| WLCE28A     | 28.0                                   | 31.10             | 34.40        | 1            | 5                                      | 33                         | 45.5                                   | 100                                  | 75                               | 1.0                              | 100                           |

## WFC Series

## WFC Series Features

- High current transient suppressor
- Excellent Clamping Capability
- Glass Passivated Junction
- Bi-directional
- RoHS Compliant
- High Temperature soldering: 260°C/10 seconds at terminals
- UL1449 4th Edition Recognized, File #E321567 (see specific values)
- **Packaging in tray/box:**
  - General Lead Series - 20pcs/80pcs
  - Cell Series - 25pcs/100pcs
  - Stack Series - 50pcs/200pcs

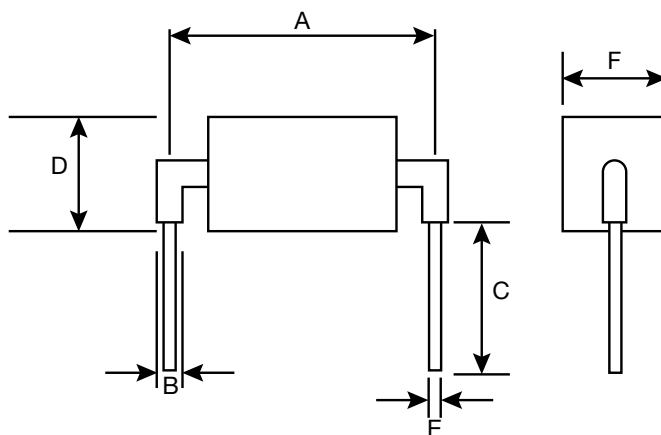


## Absolute Maximum Ratings

| RATING                                           | SYMBOL   | VALUE        | UNITS |
|--------------------------------------------------|----------|--------------|-------|
| Current Rating                                   | IPP      | 3, 6, 10, 16 | KAmps |
| Operating Junction and Storage Temperature Range | TJ, TSTG | -55 to +150  | °C    |

## Package Dimensions

## General Lead Series



WFC A, WFC B, WFC C (020-190) SERIES DIMENSIONS

| DIMENSIONS | INCHES        | MILLIMETERS  |
|------------|---------------|--------------|
| A          | 0.951 ± 0.047 | 24.15 ± 1.20 |
| B          | 0.055 min.    | 1.40 min.    |
| C          | 0.236 ± 0.047 | 6.0 ± 1.20   |
| D          | 0.512 max.    | 13.0 max.    |
| E          | 0.05 ± 0.004  | 1.28 ± 0.01  |
| F          | 0.512 max.    | 13.0 max.    |

WFC C (012, 015, 200, 240)/WFC D SERIES DIMENSIONS

| DIMENSIONS | INCHES        | MILLIMETERS  |
|------------|---------------|--------------|
| A          | 0.951 ± 0.047 | 24.15 ± 1.20 |
| B          | 0.055 min     | 1.40 min     |
| C          | 0.236 ± 0.047 | 6.0 ± 1.20   |
| D          | 0.630 max.    | 16 max.      |
| E          | 0.05 ± 0.004  | 1.28 ± 0.01  |
| F          | 0.63 max.     | 16 max       |

WFC B (430) SERIES DIMENSIONS

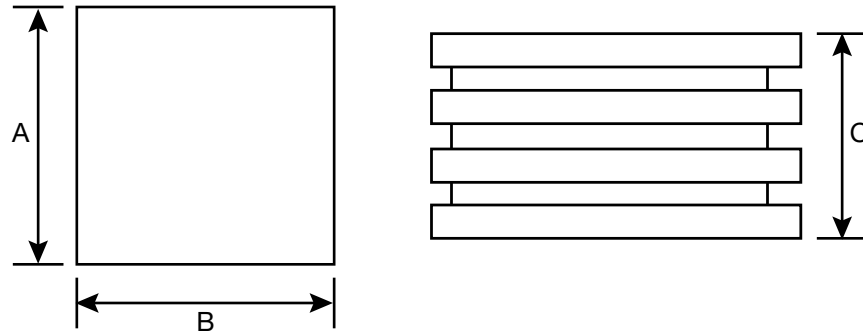
| DIMENSIONS | INCHES        | MILLIMETERS  |
|------------|---------------|--------------|
| A          | 1.063 ± 0.047 | 27.00 ± 1.20 |
| B          | 0.055 min.    | 1.40 min.    |
| C          | 0.079 min     | 2.00 min.    |
| D          | 0.512 max.    | 13.0 max.    |
| E          | 0.05 ± 0.004  | 1.28 ± 0.10  |
| F          | 0.512 max.    | 13.0 max.    |

WFC C (430) SERIES DIMENSIONS

| DIMENSIONS | INCHES        | MILLIMETERS  |
|------------|---------------|--------------|
| A          | 1.024 ± 0.047 | 26.00 ± 1.20 |
| B          | 0.055 min     | 1.40 min     |
| C          | 0.079 min.    | 2.00 min.    |
| D          | 0.630 max.    | 16.0 max.    |
| E          | 0.05 ± 0.004  | 1.28 ± 0.10  |
| F          | 0.63 max.     | 16.0 max     |

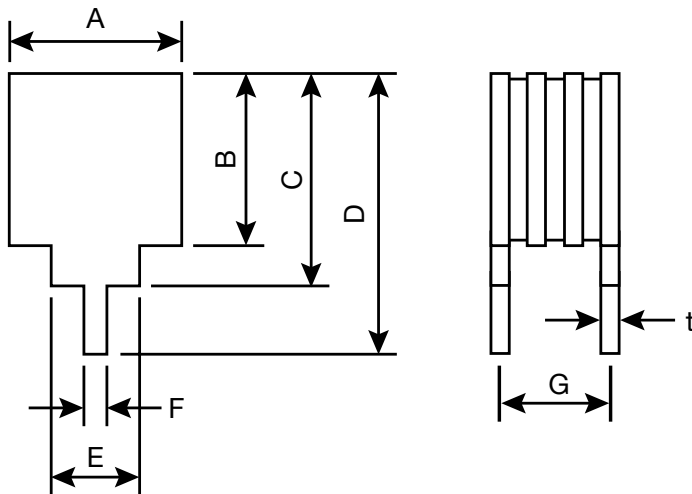
**WFC Series****Package Dimensions (continued)**

## Cell Series

**WFCA, WFCB, WFCC SERIES DIMENSIONS**

| DIMENSIONS | INCHES           | MILLIMETERS   |
|------------|------------------|---------------|
| A          | $0.37 \pm 0.016$ | $9.4 \pm 0.4$ |
| B          | $0.37 \pm 0.016$ | $9.4 \pm 0.4$ |
| C          | 0.787 max.       | 20 max.       |

## Stack Series



| DIMENSIONS | INCHES            | MILLIMETERS     |
|------------|-------------------|-----------------|
| A          | $0.37 \pm 0.016$  | $9.4 \pm 0.4$   |
| B          | $0.37 \pm 0.016$  | $9.4 \pm 0.4$   |
| C          | $0.457 \pm 0.016$ | $11.6 \pm 0.4$  |
| D          | $0.605 \pm 0.016$ | $15.37 \pm 0.4$ |
| E          | $0.19 \pm 0.012$  | $4.83 \pm 0.3$  |
| F          | $0.049 \pm 0.008$ | $1.25 \pm 0.2$  |
| G          | 0.787 max         | 20 max          |
| t          | $0.015 \pm 0.002$ | $0.38 \pm 0.05$ |

# TVS Diodes

## WFC Series Electrical Characteristics (continued)

| Part Number         |              |              | Rated Standoff Voltage |         | Breakdown Voltage | Test Current | Current Rating                       | Maximum Clamping Voltage | Reverse Leakage |
|---------------------|--------------|--------------|------------------------|---------|-------------------|--------------|--------------------------------------|--------------------------|-----------------|
| General Lead Series | Cell Series  | Stack Series | VAC (V)                | VDC (V) | VBR (V) MIN. @IT  | IT (mA)      | Rated IPP measured with 8/20µS pulse | VC(V) @IPP               | IR (µA) @ VDC   |
| <b>WFC A</b>        |              |              |                        |         |                   |              |                                      |                          |                 |
| WFC A-012L          | WFC A-012C   | WFC A-012S   | 8.5                    | 12      | 14.0              | 1.0          | 3KA                                  | 28.0                     | 20              |
| WFC A-015L          | WFC A-015C   | WFC A-015S   | 11                     | 15      | 17.0              | 1.0          | 3KA                                  | 30.0                     | 20              |
| WFC A-020L          | WFC A-020C   | WFC A-020S   | 14                     | 20      | 22.0              | 1.0          | 3KA                                  | 40.0                     | 20              |
| WFC A-025L          | WFC A-025C   | WFC A-025S   | 17                     | 25      | 28.0              | 1.0          | 3KA                                  | 50.0                     | 20              |
| WFC A-030L          | WFC A-030C   | WFC A-030S   | 21                     | 30      | 33.0              | 1.0          | 3KA                                  | 60.0                     | 20              |
| WFC A-042L          | WFC A-042C   | WFC A-042S   | 30                     | 42      | 47.0              | 1.0          | 3KA                                  | 77.0                     | 20              |
| WFC A-058L          | WFC A-058C   | WFC A-058S   | 40                     | 58      | 64.0              | 1.0          | 3KA                                  | 110.0                    | 20              |
| WFC A-066L          | WFC A-066C   | WFC A-066S   | 45                     | 66      | 70.0              | 1.0          | 3KA                                  | 125.0                    | 20              |
| WFC A-076L          | WFC A-076C   | WFC A-076S   | 54                     | 76      | 85.0              | 1.0          | 3KA                                  | 140.0                    | 20              |
| WFC A-100L          | WFC A-100C   | WFC A-100S   | 72                     | 100     | 110.0             | 1.0          | 3KA                                  | 165.0                    | 20              |
| WFC A-133L          | WFC A-133C   | WFC A-133S   | 100                    | 133     | 147.0             | 1.0          | 3KA                                  | 220.0                    | 20              |
| WFC A-170L          | WFC A-170C   | WFC A-170S   | 130                    | 170     | 180.0             | 1.0          | 3KA                                  | 260.0                    | 20              |
| WFC A-190L          | WFC A-190C   | WFC A-190S   | 145                    | 190     | 200.0             | 1.0          | 3KA                                  | 290.0                    | 20              |
| WFC A-200L          | WFC A-200C   | WFC A-200S   | 150                    | 200     | 222.0             | 1.0          | 3KA                                  | 330.0                    | 20              |
| WFC A-240L          | WFC 0.5-240C | WFC A-240S   | 180                    | 240     | 250.0             | 1.0          | 3KA                                  | 340.0                    | 20              |
| WFC A-275L          | WFC A-275C   | WFC A-275S   | 210                    | 275     | 300.0             | 1.0          | 3KA                                  | 435.0                    | 20              |
| WFC A-300L          | WFC A-300C   | WFC A-300S   | 230                    | 300     | 330.0             | 1.0          | 3KA                                  | 470.0                    | 20              |
| WFC A-380L          | WFC A-380C   | WFC A-380S   | 275                    | 380     | 401.0             | 1.0          | 3KA                                  | 520.0                    | 20              |
| WFC A-430L          | WFC A-430C   | WFC A-430S   | 310                    | 430     | 440.0             | 1.0          | 3KA                                  | 625.0                    | 20              |
| WFC A-460L          | WFC A-460C   | WFC A-460S   | 330                    | 460     | 500.0             | 1.0          | 3KA                                  | 770.0                    | 20              |
| WFC A-500L          | WFC A-500C   | WFC A-500S   | 350                    | 500     | 558.0             | 1.0          | 3KA                                  | 868.0                    | 20              |
| <b>WFC B</b>        |              |              |                        |         |                   |              |                                      |                          |                 |
| WFC B-012L          | WFC B-012C   | WFC B-012S   | 8.5                    | 12      | 14.0              | 1.0          | 6KA                                  | 28.0                     | 20              |
| WFC B-015L          | WFC B-015C   | WFC B-015S   | 11                     | 15      | 17.0              | 1.0          | 6KA                                  | 30.0                     | 20              |
| WFC B-020L          | WFC B-020C   | WFC B-020S   | 14                     | 20      | 22.0              | 1.0          | 6KA                                  | 40.0                     | 20              |
| WFC B-025L          | WFC B-025C   | WFC B-025S   | 17                     | 25      | 28.0              | 1.0          | 6KA                                  | 50.0                     | 20              |
| WFC B-030L          | WFC B-030C   | WFC B-030S   | 21                     | 30      | 33.0              | 1.0          | 6KA                                  | 60.0                     | 20              |
| WFC B-042L          | WFC B-042C   | WFC B-042S   | 30                     | 42      | 47.0              | 1.0          | 6KA                                  | 77.0                     | 20              |
| WFC B-058L          | WFC B-058C   | WFC B-058S   | 40                     | 58      | 64.0              | 1.0          | 6KA                                  | 110.0                    | 20              |
| WFC B-066L          | WFC B-066C   | WFC B-066S   | 45                     | 66      | 70.0              | 1.0          | 6KA                                  | 125.0                    | 20              |
| WFC B-076L          | WFC B-076C   | WFC B-076S   | 54                     | 76      | 83.0              | 1.0          | 6KA                                  | 135.0                    | 20              |
| WFC B-100L          | WFC B-100C   | WFC B-100S   | 72                     | 100     | 110.0             | 1.0          | 6KA                                  | 165.0                    | 20              |
| WFC B-133L          | WFC B-133C   | WFC B-133S   | 100                    | 133     | 147.0             | 1.0          | 6KA                                  | 220.0                    | 20              |
| WFC B-170L          | WFC B-170C   | WFC B-170S   | 130                    | 170     | 180.0             | 1.0          | 6KA                                  | 260.0                    | 20              |
| WFC B-190L          | WFC B-190C   | WFC B-190S   | 145                    | 190     | 200.0             | 1.0          | 6KA                                  | 290.0                    | 20              |
| WFC B-200L          | WFC B-200C   | WFC B-200S   | 150                    | 200     | 222.0             | 1.0          | 6KA                                  | 330.0                    | 20              |
| WFC B-240L          | WFC B-240C   | WFC B-240S   | 180                    | 240     | 250.0             | 1.0          | 6KA                                  | 340.0                    | 20              |
| WFC B-275L          | WFC B-275C   | WFC B-275S   | 210                    | 275     | 300.0             | 1.0          | 6KA                                  | 435.0                    | 20              |
| WFC B-300L          | WFC B-300C   | WFC B-300S   | 230                    | 300     | 330.0             | 1.0          | 6KA                                  | 470.0                    | 20              |
| WFC B-380L          | WFC B-380C   | WFC B-380S   | 275                    | 380     | 401.0             | 1.0          | 6KA                                  | 520.0                    | 20              |
| WFC B-430L          | NA           | NA           | 310                    | 430     | 440.0             | 1.0          | 6KA                                  | 625.0                    | 20              |

### NOTES:

1. Ta=25°C unless otherwise specified.
2. Using 8/20 us wave shape pulses as defined in IEC61000-4-5.

UL1449 4th Edition Recognized, File #E321567. (Pending)

# TVS Diodes

## WFC Series Electrical Characteristics (continued)

| Part Number         |             |              | Rated Standoff Voltage |         | Breakdown Voltage | Test Current | Current Rating                       | Maximum Clamping Voltage | Reverse Leakage |
|---------------------|-------------|--------------|------------------------|---------|-------------------|--------------|--------------------------------------|--------------------------|-----------------|
| General Lead Series | Cell Series | Stack Series | VAC (V)                | VDC (V) | VBR (V) MIN. @IT  | IT (mA)      | Rated IPP measured with 8/20µS pulse | VC(V) @IPP               | IR (µA) @ VDC   |
| <b>WFCC</b>         |             |              |                        |         |                   |              |                                      |                          |                 |
| WFCC-012L           | WFCC-012C   | WFCC-012S    | 8.5                    | 12      | 14.0              | 1.0          | 10KA                                 | 28.0                     | 20              |
| WFCC-015L           | WFCC-015C   | WFCC-015S    | 11                     | 15      | 17.0              | 1.0          | 10KA                                 | 30.0                     | 20              |
| WFCC-020L           | WFCC-020C   | WFCC-020S    | 14                     | 20      | 22.0              | 1.0          | 10KA                                 | 40.0                     | 20              |
| WFCC-025L           | WFCC-025C   | WFCC-025S    | 17                     | 25      | 28.0              | 1.0          | 10KA                                 | 50.0                     | 20              |
| WFCC-030L           | WFCC-030C   | WFCC-030S    | 21                     | 30      | 33.0              | 1.0          | 10KA                                 | 60.0                     | 20              |
| WFCC-042L           | WFCC-042C   | WFCC-042S    | 30                     | 42      | 47.0              | 1.0          | 10KA                                 | 77.0                     | 20              |
| WFCC-058L           | WFCC-058C   | WFCC-058S    | 40                     | 58      | 64.0              | 1.0          | 10KA                                 | 110.0                    | 20              |
| WFCC-066L           | WFCC-066C   | WFCC-066S    | 45                     | 66      | 70.0              | 1.0          | 10KA                                 | 125.0                    | 20              |
| WFCC-076L           | WFCC-076C   | WFCC-076S    | 54                     | 76      | 83.0              | 1.0          | 10KA                                 | 135.0                    | 20              |
| WFCC-100L           | WFCC-100C   | WFCC-100S    | 72                     | 100     | 110.0             | 1.0          | 10KA                                 | 165.0                    | 20              |
| WFCC-133L           | WFCC-133C   | WFCC-133S    | 100                    | 133     | 147.0             | 1.0          | 10KA                                 | 220.0                    | 20              |
| WFCC-170L           | WFCC-170C   | WFCC-170S    | 130                    | 170     | 180.0             | 1.0          | 10KA                                 | 260.0                    | 20              |
| WFCC-190L           | WFCC-190C   | WFCC-190S    | 145                    | 190     | 200.0             | 1.0          | 10KA                                 | 290.0                    | 20              |
| WFCC-200L           | NA          | NA           | 150                    | 200     | 222.0             | 1.0          | 10KA                                 | 330.0                    | 20              |
| WFCC-240L           | NA          | NA           | 180                    | 240     | 250.0             | 1.0          | 10KA                                 | 340.0                    | 20              |
| WFCC-430L           | NA          | NA           | 310                    | 430     | 440.0             | 1.0          | 10KA                                 | 625.0                    | 20              |
| <b>WFCD</b>         |             |              |                        |         |                   |              |                                      |                          |                 |
| WFCD-012L           | NA          | NA           | 8.5                    | 12      | 14.0              | 1.0          | 16KA                                 | 28.0                     | 20              |
| WFCD-015L           | NA          | NA           | 11                     | 15      | 17.0              | 1.0          | 16KA                                 | 30.0                     | 20              |
| WFCD-020L           | NA          | NA           | 14                     | 20      | 22.0              | 1.0          | 16KA                                 | 40.0                     | 20              |
| WFCD-025L           | NA          | NA           | 17                     | 25      | 28.0              | 1.0          | 16KA                                 | 50.0                     | 20              |
| WFCD-030L           | NA          | NA           | 21                     | 30      | 33.0              | 1.0          | 16KA                                 | 60.0                     | 20              |
| WFCD-042L           | NA          | NA           | 30                     | 42      | 47.0              | 1.0          | 16KA                                 | 77.0                     | 20              |
| WFCD-058L           | NA          | NA           | 40                     | 58      | 64.0              | 1.0          | 16KA                                 | 110.0                    | 20              |
| WFCD-066L           | NA          | NA           | 45                     | 66      | 70.0              | 1.0          | 16KA                                 | 125.0                    | 20              |
| WFCD-076L           | NA          | NA           | 54                     | 76      | 85.0              | 1.0          | 16KA                                 | 135.0                    | 20              |
| WFCD-100L           | NA          | NA           | 72                     | 100     | 110.0             | 1.0          | 16KA                                 | 165.0                    | 20              |
| WFCD-133L           | NA          | NA           | 100                    | 133     | 147.0             | 1.0          | 16KA                                 | 220.0                    | 20              |
| WFCD-170L           | NA          | NA           | 130                    | 170     | 180.0             | 1.0          | 16KA                                 | 260.0                    | 20              |
| WFCD-190L           | NA          | NA           | 145                    | 190     | 200.0             | 1.0          | 16KA                                 | 290.0                    | 20              |
| WFCD-200L           | NA          | NA           | 150                    | 200     | 222.0             | 1.0          | 16KA                                 | 330.0                    | 20              |

### NOTES:

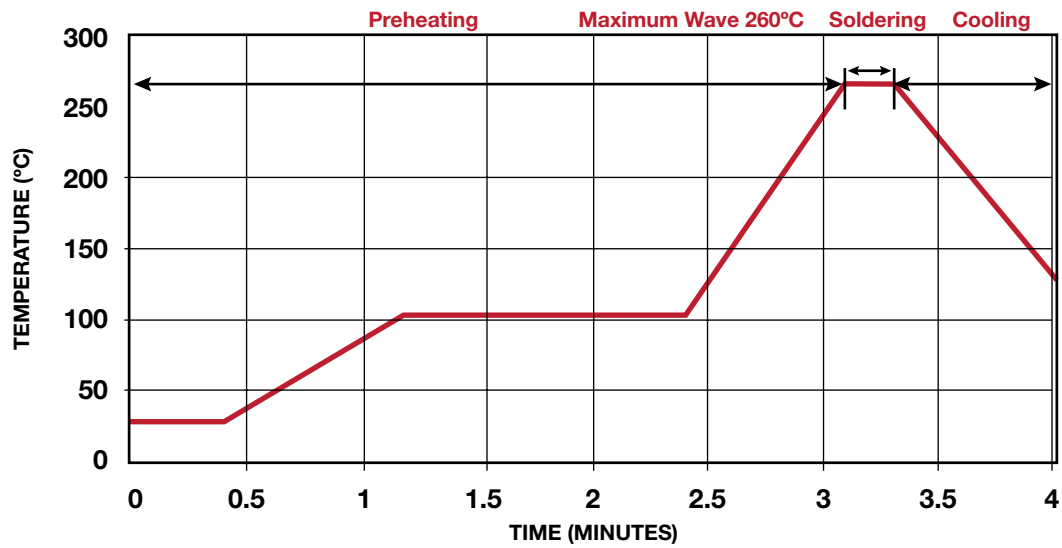
1. Ta=25°C unless otherwise specified.
2. Using 8/20 us wave shape pulses as defined in IEC61000-4-5.

UL1449 4th Edition Recognized, File #E321567. (Pending)

## WFC Series

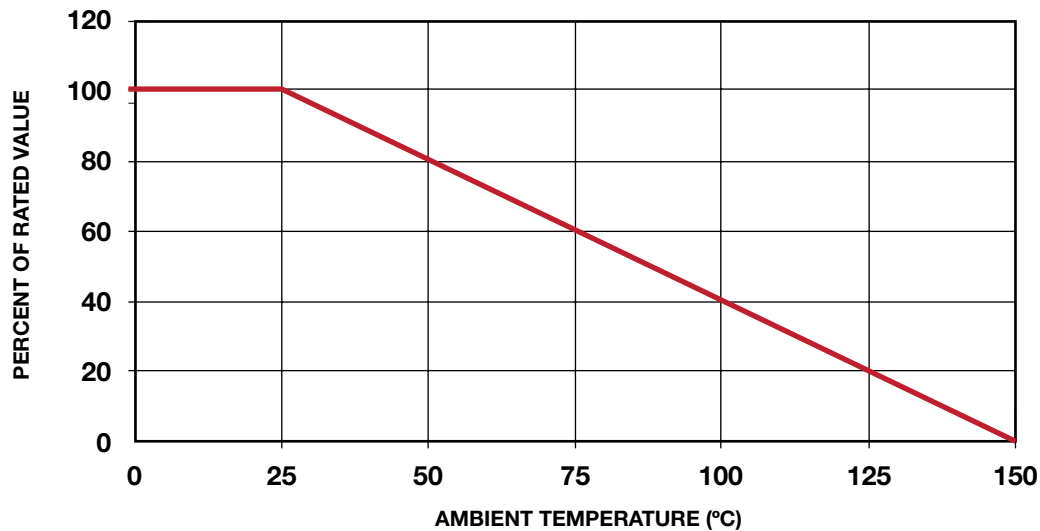
## FLOW/WAVE SOLDERING RECOMMENDATION PARAMETERS

Flow/wave Soldering



Peak Temperature: 265°C  
Dipping Time: 10 seconds  
Soldering: 1 time

## PEAK POWER DERATING



## P4SMAJ Series – 400 Watt Surface Mount



### P4SMAJ Series Features

- RoHS Compliance Standard
- 400 watt peak pulse power dissipation
- Available in voltages from 5.0V to 440V
- Unidirectional and bidirectional
- Glass passivated junction
- Low clamping factor
- Available in tape and reel (Reel quantity = 5,000 pieces)
- Each device 100% surge tested
- Tape and Reel to EIA Standard RS - 481 - A
- UL 497B Recognized, File #E135015
- AEC-Q101 Qualified (11A & 11CA - 440A & 440CA) types. (When ordering ADD suffix “Z” to end of part number.)

