

TVS Diodes



New WPA Series - Automotive TVS Diode Series on page 50.

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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 μ 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

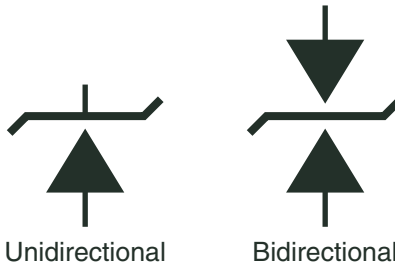
| | | | | |
|-----------------------|--------|----|--------------------------|-------|
| 1. Stand-off Voltage | (VWM) | >= | Operating Voltage | (VOP) |
| 2. Peak Pulse Current | (IPPM) | >= | Source Transient Current | (IS) |
| 3. Clamping Voltage | (VC) | =< | Voltage Withstand | (VWS) |

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_c Clamping Voltage:

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

IPP Peak Impulse Current:

Peak current measured using a specified waveform.

IPPM Rated Peak Impulse Current:

Rated maximum value of peak impulse current (IPP) applied using a 10 x 1000µs waveform. (Minimum of 10 pulses applied.)

V_{wm} Rated Standoff Voltage:

Maximum working (continuous) DC or peak voltage which may be applied over the standard operating temperature range. (Note: V_{wm} of a selected device must be greater than or equal to the maximum operating voltage of the line to be protected.)

I_d Stand-By Current:

Maximum current that flows through the suppressor at rated standoff voltage (V_{WM}) at a specified temperature.

V_{BR} Breakdown Voltage:

The voltage measured across the suppressor at a specified DC test current (I_T).

I_t Test Current:

The specific DC current applied to the suppressor used to determine breakdown voltage (V_{BR}).

V_{br} Temperature Coefficient:

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

CF Clamping Factor:

Ratio of the measured clamping voltage (V_C) at specified peak pulse current (IPP) to breakdown voltage (V_{BR}) 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.

PPPM Rated Multiple Peak Pulse Power:

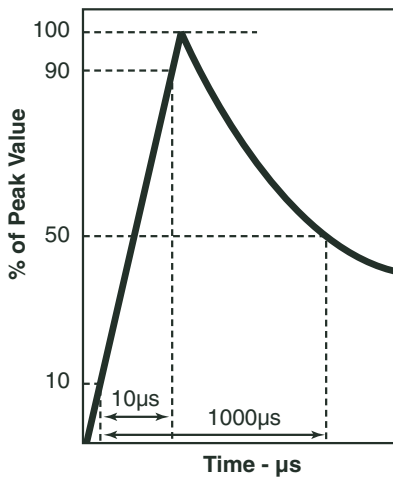
Derived by multiplying the maximum clamping voltage (V_C) times the Rated Peak Impulse Current (IPPM).

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.

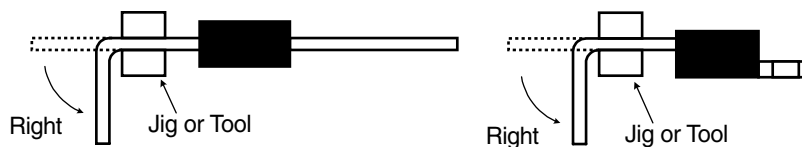
The leads must be bent only once and they should not be bent at an angle of more than 90°C. Leads must be formed before fixing them to a printed circuit board. Never form the leads after soldering.

Recommended distances are:

2mm for P4KE and SA series.

3mm for 1.5KE series.