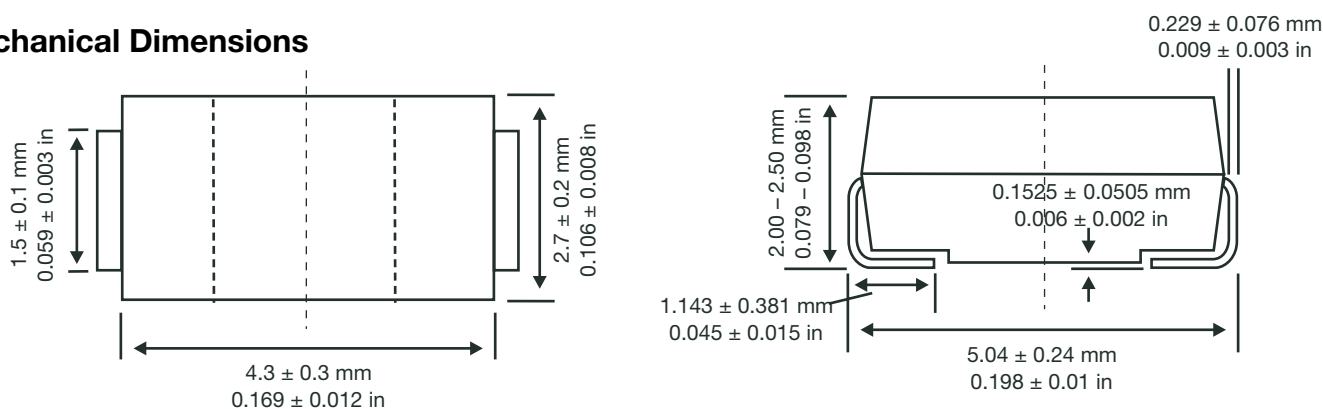
### Absolute Maximum Ratings

| Parameter                                   | Value            |
|---------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 400W             |
| Operating and storage temperatures          | -55°C to + 150°C |

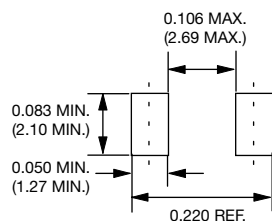
### Mechanical Characteristics

- DO214AC package
- UL94V-0 Thermoset Epoxy
- Solder plated terminals
- Solderable per MIL-STD-750 Method 2026

### Mechanical Dimensions



### Standard Mounting Pad Layout



All dimensions in inches and (millimeters)

## P4SMAJ Series — 400 Watt Surface Mount (continued)

### Electrical Characteristics

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage Vwm | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|--------------------|-------------------|----------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              |                    |                   | (Volts)                    | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| P4SMAJ5.0    | HD                 | TD                | 5                          | 6.4               | 7.3  | 10   | 800                               | 9.6                                              | 41.6                                       |
| P4SMAJ5.0A   | HE/AE              | TE/WE             | 5                          | 6.4               | 7    | 10   | 800                               | 9.2                                              | 43.5                                       |
| P4SMAJ6.0    | HF                 | TF                | 6                          | 6.67              | 8.15 | 10   | 800                               | 11.4                                             | 35.1                                       |
| P4SMAJ6.0A   | HG/AG              | TG/WG             | 6                          | 6.67              | 7.37 | 10   | 800                               | 10.3                                             | 38.8                                       |
| P4SMAJ6.5    | HH                 | TH                | 6.5                        | 7.22              | 8.82 | 10   | 500                               | 12.3                                             | 32.5                                       |
| P4SMAJ6.5A   | HK/AK              | TK/WK             | 6.5                        | 7.22              | 7.98 | 10   | 500                               | 11.2                                             | 35.7                                       |
| P4SMAJ7.0    | HL                 | TL                | 7                          | 7.78              | 9.51 | 10   | 200                               | 13.3                                             | 30.1                                       |
| P4SMAJ7.0A   | HM/AM              | TM/WM             | 7                          | 7.78              | 8.6  | 10   | 200                               | 12                                               | 33.3                                       |
| P4SMAJ7.5    | HN                 | TN                | 7.5                        | 8.33              | 10.3 | 1    | 100                               | 14.3                                             | 28                                         |
| P4SMAJ7.5A   | HP/AP              | TP/WP             | 7.5                        | 8.33              | 9.21 | 1    | 100                               | 12.9                                             | 31                                         |
| P4SMAJ8.0    | HQ                 | TQ                | 8                          | 8.89              | 10.9 | 1    | 50                                | 15                                               | 26.5                                       |
| P4SMAJ8.0A   | HR/AR              | TR/WR             | 8                          | 8.89              | 9.83 | 1    | 50                                | 13.6                                             | 29.4                                       |
| P4SMAJ8.5    | HS                 | TS                | 8.5                        | 9.44              | 11.5 | 1    | 20                                | 15.9                                             | 25.1                                       |
| P4SMAJ8.5A   | HT/AT              | TT/WT             | 8.5                        | 9.44              | 10.4 | 1    | 20                                | 14.4                                             | 27.8                                       |
| P4SMAJ9.0    | HU                 | TU                | 9                          | 10                | 12.2 | 1    | 10                                | 16.9                                             | 23.6                                       |
| P4SMAJ9.0A   | HV/AV              | TV/WV             | 9                          | 10                | 11.1 | 1    | 10                                | 15.4                                             | 26                                         |
| P4SMAJ10     | HW                 | TW                | 10                         | 11.1              | 13.6 | 1    | 5                                 | 18.8                                             | 21.2                                       |
| P4SMAJ10A    | HX/AX              | TX/WX             | 10                         | 11.1              | 12.3 | 1    | 5                                 | 17                                               | 23.5                                       |
| P4SMAJ11     | HY                 | TY                | 11                         | 12.2              | 14.9 | 1    | 1                                 | 20.1                                             | 20                                         |
| P4SMAJ11A    | HZ/AZ              | TZ/WZ             | 11                         | 12.2              | 13.5 | 1    | 1                                 | 18.2                                             | 22                                         |
| P4SMAJ12     | ID                 | UD                | 12                         | 13.3              | 16.3 | 1    | 1                                 | 22                                               | 18.1                                       |
| P4SMAJ12A    | IE/BE              | UE/XE             | 12                         | 13.3              | 14.7 | 1    | 1                                 | 19.9                                             | 20.1                                       |
| P4SMAJ13     | IF                 | UF                | 13                         | 14.4              | 17.6 | 1    | 1                                 | 23.8                                             | 16.8                                       |
| P4SMAJ13A    | IG/BG              | UG/XG             | 13                         | 14.4              | 15.9 | 1    | 1                                 | 21.5                                             | 18.6                                       |
| P4SMAJ14     | IH                 | UH                | 14                         | 15.6              | 19.1 | 1    | 1                                 | 25.8                                             | 15.5                                       |
| P4SMAJ14A    | IK/BK              | UK/XK             | 14                         | 15.6              | 17.2 | 1    | 1                                 | 23.2                                             | 17.2                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

\*\* = There may be two potential codes depending on factory designation.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**P4SMAJ Series — 400 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage Vwm | Breakdown Voltage |      |     | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|--------------------|-------------------|----------------------------|-------------------|------|-----|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |      | @It |                                   |                                                  |                                            |
|              |                    |                   |                            | (Volts)           | Min  | Max | (mA)                              | (µA)                                             | (Volts)                                    |
| P4SMAJ15     | IL                 | UL                | 15                         | 16.7              | 20.4 | 1   | 1                                 | 26.9                                             | 14.8                                       |
| P4SMAJ15A    | IM/BM              | UM/XM             | 15                         | 16.7              | 18.5 | 1   | 1                                 | 24.4                                             | 16.4                                       |
| P4SMAJ16     | IN                 | UN                | 16                         | 17.8              | 21.8 | 1   | 1                                 | 28.8                                             | 13.8                                       |
| P4SMAJ16A    | IP/BP              | UP/XP             | 16                         | 17.8              | 19.7 | 1   | 1                                 | 26                                               | 15.4                                       |
| P4SMAJ17     | IQ                 | UQ                | 17                         | 18.9              | 23.1 | 1   | 1                                 | 30.5                                             | 13.1                                       |
| P4SMAJ17A    | IR/BR              | UR/XR             | 17                         | 18.9              | 20.9 | 1   | 1                                 | 27.6                                             | 14.5                                       |
| P4SMAJ18     | IS                 | US                | 18                         | 20                | 24.4 | 1   | 1                                 | 32.2                                             | 12.4                                       |
| P4SMAJ18A    | IT/BT              | UT/XT             | 18                         | 20                | 22.1 | 1   | 1                                 | 29.2                                             | 13.7                                       |
| P4SMAJ20     | IU                 | UU                | 20                         | 22.2              | 27.1 | 1   | 1                                 | 35.8                                             | 11.1                                       |
| P4SMAJ20A    | IV/BV              | UV/XV             | 20                         | 22.2              | 24.5 | 1   | 1                                 | 32.4                                             | 12.3                                       |
| P4SMAJ22     | IW                 | UW                | 22                         | 24.4              | 29.8 | 1   | 1                                 | 39.4                                             | 10.1                                       |
| P4SMAJ22A    | IX/BX              | UX/XX             | 22                         | 24.4              | 26.9 | 1   | 1                                 | 35.5                                             | 11.3                                       |
| P4SMAJ24     | IY                 | UY                | 24                         | 26.7              | 32.6 | 1   | 1                                 | 43                                               | 9.3                                        |
| P4SMAJ24A    | IZ/BZ              | UZ/XZ             | 24                         | 26.7              | 29.5 | 1   | 1                                 | 38.9                                             | 10.3                                       |
| P4SMAJ26     | JD                 | VD                | 26                         | 28.9              | 35.3 | 1   | 1                                 | 46.6                                             | 8.6                                        |
| P4SMAJ26A    | JE/CE              | VE/YE             | 26                         | 28.9              | 31.9 | 1   | 1                                 | 42.1                                             | 9.5                                        |
| P4SMAJ28     | JF                 | VF                | 28                         | 31.1              | 38   | 1   | 1                                 | 50                                               | 8                                          |
| P4SMAJ28A    | JG/CG              | VG/YG             | 28                         | 31.1              | 34.4 | 1   | 1                                 | 45.4                                             | 8.8                                        |
| P4SMAJ30     | JH                 | VH                | 30                         | 33.3              | 40.7 | 1   | 1                                 | 53.5                                             | 7.5                                        |
| P4SMAJ30A    | JK/CK              | VK/YK             | 30                         | 33.3              | 36.8 | 1   | 1                                 | 48.4                                             | 8.3                                        |
| P4SMAJ33     | JL                 | VL                | 33                         | 36.7              | 44.9 | 1   | 1                                 | 59                                               | 6.8                                        |
| P4SMAJ33A    | JM/CM              | VM/YM             | 33                         | 36.7              | 40.6 | 1   | 1                                 | 53.3                                             | 7.5                                        |
| P4SMAJ36     | JN                 | VN                | 36                         | 40                | 48.9 | 1   | 1                                 | 64.3                                             | 6.2                                        |
| P4SMAJ36A    | JP/CP              | VP/YP             | 36                         | 40                | 44.2 | 1   | 1                                 | 58.1                                             | 6.9                                        |
| P4SMAJ40     | JQ                 | VQ                | 40                         | 44.4              | 54.3 | 1   | 1                                 | 71.4                                             | 5.6                                        |
| P4SMAJ40A    | JR/CR              | VR/YR             | 40                         | 44.4              | 49.1 | 1   | 1                                 | 64.5                                             | 6.2                                        |

\* = Add "C" or "CA" suffix for bidirectional device types.

\*\* = There may be two potential codes depending on factory designation.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**P4SMAJ Series — 400 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage Vwm | Breakdown Voltage |      |     | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|--------------------|-------------------|----------------------------|-------------------|------|-----|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |      | @It |                                   |                                                  |                                            |
|              |                    |                   |                            | (Volts)           | Min  | Max | (mA)                              | (µA)                                             | (Volts)                                    |
| P4SMAJ43     | JS                 | VS                | 43                         | 47.8              | 58.4 | 1   | 1                                 | 76.7                                             | 5.2                                        |
| P4SMAJ43A    | JT/CT              | VT/YT             | 43                         | 47.8              | 52.8 | 1   | 1                                 | 69.4                                             | 5.8                                        |
| P4SMAJ45     | JU                 | VU                | 45                         | 50                | 61.1 | 1   | 1                                 | 80.3                                             | 5.0                                        |
| P4SMAJ45A    | JV/CV              | VV/YV             | 45                         | 50                | 55.3 | 1   | 1                                 | 72.7                                             | 5.5                                        |
| P4SMAJ48     | JW                 | VW                | 48                         | 53.3              | 65.1 | 1   | 1                                 | 85.5                                             | 4.7                                        |
| P4SMAJ48A    | JX/CX              | VX/YX             | 48                         | 53.3              | 58.9 | 1   | 1                                 | 77.4                                             | 5.2                                        |
| P4SMAJ51     | JY                 | VY                | 51                         | 56.7              | 69.3 | 1   | 1                                 | 91.1                                             | 4.4                                        |
| P4SMAJ51A    | JZ/CZ              | VZ/YZ             | 51                         | 56.7              | 62.7 | 1   | 1                                 | 82.4                                             | 4.9                                        |
| P4SMAJ54     | RD                 | WD                | 54                         | 60                | 73.3 | 1   | 1                                 | 96.3                                             | 4.2                                        |
| P4SMAJ54A    | RE                 | WE/ZE             | 54                         | 60                | 66.3 | 1   | 1                                 | 87.1                                             | 4.6                                        |
| P4SMAJ58     | RF                 | WF                | 58                         | 64.4              | 78.7 | 1   | 1                                 | 103                                              | 3.9                                        |
| P4SMAJ58A    | RG                 | WG/ZG             | 58                         | 64.4              | 71.2 | 1   | 1                                 | 93.6                                             | 4.3                                        |
| P4SMAJ60     | RH                 | WH                | 60                         | 66.7              | 81.5 | 1   | 1                                 | 107                                              | 3.7                                        |
| P4SMAJ60A    | RK                 | WK/ZK             | 60                         | 66.7              | 73.7 | 1   | 1                                 | 96.8                                             | 4.1                                        |
| P4SMAJ64     | RL                 | WL                | 64                         | 71.1              | 86.4 | 1   | 1                                 | 114                                              | 3.5                                        |
| P4SMAJ64A    | RM                 | WM/ZM             | 64                         | 71.1              | 78.6 | 1   | 1                                 | 103                                              | 3.9                                        |
| P4SMAJ70     | RN                 | WN                | 70                         | 77.8              | 95.1 | 1   | 1                                 | 125                                              | 3.2                                        |
| P4SMAJ70A    | RP                 | WP/ZP             | 70                         | 77.8              | 86   | 1   | 1                                 | 113                                              | 3.5                                        |
| P4SMAJ75     | RQ                 | WQ                | 75                         | 83.3              | 102  | 1   | 1                                 | 134                                              | 3.0                                        |
| P4SMAJ75A    | RR                 | WR/ZR             | 75                         | 83.3              | 92.1 | 1   | 1                                 | 121                                              | 3.3                                        |
| P4SMAJ78     | RS                 | WS                | 78                         | 86.7              | 106  | 1   | 1                                 | 139                                              | 2.9                                        |
| P4SMAJ78A    | RT                 | WT/ZT             | 78                         | 86.7              | 95.8 | 1   | 1                                 | 126                                              | 3.2                                        |
| P4SMAJ85     | RU                 | WU                | 85                         | 94.4              | 115  | 1   | 1                                 | 151                                              | 2.6                                        |
| P4SMAJ85A    | RV                 | WV/ZV             | 85                         | 94.4              | 104  | 1   | 1                                 | 137                                              | 2.9                                        |
| P4SMAJ90     | RW                 | WW                | 90                         | 100               | 122  | 1   | 1                                 | 160                                              | 2.5                                        |
| P4SMAJ90A    | RX                 | WX/ZX             | 90                         | 100               | 111  | 1   | 1                                 | 146                                              | 2.7                                        |

\* = Add "C" or "CA" suffix for bidirectional device types.

\*\* = There may be two potential codes depending on factory designation.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**P4SMAJ Series — 400 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage VWM | Breakdown Voltage |     |     | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @1PPM# Vc Max | 10/1000µs Rated Peak Impulse Current IPPM# |
|--------------|--------------------|-------------------|----------------------------|-------------------|-----|-----|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |     | @It |                                   |                                                  |                                            |
|              |                    |                   |                            | (Volts)           | Min | Max | (mA)                              | (µA)                                             | (Volts)                                    |
| P4SMAJ100    | RY                 | WY                | 100                        | 111               | 136 | 1   | 1                                 | 179                                              | 2.2                                        |
| P4SMAJ100A   | RZ                 | WZ/ZZ             | 100                        | 111               | 123 | 1   | 1                                 | 162                                              | 2.5                                        |
| P4SMAJ110    | SD                 | XD                | 110                        | 122               | 149 | 1   | 1                                 | 196                                              | 2                                          |
| P4SMAJ110A   | SE                 | XE/VE             | 110                        | 122               | 135 | 1   | 1                                 | 177                                              | 2.3                                        |
| P4SMAJ120    | SF                 | XF                | 120                        | 133               | 163 | 1   | 1                                 | 214                                              | 1.9                                        |
| P4SMAJ120A   | SG                 | XG/VG             | 120                        | 133               | 147 | 1   | 1                                 | 193                                              | 2.1                                        |
| P4SMAJ130    | SH                 | XH                | 130                        | 144               | 176 | 1   | 1                                 | 231                                              | 1.7                                        |
| P4SMAJ130A   | SK                 | XK/VK             | 130                        | 144               | 159 | 1   | 1                                 | 209                                              | 1.9                                        |
| P4SMAJ150    | SL                 | XL                | 150                        | 167               | 204 | 1   | 1                                 | 268                                              | 1.5                                        |
| P4SMAJ150A   | SM                 | XM/VM             | 150                        | 167               | 185 | 1   | 1                                 | 243                                              | 1.6                                        |
| P4SMAJ160    | SN                 | XN                | 160                        | 178               | 218 | 1   | 1                                 | 287                                              | 1.4                                        |
| P4SMAJ160A   | SP                 | XP/VP             | 160                        | 178               | 197 | 1   | 1                                 | 259                                              | 1.5                                        |
| P4SMAJ170    | SQ                 | XQ                | 170                        | 189               | 231 | 1   | 1                                 | 304                                              | 1.3                                        |
| P4SMAJ170A   | SR                 | XR/VR             | 170                        | 189               | 209 | 1   | 1                                 | 275                                              | 1.5                                        |
| P4SMAJ180A   | ST                 | VT                | 180                        | 201               | 222 | 1   | 1                                 | 292                                              | 1.4                                        |
| P4SMAJ190A   | SU                 | YU                | 190                        | 211               | 233 | 1   | 1                                 | 308                                              | 1.3                                        |
| P4SMAJ200A   | SV                 | VV                | 200                        | 224               | 247 | 1   | 1                                 | 324                                              | 1.2                                        |
| P4SMAJ210A   | SW                 | YW                | 210                        | 237               | 263 | 1   | 1                                 | 340                                              | 1.2                                        |
| P4SMAJ220A   | GE                 | VX                | 220                        | 246               | 272 | 1   | 1                                 | 356                                              | 1.1                                        |
| P4SMAJ250A   | SZ                 | VZ                | 250                        | 279               | 309 | 1   | 1                                 | 405                                              | 1.0                                        |
| P4SMAJ300A   | TE                 | UE                | 300                        | 335               | 371 | 1   | 1                                 | 486                                              | 0.8                                        |
| P4SMAJ350A   | TG                 | UG                | 350                        | 391               | 432 | 1   | 1                                 | 567                                              | 0.7                                        |
| P4SMAJ400A   | TK                 | UK                | 400                        | 447               | 494 | 1   | 1                                 | 648                                              | 0.6                                        |
| P4SMAJ440A   | TM                 | UM                | 440                        | 492               | 543 | 1   | 1                                 | 713                                              | 0.6                                        |

\* = Add "C" or "CA" suffix for bidirectional device types.

\*\* = There may be two potential codes depending on factory designation.

+ = For Bidirectional Types Having VWM <= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.



## P6SMBJ Series — 600 Watt Surface Mount



### P6SMBJ Series Features

- RoHS Compliance Standard
- 600 watt peak pulse power dissipation
- Available in voltages from 5.0V to 440V
- Unidirectional and bidirectional
- Glass passivated junction
- Low clamping factor
- Available in tape and reel (Reel quantity = 3,000 pieces)
- Each device 100% surge tested
- Tape and Reel to EIA Standard RS-481-A
- UL 497B Recognized, File # E135015
- AEC-Q101 Qualified (8.0A & 8.0CA – 440A & 440CA) types. (When ordering ADD suffix “Z” to end of part number.)

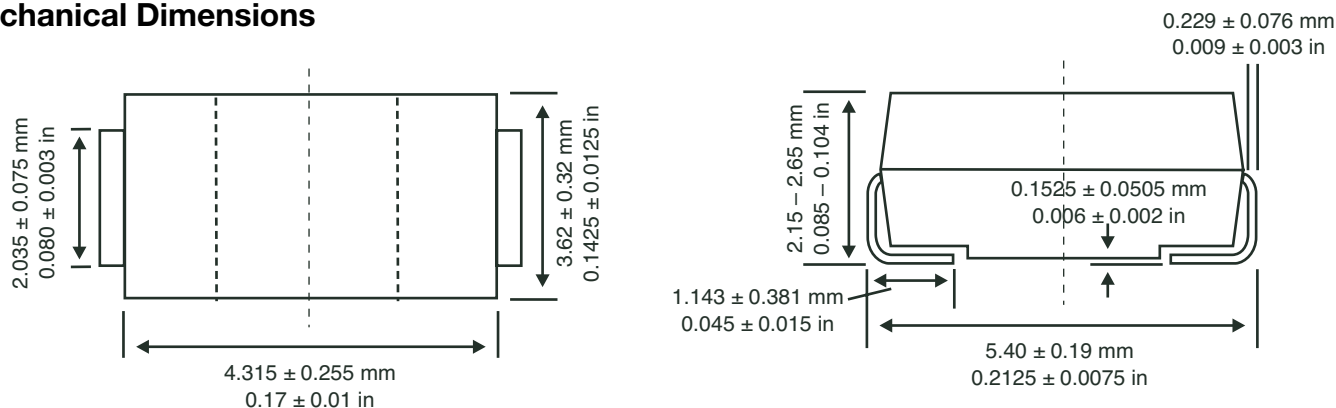
### Absolute Maximum Ratings

| Parameter                                   | Value            |
|---------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 600W             |
| Steady state power dissipation at 25°C      | 5W               |
| Operating and storage temperatures          | -55°C to + 150°C |

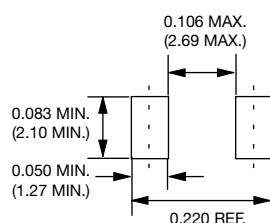
### Mechanical Characteristics

- DO214AA package
- UL94V-0 Thermoset Epoxy
- Solder plated terminals
- Solderable per MIL-STD-750 Method 2026

### Mechanical Dimensions



### Standard Mounting Pad Layout



All dimensions in inches and (millimeters)

## P6SMBJ Series — 600 Watt Surface Mount (continued)

### Electrical Characteristics

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage Vwm | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------|-----------------|----------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                  |                 |                            | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              |                  |                 | (Volts)                    | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| P6SMBJ5.0    | KD               | AD              | 5                          | 6.4               | 7.55 | 10   | 800                               | 9.6                                              | 62.5                                       |
| P6SMBJ5.0A   | KE               | AE              | 5                          | 6.4               | 7.0  | 10   | 800                               | 9.2                                              | 65.3                                       |
| P6SMBJ6.0    | KF               | AF              | 6                          | 6.67              | 8.45 | 10   | 800                               | 11.4                                             | 52.6                                       |
| P6SMBJ6.0A   | KG               | AG              | 6                          | 6.67              | 7.37 | 10   | 800                               | 10.3                                             | 58.3                                       |
| P6SMBJ6.5    | KH               | AH              | 6.5                        | 7.22              | 9.14 | 10   | 500                               | 12.3                                             | 48.7                                       |
| P6SMBJ6.5A   | KK               | AK              | 6.5                        | 7.22              | 7.98 | 10   | 500                               | 11.2                                             | 53.6                                       |
| P6SMBJ7.0    | KL               | AL              | 7                          | 7.78              | 9.86 | 10   | 200                               | 13.3                                             | 45.1                                       |
| P6SMBJ7.0A   | KM               | AM              | 7                          | 7.78              | 8.6  | 10   | 200                               | 12                                               | 50                                         |
| P6SMBJ7.5    | KN               | AN              | 7.5                        | 8.33              | 10.8 | 1    | 100                               | 14.3                                             | 42                                         |
| P6SMBJ7.5A   | KP               | AP              | 7.5                        | 8.33              | 9.21 | 1    | 100                               | 12.9                                             | 46.6                                       |
| P6SMBJ8.0    | KQ               | AQ              | 8                          | 8.89              | 11.3 | 1    | 50                                | 15                                               | 40                                         |
| P6SMBJ8.0A   | KR               | AR              | 8                          | 8.89              | 9.83 | 1    | 50                                | 13.6                                             | 44.2                                       |
| P6SMBJ8.5    | KS               | AS              | 8.5                        | 9.44              | 11.9 | 1    | 20                                | 15.9                                             | 37.7                                       |
| P6SMBJ8.5A   | KT               | AT              | 8.5                        | 9.44              | 10.4 | 1    | 20                                | 14.4                                             | 41.7                                       |
| P6SMBJ9.0    | KU               | AU              | 9                          | 10                | 12.8 | 1    | 10                                | 16.9                                             | 35.5                                       |
| P6SMBJ9.0A   | KV               | AV              | 9                          | 10                | 11.1 | 1    | 10                                | 15.4                                             | 39                                         |
| P6SMBJ10     | KW               | AW              | 10                         | 11.1              | 14.1 | 1    | 5                                 | 18.8                                             | 31.9                                       |
| P6SMBJ10A    | KX               | AX              | 10                         | 11.1              | 12.3 | 1    | 5                                 | 17                                               | 35.3                                       |
| P6SMBJ11     | KY               | AY              | 11                         | 12.2              | 15.4 | 1    | 1                                 | 20.1                                             | 29.9                                       |
| P6SMBJ11A    | KZ               | AZ              | 11                         | 12.2              | 13.5 | 1    | 1                                 | 18.2                                             | 33                                         |
| P6SMBJ12     | LD               | BD              | 12                         | 13.3              | 16.9 | 1    | 1                                 | 22                                               | 27.3                                       |
| P6SMBJ12A    | LE               | BE              | 12                         | 13.3              | 14.7 | 1    | 1                                 | 19.9                                             | 30.2                                       |
| P6SMBJ13     | LF               | BF              | 13                         | 14.4              | 18.2 | 1    | 1                                 | 23.8                                             | 25.2                                       |
| P6SMBJ13A    | LG               | BG              | 13                         | 14.4              | 15.9 | 1    | 1                                 | 21.5                                             | 28                                         |
| P6SMBJ14     | LH               | BH              | 14                         | 15.6              | 19.8 | 1    | 1                                 | 25.8                                             | 23.3                                       |
| P6SMBJ14A    | LK               | BK              | 14                         | 15.6              | 17.2 | 1    | 1                                 | 23.2                                             | 25.9                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM <= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**P6SMBJ Series — 600 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage V <sub>wm</sub> | Breakdown Voltage       |      |                 | Maximum Stand By Current @V <sub>WM</sub> + I <sub>d</sub> | 10/1000 $\mu$ s Maximum Clamping Voltage @I <sub>ppm</sub> # V <sub>c</sub> Max | 10/1000 $\mu$ s Rated Peak Impulse Current I <sub>ppm</sub> # |
|--------------|------------------|-----------------|----------------------------------------|-------------------------|------|-----------------|------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------|
|              |                  |                 |                                        | V <sub>br</sub> (Volts) |      | @I <sub>t</sub> |                                                            |                                                                                 |                                                               |
|              |                  |                 |                                        | (Volts)                 | Min  | Max             | (mA)                                                       | (Volts)                                                                         | (Amperes)                                                     |
| P6SMBJ15     | LL               | BL              | 15                                     | 16.7                    | 21.1 | 1               | 1                                                          | 26.9                                                                            | 22.3                                                          |
| P6SMBJ15A    | LM               | BM              | 15                                     | 16.7                    | 18.5 | 1               | 1                                                          | 24.4                                                                            | 24.6                                                          |
| P6SMBJ16     | LN               | BN              | 16                                     | 17.8                    | 22.6 | 1               | 1                                                          | 28.8                                                                            | 20.8                                                          |
| P6SMBJ16A    | LP               | BP              | 16                                     | 17.8                    | 19.7 | 1               | 1                                                          | 26                                                                              | 23.1                                                          |
| P6SMBJ17     | LQ               | BQ              | 17                                     | 18.9                    | 23.9 | 1               | 1                                                          | 30.5                                                                            | 19.7                                                          |
| P6SMBJ17A    | LR               | BR              | 17                                     | 18.9                    | 20.9 | 1               | 1                                                          | 27.6                                                                            | 21.8                                                          |
| P6SMBJ18     | LS               | BS              | 18                                     | 20                      | 25.3 | 1               | 1                                                          | 32.2                                                                            | 18.6                                                          |
| P6SMBJ18A    | LT               | BT              | 18                                     | 20                      | 22.1 | 1               | 1                                                          | 29.2                                                                            | 20.6                                                          |
| P6SMBJ20     | LU               | BU              | 20                                     | 22.2                    | 28.1 | 1               | 1                                                          | 35.8                                                                            | 16.7                                                          |
| P6SMBJ20A    | LV               | BV              | 20                                     | 22.2                    | 24.5 | 1               | 1                                                          | 32.4                                                                            | 18.6                                                          |
| P6SMBJ22     | LW               | BW              | 22                                     | 24.4                    | 30.9 | 1               | 1                                                          | 39.4                                                                            | 15.2                                                          |
| P6SMBJ22A    | LX               | BX              | 22                                     | 24.4                    | 26.9 | 1               | 1                                                          | 35.5                                                                            | 16.9                                                          |
| P6SMBJ24     | LY               | BY              | 24                                     | 26.7                    | 33.8 | 1               | 1                                                          | 43                                                                              | 14                                                            |
| P6SMBJ24A    | LZ               | BZ              | 24                                     | 26.7                    | 29.5 | 1               | 1                                                          | 38.9                                                                            | 15.5                                                          |
| P6SMBJ26     | MD               | CD              | 26                                     | 28.9                    | 36.8 | 1               | 1                                                          | 46.6                                                                            | 12.4                                                          |
| P6SMBJ26A    | ME               | CE              | 26                                     | 28.9                    | 31.9 | 1               | 1                                                          | 42.1                                                                            | 14.3                                                          |
| P6SMBJ28     | MF               | CF              | 28                                     | 31.1                    | 39.4 | 1               | 1                                                          | 50                                                                              | 12                                                            |
| P6SMBJ28A    | MG               | CG              | 28                                     | 31.1                    | 34.4 | 1               | 1                                                          | 45.4                                                                            | 13.3                                                          |
| P6SMBJ30     | MH               | CH              | 30                                     | 33.3                    | 42.4 | 1               | 1                                                          | 53.5                                                                            | 11.2                                                          |
| P6SMBJ30A    | MK               | CK              | 30                                     | 33.3                    | 36.8 | 1               | 1                                                          | 48.4                                                                            | 12.4                                                          |
| P6SMBJ33     | ML               | CL              | 33                                     | 36.7                    | 46.9 | 1               | 1                                                          | 59                                                                              | 10.2                                                          |
| P6SMBJ33A    | MM               | CM              | 33                                     | 36.7                    | 40.6 | 1               | 1                                                          | 53.3                                                                            | 11.3                                                          |
| P6SMBJ36     | MN               | CN              | 36                                     | 40                      | 50.7 | 1               | 1                                                          | 64.3                                                                            | 9.3                                                           |
| P6SMBJ36A    | MP               | CP              | 36                                     | 40                      | 44.2 | 1               | 1                                                          | 58.1                                                                            | 10.4                                                          |
| P6SMBJ40     | MQ               | CQ              | 40                                     | 44.4                    | 56.3 | 1               | 1                                                          | 71.4                                                                            | 8.4                                                           |
| P6SMBJ40A    | MR               | CR              | 40                                     | 44.4                    | 49.1 | 1               | 1                                                          | 64.5                                                                            | 9.3                                                           |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having V<sub>WM</sub> <= 10V, their I<sub>D</sub> limit is doubled.

# = See General Information for Impulse Current Waveform.

**P6SMBJ Series — 600 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage V <sub>wm</sub> | Breakdown Voltage       |       |                 | Maximum Stand By Current @V <sub>WM</sub> + I <sub>d</sub> | 10/1000µs Maximum Clamping Voltage @I <sub>ppm</sub> # V <sub>c</sub> Max | 10/1000µs Rated Peak Impulse Current I <sub>ppm</sub> # |
|--------------|------------------|-----------------|----------------------------------------|-------------------------|-------|-----------------|------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------|
|              |                  |                 |                                        | V <sub>br</sub> (Volts) |       | @I <sub>t</sub> |                                                            |                                                                           |                                                         |
|              |                  |                 | (Volts)                                | Min                     | Max   | (mA)            | (µA)                                                       | (Volts)                                                                   | (Amperes)                                               |
| P6SMBJ43     | MS               | CS              | 43                                     | 47.8                    | 60.5  | 1               | 1                                                          | 76.7                                                                      | 7.8                                                     |
| P6SMBJ43A    | MT               | CT              | 43                                     | 47.8                    | 52.8  | 1               | 1                                                          | 69.4                                                                      | 8.7                                                     |
| P6SMBJ45     | MU               | CU              | 45                                     | 50                      | 63.3  | 1               | 1                                                          | 80.3                                                                      | 7.5                                                     |
| P6SMBJ45A    | MV               | CV              | 45                                     | 50                      | 55.3  | 1               | 1                                                          | 72.7                                                                      | 8.3                                                     |
| P6SMBJ48     | MW               | CW              | 48                                     | 53.3                    | 67.5  | 1               | 1                                                          | 85.5                                                                      | 7                                                       |
| P6SMBJ48A    | MX               | CX              | 48                                     | 53.3                    | 58.9  | 1               | 1                                                          | 77.4                                                                      | 7.8                                                     |
| P6SMBJ51     | MY               | CY              | 51                                     | 56.7                    | 71.8  | 1               | 1                                                          | 91.1                                                                      | 6.6                                                     |
| P6SMBJ51A    | MZ               | CZ              | 51                                     | 56.7                    | 62.7  | 1               | 1                                                          | 82.4                                                                      | 7.3                                                     |
| P6SMBJ54     | ND               | DD              | 54                                     | 60                      | 76    | 1               | 1                                                          | 96.3                                                                      | 6.2                                                     |
| P6SMBJ54A    | NE               | DE              | 54                                     | 60                      | 66.3  | 1               | 1                                                          | 87.1                                                                      | 6.9                                                     |
| P6SMBJ58     | NF               | DF              | 58                                     | 64.4                    | 81.6  | 1               | 1                                                          | 103                                                                       | 5.8                                                     |
| P6SMBJ58A    | NG               | DG              | 58                                     | 64.4                    | 71.2  | 1               | 1                                                          | 93.6                                                                      | 6.5                                                     |
| P6SMBJ60     | NH               | DH              | 60                                     | 66.7                    | 84.5  | 1               | 1                                                          | 107                                                                       | 5.6                                                     |
| P6SMBJ60A    | NK               | DK              | 60                                     | 66.7                    | 73.7  | 1               | 1                                                          | 96.8                                                                      | 6.2                                                     |
| P6SMBJ64     | NL               | DL              | 64                                     | 71.1                    | 90.1  | 1               | 1                                                          | 114                                                                       | 5.3                                                     |
| P6SMBJ64A    | NM               | DM              | 64                                     | 71.1                    | 78.6  | 1               | 1                                                          | 103                                                                       | 5.9                                                     |
| P6SMBJ70     | NN               | DN              | 70                                     | 77.8                    | 98.6  | 1               | 1                                                          | 125                                                                       | 4.8                                                     |
| P6SMBJ70A    | NP               | DP              | 70                                     | 77.8                    | 86.0  | 1               | 1                                                          | 113                                                                       | 5.3                                                     |
| P6SMBJ75     | NQ               | DQ              | 75                                     | 83.3                    | 106   | 1               | 1                                                          | 134                                                                       | 4.5                                                     |
| P6SMBJ75A    | NR               | DR              | 75                                     | 83.3                    | 92.1  | 1               | 1                                                          | 121                                                                       | 5.0                                                     |
| P6SMBJ78     | NS               | DS              | 78                                     | 86.7                    | 110   | 1               | 1                                                          | 139                                                                       | 4.3                                                     |
| P6SMBJ78A    | NT               | DT              | 78                                     | 86.7                    | 95.8  | 1               | 1                                                          | 126                                                                       | 4.8                                                     |
| P6SMBJ85     | NU               | DU              | 85                                     | 94.4                    | 119.2 | 1               | 1                                                          | 151                                                                       | 3.9                                                     |
| P6SMBJ85A    | NV               | DV              | 85                                     | 94.4                    | 104.0 | 1               | 1                                                          | 137                                                                       | 4.4                                                     |
| P6SMBJ90     | NW               | DW              | 90                                     | 100                     | 126.5 | 1               | 1                                                          | 160                                                                       | 3.8                                                     |
| P6SMBJ90A    | NX               | DX              | 90                                     | 100                     | 111.0 | 1               | 1                                                          | 146                                                                       | 4.1                                                     |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having V<sub>WM</sub> <= 10V, their I<sub>D</sub> limit is doubled.

# = See General Information for Impulse Current Waveform.

**P6SMBJ Series — 600 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage V <sub>wm</sub> | Breakdown Voltage       |       |                 | Maximum Stand By Current @V <sub>WM</sub> + I <sub>d</sub> | 10/1000 $\mu$ s Maximum Clamping Voltage @I <sub>ppm</sub> # V <sub>c</sub> Max | 10/1000 $\mu$ s Rated Peak Impulse Current I <sub>ppm</sub> # |
|--------------|------------------|-----------------|----------------------------------------|-------------------------|-------|-----------------|------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------|
|              |                  |                 |                                        | V <sub>br</sub> (Volts) |       | @I <sub>t</sub> |                                                            |                                                                                 |                                                               |
|              |                  |                 | (Volts)                                | Min                     | Max   | (mA)            | ( $\mu$ A)                                                 | (Volts)                                                                         | (Amperes)                                                     |
| P6SMBJ100    | NY               | DY              | 100                                    | 111                     | 141   | 1               | 1                                                          | 179                                                                             | 3.4                                                           |
| P6SMBJ100A   | NZ               | DZ              | 100                                    | 111                     | 123   | 1               | 1                                                          | 162                                                                             | 3.7                                                           |
| P6SMBJ110    | PD               | ED              | 110                                    | 122                     | 154   | 1               | 1                                                          | 196                                                                             | 3                                                             |
| P6SMBJ110A   | PE               | EE              | 110                                    | 122                     | 135   | 1               | 1                                                          | 177                                                                             | 3.4                                                           |
| P6SMBJ120    | PF               | EF              | 120                                    | 133                     | 169   | 1               | 1                                                          | 214                                                                             | 2.8                                                           |
| P6SMBJ120A   | PG               | EG              | 120                                    | 133                     | 147   | 1               | 1                                                          | 193                                                                             | 3.1                                                           |
| P6SMBJ130    | PH               | EH              | 130                                    | 144                     | 182   | 1               | 1                                                          | 231                                                                             | 2.6                                                           |
| P6SMBJ130A   | PK               | EK              | 130                                    | 144                     | 159   | 1               | 1                                                          | 209                                                                             | 2.9                                                           |
| P6SMBJ150    | PL               | EL              | 150                                    | 167                     | 211.5 | 1               | 1                                                          | 268                                                                             | 2.2                                                           |
| P6SMBJ150A   | PM               | EM              | 150                                    | 167                     | 185   | 1               | 1                                                          | 243                                                                             | 2.5                                                           |
| P6SMBJ160    | PN               | EN              | 160                                    | 178                     | 226   | 1               | 1                                                          | 287                                                                             | 2.1                                                           |
| P6SMBJ160A   | PP               | EP              | 160                                    | 178                     | 197   | 1               | 1                                                          | 259                                                                             | 2.3                                                           |
| P6SMBJ170    | PQ               | EQ              | 170                                    | 189                     | 239.5 | 1               | 1                                                          | 304                                                                             | 2                                                             |
| P6SMBJ170A   | PR               | ER              | 170                                    | 189                     | 209   | 1               | 1                                                          | 275                                                                             | 2.2                                                           |
| P6SMBJ180A   | PT               | ET              | 180                                    | 201                     | 222   | 1               | 1                                                          | 292                                                                             | 2.1                                                           |
| P6SMBJ190A   | PA               | EC              | 190                                    | 209                     | 233   | 1               | 1                                                          | 308                                                                             | 2                                                             |
| P6SMBJ200A   | PV               | EV              | 200                                    | 224                     | 247   | 1               | 1                                                          | 324                                                                             | 1.9                                                           |
| P6SMBJ210A   | PB               | ED              | 210                                    | 237                     | 263   | 1               | 1                                                          | 340                                                                             | 1.8                                                           |
| P6SMBJ220A   | PX               | EX              | 220                                    | 246                     | 272   | 1               | 1                                                          | 356                                                                             | 1.7                                                           |
| P6SMBJ250A   | PZ               | EZ              | 250                                    | 279                     | 309   | 1               | 1                                                          | 405                                                                             | 1.5                                                           |
| P6SMBJ300A   | QE               | FE              | 300                                    | 335                     | 371   | 1               | 1                                                          | 486                                                                             | 1.3                                                           |
| P6SMBJ350A   | QG               | FG              | 350                                    | 391                     | 432   | 1               | 1                                                          | 567                                                                             | 1.1                                                           |
| P6SMBJ400A   | QK               | FK              | 400                                    | 447                     | 494   | 1               | 1                                                          | 648                                                                             | 0.9                                                           |
| P6SMBJ440A   | QM               | FM              | 440                                    | 492                     | 543   | 1               | 1                                                          | 713                                                                             | 0.9                                                           |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having V<sub>WM</sub> <= 10V, their I<sub>D</sub> limit is doubled.

# = See General Information for Impulse Current Waveform.



## 1.5SMCJ Series — 1500 Watt Surface Mount



### 1.5SMCJ Series Features

- RoHS Compliance Standard
- 1500 watt peak pulse power dissipation
- Available in voltages from 5.0V to 440V
- Unidirectional and bidirectional
- Glass passivated junction
- Low clamping factor
- Available in tape and reel (Reel quantity = 3,000 pieces)
- Each device 100% surge tested
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS-481-A
- Gull-wing lead frame may be available upon request
- AEC-Q101 Qualified (11A & 11CA - 440A & 440CA) types. (When ordering ADD suffix "Z" to end of part number.)

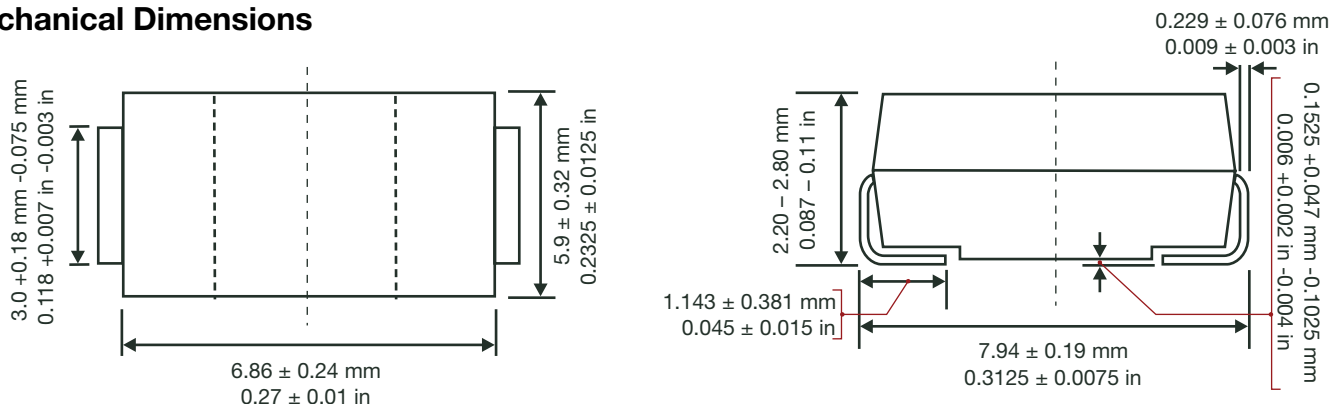
### Absolute Maximum Ratings

| Parameter                                   | Value            |
|---------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 1500W            |
| Operating and storage temperatures          | -55°C to + 150°C |

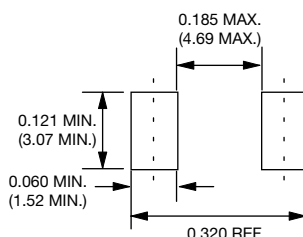
### Mechanical Characteristics

- DO214AB package
- UL94V-0 Thermoset Epoxy
- Solder plated terminals
- Solderable per MIL-STD-750 Method 2026

### Mechanical Dimensions



### Standard Mounting Pad Layout



All dimensions in inches and (millimeters)