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



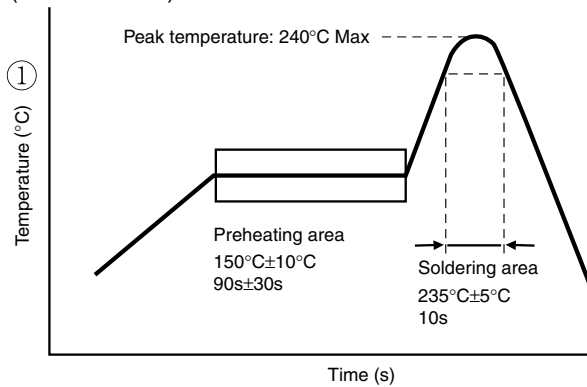
General Information (continued)

Solderability

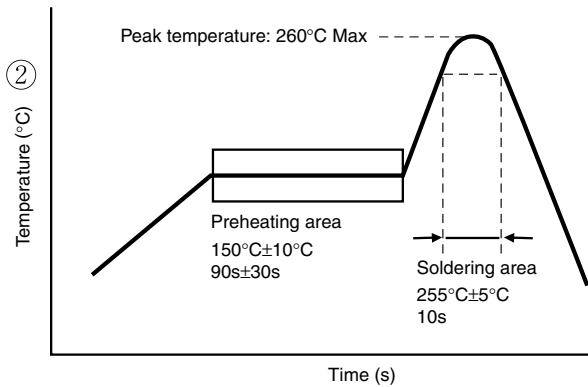
Military Standard 202G Method 208H

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

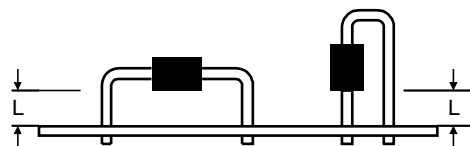
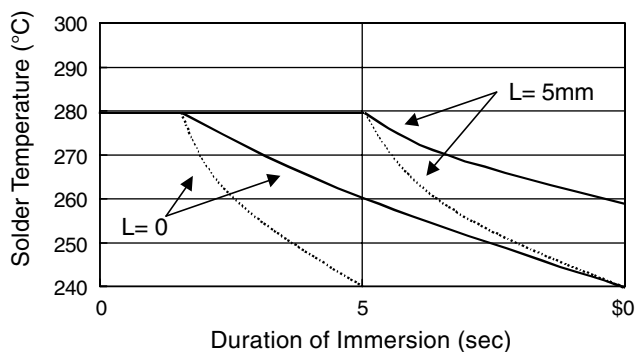
Duration 10 ± 1s

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.

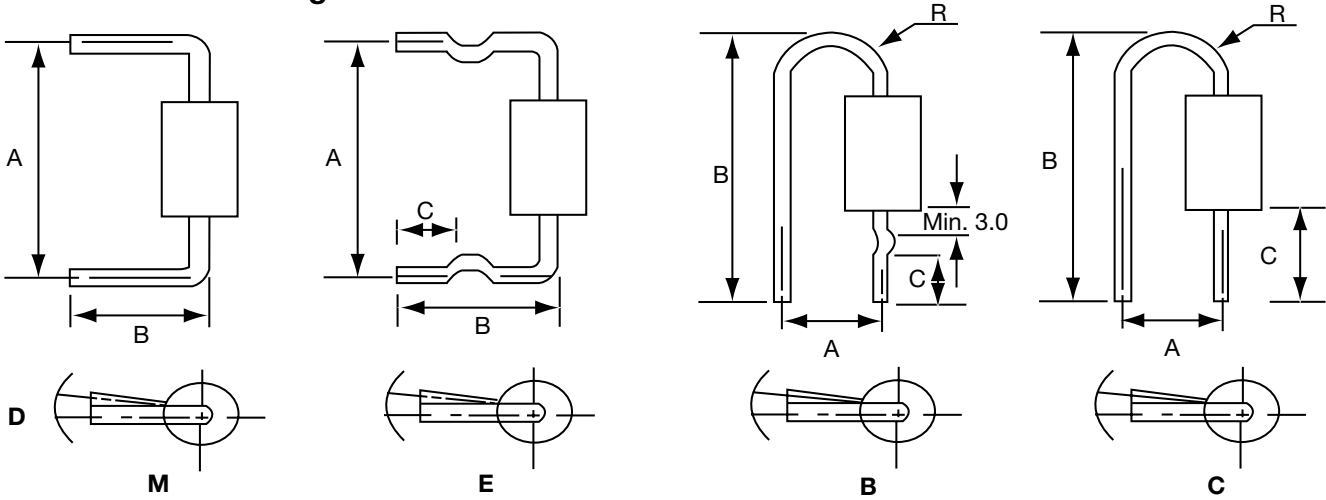
Be sure again not to put an excessive mechanical stress on devices, such as a rough insertion of device into a throughhole, or manual reforming of leads after soldering.