**1.5SMCJ Series — 1500 Watt Surface Mount (continued)****Electrical Characteristics**

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage Vwm | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------|-----------------|----------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                  |                 |                            | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              |                  |                 | (Volts)                    | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 1.5SMCJ5.0   | GDD              | BDD             | 5                          | 6.4               | 7.55 | 10   | 800                               | 9.6                                              | 156.2                                      |
| 1.5SMCJ5.0A  | GDE              | BDE             | 5                          | 6.4               | 7.00 | 10   | 800                               | 9.2                                              | 163                                        |
| 1.5SMCJ6.0   | GDF              | BDF             | 6                          | 6.67              | 8.45 | 10   | 800                               | 11.4                                             | 131.6                                      |
| 1.5SMCJ6.0A  | GDG              | BDG             | 6                          | 6.67              | 7.37 | 10   | 800                               | 10.3                                             | 145.7                                      |
| 1.5SMCJ6.5   | GDH              | BDH             | 6.5                        | 7.22              | 9.14 | 10   | 500                               | 12.3                                             | 122                                        |
| 1.5SMCJ6.5A  | GDK              | BDK             | 6.5                        | 7.22              | 7.98 | 10   | 500                               | 11.2                                             | 134                                        |
| 1.5SMCJ7.0   | GDL              | BDL             | 7                          | 7.78              | 9.86 | 10   | 200                               | 13.3                                             | 112.8                                      |
| 1.5SMCJ7.0A  | GDM              | BDM             | 7                          | 7.78              | 8.6  | 10   | 200                               | 12                                               | 125                                        |
| 1.5SMCJ7.5   | GDN              | BDN             | 7.5                        | 8.33              | 10.8 | 1    | 100                               | 14.3                                             | 104.9                                      |
| 1.5SMCJ7.5A  | GDP              | BDP             | 7.5                        | 8.33              | 9.21 | 1    | 100                               | 12.9                                             | 116.3                                      |
| 1.5SMCJ8.0   | GDQ              | BDQ             | 8                          | 8.89              | 11.3 | 1    | 50                                | 15                                               | 100                                        |
| 1.5SMCJ8.0A  | GDR              | BDR             | 8                          | 8.89              | 9.83 | 1    | 50                                | 13.6                                             | 110.3                                      |
| 1.5SMCJ8.5   | GDS              | BDS             | 8.5                        | 9.44              | 11.9 | 1    | 20                                | 15.9                                             | 94.3                                       |
| 1.5SMCJ8.5A  | GDT              | BDT             | 8.5                        | 9.44              | 10.4 | 1    | 20                                | 14.4                                             | 104.2                                      |
| 1.5SMCJ9.0   | GDU              | BDU             | 9                          | 10                | 12.8 | 1    | 10                                | 16.9                                             | 88.7                                       |
| 1.5SMCJ9.0A  | GDV              | BDV             | 9                          | 10                | 11.1 | 1    | 10                                | 15.4                                             | 97.4                                       |
| 1.5SMCJ10    | GDW              | BDW             | 10                         | 11.1              | 14.1 | 1    | 5                                 | 18.8                                             | 79.8                                       |
| 1.5SMCJ10A   | GDX              | BDX             | 10                         | 11.1              | 12.3 | 1    | 5                                 | 17                                               | 88.3                                       |
| 1.5SMCJ11    | GDY              | BDY             | 11                         | 12.2              | 15.4 | 1    | 1                                 | 20.1                                             | 74.6                                       |
| 1.5SMCJ11A   | GDZ              | BDZ             | 11                         | 12.2              | 13.5 | 1    | 1                                 | 18.2                                             | 82.5                                       |
| 1.5SMCJ12    | GED              | BED             | 12                         | 13.3              | 16.9 | 1    | 1                                 | 22                                               | 68.2                                       |
| 1.5SMCJ12A   | GEE              | BEE             | 12                         | 13.3              | 14.7 | 1    | 1                                 | 19.9                                             | 75.4                                       |
| 1.5SMCJ13    | GEF              | BEF             | 13                         | 14.4              | 18.2 | 1    | 1                                 | 23.8                                             | 63                                         |
| 1.5SMCJ13A   | GEG              | BEG             | 13                         | 14.4              | 15.9 | 1    | 1                                 | 21.5                                             | 69.8                                       |
| 1.5SMCJ14    | GEH              | BEH             | 14                         | 15.6              | 19.8 | 1    | 1                                 | 25.8                                             | 58.1                                       |
| 1.5SMCJ14A   | GEK              | BEK             | 14                         | 15.6              | 17.2 | 1    | 1                                 | 23.2                                             | 64.7                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**1.5SMCJ Series — 1500 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage Vwm | Breakdown Voltage |      |     | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------|-----------------|----------------------------|-------------------|------|-----|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                  |                 |                            | Vbr (Volts)       |      | @It |                                   |                                                  |                                            |
|              |                  |                 |                            | (Volts)           | Min  | Max | (mA)                              | (µA)                                             | (Volts)                                    |
| 1.5SMCJ15    | GEL              | BEL             | 15                         | 16.7              | 21.1 | 1   | 1                                 | 26.9                                             | 55.8                                       |
| 1.5SMCJ15A   | GEM              | BEM             | 15                         | 16.7              | 18.5 | 1   | 1                                 | 24.4                                             | 61.5                                       |
| 1.5SMCJ16    | GEN              | BEN             | 16                         | 17.8              | 22.6 | 1   | 1                                 | 28.8                                             | 52.1                                       |
| 1.5SMCJ16A   | GEP              | BEP             | 16                         | 17.8              | 19.7 | 1   | 1                                 | 26                                               | 57.7                                       |
| 1.5SMCJ17    | GEQ              | BEQ             | 17                         | 18.9              | 23.9 | 1   | 1                                 | 30.5                                             | 49.2                                       |
| 1.5SMCJ17A   | GER              | BER             | 17                         | 18.9              | 20.9 | 1   | 1                                 | 27.6                                             | 54.4                                       |
| 1.5SMCJ18    | GES              | BES             | 18                         | 20                | 25.3 | 1   | 1                                 | 32.2                                             | 46.6                                       |
| 1.5SMCJ18A   | GET              | BET             | 18                         | 20                | 22.1 | 1   | 1                                 | 29.2                                             | 51.4                                       |
| 1.5SMCJ20    | GEU              | BEU             | 20                         | 22.2              | 28.1 | 1   | 1                                 | 35.8                                             | 41.9                                       |
| 1.5SMCJ20A   | GEV              | BEV             | 20                         | 22.2              | 24.5 | 1   | 1                                 | 32.4                                             | 46.3                                       |
| 1.5SMCJ22    | GEW              | BEW             | 22                         | 24.4              | 30.9 | 1   | 1                                 | 39.4                                             | 38.1                                       |
| 1.5SMCJ22A   | GEX              | BEX             | 22                         | 24.4              | 26.9 | 1   | 1                                 | 35.5                                             | 42.3                                       |
| 1.5SMCJ24    | GEY              | BEY             | 24                         | 26.7              | 33.8 | 1   | 1                                 | 43                                               | 34.9                                       |
| 1.5SMCJ24A   | GEZ              | BEZ             | 24                         | 26.7              | 29.5 | 1   | 1                                 | 38.9                                             | 38.6                                       |
| 1.5SMCJ26    | GFD              | BFD             | 26                         | 28.9              | 36.8 | 1   | 1                                 | 46.6                                             | 32.2                                       |
| 1.5SMCJ26A   | GFE              | BFE             | 26                         | 28.9              | 31.9 | 1   | 1                                 | 42.1                                             | 35.7                                       |
| 1.5SMCJ28    | GFF              | BFF             | 28                         | 31.1              | 39.4 | 1   | 1                                 | 50                                               | 30                                         |
| 1.5SMCJ28A   | GFG              | BFG             | 28                         | 31.1              | 34.4 | 1   | 1                                 | 45.4                                             | 33.1                                       |
| 1.5SMCJ30    | GFH              | BFH             | 30                         | 33.3              | 42.4 | 1   | 1                                 | 53.5                                             | 28                                         |
| 1.5SMCJ30A   | GFK              | BFK             | 30                         | 33.3              | 36.8 | 1   | 1                                 | 48.4                                             | 31                                         |
| 1.5SMCJ33    | GFL              | BFL             | 33                         | 36.7              | 46.9 | 1   | 1                                 | 59                                               | 25.2                                       |
| 1.5SMCJ33A   | GFM              | BFM             | 33                         | 36.7              | 40.6 | 1   | 1                                 | 53.3                                             | 28.2                                       |
| 1.5SMCJ36    | GFN              | BFN             | 36                         | 40                | 50.7 | 1   | 1                                 | 64.3                                             | 23.3                                       |
| 1.5SMCJ36A   | GFP              | BFP             | 36                         | 40                | 44.2 | 1   | 1                                 | 58.1                                             | 25.9                                       |
| 1.5SMCJ40    | GFQ              | BFQ             | 40                         | 44.4              | 56.3 | 1   | 1                                 | 71.4                                             | 21                                         |
| 1.5SMCJ40A   | GFR              | BFR             | 40                         | 44.4              | 49.1 | 1   | 1                                 | 64.5                                             | 23.3                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**1.5SMCJ Series — 1500 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage Vwm | Breakdown Voltage |       |     | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|------------------|-----------------|----------------------------|-------------------|-------|-----|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                  |                 |                            | Vbr (Volts)       |       | @It |                                   |                                                  |                                            |
|              |                  |                 |                            | (Volts)           | Min   | Max | (mA)                              | (µA)                                             | (Volts)                                    |
| 1.5SMCJ43    | GFS              | BFS             | 43                         | 47.8              | 60.5  | 1   | 1                                 | 76.7                                             | 19.6                                       |
| 1.5SMCJ43A   | GFT              | BFT             | 43                         | 47.8              | 52.8  | 1   | 1                                 | 69.4                                             | 21.7                                       |
| 1.5SMCJ45    | GFU              | BFU             | 45                         | 50                | 63.3  | 1   | 1                                 | 80.3                                             | 18.7                                       |
| 1.5SMCJ45A   | GFV              | BFV             | 45                         | 50                | 55.3  | 1   | 1                                 | 72.7                                             | 20.6                                       |
| 1.5SMCJ48    | GFW              | BFW             | 48                         | 53.3              | 67.5  | 1   | 1                                 | 85.5                                             | 17.5                                       |
| 1.5SMCJ48A   | GFX              | BFX             | 48                         | 53.3              | 58.9  | 1   | 1                                 | 77.4                                             | 19.4                                       |
| 1.5SMCJ51    | GFY              | BFY             | 51                         | 56.7              | 71.8  | 1   | 1                                 | 91.1                                             | 18.5                                       |
| 1.5SMCJ51A   | GFZ              | BFZ             | 51                         | 56.7              | 62.7  | 1   | 1                                 | 82.4                                             | 18.2                                       |
| 1.5SMCJ54    | GGD              | BGD             | 54                         | 60                | 76    | 1   | 1                                 | 96.3                                             | 15.6                                       |
| 1.5SMCJ54A   | GGE              | BGE             | 54                         | 60                | 66.3  | 1   | 1                                 | 87.1                                             | 17.3                                       |
| 1.5SMCJ58    | GGF              | BGF             | 58                         | 64.4              | 81.6  | 1   | 1                                 | 103                                              | 14.6                                       |
| 1.5SMCJ58A   | GGG              | BGG             | 58                         | 64.4              | 71.2  | 1   | 1                                 | 93.6                                             | 16.1                                       |
| 1.5SMCJ60    | GGH              | BGH             | 60                         | 66.7              | 84.5  | 1   | 1                                 | 107                                              | 14                                         |
| 1.5SMCJ60A   | GGK              | BGK             | 60                         | 66.7              | 73.7  | 1   | 1                                 | 96.8                                             | 15.5                                       |
| 1.5SMCJ64    | GGL              | BGL             | 64                         | 71.1              | 90.1  | 1   | 1                                 | 114                                              | 13.2                                       |
| 1.5SMCJ64A   | GGM              | BGM             | 64                         | 71.1              | 78.6  | 1   | 1                                 | 103                                              | 14.6                                       |
| 1.5SMCJ70    | GGN              | BGN             | 70                         | 77.8              | 98.6  | 1   | 1                                 | 125                                              | 12                                         |
| 1.5SMCJ70A   | GGP              | BGP             | 70                         | 77.8              | 86    | 1   | 1                                 | 113                                              | 13.3                                       |
| 1.5SMCJ75    | GGQ              | BGQ             | 75                         | 83.3              | 106   | 1   | 1                                 | 134                                              | 11.2                                       |
| 1.5SMCJ75A   | GGR              | BGR             | 75                         | 83.3              | 92.1  | 1   | 1                                 | 121                                              | 12.4                                       |
| 1.5SMCJ78    | GGS              | BGS             | 78                         | 86.7              | 110   | 1   | 1                                 | 139                                              | 10.8                                       |
| 1.5SMCJ78A   | GGT              | BGT             | 78                         | 86.7              | 95.8  | 1   | 1                                 | 126                                              | 11.9                                       |
| 1.5SMCJ85    | GGU              | BGU             | 85                         | 94.4              | 119.2 | 1   | 1                                 | 151                                              | 9.9                                        |
| 1.5SMCJ85A   | GGV              | BGV             | 85                         | 94.4              | 104   | 1   | 1                                 | 137                                              | 11                                         |
| 1.5SMCJ90    | GGW              | BGW             | 90                         | 100               | 126.5 | 1   | 1                                 | 160                                              | 9.4                                        |
| 1.5SMCJ90A   | GGX              | BGX             | 90                         | 100               | 111   | 1   | 1                                 | 146                                              | 10.3                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having VWM &lt;= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**1.5SMCJ Series — 1500 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage V <sub>wm</sub> | Breakdown Voltage       |       |                 | Maximum Stand By Current @V <sub>WM</sub> + I <sub>d</sub> | 10/1000 $\mu$ s Maximum Clamping Voltage @I <sub>ppm</sub> # V <sub>c</sub> Max | 10/1000 $\mu$ s Rated Peak Impulse Current I <sub>ppm</sub> # |
|--------------|------------------|-----------------|----------------------------------------|-------------------------|-------|-----------------|------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------|
|              |                  |                 |                                        | V <sub>br</sub> (Volts) |       | @I <sub>t</sub> |                                                            |                                                                                 |                                                               |
|              |                  |                 | (Volts)                                | Min                     | Max   | (mA)            | ( $\mu$ A)                                                 | (Volts)                                                                         | (Amperes)                                                     |
| 1.5SMCJ100   | GGY              | BGY             | 100                                    | 111                     | 141   | 1               | 1                                                          | 179                                                                             | 8.4                                                           |
| 1.5SMCJ100A  | GGZ              | BGZ             | 100                                    | 111                     | 123   | 1               | 1                                                          | 162                                                                             | 9.3                                                           |
| 1.5SMCJ110   | GHD              | BHD             | 110                                    | 122                     | 154   | 1               | 1                                                          | 196                                                                             | 7.7                                                           |
| 1.5SMCJ110A  | GHE              | BHE             | 110                                    | 122                     | 135   | 1               | 1                                                          | 177                                                                             | 8.5                                                           |
| 1.5SMCJ120   | GHF              | BHF             | 120                                    | 133                     | 169   | 1               | 1                                                          | 214                                                                             | 7                                                             |
| 1.5SMCJ120A  | GHG              | BHG             | 120                                    | 133                     | 147   | 1               | 1                                                          | 193                                                                             | 7.8                                                           |
| 1.5SMCJ130   | GHH              | BHH             | 130                                    | 144                     | 182   | 1               | 1                                                          | 231                                                                             | 6.5                                                           |
| 1.5SMCJ130A  | GHK              | BHK             | 130                                    | 144                     | 159   | 1               | 1                                                          | 209                                                                             | 7.2                                                           |
| 1.5SMCJ150   | GHL              | BHL             | 150                                    | 167                     | 211.5 | 1               | 1                                                          | 268                                                                             | 5.6                                                           |
| 1.5SMCJ150A  | GHM              | BHM             | 150                                    | 167                     | 185   | 1               | 1                                                          | 243                                                                             | 6.2                                                           |
| 1.5SMCJ160   | GHN              | BHN             | 160                                    | 178                     | 226   | 1               | 1                                                          | 287                                                                             | 5.2                                                           |
| 1.5SMCJ160A  | GHP              | BHP             | 160                                    | 178                     | 197   | 1               | 1                                                          | 259                                                                             | 5.8                                                           |
| 1.5SMCJ170   | GHQ              | BHQ             | 170                                    | 189                     | 239.5 | 1               | 1                                                          | 304                                                                             | 4.9                                                           |
| 1.5SMCJ170A  | GHR              | BHR             | 170                                    | 189                     | 209   | 1               | 1                                                          | 275                                                                             | 5.5                                                           |
| 1.5SMCJ180A  | GHT              | BHT             | 180                                    | 201                     | 222   | 1               | 1                                                          | 292                                                                             | 5.1                                                           |
| 1.5SMCJ190A  | GHU              | BHU             | 190                                    | 211                     | 233   | 1               | 1                                                          | 308                                                                             | 4.8                                                           |
| 1.5SMCJ200A  | GHV              | BHV             | 200                                    | 224                     | 247   | 1               | 1                                                          | 324                                                                             | 4.6                                                           |
| 1.5SMCJ210A  | GHW              | BHW             | 210                                    | 237                     | 263   | 1               | 1                                                          | 340                                                                             | 4.4                                                           |
| 1.5SMCJ220A  | GHX              | BHX             | 220                                    | 246                     | 272   | 1               | 1                                                          | 356                                                                             | 4.2                                                           |
| 1.5SMCJ250A  | GHZ              | BHZ             | 250                                    | 279                     | 309   | 1               | 1                                                          | 405                                                                             | 3.7                                                           |
| 1.5SMCJ300A  | GJE              | BJE             | 300                                    | 335                     | 371   | 1               | 1                                                          | 486                                                                             | 3.1                                                           |
| 1.5SMCJ350A  | GJG              | BJG             | 350                                    | 391                     | 432   | 1               | 1                                                          | 567                                                                             | 2.6                                                           |
| 1.5SMCJ400A  | GJK              | BJK             | 400                                    | 447                     | 494   | 1               | 1                                                          | 648                                                                             | 2.3                                                           |
| 1.5SMCJ440A  | GJM              | BJM             | 440                                    | 492                     | 543   | 1               | 1                                                          | 713                                                                             | 2.1                                                           |

\* = Add "C" or "CA" suffix for bidirectional device types.

+ = For Bidirectional Types Having V<sub>WM</sub> <= 10V, their I<sub>D</sub> limit is doubled.

# = See General Information for Impulse Current Waveform.



### 3.0SMCJ Series — 3000 Watt Surface Mount



#### 3.0SMCJ Series Features

- RoHS Compliance Standard
- 3000 watt peak pulse power dissipation
- Available in voltages from 5.0V to 220V
- Unidirectional and bidirectional
- Glass passivated junction
- Low clamping factor
- Available in tape and reel (Reel quantity = 3,000 pieces)
- Each device 100% surge tested
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS - 481 - A
- Gull-wing lead frame may be available upon request
- AEC-Q101 Qualified (8.0A & 8.0CA – 220A & 220CA) types. (When ordering ADD suffix “Z” to end of part number.)

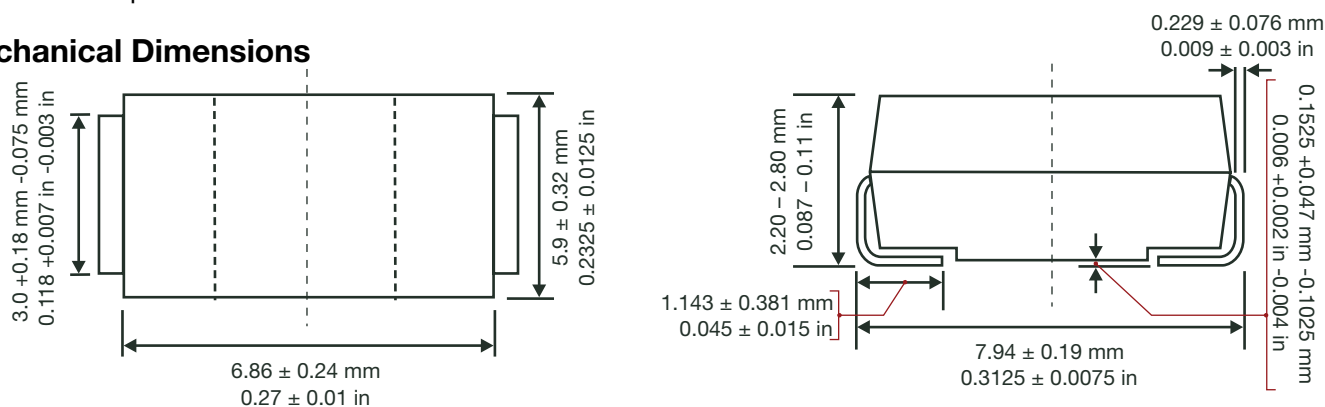
#### Absolute Maximum Ratings

| Parameter                                   | Value            |
|---------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 3000W            |
| Operating and storage temperatures          | -55°C to + 150°C |

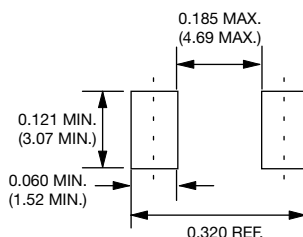
#### Mechanical Characteristics

- DO214AB package
- UL94V-0 Thermoset Epoxy
- Solder plated terminals
- Solderable per MIL-STD-750 Method 2026

#### Mechanical Dimensions



#### Standard Mounting Pad Layout



All dimensions in inches and (millimeters)

**3.0SMCJ Series — 3000 Watt Surface Mount (continued)****Electrical Characteristics**

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage Vwm | Breakdown Voltage |      |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|--------------------|-------------------|----------------------------|-------------------|------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |      | @It  |                                   |                                                  |                                            |
|              |                    |                   | (Volts)                    | Min               | Max  | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 3.0SMCJ5.0   | HDD                | IDD               | 5                          | 6.4               | 7.55 | 10   | 800                               | 9.6                                              | 312.5                                      |
| 3.0SMCJ5.0A  | HDE/RDE            | IDE/DDE           | 5                          | 6.4               | 7    | 10   | 800                               | 9.2                                              | 326.1                                      |
| 3.0SMCJ6.0   | HDF                | IDF               | 6                          | 6.67              | 8.45 | 10   | 800                               | 11.4                                             | 263.2                                      |
| 3.0SMCJ6.0A  | HDG/RDG            | IDG/DDG           | 6                          | 6.67              | 7.37 | 10   | 800                               | 10.3                                             | 291.3                                      |
| 3.0SMCJ6.5   | HDH                | IDH               | 6.5                        | 7.22              | 9.14 | 10   | 500                               | 12.3                                             | 243.9                                      |
| 3.0SMCJ6.5A  | HDK/RDK            | IDK/DDK           | 6.5                        | 7.22              | 7.98 | 10   | 500                               | 11.2                                             | 267.9                                      |
| 3.0SMCJ7.0   | HDL                | IDL               | 7                          | 7.78              | 9.86 | 10   | 200                               | 13.3                                             | 225.6                                      |
| 3.0SMCJ7.0A  | HDM/PDM            | IDM/DDM           | 7                          | 7.78              | 8.6  | 10   | 200                               | 12                                               | 250                                        |
| 3.0SMCJ7.5   | HDN                | IDN               | 7.5                        | 8.33              | 10.8 | 1    | 100                               | 14.3                                             | 209.8                                      |
| 3.0SMCJ7.5A  | HDP/PDP            | IDP/DDP           | 7.5                        | 8.33              | 9.21 | 1    | 100                               | 12.9                                             | 232.6                                      |
| 3.0SMCJ8.0   | HDQ                | IDQ               | 8                          | 8.89              | 11.3 | 1    | 50                                | 15                                               | 200                                        |
| 3.0SMCJ8.0A  | HDR/PDR            | IDR/DDR           | 8                          | 8.89              | 9.83 | 1    | 50                                | 13.6                                             | 220.6                                      |
| 3.0SMCJ8.5   | HDS                | IDS               | 8.5                        | 9.44              | 11.9 | 1    | 20                                | 15.9                                             | 188.8                                      |
| 3.0SMCJ8.5A  | HDT/PDT            | IDT/DDT           | 8.5                        | 9.44              | 10.4 | 1    | 20                                | 14.4                                             | 208.3                                      |
| 3.0SMCJ9.0   | HDU                | IDU               | 9                          | 10                | 12.8 | 1    | 10                                | 16.9                                             | 177.4                                      |
| 3.0SMCJ9.0A  | HDV/PDV            | IDV/DDV           | 9                          | 10                | 11.1 | 1    | 10                                | 15.4                                             | 194.8                                      |
| 3.0SMCJ10    | HDW                | IDW               | 10                         | 11.1              | 14.1 | 1    | 5                                 | 18.8                                             | 159.6                                      |
| 3.0SMCJ10A   | HDX/PDX            | IDX/DDX           | 10                         | 11.1              | 13.3 | 1    | 5                                 | 17                                               | 176.5                                      |
| 3.0SMCJ11    | HDY                | IDY               | 11                         | 12.2              | 15.4 | 1    | 2                                 | 20.1                                             | 149.2                                      |
| 3.0SMCJ11A   | HDZ/PDZ            | IDZ/DDZ           | 11                         | 12.2              | 13.5 | 1    | 2                                 | 18.2                                             | 164.8                                      |
| 3.0SMCJ12    | HED                | IED               | 12                         | 13.3              | 16.9 | 1    | 2                                 | 22                                               | 136.4                                      |
| 3.0SMCJ12A   | HEE/PEE            | IEE/DEE           | 12                         | 13.3              | 14.7 | 1    | 2                                 | 19.9                                             | 150.8                                      |
| 3.0SMCJ13    | HEF                | IEF               | 13                         | 14.4              | 18.2 | 1    | 2                                 | 23.8                                             | 126                                        |
| 3.0SMCJ13A   | HEG/PEG            | IEG/DEG           | 13                         | 14.4              | 15.9 | 1    | 2                                 | 21.5                                             | 139.4                                      |
| 3.0SMCJ14    | HEH                | IEH               | 14                         | 15.6              | 19.8 | 1    | 2                                 | 25.8                                             | 116.2                                      |
| 3.0SMCJ14A   | HEK/PEK            | IEK/DEK           | 14                         | 15.6              | 17.2 | 1    | 2                                 | 23.2                                             | 129.3                                      |

\* = Add "C" or "CA" suffix for bidirectional device types.

\*\* = There may be two potential codes depending on factory designation.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**3.0SMCJ Series — 3000 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage Vwm | Breakdown Voltage |      |     | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|--------------------|-------------------|----------------------------|-------------------|------|-----|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |      | @It |                                   |                                                  |                                            |
|              |                    |                   |                            | (Volts)           | Min  | Max | (mA)                              | (µA)                                             | (Volts)                                    |
| 3.0SMCJ15    | HEL                | IEL               | 15                         | 16.7              | 21.1 | 1   | 2                                 | 26.9                                             | 111.6                                      |
| 3.0SMCJ15A   | HEM/PEM            | IEM/DEM           | 15                         | 16.7              | 18.5 | 1   | 2                                 | 24.4                                             | 123                                        |
| 3.0SMCJ16    | HEN                | IEN               | 16                         | 17.8              | 22.6 | 1   | 2                                 | 28.8                                             | 104.2                                      |
| 3.0SMCJ16A   | HEP/PEP            | IEP/DEP           | 16                         | 17.8              | 19.7 | 1   | 2                                 | 26                                               | 115.4                                      |
| 3.0SMCJ17    | HEQ                | IEQ               | 17                         | 18.9              | 23.9 | 1   | 2                                 | 30.5                                             | 98.4                                       |
| 3.0SMCJ17A   | HER/PER            | IER/DER           | 17                         | 18.9              | 20.9 | 1   | 2                                 | 27.6                                             | 108.7                                      |
| 3.0SMCJ18    | HES                | IES               | 18                         | 20.0              | 25.3 | 1   | 2                                 | 32.2                                             | 93.2                                       |
| 3.0SMCJ18A   | HET/PET            | IET/DET           | 18                         | 20.0              | 22.1 | 1   | 2                                 | 29.2                                             | 102.7                                      |
| 3.0SMCJ20    | HEU                | IEU               | 20                         | 22.2              | 28.1 | 1   | 2                                 | 35.8                                             | 83.8                                       |
| 3.0SMCJ20A   | HEV/PEV            | IEV/DEV           | 20                         | 22.2              | 24.5 | 1   | 2                                 | 32.4                                             | 92.6                                       |
| 3.0SMCJ22    | HEW                | IEW               | 22                         | 24.4              | 30.9 | 1   | 2                                 | 39.4                                             | 76.2                                       |
| 3.0SMCJ22A   | HEX/PEX            | IEX/DEX           | 22                         | 24.4              | 26.9 | 1   | 2                                 | 35.5                                             | 84.5                                       |
| 3.0SMCJ24    | HEY                | IEY               | 24                         | 26.7              | 33.8 | 1   | 2                                 | 43                                               | 69.8                                       |
| 3.0SMCJ24A   | HEZ/PEZ            | IEZ/DEZ           | 24                         | 26.7              | 29.5 | 1   | 2                                 | 38.9                                             | 77.1                                       |
| 3.0SMCJ26    | HFD                | IFD               | 26                         | 28.9              | 36.8 | 1   | 2                                 | 46.6                                             | 64.4                                       |
| 3.0SMCJ26A   | HFE/PFE            | IFE/DFE           | 26                         | 28.9              | 31.9 | 1   | 2                                 | 42.1                                             | 71.3                                       |
| 3.0SMCJ28    | HFF                | IFF               | 28                         | 31.1              | 39.4 | 1   | 2                                 | 50                                               | 60                                         |
| 3.0SMCJ28A   | HFG/PFG            | IFG/DFG           | 28                         | 31.1              | 34.4 | 1   | 2                                 | 45.4                                             | 66.1                                       |
| 3.0SMCJ30    | HFH                | IFH               | 30                         | 33.3              | 42.4 | 1   | 2                                 | 53.5                                             | 56                                         |
| 3.0SMCJ30A   | HFH/PFK            | IFK/DFK           | 30                         | 33.3              | 36.8 | 1   | 2                                 | 48.4                                             | 62                                         |
| 3.0SMCJ33    | HFL                | IFL               | 33                         | 36.7              | 46.9 | 1   | 2                                 | 59                                               | 50.4                                       |
| 3.0SMCJ33A   | HFM/PFM            | IFM/DFM           | 33                         | 36.7              | 40.6 | 1   | 2                                 | 53.3                                             | 56.3                                       |
| 3.0SMCJ36    | HFN                | IFN               | 36                         | 40.0              | 50.7 | 1   | 2                                 | 64.3                                             | 46.6                                       |
| 3.0SMCJ36A   | HFP/PFP            | IFP/DFP           | 36                         | 40.0              | 44.2 | 1   | 2                                 | 58.1                                             | 51.6                                       |
| 3.0SMCJ40    | HFQ                | IFQ               | 40                         | 44.4              | 56.3 | 1   | 2                                 | 71.4                                             | 42                                         |
| 3.0SMCJ40A   | HFR/PFR            | IFR/DFR           | 40                         | 44.4              | 49.1 | 1   | 2                                 | 64.5                                             | 46.5                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

\*\* = There may be two potential codes depending on factory designation.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

**3.0SMCJ Series — 3000 Watt Surface Mount (continued)****Electrical Characteristics (continued)**

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage Vwm | Breakdown Voltage |       |      | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|--------------------|-------------------|----------------------------|-------------------|-------|------|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |       | @It  |                                   |                                                  |                                            |
|              |                    |                   | (Volts)                    | Min               | Max   | (mA) | (µA)                              | (Volts)                                          | (Amperes)                                  |
| 3.0SMCJ43    | HFS                | IFS               | 43                         | 47.8              | 60.5  | 1    | 2                                 | 76.7                                             | 39.2                                       |
| 3.0SMCJ43A   | HFT/PFT            | IFT/DFT           | 43                         | 47.8              | 52.8  | 1    | 2                                 | 69.4                                             | 43.2                                       |
| 3.0SMCJ45    | HFU                | IFU               | 45                         | 50                | 63.3  | 1    | 2                                 | 80.3                                             | 37.4                                       |
| 3.0SMCJ45A   | HFV/PFV            | IFV/DFV           | 45                         | 50                | 55.3  | 1    | 2                                 | 72.7                                             | 41.3                                       |
| 3.0SMCJ48    | HFW                | IFW               | 48                         | 53.3              | 67.5  | 1    | 2                                 | 85.5                                             | 35                                         |
| 3.0SMCJ48A   | HFX/PFX            | IFX/DFX           | 48                         | 53.3              | 58.9  | 1    | 2                                 | 77.4                                             | 38.8                                       |
| 3.0SMCJ51    | HFY                | IFY               | 51                         | 56.7              | 71.8  | 1    | 2                                 | 91.1                                             | 37                                         |
| 3.0SMCJ51A   | HFZ/PFZ            | IFZ/DFZ           | 51                         | 56.7              | 62.7  | 1    | 2                                 | 82.4                                             | 36.4                                       |
| 3.0SMCJ54    | HGD                | IGD               | 54                         | 60                | 76    | 1    | 2                                 | 96.3                                             | 31.2                                       |
| 3.0SMCJ54A   | HGE/PGE            | IGE/DGE           | 54                         | 60                | 66.3  | 1    | 2                                 | 87.1                                             | 34.4                                       |
| 3.0SMCJ58    | HGF                | IGF               | 58                         | 64.4              | 81.6  | 1    | 2                                 | 103                                              | 39.2                                       |
| 3.0SMCJ58A   | HGG/PGG            | IGG/DGG           | 58                         | 64.4              | 71.2  | 1    | 2                                 | 93.6                                             | 32.1                                       |
| 3.0SMCJ60    | HGH                | IGH               | 60                         | 66.7              | 84.5  | 1    | 2                                 | 107                                              | 28                                         |
| 3.0SMCJ60A   | HGK/PGK            | IGK/DGK           | 60                         | 66.7              | 73.7  | 1    | 2                                 | 96.8                                             | 31                                         |
| 3.0SMCJ64    | HGL                | IGL               | 64                         | 71.1              | 90.1  | 1    | 2                                 | 114                                              | 26.4                                       |
| 3.0SMCJ64A   | HGM/PGM            | IGM/DGM           | 64                         | 71.1              | 78.6  | 1    | 2                                 | 103                                              | 29.1                                       |
| 3.0SMCJ70    | HGN                | IGN               | 70                         | 77.8              | 98.6  | 1    | 2                                 | 125                                              | 24                                         |
| 3.0SMCJ70A   | HGP/PGP            | IGP/DGP           | 70                         | 77.8              | 86    | 1    | 2                                 | 113                                              | 26.5                                       |
| 3.0SMCJ75    | HGQ                | IGQ               | 75                         | 83.3              | 106   | 1    | 2                                 | 134                                              | 22.4                                       |
| 3.0SMCJ75A   | HGR/PGR            | IGR/DGR           | 75                         | 83.3              | 92.1  | 1    | 2                                 | 121                                              | 24.8                                       |
| 3.0SMCJ78    | HGS                | IGS               | 78                         | 86.7              | 110   | 1    | 2                                 | 139                                              | 21.6                                       |
| 3.0SMCJ78A   | HGT/PGT            | IGT/DGT           | 78                         | 86.7              | 95.8  | 1    | 2                                 | 126                                              | 23.8                                       |
| 3.0SMCJ85    | HGU                | IGU               | 85                         | 94.4              | 119.2 | 1    | 2                                 | 151                                              | 19.8                                       |
| 3.0SMCJ85A   | HGV/PGV            | IGV/DGV           | 85                         | 94.4              | 104   | 1    | 2                                 | 137                                              | 21.9                                       |
| 3.0SMCJ90    | HGW                | IGW               | 90                         | 100               | 126.5 | 1    | 2                                 | 160                                              | 18.8                                       |
| 3.0SMCJ90A   | HGX/PGX            | IGX/DGX           | 90                         | 100               | 111   | 1    | 2                                 | 146                                              | 20.5                                       |

\* = Add "C" or "CA" suffix for bidirectional device types.

\*\* = There may be two potential codes depending on factory designation.

+ = For Bidirectional Types Having VWM ≤ 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

### 3.0SMCJ Series — 3000 Watt Surface Mount (continued)

#### Electrical Characteristics (continued)

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage Vwm | Breakdown Voltage |       |     | Maximum Stand By Current @VWM+ Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|--------------------|-------------------|----------------------------|-------------------|-------|-----|-----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |       | @It |                                   |                                                  |                                            |
|              |                    |                   |                            | (Volts)           | Min   | Max | (mA)                              | (µA)                                             | (Volts)                                    |
| 3.0SMCJ100   | HGY                | IGY               | 100                        | 111               | 141   | 1   | 2                                 | 179                                              | 16.6                                       |
| 3.0SMCJ100A  | HGZ/PGZ            | IGZ/DGZ           | 100                        | 111               | 123   | 1   | 2                                 | 162                                              | 18.5                                       |
| 3.0SMCJ110   | HHD                | IHD               | 110                        | 122               | 154   | 1   | 2                                 | 196                                              | 15.4                                       |
| 3.0SMCJ110A  | HHE/PHE            | IHE/DHE           | 110                        | 122               | 135   | 1   | 2                                 | 177                                              | 16.9                                       |
| 3.0SMCJ120   | HHF                | IHF               | 120                        | 133               | 169   | 1   | 2                                 | 214                                              | 14                                         |
| 3.0SMCJ120A  | HHG/PHG            | IHG/DHG           | 120                        | 133               | 147   | 1   | 2                                 | 193                                              | 15.5                                       |
| 3.0SMCJ130   | HHH                | IHH               | 130                        | 144               | 182   | 1   | 2                                 | 231                                              | 13                                         |
| 3.0SMCJ130A  | HHK/PHK            | IHK/DHK           | 130                        | 144               | 159   | 1   | 2                                 | 209                                              | 14.4                                       |
| 3.0SMCJ150   | HHL                | IHL               | 150                        | 167               | 211.5 | 1   | 2                                 | 268                                              | 11.2                                       |
| 3.0SMCJ150A  | HHM/PHM            | IHM/DHM           | 150                        | 167               | 185   | 1   | 2                                 | 243                                              | 12.3                                       |
| 3.0SMCJ160   | HHN                | IHN               | 160                        | 178               | 226   | 1   | 2                                 | 287                                              | 10.4                                       |
| 3.0SMCJ160A  | HHP/PHP            | IHP/DHP           | 160                        | 178               | 197   | 1   | 2                                 | 259                                              | 11.6                                       |
| 3.0SMCJ170   | HHQ                | IHQ               | 170                        | 189               | 239.5 | 1   | 2                                 | 304                                              | 9.8                                        |
| 3.0SMCJ170A  | HHR/PHR            | IHR/DHR           | 170                        | 189               | 209   | 1   | 2                                 | 275                                              | 10.9                                       |
| 3.0SMCJ180A  | HHT                | IHT               | 180                        | 198               | 230.4 | 1   | 2                                 | 292                                              | 10.3                                       |
| 3.0SMCJ190A  | HHV                | IHV               | 190                        | 211               | 233   | 1   | 2                                 | 308                                              | 9.7                                        |
| 3.0SMCJ200A  | HHX                | IHX               | 200                        | 224               | 247   | 1   | 2                                 | 324                                              | 9.3                                        |
| 3.0SMCJ210A  | HHZ                | IHZ               | 210                        | 237               | 263   | 1   | 2                                 | 340                                              | 8.8                                        |
| 3.0SMCJ220A  | HIE                | IIE               | 220                        | 246               | 272   | 1   | 2                                 | 356                                              | 8.4                                        |

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# = See General Information for Impulse Current Waveform.



## 5.0SMCJ Series — 5000 Watt Surface Mount



### 5.0SMCJ Series Features

- RoHS Compliance Standard
- 5000 watt peak pulse power dissipation
- Available in voltages from 11V to 170V
- Unidirectional and Bidirectional
- Glass passivated junction
- Low clamping factor
- Available in tape and reel (Reel quantity = 3,000 pieces)
- Each device 100% surge tested
- UL 497B Recognized, File # E135015
- Tape and Reel to EIA Standard RS - 481 - A
- Gull-wing lead frame may be available upon request
- AEC-Q101 Qualified (22A & 22CA – 170A & 170CA) types. (When ordering ADD suffix “Z” to end of part number.)

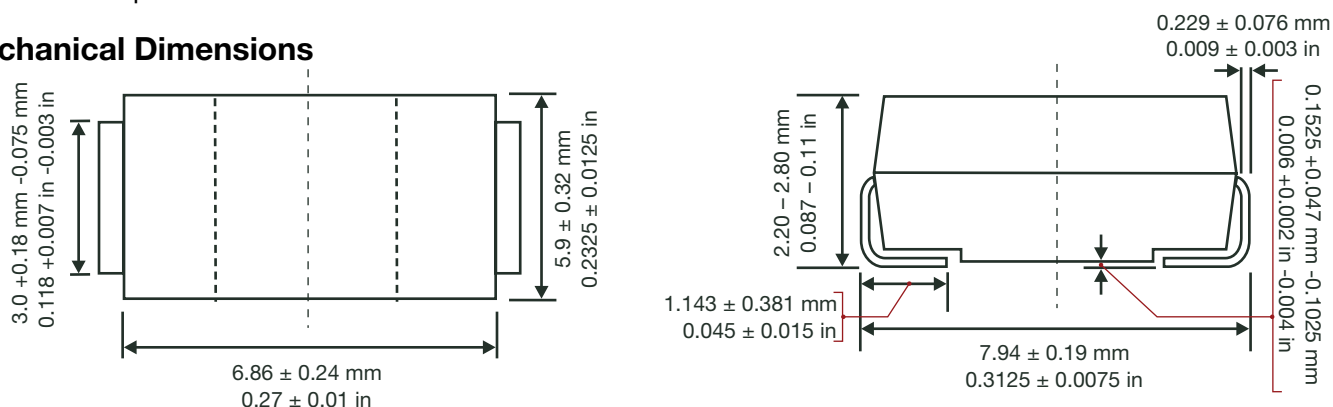
### Absolute Maximum Ratings

| Parameter                                   | Value            |
|---------------------------------------------|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 5000W            |
| Operating and storage temperatures          | -55°C to + 150°C |

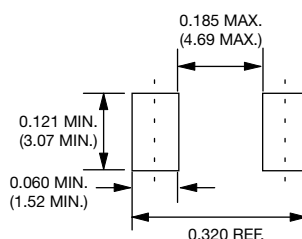
### Mechanical Characteristics

- DO214AB package
- UL94V-0 Thermoset Epoxy
- Solder plated terminals
- Solderable per MIL-STD-750 Method 2026

### Mechanical Dimensions



### Standard Mounting Pad Layout



All dimensions in inches and (millimeters)

## 5.0SMCJ Series — 5000 Watt Surface Mount

### Electrical Characteristics (continued)

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage Vwm | Breakdown Voltage |       |      | Maximum Stand By Current @VWM Id | 10/1000µs Maximum Clamping Voltage @Ippm# Vc Max | 10/1000µs Rated Peak Impulse Current Ippm# |
|--------------|--------------------|-------------------|----------------------------|-------------------|-------|------|----------------------------------|--------------------------------------------------|--------------------------------------------|
|              |                    |                   |                            | Vbr (Volts)       |       | @It  |                                  |                                                  |                                            |
|              |                    |                   | (Volts)                    | Min               | Max   | (mA) | (µA)                             | (Volts)                                          | (Amperes)                                  |
| 5.0SMCJ11A   | 5PEN               | 5BEN              | 11                         | 12.2              | 13.5  | 10   | 800                              | 18.2                                             | 275                                        |
| 5.0SMCJ12A   | 5PEP               | 5BEP              | 12                         | 13.3              | 14.7  | 10   | 800                              | 19.9                                             | 252                                        |
| 5.0SMCJ13A   | 5PEQ               | 5BEQ              | 13                         | 14.4              | 15.9  | 10   | 500                              | 21.5                                             | 233                                        |
| 5.0SMCJ14A   | 5PER               | 5BER              | 14                         | 15.6              | 17.2  | 10   | 200                              | 23.2                                             | 216                                        |
| 5.0SMCJ15A   | 5PES               | 5BES              | 15                         | 16.7              | 18.5  | 1    | 100                              | 24.4                                             | 205                                        |
| 5.0SMCJ16A   | 5PET               | 5BET              | 16                         | 17.8              | 19.7  | 1    | 50                               | 26.0                                             | 193                                        |
| 5.0SMCJ17A   | 5PEU               | 5BEU              | 17                         | 18.9              | 20.9  | 1    | 20                               | 27.6                                             | 181                                        |
| 5.0SMCJ18A   | OET/5PEV           | 5BEV              | 18                         | 20                | 22.1  | 1    | 10                               | 29.2                                             | 172                                        |
| 5.0SMCJ20A   | OEV/5PEW           | 5BEW              | 20                         | 22.2              | 24.5  | 1    | 5                                | 32.4                                             | 155                                        |
| 5.0SMCJ22A   | OEX/5PEX           | 5BEX              | 22                         | 24.4              | 26.9  | 1    | 5                                | 35.5                                             | 141                                        |
| 5.0SMCJ24A   | OEZ/5PEZ           | 5BEZ              | 24                         | 26.7              | 29.5  | 1    | 2                                | 38.9                                             | 129                                        |
| 5.0SMCJ26A   | OFE/5PFE           | 5BFE              | 26                         | 28.9              | 31.9  | 1    | 2                                | 42.1                                             | 119                                        |
| 5.0SMCJ28A   | OFG/5PFG           | 5BFG              | 28                         | 31.1              | 34.4  | 1    | 2                                | 45.4                                             | 110.0                                      |
| 5.0SMCJ30A   | OFK/5PFK           | 5BFK              | 30                         | 33.3              | 36.8  | 1    | 2                                | 48.4                                             | 103.3                                      |
| 5.0SMCJ33A   | OFM/5PFM           | 5BFM              | 33                         | 36.7              | 40.6  | 1    | 2                                | 53.3                                             | 93.8                                       |
| 5.0SMCJ36A   | OFF/5PFP           | 5BFP              | 36                         | 40                | 44.2  | 1    | 2                                | 58.1                                             | 86.1                                       |
| 5.0SMCJ40A   | 5PFR               | 5BFR              | 40                         | 44.4              | 49.1  | 1    | 2                                | 64.5                                             | 77.6                                       |
| 5.0SMCJ43A   | 5PFT               | 5BFT              | 43                         | 47.8              | 52.8  | 1    | 2                                | 69.4                                             | 72.1                                       |
| 5.0SMCJ45A   | 5PFV               | 5BFV              | 45                         | 50.0              | 55.3  | 1    | 2                                | 72.7                                             | 68.8                                       |
| 5.0SMCJ48A   | 5PFX               | 5BFX              | 48                         | 53.3              | 58.9  | 1    | 2                                | 77.4                                             | 64.7                                       |
| 5.0SMCJ51A   | 5PFZ               | 5BFZ              | 51                         | 56.7              | 62.7  | 1    | 2                                | 82.4                                             | 60.7                                       |
| 5.0SMCJ54A   | 5PGE               | 5BGE              | 54                         | 60.0              | 66.3  | 1    | 2                                | 87.1                                             | 57.5                                       |
| 5.0SMCJ58A   | 5PGG               | 5BGG              | 58                         | 64.4              | 71.2  | 1    | 2                                | 93.6                                             | 53.5                                       |
| 5.0SMCJ60A   | 5PGK               | 5BGK              | 60                         | 66.7              | 73.7  | 1    | 2                                | 96.8                                             | 51.7                                       |
| 5.0SMCJ64A   | 5PGM               | 5BGM              | 64                         | 71.1              | 78.6  | 1    | 2                                | 103.0                                            | 48.6                                       |
| 5.0SMCJ70A   | 5PGP               | 5BGP              | 70                         | 77.8              | 86.0  | 1    | 2                                | 113.0                                            | 44.3                                       |
| 5.0SMCJ75A   | 5PGR               | 5BGR              | 75                         | 83.3              | 92.1  | 1    | 2                                | 121.0                                            | 41.4                                       |
| 5.0SMCJ78A   | 5PGT               | 5BGT              | 78                         | 86.7              | 95.8  | 1    | 2                                | 126.0                                            | 39.7                                       |
| 5.0SMCJ85A   | 5PGV               | 5BGV              | 85                         | 94.4              | 104.0 | 1    | 2                                | 137.0                                            | 36.5                                       |
| 5.0SMCJ90A   | 5PGX               | 5BGX              | 90                         | 100.0             | 111.0 | 1    | 2                                | 146.0                                            | 34.3                                       |
| 5.0SMCJ100A  | 5PGZ               | 5BGZ              | 100                        | 111.0             | 123.0 | 1    | 2                                | 162.0                                            | 30.9                                       |
| 5.0SMCJ110A  | 5PHE               | 5BHE              | 110                        | 122.0             | 135.0 | 1    | 2                                | 177.0                                            | 28.3                                       |
| 5.0SMCJ120A  | 5PHG               | 5BHG              | 120                        | 133.0             | 147.0 | 1    | 2                                | 193.0                                            | 26.0                                       |
| 5.0SMCJ130A  | 5PHK               | 5BHK              | 130                        | 144.0             | 159.0 | 1    | 2                                | 209.0                                            | 24.0                                       |
| 5.0SMCJ150A  | 5PHM               | 5BHM              | 150                        | 167.0             | 185.0 | 1    | 2                                | 243.0                                            | 20.6                                       |
| 5.0SMCJ160A  | 5PHP               | 5BHP              | 160                        | 178.0             | 197.0 | 1    | 2                                | 259.0                                            | 19.3                                       |
| 5.0SMCJ170A  | 5PHR               | 5BHR              | 170                        | 189.0             | 209.0 | 1    | 2                                | 275.0                                            | 18.2                                       |

\* = Add "CA" suffix for bidirectional device types.

\*\* = There may be two potential codes depending on factory designation.

+ = For Bidirectional Types Having VWM <= 10V, their ID limit is doubled.

# = See General Information for Impulse Current Waveform.

## 6.6SMEJ Series — 6600 Watt Surface Mount



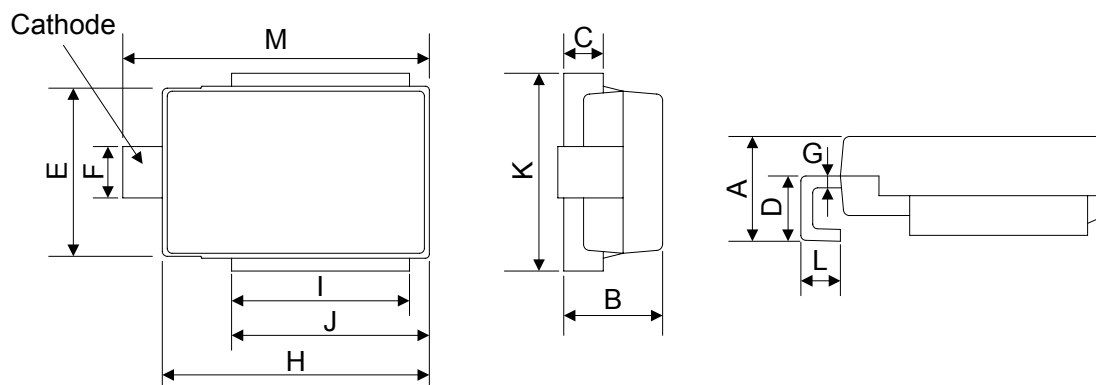
### 6.6SMEJ Series Features

- RoHS Compliance Standard
- 6600 watt peak pulse power dissipation
- Available in voltages from 20V to 48V
- Unidirectional
- Glass passivated junction
- Low clamping factor
- Available in tape and reel (Reel quantity = 700 pieces)
- Meets MSL Level 1, per J-STD-020
- Tape and Reel to EIA Standard RS - 481 - A
- Meets AEC-Q101 requirements.