Axial Lead Devices



General Information (continued)

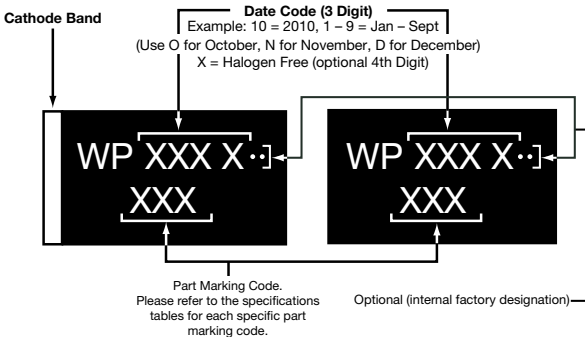
Preformed Lead Drawings



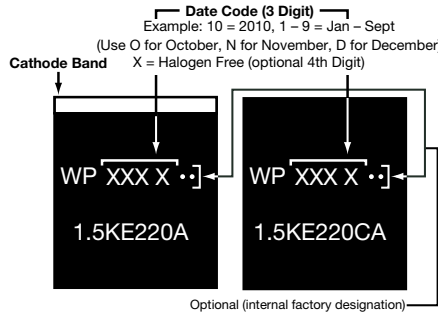
| Case type | Preformed type | A (mm) | | B (mm) | | C (mm) | | D (mm) | | R (mm) | |
|---|----------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|
| | | Range | Tolerance | Range | Tolerance | Range | Tolerance | Range | Tolerance | Range | Tolerance |
| DO-41 package 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. |
| DO-15 package SA Series 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. | --- | --- |
| DO-201AD package 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. | --- | --- |
| R-6 package 3KP Series 5KP Series 15KP Series | M | 15~20 | ±1.0 | 8~22 | ±1.0 | --- | --- | 2.0 | max. | --- | --- |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 20KP Series 30KP Series | M | 15~20 | ±1.0 | 8~22 | ±1.0 | --- | --- | 2.0 | max. | --- | --- |

Part Marking

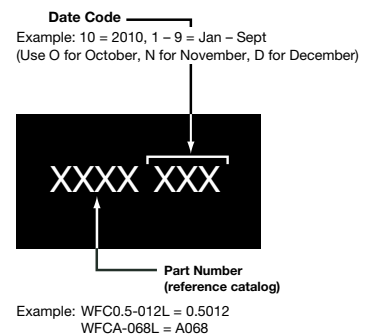
For Surface Mount Devices



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>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.

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.

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>X</u> |
| (1) | (2) | (3) | (4) | (5) | (6) | | (7) |

- (1) Series:** P4SMAJ = 400 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.

P4KE Series – 400 Watt



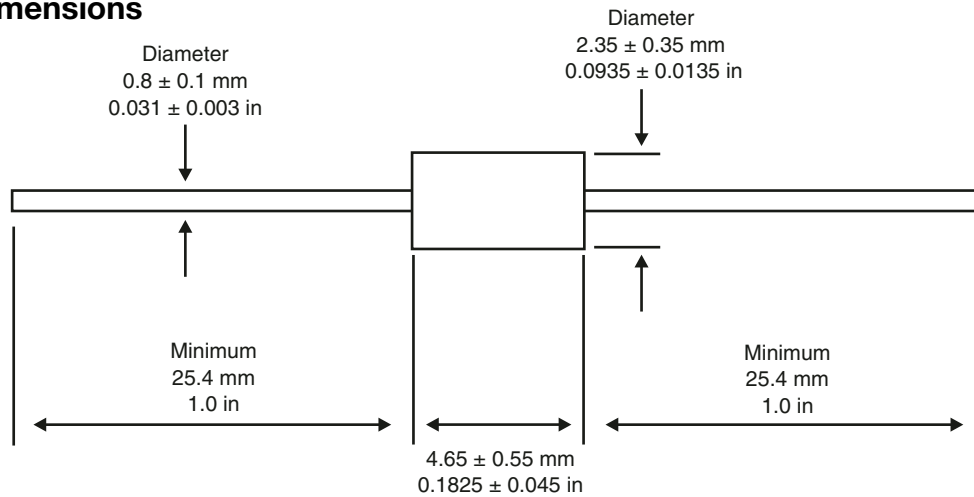
P4KE Series Features

- 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.)