### Absolute Maximum Ratings and Characteristics

| Rating                                           | Symbol         | Value       | Units |
|--------------------------------------------------|----------------|-------------|-------|
| Peak pulse power dissipation 10/1000μs waveform  | $P_{PPM}$      | min. 6600   | W     |
| Surge Discharge current 10/1000μs waveform       | $I_{PP}$       | See table   | A     |
| Operating junction and Storage Temperature range | $T_J, T_{STG}$ | -55 to +175 | °C    |

### Dimensions



| Symbol | Millimeters |      |      | Symbol | Millimeters |      |      |
|--------|-------------|------|------|--------|-------------|------|------|
|        | Min.        | Nom. | Max. |        | Min.        | Nom. | Max. |
| A      | 4.8         | 5.3  | 5.8  | H      | 13.3        | 13.5 | 13.7 |
| B      | 4.9         | 5.0  | 5.2  | I      | 8.7         | 9.0  | 9.3  |
| C      | 1.7         | 2.0  | 2.3  | J      | 9.7         | 10.0 | 10.3 |
| D      | 2.5         | 3.2  | 3.9  | K      | 9.5         | 10.0 | 10.5 |
| E      | 8.3         | 8.5  | 8.7  | L      | 1.5         | 2.0  | 2.5  |
| F      | 2.3         | 2.7  | 3.1  | M      | 15.0        | 15.5 | 16.0 |
| G      | 0.5         | 0.6  | 0.7  |        |             |      |      |

## 6.6SMEJ Series — 6600 Watt Surface Mount

### Electrical Characteristics

| Part Number* | Marking | Standoff Voltage<br>$V_{RWM}$ (V) | Breakdown Voltage |      |      | Surge Discharge Current          | Maximum Clamping Voltage | Reverse Leakage             |
|--------------|---------|-----------------------------------|-------------------|------|------|----------------------------------|--------------------------|-----------------------------|
|              |         |                                   | Vbr (Volts)       |      | @It  |                                  |                          |                             |
|              |         | (Volts)                           | Min.              | Max. | (mA) | $I_{PP}$ (A)<br>@10/1000 $\mu$ s | $V_C$ (V)<br>@ $I_{PP}$  | $I_R$ ( $\mu$ A) @ $V_{DC}$ |
| 6.6SMEJ20AG  | 20A     | 20.0                              | 22.2              | 24.5 | 5    | 204.0                            | 32.4                     | 10                          |
| 6.6SMEJ22AG  | 22A     | 22.0                              | 24.4              | 26.9 | 5    | 186.0                            | 35.5                     | 10                          |
| 6.6SMEJ24AG  | 24A     | 24.0                              | 26.7              | 29.5 | 5    | 170.0                            | 38.9                     | 10                          |
| 6.6SMEJ26AG  | 26A     | 26.0                              | 28.9              | 31.9 | 5    | 157.0                            | 42.1                     | 10                          |
| 6.6SMEJ28AG  | 28A     | 28.0                              | 31.1              | 34.4 | 5    | 145.0                            | 45.4                     | 10                          |
| 6.6SMEJ30AG  | 30A     | 30.0                              | 33.3              | 36.8 | 5    | 136.0                            | 48.4                     | 10                          |
| 6.6SMEJ33AG  | 33A     | 33.0                              | 36.7              | 40.6 | 5    | 124.0                            | 53.3                     | 10                          |
| 6.6SMEJ36AG  | 36A     | 36.0                              | 40.0              | 44.2 | 5    | 114.0                            | 58.1                     | 10                          |
| 6.6SMEJ40AG  | 40A     | 40.0                              | 44.4              | 49.1 | 5    | 102.0                            | 64.5                     | 10                          |
| 6.6SMEJ43AG  | 43A     | 43.0                              | 47.8              | 52.8 | 5    | 95.1                             | 69.4                     | 10                          |
| 6.6SMEJ48AG  | 48A     | 48.0                              | 53.2              | 58.7 | 5    | 85.0                             | 77.4                     | 10                          |

## 8SMEJ Series – 8000 Watt Surface Mount



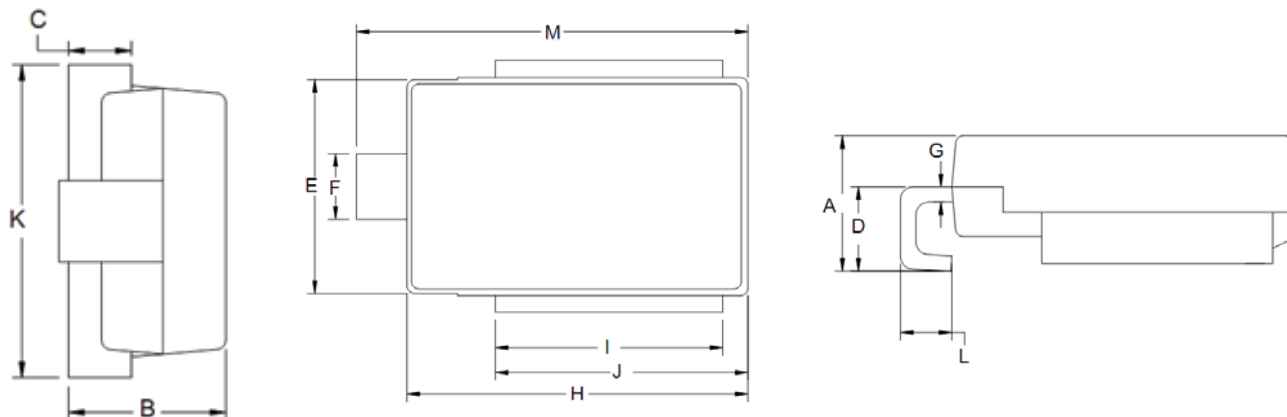
### 8SMEJ Series Features

- RoHS Compliance Standard
- 8000 watt peak pulse power dissipation
- Available in voltages from 10V to 48V
- Unidirectional
- Glass passivated junction
- Low clamping factor
- Available in tape and reel (Reel quantity = 700 pieces)
- Meets MSL Level 1, per J-STD-020
- Tape and Reel to EIA Standard RS - 481 - A
- Meets AEC-Q101 requirements.

### Absolute Maximum Ratings and Characteristics

| Rating                                           | Symbol         | Value       | Units |
|--------------------------------------------------|----------------|-------------|-------|
| Peak pulse power dissipation 10/1000μs waveform  | $P_{PPM}$      | 8000        | W     |
| Surge Discharge current 10/1000μs waveform       | $I_{PP}$       | See table   | A     |
| Operating junction and Storage Temperature range | $T_J, T_{STG}$ | -55 to +150 | °C    |

### Dimensions



| Symbol | Millimeters |      |      | Symbol | Millimeters |      |      |
|--------|-------------|------|------|--------|-------------|------|------|
|        | Min.        | Nom. | Max. |        | Min.        | Nom. | Max. |
| A      | 4.8         | 5.3  | 5.8  | H      | 13.3        | 13.5 | 13.7 |
| B      | 4.9         | 5.0  | 5.2  | I      | 8.7         | 9.0  | 9.3  |
| C      | 1.7         | 2.0  | 2.3  | J      | 9.7         | 10.0 | 10.3 |
| D      | 2.8         | 3.3  | 3.8  | K      | 9.5         | 10.0 | 10.5 |
| E      | 8.3         | 8.5  | 8.7  | L      | 1.5         | 2.0  | 2.5  |
| F      | 2.3         | 2.6  | 2.9  | M      | 15.0        | 15.5 | 16.0 |
| G      | 0.5         | 0.6  | 0.7  |        |             |      |      |

## 8SMEJ Series – 8000 Watt Surface Mount

### Electrical Characteristics

| Part Number* | Marking | Standoff Voltage<br>$V_{RWM}$ (V) | Breakdown Voltage |      |      | Surge Discharge Current          | Maximum Clamping Voltage | Reverse Leakage             |
|--------------|---------|-----------------------------------|-------------------|------|------|----------------------------------|--------------------------|-----------------------------|
|              |         |                                   | Vbr (Volts)       |      | @It  |                                  |                          |                             |
|              |         | (Volts)                           | Min.              | Max. | (mA) | $I_{PP}$ (A)<br>@10/1000 $\mu$ s | $V_C$ (V)<br>@ $I_{PP}$  | $I_R$ ( $\mu$ A) @ $V_{DC}$ |
| 8SMEJ10A     | 10A     | 10                                | 11.1              | 12.3 | 5    | 475.0                            | 17.5                     | 15                          |
| 8SMEJ11A     | 11A     | 11.0                              | 12.2              | 13.5 | 5    | 443.8                            | 18.7                     | 15                          |
| 8SMEJ12A     | 12A     | 12.0                              | 13.3              | 14.7 | 5    | 405.0                            | 20.5                     | 10                          |
| 8SMEJ13A     | 13A     | 13.0                              | 14.4              | 15.9 | 5    | 373.8                            | 22.1                     | 10                          |
| 8SMEJ14A     | 14A     | 14.0                              | 15.6              | 17.2 | 5    | 345.0                            | 23.9                     | 10                          |
| 8SMEJ15A     | 15A     | 15.0                              | 16.7              | 18.5 | 5    | 327.5                            | 25.1                     | 10                          |
| 8SMEJ16A     | 16A     | 16.0                              | 17.8              | 19.7 | 5    | 307.5                            | 26.8                     | 10                          |
| 8SMEJ17A     | 17A     | 17.0                              | 18.9              | 20.9 | 5    | 288.8                            | 28.4                     | 10                          |
| 8SMEJ18A     | 18A     | 18.0                              | 20.0              | 22.1 | 5    | 272.5                            | 30.1                     | 10                          |
| 8SMEJ20A     | 20A     | 20.0                              | 22.2              | 24.5 | 5    | 245.0                            | 33.4                     | 10                          |
| 8SMEJ22A     | 22A     | 22.0                              | 24.4              | 26.9 | 5    | 222.5                            | 36.6                     | 10                          |
| 8SMEJ24A     | 24A     | 24.0                              | 26.7              | 29.5 | 5    | 202.5                            | 40.1                     | 10                          |
| 8SMEJ26A     | 26A     | 26.0                              | 28.9              | 31.9 | 5    | 186.3                            | 43.4                     | 10                          |
| 8SMEJ28A     | 28A     | 28.0                              | 31.1              | 34.4 | 5    | 171.3                            | 46.8                     | 10                          |
| 8SMEJ30A     | 30A     | 30.0                              | 33.3              | 36.8 | 5    | 160.0                            | 50.1                     | 10                          |
| 8SMEJ33A     | 33A     | 33.0                              | 36.7              | 40.6 | 5    | 145.0                            | 55.2                     | 10                          |
| 8SMEJ36A     | 36A     | 36.0                              | 40.0              | 44.2 | 5    | 132.5                            | 60.4                     | 10                          |
| 8SMEJ40A     | 40A     | 40.0                              | 44.4              | 49.1 | 5    | 117.5                            | 68.3                     | 10                          |
| 8SMEJ43A     | 43A     | 43.0                              | 47.8              | 52.8 | 5    | 108.9                            | 73.8                     | 10                          |
| 8SMEJ48A     | 48A     | 48.0                              | 53.2              | 58.7 | 5    | 93.5                             | 85.6                     | 10                          |

## PA4SMAJ Series



### PA4SMAJ Series Features

- RoHS Compliance Standard
- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- Repetition Rate (duty cycle): 0.01%
- Fast response time: typically less than 1.0 ps from 0 Volts to VBR for unidirectional types
- Typical IR less than 1 $\mu$ A above 10V
- High Temperature soldering: 260°C/10 seconds at terminals
- UL497B Recognized, File #E135015
- Tape and Reel to EIA Standard RS - 481 - A (Reel Quantity = 5000 pieces)
- AEC-Q101 Qualified (9.1A & 9.1CA – 550A & 550CA) types. (When ordering ADD suffix “Z” to end of part number.)



**SMAJ/DO-214AC**

### Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

| Rating                                                                                                              | Symbol                            | Value       | Units |
|---------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------|-------|
| Peak pulse power dissipation on 10/1000 $\mu$ s waveform. (Note1 & 2, Fig. 1)                                       | P <sub>PPM</sub>                  | Minimum 400 | Watts |
| Peak Pulse Current on 10/1000 $\mu$ s waveform. (Note 1, Fig. 2)                                                    | I <sub>PPM</sub>                  | See Table   | Amps  |
| Steady State Power Dissipation at TL = 75°C. Lead lengths .375 in. (9.5mm). (Note 2, Fig. 5)                        | P <sub>M(AV)</sub>                | 3.3         | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method). (Note 3, Fig. 6) | I <sub>FSM</sub>                  | 40          | Amps  |
| Operating junction and Storage Temperature Range.                                                                   | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 | °C    |

**Notes:** 1. Non-repetitive current pulse, per Fig. 3 and derated above TA= 25°C per Fig. 2.  
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.  
 3. 8.3ms single half sine-wave or equivalent square wave. Duty Cycle = 4 pulses per minute maximum.

### Mechanical Characteristics

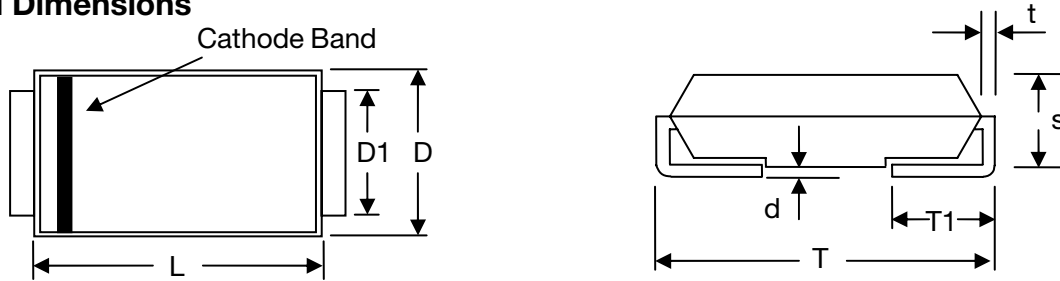
- Case: JEDEC DO214AC. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted positive end (cathode) except Bi-directional
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.002 ounce, 0.061 grams

### Devices for Bipolar Application

For bi-directional use CA suffix for types PA4SMAJ 6.8CA thru types PA4SMAJ 550CA, electrical characteristics apply in both directions.

# TVS Diodes

## Mechanical Dimensions



| Item | Millimeters |       | Inches |       |
|------|-------------|-------|--------|-------|
|      | Min.        | Max.  | Min.   | Max.  |
| L    | 3.99        | 4.50  | 0.157  | 0.177 |
| D    | 2.54        | 2.79  | 0.100  | 0.110 |
| D1   | 1.25        | 1.65  | 0.049  | 0.065 |
| T    | 4.93        | 5.28  | 0.194  | 0.208 |
| T1   | 0.76        | 1.52  | 0.030  | 0.060 |
| d    | ---         | 0.203 | ---    | 0.008 |
| s    | 2.00        | 2.50  | 0.079  | 0.098 |
| t    | 0.152       | 0.305 | 0.006  | 0.012 |

## Ratings and Characteristics Curves

(TA = 25°C unless otherwise noted)

Figure 1 - Peak Pulse Power Rating Curve

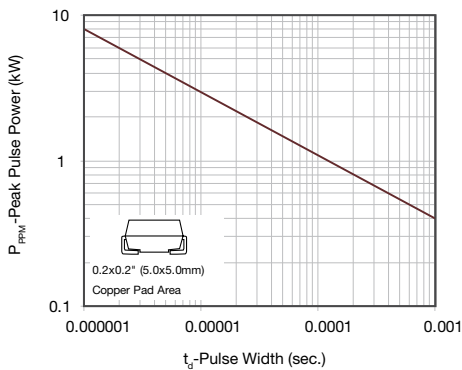


Figure 2 - Pulse Derating Curve

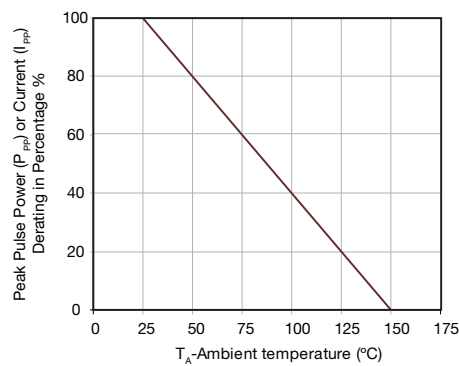


Figure 3 - Pulse Waveform

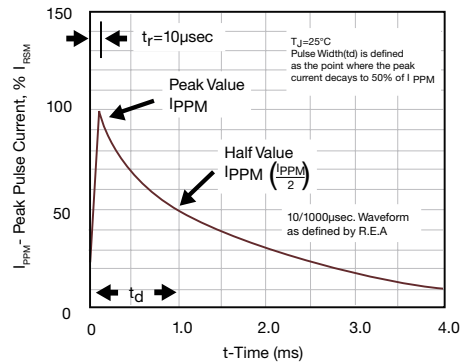


Figure 4 - Typical Junction Capacitance

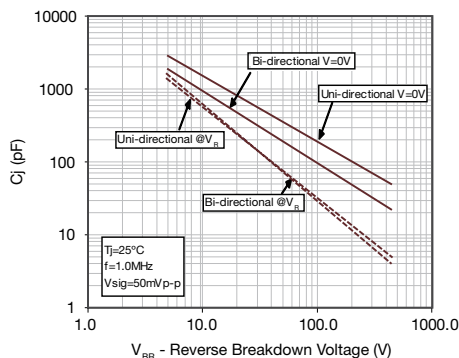


Figure 5 - Steady State Power Dissipation Derating Curve

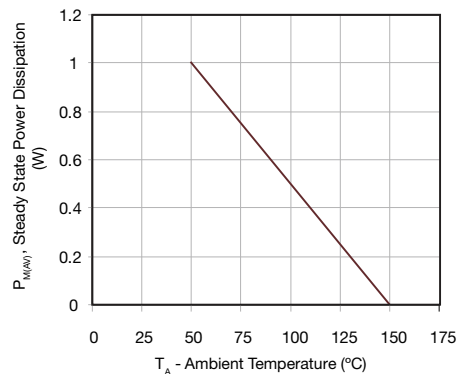


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



# TVS Diodes

## PA4SMAJ Series

### Electrical Characteristics

| Part Number |              | Device Marking Code |      | Reverse Standoff Voltage | Breakdown Voltage @I <sub>T</sub> |                          | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|-------------|--------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
| Uni Polar   | Bi Polar     | UNI                 | BI   | V <sub>RWM</sub> (V)     | V <sub>BR</sub> MIN. (V)          | V <sub>BR</sub> MAX. (V) | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| PA4SMAJ6.8A | PA4SMAJ6.8CA | 6V8A                | 6V8C | 5.80                     | 6.45                              | 7.14                     | 10                  | 10.5                                      | 39.0                | 1000                              |
| PA4SMAJ7.5A | PA4SMAJ7.5CA | 7V5A                | 7V5C | 6.40                     | 7.13                              | 7.88                     | 10                  | 11.3                                      | 36.3                | 500                               |
| PA4SMAJ8.2A | PA4SMAJ8.2CA | 8V2A                | 8V2C | 7.02                     | 7.79                              | 8.61                     | 10                  | 12.1                                      | 33.9                | 200                               |
| PA4SMAJ9.1A | PA4SMAJ9.1CA | 9V1A                | 9V1C | 7.78                     | 8.65                              | 9.55                     | 1                   | 13.4                                      | 30.6                | 50                                |
| PA4SMAJ10A  | PA4SMAJ10CA  | 10A                 | 10C  | 8.55                     | 9.50                              | 10.50                    | 1                   | 14.5                                      | 28.3                | 10                                |
| PA4SMAJ11A  | PA4SMAJ11CA  | 11A                 | 11C  | 9.40                     | 10.50                             | 11.60                    | 1                   | 15.6                                      | 26.3                | 5                                 |
| PA4SMAJ12A  | PA4SMAJ12CA  | 12A                 | 12C  | 10.20                    | 11.40                             | 12.60                    | 1                   | 16.7                                      | 24.6                | 5                                 |
| PA4SMAJ13A  | PA4SMAJ13CA  | 13A                 | 13C  | 11.10                    | 12.40                             | 13.70                    | 1                   | 18.2                                      | 22.5                | 1                                 |
| PA4SMAJ15A  | PA4SMAJ15CA  | 15A                 | 15C  | 12.80                    | 14.30                             | 15.80                    | 1                   | 21.2                                      | 19.3                | 1                                 |
| PA4SMAJ16A  | PA4SMAJ16CA  | 16A                 | 16C  | 13.60                    | 15.20                             | 16.80                    | 1                   | 22.5                                      | 18.2                | 1                                 |
| PA4SMAJ18A  | PA4SMAJ18CA  | 18A                 | 18C  | 15.30                    | 17.10                             | 18.90                    | 1                   | 25.5                                      | 16.1                | 1                                 |
| PA4SMAJ20A  | PA4SMAJ20CA  | 20A                 | 20C  | 17.10                    | 19.00                             | 21.00                    | 1                   | 27.7                                      | 14.8                | 1                                 |
| PA4SMAJ22A  | PA4SMAJ22CA  | 22A                 | 22C  | 18.80                    | 20.90                             | 23.10                    | 1                   | 30.6                                      | 13.4                | 1                                 |
| PA4SMAJ24A  | PA4SMAJ24CA  | 24A                 | 24C  | 20.50                    | 22.80                             | 25.20                    | 1                   | 33.2                                      | 12.3                | 1                                 |
| PA4SMAJ27A  | PA4SMAJ27CA  | 27A                 | 27C  | 23.10                    | 25.70                             | 28.40                    | 1                   | 37.5                                      | 10.9                | 1                                 |
| PA4SMAJ30A  | PA4SMAJ30CA  | 30A                 | 30C  | 25.60                    | 28.50                             | 31.50                    | 1                   | 41.4                                      | 9.9                 | 1                                 |
| PA4SMAJ33A  | PA4SMAJ33CA  | 33A                 | 33C  | 28.20                    | 31.40                             | 34.70                    | 1                   | 45.7                                      | 9.0                 | 1                                 |
| PA4SMAJ36A  | PA4SMAJ36CA  | 36A                 | 36C  | 30.80                    | 34.20                             | 37.80                    | 1                   | 49.9                                      | 8.2                 | 1                                 |
| PA4SMAJ39A  | PA4SMAJ39CA  | 39A                 | 39C  | 33.30                    | 37.10                             | 41.00                    | 1                   | 53.9                                      | 7.6                 | 1                                 |
| PA4SMAJ43A  | PA4SMAJ43CA  | 43A                 | 43C  | 36.80                    | 40.90                             | 45.20                    | 1                   | 59.3                                      | 6.9                 | 1                                 |
| PA4SMAJ47A  | PA4SMAJ47CA  | 47A                 | 47C  | 40.20                    | 44.70                             | 49.40                    | 1                   | 64.8                                      | 6.3                 | 1                                 |
| PA4SMAJ51A  | PA4SMAJ51CA  | 51A                 | 51C  | 43.60                    | 48.50                             | 53.60                    | 1                   | 70.1                                      | 5.8                 | 1                                 |
| PA4SMAJ56A  | PA4SMAJ56CA  | 56A                 | 56C  | 47.80                    | 53.20                             | 58.80                    | 1                   | 77.0                                      | 5.3                 | 1                                 |
| PA4SMAJ62A  | PA4SMAJ62CA  | 62A                 | 62C  | 53.00                    | 58.90                             | 65.10                    | 1                   | 85.0                                      | 4.8                 | 1                                 |
| PA4SMAJ68A  | PA4SMAJ68CA  | 68A                 | 68C  | 58.10                    | 64.60                             | 71.40                    | 1                   | 92.0                                      | 4.5                 | 1                                 |
| PA4SMAJ75A  | PA4SMAJ75CA  | 75A                 | 75C  | 64.10                    | 71.30                             | 78.80                    | 1                   | 103.0                                     | 4.0                 | 1                                 |
| PA4SMAJ82A  | PA4SMAJ82CA  | 82A                 | 82C  | 70.10                    | 77.90                             | 86.10                    | 1                   | 113.0                                     | 3.6                 | 1                                 |
| PA4SMAJ91A  | PA4SMAJ91CA  | 91A                 | 91C  | 77.80                    | 86.50                             | 95.50                    | 1                   | 125.0                                     | 3.3                 | 1                                 |

Note: For bi-directional type having V<sub>RWM</sub> of 10 volts and less, the I<sub>R</sub> limit is double.

# TVS Diodes

## PA4SMAJ Series

### Electrical Characteristics (continued)

| Part Number |              | Device Marking Code |      | Reverse Standoff Voltage | Breakdown Voltage @I <sub>T</sub> |                          | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|-------------|--------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
| Uni Polar   | Bi Polar     | UNI                 | BI   | V <sub>RWM</sub> (V)     | V <sub>BR</sub> MIN. (V)          | V <sub>BR</sub> MAX. (V) | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| PA4SMAJ100A | PA4SMAJ100CA | 100A                | 100C | 85.50                    | 95.00                             | 105.00                   | 1                   | 137.0                                     | 3.0                 | 1                                 |
| PA4SMAJ110A | PA4SMAJ110CA | 110A                | 110C | 94.00                    | 105.00                            | 116.00                   | 1                   | 152.0                                     | 2.7                 | 1                                 |
| PA4SMAJ120A | PA4SMAJ120CA | 120A                | 120C | 102.00                   | 114.00                            | 126.00                   | 1                   | 165.0                                     | 2.5                 | 1                                 |
| PA4SMAJ130A | PA4SMAJ130CA | 130A                | 130C | 111.00                   | 124.00                            | 137.00                   | 1                   | 179.0                                     | 2.3                 | 1                                 |
| PA4SMAJ150A | PA4SMAJ150CA | 150A                | 150C | 128.00                   | 143.00                            | 158.00                   | 1                   | 207.0                                     | 2.0                 | 1                                 |
| PA4SMAJ160A | PA4SMAJ160CA | 160A                | 160C | 136.00                   | 152.00                            | 168.00                   | 1                   | 219.0                                     | 1.9                 | 1                                 |
| PA4SMAJ170A | PA4SMAJ170CA | 170A                | 170C | 145.00                   | 162.00                            | 179.00                   | 1                   | 234.0                                     | 1.8                 | 1                                 |
| PA4SMAJ180A | PA4SMAJ180CA | 180A                | 180C | 154.00                   | 171.00                            | 189.00                   | 1                   | 246.0                                     | 1.7                 | 1                                 |
| PA4SMAJ200A | PA4SMAJ200CA | 200A                | 200C | 171.00                   | 190.00                            | 210.00                   | 1                   | 274.0                                     | 1.5                 | 1                                 |
| PA4SMAJ220A | PA4SMAJ220CA | 220A                | 220C | 185.00                   | 209.00                            | 231.00                   | 1                   | 328.0                                     | 1.3                 | 1                                 |
| PA4SMAJ250A | PA4SMAJ250CA | 250A                | 250C | 214.00                   | 237.00                            | 263.00                   | 1                   | 344.0                                     | 1.2                 | 1                                 |
| PA4SMAJ300A | PA4SMAJ300CA | 300A                | 300C | 256.00                   | 285.00                            | 315.00                   | 1                   | 414.0                                     | 1.0                 | 1                                 |
| PA4SMAJ350A | PA4SMAJ350CA | 350A                | 350C | 300.00                   | 332.00                            | 368.00                   | 1                   | 482.0                                     | 0.9                 | 1                                 |
| PA4SMAJ400A | PA4SMAJ400CA | 400A                | 400C | 342.00                   | 380.00                            | 420.00                   | 1                   | 548.0                                     | 0.8                 | 1                                 |
| PA4SMAJ440A | PA4SMAJ440CA | 440A                | 440C | 376.00                   | 418.00                            | 462.00                   | 1                   | 602.0                                     | 0.7                 | 1                                 |
| PA4SMAJ480A | PA4SMAJ480CA | 480A                | 480C | 408.00                   | 456.00                            | 504.00                   | 1                   | 658.0                                     | 0.6                 | 1                                 |
| PA4SMAJ510A | PA4SMAJ510CA | 510A                | 510C | 434.00                   | 485.00                            | 535.00                   | 1                   | 698.0                                     | 0.6                 | 1                                 |
| PA4SMAJ530A | PA4SMAJ530CA | 530A                | 530C | 450.00                   | 503.50                            | 556.50                   | 1                   | 725.0                                     | 0.6                 | 1                                 |
| PA4SMAJ540A | PA4SMAJ540CA | 540A                | 540C | 459.00                   | 513.00                            | 567.00                   | 1                   | 740.0                                     | 0.5                 | 1                                 |
| PA4SMAJ550A | PA4SMAJ550CA | 550A                | 550C | 467.00                   | 522.50                            | 577.50                   | 1                   | 760.0                                     | 0.5                 | 1                                 |

Note: For bi-directional type having V<sub>RWM</sub> of 10 volts and less, the I<sub>R</sub> limit is double.

## PA6SMBJ Series

### PA6SMBJ Series Features

- RoHS Compliance Standard
- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- Repetition Rate (duty cycle): 0.01%
- Fast response time: typically less than 1.0 ps from 0 Volts to VBR for unidirectional types
- Typical IR less than 1 $\mu$ A above 10V
- High Temperature soldering: 260°C/10 seconds at terminals
- UL497B Recognized, File #E135015
- Tape and Reel to EIA Standard RS - 481 - A (Reel Quantity = 3000 pieces)
- AEC-Q101 Qualified (9.1A & 9.1CA – 550A & 550CA) types. (When ordering ADD suffix “Z” to end of part number.)



SMBJ/DO-214AA

### Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

| Rating                                                                                                              | Symbol                            | Value       | Units |
|---------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------|-------|
| Peak pulse power dissipation on 10/1000 $\mu$ s waveform. (Note1 & 2, Fig. 1)                                       | P <sub>PPM</sub>                  | Minimum 600 | Watts |
| Peak Pulse Current on 10/1000 $\mu$ s waveform. (Note 1, Fig. 3)                                                    | I <sub>PPM</sub>                  | See Table   | Amps  |
| Steady State Power Dissipation at TL = 75°C. Lead lengths .375 in. (9.5mm). (Note 2, Fig. 5)                        | P <sub>M(AV)</sub>                | 5.0         | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method). (Note 3, Fig. 6) | I <sub>FSM</sub>                  | 100         | Amps  |
| Operating junction and Storage Temperature Range.                                                                   | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 | °C    |

**Notes:** 1. Non-repetitive current pulse, per Fig. 3 and derated above TA= 25°C per Fig. 2.  
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.  
 3. 8.3ms single half sine-wave or equivalent square wave. Duty Cycle = 4 pulses per minute maximum.

### Mechanical Characteristics

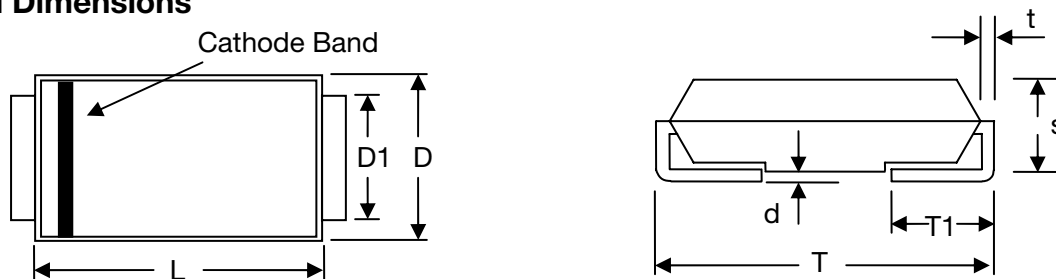
- Case: JEDEC DO214AA. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted positive end (cathode) except Bi-directional
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.003 ounce, 0.093 grams

### Devices for Bipolar Application

For bi-directional use CA suffix for types PA6SMBJ 6.8CA thru types PA6SMBJ 550 CA, electrical characteristics apply in both directions.

# TVS Diodes

## Mechanical Dimensions



| Item | Millimeters |       | Inches |       |
|------|-------------|-------|--------|-------|
|      | Min.        | Max.  | Min.   | Max.  |
| L    | 4.06        | 4.57  | 0.160  | 0.180 |
| D    | 3.30        | 3.94  | 0.130  | 0.155 |
| D1   | 1.95        | 2.20  | 0.077  | 0.086 |
| T    | 5.21        | 5.59  | 0.205  | 0.220 |
| T1   | 0.76        | 1.52  | 0.030  | 0.060 |
| d    | ---         | 0.203 | ---    | 0.008 |
| s    | 2.15        | 2.65  | 0.085  | 0.104 |
| t    | 0.152       | 0.305 | 0.006  | 0.012 |

## Ratings and Characteristics Curves

(TA = 25°C unless otherwise noted)

Figure 1 - Peak Pulse Power Rating Curve

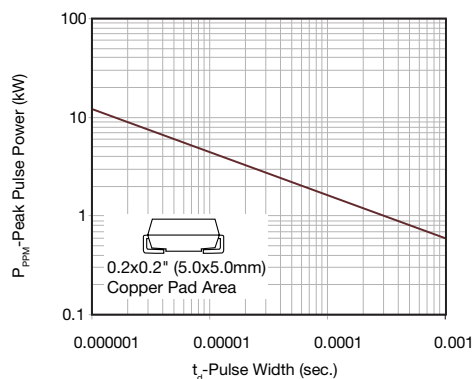


Figure 2 - Pulse Derating Curve

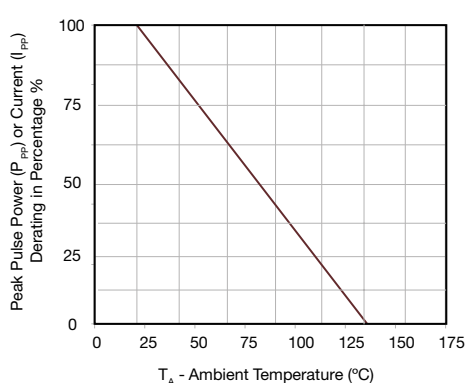


Figure 3 - Pulse Waveform

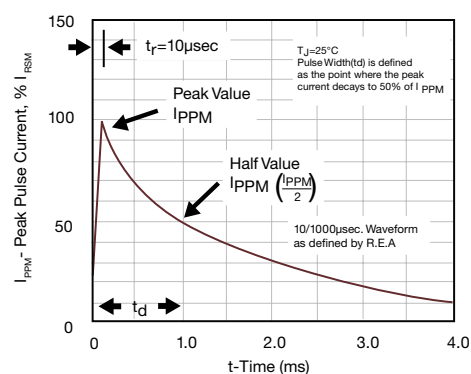


Figure 4 - Typical Junction Capacitance

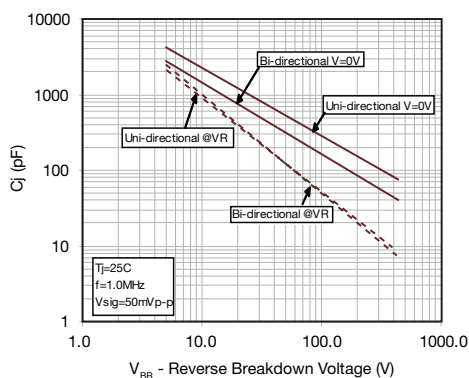


Figure 5 - Steady State Power Dissipation Derating Curve

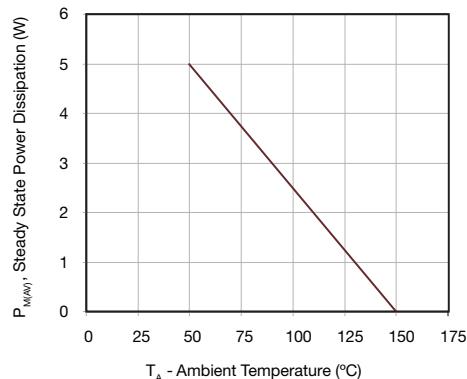
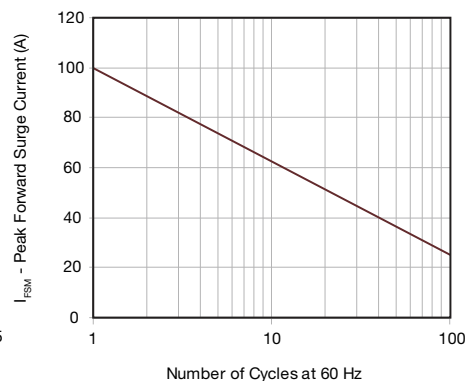


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



# TVS Diodes

## PA6SMBJ Series

### Electrical Characteristics

| Part Number |              | Device Marking Code |      | Reverse Standoff Voltage | Breakdown Voltage @I <sub>T</sub> |                          | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|-------------|--------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
| Uni Polar   | Bi Polar     | UNI                 | BI   | V <sub>RWM</sub> (V)     | V <sub>BR</sub> MIN. (V)          | V <sub>BR</sub> MAX. (V) | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| PA6SMBJ6.8A | PA6SMBJ6.8CA | 6V8A                | 6V8C | 5.80                     | 6.45                              | 7.14                     | 10                  | 10.5                                      | 58.1                | 1000                              |
| PA6SMBJ7.5A | PA6SMBJ7.5CA | 7V5A                | 7V5C | 6.40                     | 7.13                              | 7.88                     | 10                  | 11.3                                      | 54.0                | 500                               |
| PA6SMBJ8.2A | PA6SMBJ8.2CA | 8V2A                | 8V2C | 7.02                     | 7.79                              | 8.61                     | 10                  | 12.1                                      | 50.4                | 200                               |
| PA6SMBJ9.1A | PA6SMBJ9.1CA | 9V1A                | 9V1C | 7.78                     | 8.65                              | 9.55                     | 1                   | 13.4                                      | 45.5                | 50                                |
| PA6SMBJ10A  | PA6SMBJ10CA  | 10A                 | 10C  | 8.55                     | 9.50                              | 10.50                    | 1                   | 14.5                                      | 42.1                | 10                                |
| PA6SMBJ11A  | PA6SMBJ11CA  | 11A                 | 11C  | 9.40                     | 10.50                             | 11.60                    | 1                   | 15.6                                      | 39.1                | 5                                 |
| PA6SMBJ12A  | PA6SMBJ12CA  | 12A                 | 12C  | 10.20                    | 11.40                             | 12.60                    | 1                   | 16.7                                      | 36.5                | 5                                 |
| PA6SMBJ13A  | PA6SMBJ13CA  | 13A                 | 13C  | 11.10                    | 12.40                             | 13.70                    | 1                   | 18.2                                      | 33.5                | 1                                 |
| PA6SMBJ15A  | PA6SMBJ15CA  | 15A                 | 15C  | 12.80                    | 14.30                             | 15.80                    | 1                   | 21.2                                      | 28.8                | 1                                 |
| PA6SMBJ16A  | PA6SMBJ16CA  | 16A                 | 16C  | 13.60                    | 15.20                             | 16.80                    | 1                   | 22.5                                      | 27.1                | 1                                 |
| PA6SMBJ18A  | PA6SMBJ18CA  | 18A                 | 18C  | 15.30                    | 17.10                             | 18.90                    | 1                   | 25.5                                      | 24.2                | 1                                 |
| PA6SMBJ20A  | PA6SMBJ20CA  | 20A                 | 20C  | 17.10                    | 19.00                             | 21.00                    | 1                   | 27.7                                      | 22.0                | 1                                 |
| PA6SMBJ22A  | PA6SMBJ22CA  | 22A                 | 22C  | 18.80                    | 20.90                             | 23.10                    | 1                   | 30.6                                      | 19.9                | 1                                 |
| PA6SMBJ24A  | PA6SMBJ24CA  | 24A                 | 24C  | 20.50                    | 22.80                             | 25.20                    | 1                   | 33.2                                      | 18.4                | 1                                 |
| PA6SMBJ27A  | PA6SMBJ27CA  | 27A                 | 27C  | 23.10                    | 25.70                             | 28.40                    | 1                   | 37.5                                      | 16.3                | 1                                 |
| PA6SMBJ30A  | PA6SMBJ30CA  | 30A                 | 30C  | 25.60                    | 28.50                             | 31.50                    | 1                   | 41.4                                      | 14.7                | 1                                 |
| PA6SMBJ33A  | PA6SMBJ33CA  | 33A                 | 33C  | 28.20                    | 31.40                             | 34.70                    | 1                   | 45.7                                      | 13.3                | 1                                 |
| PA6SMBJ36A  | PA6SMBJ36CA  | 36A                 | 36C  | 30.80                    | 34.20                             | 37.80                    | 1                   | 49.9                                      | 12.2                | 1                                 |
| PA6SMBJ39A  | PA6SMBJ39CA  | 39A                 | 39C  | 33.30                    | 37.10                             | 41.00                    | 1                   | 53.9                                      | 11.3                | 1                                 |
| PA6SMBJ43A  | PA6SMBJ43CA  | 43A                 | 43C  | 36.80                    | 40.90                             | 45.20                    | 1                   | 59.3                                      | 10.3                | 1                                 |
| PA6SMBJ47A  | PA6SMBJ47CA  | 47A                 | 47C  | 40.20                    | 44.70                             | 49.40                    | 1                   | 64.8                                      | 9.4                 | 1                                 |
| PA6SMBJ51A  | PA6SMBJ51CA  | 51A                 | 51C  | 43.60                    | 48.50                             | 53.60                    | 1                   | 70.1                                      | 8.7                 | 1                                 |
| PA6SMBJ56A  | PA6SMBJ56CA  | 56A                 | 56C  | 47.80                    | 53.20                             | 58.80                    | 1                   | 77.0                                      | 7.9                 | 1                                 |
| PA6SMBJ62A  | PA6SMBJ62CA  | 62A                 | 62C  | 53.00                    | 58.90                             | 65.10                    | 1                   | 85.0                                      | 7.2                 | 1                                 |
| PA6SMBJ68A  | PA6SMBJ68CA  | 68A                 | 68C  | 58.10                    | 64.60                             | 71.40                    | 1                   | 92.0                                      | 6.6                 | 1                                 |
| PA6SMBJ75A  | PA6SMBJ75CA  | 75A                 | 75C  | 64.10                    | 71.30                             | 78.80                    | 1                   | 103.0                                     | 5.9                 | 1                                 |
| PA6SMBJ82A  | PA6SMBJ82CA  | 82A                 | 82C  | 70.10                    | 77.90                             | 86.10                    | 1                   | 113.0                                     | 5.4                 | 1                                 |
| PA6SMBJ91A  | PA6SMBJ91CA  | 91A                 | 91C  | 77.80                    | 86.50                             | 95.50                    | 1                   | 125.0                                     | 4.9                 | 1                                 |

Note: For bi-directional type having V<sub>RWM</sub> of 10 volts and less, the I<sub>R</sub> limit is double.

# TVS Diodes

## PA6SMBJ Series

### Electrical Characteristics (continued)

| Part Number |              | Device Marking Code |      | Reverse Standoff Voltage | Breakdown Voltage @I <sub>T</sub> |                          | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|-------------|--------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
|             |              |                     |      |                          | V <sub>BR</sub> MIN. (V)          | V <sub>BR</sub> MAX. (V) |                     |                                           |                     |                                   |
| Uni Polar   | Bi Polar     | UNI                 | BI   | V <sub>RWM</sub> (V)     |                                   |                          | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| PA6SMBJ100A | PA6SMBJ100CA | 100A                | 100C | 85.50                    | 95.00                             | 105.00                   | 1                   | 137.0                                     | 4.5                 | 1                                 |
| PA6SMBJ110A | PA6SMBJ110CA | 110A                | 110C | 94.00                    | 105.00                            | 116.00                   | 1                   | 152.0                                     | 4.0                 | 1                                 |
| PA6SMBJ120A | PA6SMBJ120CA | 120A                | 120C | 102.00                   | 114.00                            | 126.00                   | 1                   | 165.0                                     | 3.7                 | 1                                 |
| PA6SMBJ130A | PA6SMBJ130CA | 130A                | 130C | 111.00                   | 124.00                            | 137.00                   | 1                   | 179.0                                     | 3.4                 | 1                                 |
| PA6SMBJ150A | PA6SMBJ150CA | 150A                | 150C | 128.00                   | 143.00                            | 158.00                   | 1                   | 207.0                                     | 2.9                 | 1                                 |
| PA6SMBJ160A | PA6SMBJ160CA | 160A                | 160C | 136.00                   | 152.00                            | 168.00                   | 1                   | 219.0                                     | 2.8                 | 1                                 |
| PA6SMBJ170A | PA6SMBJ170CA | 170A                | 170C | 145.00                   | 162.00                            | 179.00                   | 1                   | 234.0                                     | 2.6                 | 1                                 |
| PA6SMBJ180A | PA6SMBJ180CA | 180A                | 180C | 154.00                   | 171.00                            | 189.00                   | 1                   | 246.0                                     | 2.5                 | 1                                 |
| PA6SMBJ200A | PA6SMBJ200CA | 200A                | 200C | 171.00                   | 190.00                            | 210.00                   | 1                   | 274.0                                     | 2.2                 | 1                                 |
| PA6SMBJ220A | PA6SMBJ220CA | 220A                | 220C | 185.00                   | 209.00                            | 231.00                   | 1                   | 328.0                                     | 1.9                 | 1                                 |
| PA6SMBJ250A | PA6SMBJ250CA | 250A                | 250C | 214.00                   | 237.00                            | 263.00                   | 1                   | 344.0                                     | 1.8                 | 1                                 |
| PA6SMBJ300A | PA6SMBJ300CA | 300A                | 300C | 256.00                   | 285.00                            | 315.00                   | 1                   | 414.0                                     | 1.5                 | 1                                 |
| PA6SMBJ350A | PA6SMBJ350CA | 350A                | 350C | 300.00                   | 332.00                            | 368.00                   | 1                   | 482.0                                     | 1.3                 | 1                                 |
| PA6SMBJ400A | PA6SMBJ400CA | 400A                | 400C | 342.00                   | 380.00                            | 420.00                   | 1                   | 548.0                                     | 1.1                 | 1                                 |
| PA6SMBJ440A | PA6SMBJ440CA | 440A                | 440C | 376.00                   | 418.00                            | 462.00                   | 1                   | 602.0                                     | 1.0                 | 1                                 |
| PA6SMBJ480A | PA6SMBJ480CA | 480A                | 480C | 408.00                   | 456.00                            | 504.00                   | 1                   | 658.0                                     | 0.9                 | 1                                 |
| PA6SMBJ510A | PA6SMBJ510CA | 510A                | 510C | 434.00                   | 485.00                            | 535.00                   | 1                   | 698.0                                     | 0.9                 | 1                                 |
| PA6SMBJ530A | PA6SMBJ530CA | 530A                | 530C | 450.00                   | 503.50                            | 556.50                   | 1                   | 725.0                                     | 0.8                 | 1                                 |
| PA6SMBJ540A | PA6SMBJ540CA | 540A                | 540C | 459.00                   | 513.00                            | 567.00                   | 1                   | 740.0                                     | 0.8                 | 1                                 |
| PA6SMBJ550A | PA6SMBJ550CA | 550A                | 550C | 467.00                   | 522.50                            | 577.50                   | 1                   | 760.0                                     | 0.8                 | 1                                 |

Note: For bi-directional type having V<sub>RWM</sub> of 10 volts and less, the I<sub>R</sub> limit is double.

## 1.5ASMCJ Series

### 1.5ASMCJ Series Features

- RoHS Compliance Standard
- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- Repetition Rate (duty cycle): 0.01%
- Fast response time: typically less than 1.0 ps from 0 Volts to BV min.
- Typical IR less than 1 $\mu$ A above 10V
- High Temperature soldering: 260°C/10 seconds at terminals
- UL497B Recognized, File #E135015
- Tape and Reel to EIA Standard RS - 481 - A (Reel Quantity = 3000 pieces)
- Gull-wing lead frame may be available upon request
- AEC-Q101 Qualified (9.1A & 9.1CA – 550A & 550CA) types. (When ordering ADD suffix “Z” to end of part number.)



**SMCJ/DO-214AB**

### Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

| Rating                                                                                                              | Symbol                            | Value        | Units |
|---------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------|-------|
| Peak pulse power dissipation on 10/1000 $\mu$ s waveform. (Note1 & 2, Fig. 1)                                       | P <sub>PPM</sub>                  | Minimum 1500 | Watts |
| Peak Pulse Current on 10/1000 $\mu$ s waveform. (Note 1, Fig. 3)                                                    | I <sub>PPM</sub>                  | See Table    | Amps  |
| Steady State Power Dissipation at TL = 75°C. Lead lengths .375 in. (9.5mm). (Note 2, Fig. 5)                        | P <sub>M(AV)</sub>                | 6.5          | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method). (Note 3, Fig. 6) | I <sub>FSM</sub>                  | 200          | Amps  |
| Operating junction and Storage Temperature Range.                                                                   | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150  | °C    |

**Notes:** 1. Non-repetitive current pulse, per Fig. 3 and derated above TA= 25°C per Fig. 2.  
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.  
 3. 8.3ms single half sine-wave or equivalent square wave. Duty Cycle = 4 pulses per minute maximum.

### Mechanical Characteristics

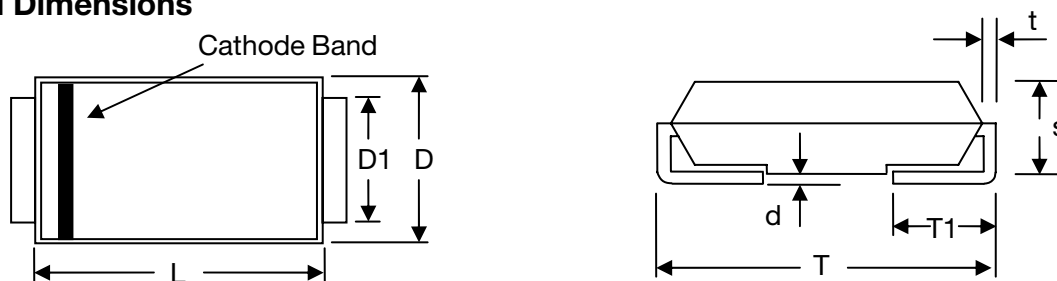
- Case: JEDEC DO214AB. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted positive end (cathode) except Bi-directional
- Standard Packaging: 16mm tape (EIA STD RS-481)
- Weight: 0.007 ounce, 0.21 grams

### Devices for Bipolar Application

For bi-directional use CA suffix for types 1.5ASMCJ 6.8CA thru types 1.5ASMCJ 550CA, electrical characteristics apply in both directions.

# TVS Diodes

## Mechanical Dimensions



| Item | Millimeters |       | Inches |       |
|------|-------------|-------|--------|-------|
|      | Min.        | Max.  | Min.   | Max.  |
| L    | 6.60        | 7.11  | 0.260  | 0.280 |
| D    | 5.59        | 6.22  | 0.220  | 0.245 |
| D1   | 2.90        | 3.20  | 0.114  | 0.126 |
| T    | 7.75        | 8.13  | 0.305  | 0.320 |
| T1   | 0.76        | 1.52  | 0.030  | 0.060 |
| d    | ---         | 0.203 | ---    | 0.008 |
| s    | 2.20        | 2.80  | 0.087  | 0.110 |
| t    | 0.152       | 0.305 | 0.006  | 0.012 |

## Ratings and Characteristics Curves

(TA = 25°C unless otherwise noted)

Figure 1 - Peak Pulse Power Rating Curve

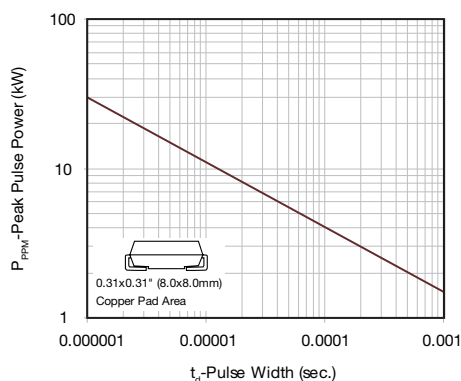


Figure 2 - Pulse Derating Curve

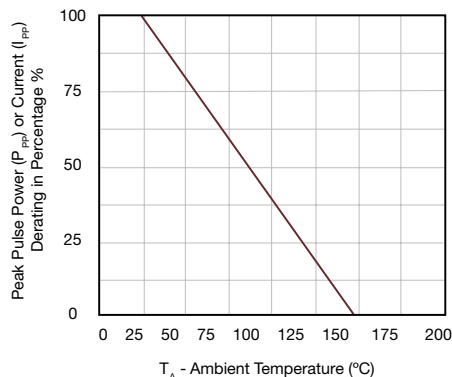


Figure 3 - Pulse Waveform

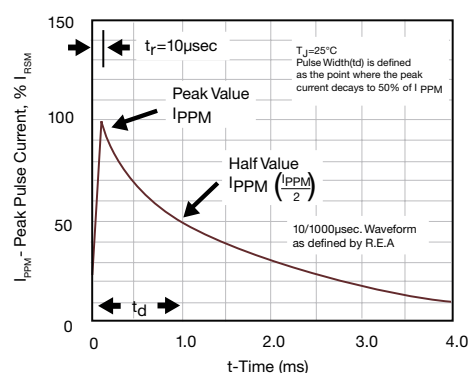


Figure 4 - Typical Junction Capacitance

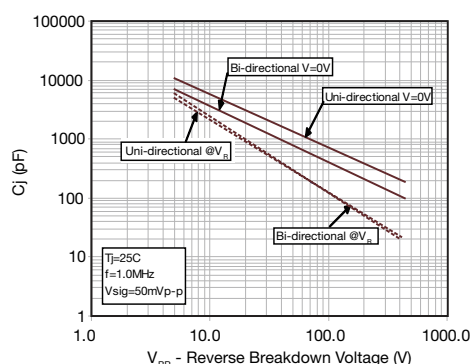


Figure 5 - Steady State Power Dissipation Derating Curve

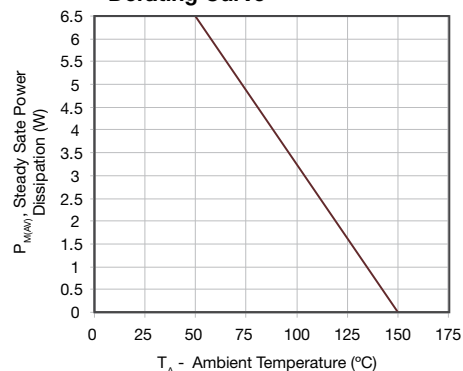
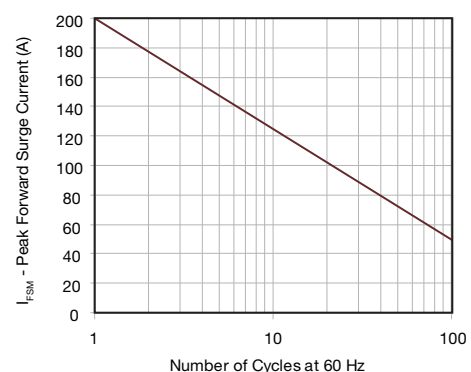


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



# TVS Diodes

## 1.5ASMCJ Series

### Electrical Characteristics

| Part Number  |               | Device Marking Code |      | Reverse Standoff Voltage | Breakdown Voltage @I <sub>T</sub> |                          | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|--------------|---------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
|              |               |                     |      |                          | V <sub>BR</sub> MIN. (V)          | V <sub>BR</sub> MAX. (V) |                     |                                           |                     |                                   |
| Uni Polar    | Bi Polar      | UNI                 | BI   | V <sub>RWM</sub> (V)     |                                   |                          | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| 1.5ASMCJ6.8A | 1.5ASMCJ6.8CA | 6V8A                | 6V8C | 5.80                     | 6.45                              | 7.14                     | 10                  | 10.5                                      | 144.8               | 1000                              |
| 1.5ASMCJ7.5A | 1.5ASMCJ7.5CA | 7V5A                | 7V5C | 6.40                     | 7.13                              | 7.88                     | 10                  | 11.3                                      | 134.5               | 500                               |
| 1.5ASMCJ8.2A | 1.5ASMCJ8.2CA | 8V2A                | 8V2C | 7.02                     | 7.79                              | 8.61                     | 10                  | 12.1                                      | 125.6               | 200                               |
| 1.5ASMCJ9.1A | 1.5ASMCJ9.1CA | 9V1A                | 9V1C | 7.78                     | 8.65                              | 9.50                     | 1                   | 13.4                                      | 113.4               | 50                                |
| 1.5ASMCJ10A  | 1.5ASMCJ10CA  | 10A                 | 10C  | 8.55                     | 9.50                              | 10.50                    | 1                   | 14.5                                      | 104.8               | 10                                |
| 1.5ASMCJ11A  | 1.5ASMCJ11CA  | 11A                 | 11C  | 9.40                     | 10.50                             | 11.60                    | 1                   | 15.6                                      | 97.4                | 5                                 |
| 1.5ASMCJ12A  | 1.5ASMCJ12CA  | 12A                 | 12C  | 10.20                    | 11.40                             | 12.60                    | 1                   | 16.7                                      | 91.0                | 5                                 |
| 1.5ASMCJ13A  | 1.5ASMCJ13CA  | 13A                 | 13C  | 11.10                    | 12.40                             | 13.70                    | 1                   | 18.2                                      | 83.5                | 1                                 |
| 1.5ASMCJ15A  | 1.5ASMCJ15CA  | 15A                 | 15C  | 12.80                    | 14.30                             | 15.80                    | 1                   | 21.2                                      | 71.7                | 1                                 |
| 1.5ASMCJ16A  | 1.5ASMCJ16CA  | 16A                 | 16C  | 13.60                    | 15.20                             | 16.80                    | 1                   | 22.5                                      | 67.6                | 1                                 |
| 1.5ASMCJ18A  | 1.5ASMCJ18CA  | 18A                 | 18C  | 15.30                    | 17.10                             | 18.90                    | 1                   | 25.5                                      | 60.3                | 1                                 |
| 1.5ASMCJ20A  | 1.5ASMCJ20CA  | 20A                 | 20C  | 17.10                    | 19.00                             | 21.00                    | 1                   | 27.7                                      | 54.9                | 1                                 |
| 1.5ASMCJ22A  | 1.5ASMCJ22CA  | 22A                 | 22C  | 18.80                    | 20.90                             | 23.10                    | 1                   | 30.6                                      | 49.7                | 1                                 |
| 1.5ASMCJ24A  | 1.5ASMCJ24CA  | 24A                 | 24C  | 20.50                    | 22.80                             | 25.20                    | 1                   | 33.2                                      | 45.8                | 1                                 |
| 1.5ASMCJ27A  | 1.5ASMCJ27CA  | 27A                 | 27C  | 23.10                    | 25.70                             | 28.40                    | 1                   | 37.5                                      | 40.5                | 1                                 |
| 1.5ASMCJ30A  | 1.5ASMCJ30CA  | 30A                 | 30C  | 25.60                    | 28.50                             | 31.50                    | 1                   | 41.4                                      | 36.7                | 1                                 |
| 1.5ASMCJ33A  | 1.5ASMCJ33CA  | 33A                 | 33C  | 28.20                    | 31.40                             | 34.70                    | 1                   | 45.7                                      | 33.3                | 1                                 |
| 1.5ASMCJ36A  | 1.5ASMCJ36CA  | 36A                 | 36C  | 30.80                    | 34.20                             | 37.80                    | 1                   | 49.9                                      | 30.5                | 1                                 |
| 1.5ASMCJ39A  | 1.5ASMCJ39CA  | 39A                 | 39C  | 33.30                    | 37.10                             | 41.00                    | 1                   | 53.9                                      | 28.2                | 1                                 |
| 1.5ASMCJ43A  | 1.5ASMCJ43CA  | 43A                 | 43C  | 36.80                    | 40.90                             | 45.20                    | 1                   | 59.3                                      | 25.6                | 1                                 |
| 1.5ASMCJ47A  | 1.5ASMCJ47CA  | 47A                 | 47C  | 40.20                    | 44.70                             | 49.40                    | 1                   | 64.8                                      | 23.5                | 1                                 |
| 1.5ASMCJ51A  | 1.5ASMCJ51CA  | 51A                 | 51C  | 43.60                    | 48.50                             | 53.60                    | 1                   | 70.1                                      | 21.7                | 1                                 |
| 1.5ASMCJ56A  | 1.5ASMCJ56CA  | 56A                 | 56C  | 47.80                    | 53.20                             | 58.80                    | 1                   | 77.0                                      | 19.7                | 1                                 |
| 1.5ASMCJ62A  | 1.5ASMCJ62CA  | 62A                 | 62C  | 53.00                    | 58.90                             | 65.10                    | 1                   | 85.0                                      | 17.9                | 1                                 |
| 1.5ASMCJ68A  | 1.5ASMCJ68CA  | 68A                 | 68C  | 58.10                    | 64.60                             | 71.40                    | 1                   | 92.0                                      | 16.5                | 1                                 |
| 1.5ASMCJ75A  | 1.5ASMCJ75CA  | 75A                 | 75C  | 64.10                    | 71.30                             | 78.80                    | 1                   | 103.0                                     | 14.8                | 1                                 |
| 1.5ASMCJ82A  | 1.5ASMCJ82CA  | 82A                 | 82C  | 70.10                    | 77.90                             | 86.10                    | 1                   | 113.0                                     | 13.5                | 1                                 |
| 1.5ASMCJ91A  | 1.5ASMCJ91CA  | 91A                 | 91C  | 77.80                    | 86.50                             | 95.50                    | 1                   | 125.0                                     | 12.2                | 1                                 |

Note: For bi-directional type having V<sub>RWM</sub> of 10 volts and less, the I<sub>R</sub> limit is double.

# TVS Diodes

## 1.5ASMCJ Series

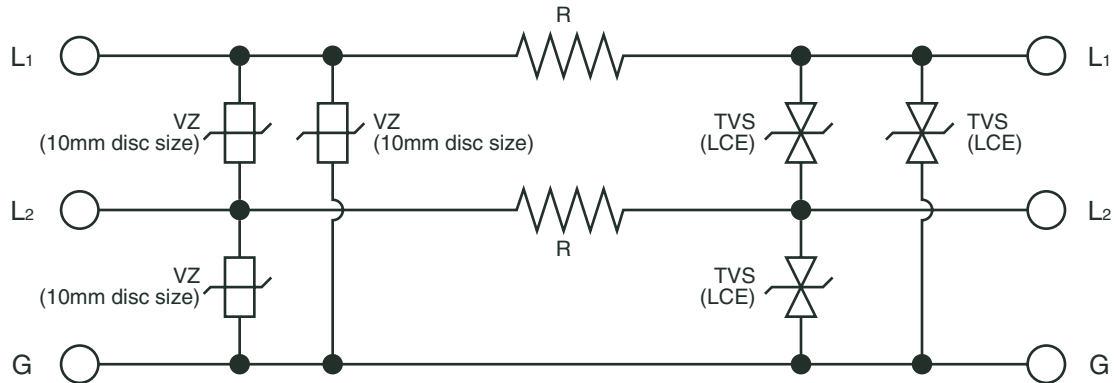
### Electrical Characteristics (continued)

| Part Number  |               | Device Marking Code |      | Reverse Standoff Voltage | Breakdown Voltage @I <sub>T</sub> |                          | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|--------------|---------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
| Uni Polar    | Bi Polar      | UNI                 | BI   | V <sub>RWM</sub> (V)     | V <sub>BR</sub> MIN. (V)          | V <sub>BR</sub> MAX. (V) | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| 1.5ASMCJ100A | 1.5ASMCJ100CA | 100A                | 100C | 85.50                    | 95.00                             | 105.00                   | 1                   | 137.0                                     | 11.1                | 1                                 |
| 1.5ASMCJ110A | 1.5ASMCJ110CA | 110A                | 110C | 94.00                    | 105.00                            | 116.00                   | 1                   | 152.0                                     | 10.0                | 1                                 |
| 1.5ASMCJ120A | 1.5ASMCJ120CA | 120A                | 120C | 102.00                   | 114.00                            | 126.00                   | 1                   | 165.0                                     | 9.2                 | 1                                 |
| 1.5ASMCJ130A | 1.5ASMCJ130CA | 130A                | 130C | 111.00                   | 124.00                            | 137.00                   | 1                   | 179.0                                     | 8.5                 | 1                                 |
| 1.5ASMCJ150A | 1.5ASMCJ150CA | 150A                | 150C | 128.00                   | 143.00                            | 158.00                   | 1                   | 207.0                                     | 7.3                 | 1                                 |
| 1.5ASMCJ160A | 1.5ASMCJ160CA | 160A                | 160C | 136.00                   | 152.00                            | 168.00                   | 1                   | 219.0                                     | 6.9                 | 1                                 |
| 1.5ASMCJ170A | 1.5ASMCJ170CA | 170A                | 170C | 145.00                   | 162.00                            | 179.00                   | 1                   | 234.0                                     | 6.5                 | 1                                 |
| 1.5ASMCJ180A | 1.5ASMCJ180CA | 180A                | 180C | 154.00                   | 171.00                            | 189.00                   | 1                   | 246.0                                     | 6.2                 | 1                                 |
| 1.5ASMCJ200A | 1.5ASMCJ200CA | 200A                | 200C | 171.00                   | 190.00                            | 210.00                   | 1                   | 274.0                                     | 5.5                 | 1                                 |
| 1.5ASMCJ220A | 1.5ASMCJ220CA | 220A                | 220C | 185.00                   | 209.00                            | 231.00                   | 1                   | 328.0                                     | 4.6                 | 1                                 |
| 1.5ASMCJ250A | 1.5ASMCJ250CA | 250A                | 250C | 214.00                   | 237.00                            | 263.00                   | 1                   | 344.0                                     | 4.4                 | 1                                 |
| 1.5ASMCJ300A | 1.5ASMCJ300CA | 300A                | 300C | 256.00                   | 285.00                            | 315.00                   | 1                   | 414.0                                     | 3.7                 | 1                                 |
| 1.5ASMCJ350A | 1.5ASMCJ350CA | 350A                | 350C | 300.00                   | 332.00                            | 368.00                   | 1                   | 482.0                                     | 3.2                 | 1                                 |
| 1.5ASMCJ400A | 1.5ASMCJ400CA | 400A                | 400C | 342.00                   | 380.00                            | 420.00                   | 1                   | 548.0                                     | 2.8                 | 1                                 |
| 1.5ASMCJ440A | 1.5ASMCJ440CA | 440A                | 440C | 376.00                   | 418.00                            | 462.00                   | 1                   | 602.0                                     | 2.5                 | 1                                 |
| 1.5ASMCJ480A | 1.5ASMCJ480CA | 480A                | 480C | 408.00                   | 456.00                            | 504.00                   | 1                   | 658.0                                     | 2.3                 | 1                                 |
| 1.5ASMCJ510A | 1.5ASMCJ510CA | 510A                | 510C | 434.00                   | 485.00                            | 535.00                   | 1                   | 698.0                                     | 2.1                 | 1                                 |
| 1.5ASMCJ530A | 1.5ASMCJ530CA | 530A                | 530C | 450.00                   | 503.50                            | 556.50                   | 1                   | 725.0                                     | 2.1                 | 1                                 |
| 1.5ASMCJ540A | 1.5ASMCJ540CA | 540A                | 540C | 459.00                   | 513.00                            | 567.00                   | 1                   | 740.0                                     | 2.0                 | 1                                 |
| 1.5ASMCJ550A | 1.5ASMCJ550CA | 550A                | 550C | 467.00                   | 522.50                            | 577.50                   | 1                   | 760.0                                     | 2.0                 | 1                                 |

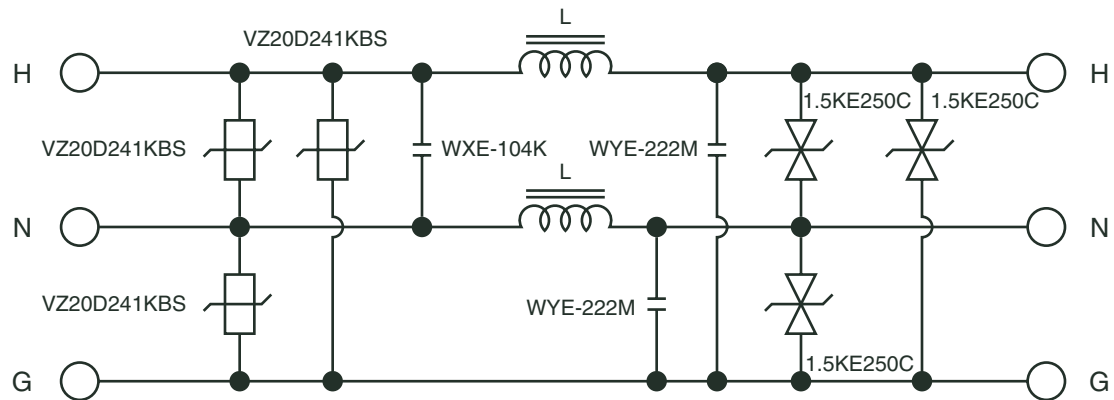
Note: For bi-directional type having V<sub>RWM</sub> of 10 volts and less, the I<sub>R</sub> limit is double.

## Circuit Examples

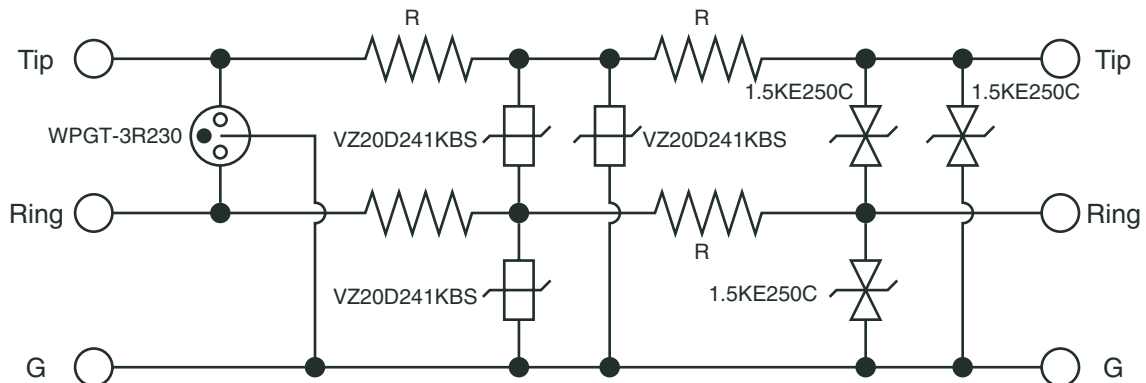
### Data Line Protection



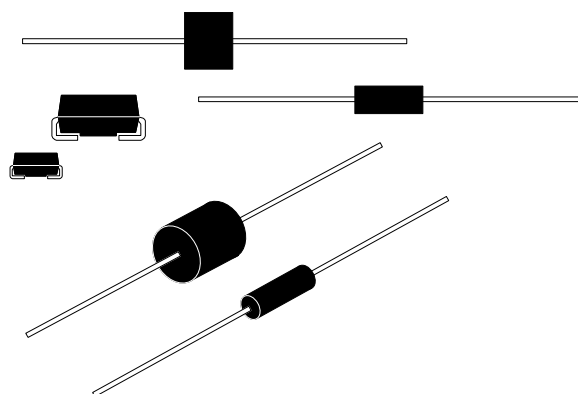
### AC Line Protection



### Telecom Circuit Protection

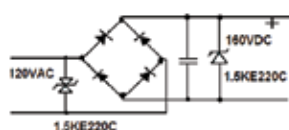


## Applications

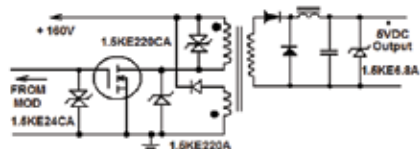


**Transient Voltage Suppression Diodes or TVSD** is a semiconductor diode with a single P-N junction which may operate in either direction and employs its breakdown characteristics as part of its function. This device limits (clamp) transient voltages and diverts transient currents.

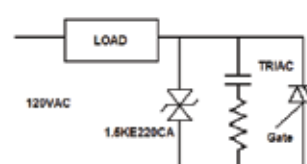
**TVSD in Bridge Rectifier Protection**



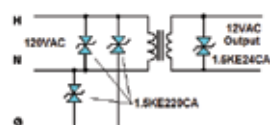
**TVSD in SMPS Output Protection**



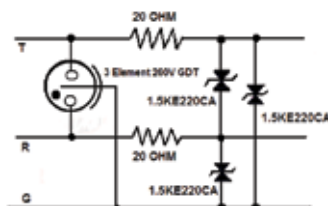
**TVSD in Triac Protection**



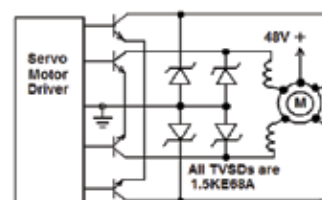
**TVSD in AC Line Protection**



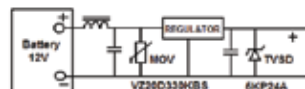
**GDT & TVSD In Telephone Line Protection**



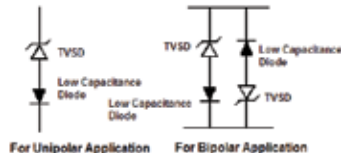
**TVSD in Servo Motor Protection**



**TVSD in Automotive Equipment Protection**



**TVSD in Low Capacitance Applications**



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