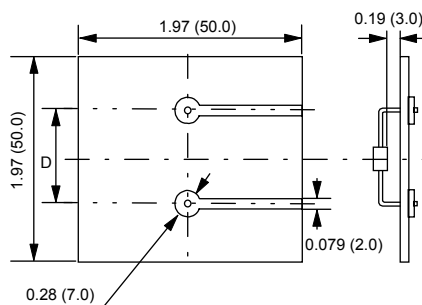
Absolute Maximum Ratings

| Parameter | Value |
|--|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 400W |
| Steady state power dissipation at lead temperature = 75°C (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 | 10/1000 μ s Maximum Clamping Voltage @Ippm# Vc Max | 10/1000 μ s Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|-------|------|-----------------------------------|--|--|
| | | Vbr (Volts) | | @It | | | |
| | Vwm (Volts) | Min | Max | (mA) | (μ A) | (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 \leq 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) |
| P4KE30 | 24.30 | 27.00 | 33.00 | 1 | 1 | 43.5 | 10.0 |
| P4KE30A | 25.60 | 28.50 | 31.50 | 1 | 1 | 41.4 | 9.9 |
| P4KE33 | 26.80 | 29.70 | 36.30 | 1 | 1 | 47.7 | 9.0 |
| P4KE33A | 28.20 | 31.40 | 34.70 | 1 | 1 | 45.7 | 9.0 |
| P4KE36 | 29.10 | 32.40 | 39.60 | 1 | 1 | 52.0 | 8.0 |
| P4KE36A | 30.80 | 34.20 | 37.80 | 1 | 1 | 49.9 | 8.2 |
| P4KE39 | 31.60 | 35.10 | 42.90 | 1 | 1 | 56.4 | 7.4 |
| P4KE39A | 33.30 | 37.10 | 41.00 | 1 | 1 | 53.9 | 7.6 |
| P4KE43 | 34.80 | 38.70 | 47.30 | 1 | 1 | 61.9 | 6.8 |
| P4KE43A | 36.80 | 40.90 | 45.20 | 1 | 1 | 59.3 | 6.9 |
| P4KE47 | 38.10 | 42.30 | 51.70 | 1 | 1 | 67.8 | 6.2 |
| P4KE47A | 40.20 | 44.70 | 49.40 | 1 | 1 | 64.8 | 6.3 |
| P4KE51 | 41.30 | 45.90 | 56.10 | 1 | 1 | 73.5 | 5.7 |
| P4KE51A | 43.60 | 48.50 | 53.60 | 1 | 1 | 70.1 | 5.8 |
| P4KE56 | 45.60 | 50.40 | 61.60 | 1 | 1 | 80.5 | 5.2 |
| P4KE56A | 47.80 | 53.20 | 58.80 | 1 | 1 | 77.0 | 5.3 |
| P4KE62 | 50.20 | 55.80 | 68.20 | 1 | 1 | 89.0 | 4.7 |
| P4KE62A | 53.00 | 58.90 | 65.10 | 1 | 1 | 85.0 | 4.8 |
| P4KE68 | 55.10 | 61.20 | 74.80 | 1 | 1 | 98.0 | 4.3 |
| P4KE68A | 58.10 | 64.60 | 71.40 | 1 | 1 | 92.0 | 4.5 |
| P4KE75 | 60.70 | 67.50 | 82.50 | 1 | 1 | 108.0 | 3.9 |
| P4KE75A | 64.10 | 71.30 | 78.80 | 1 | 1 | 103.0 | 4.0 |
| P4KE82 | 66.40 | 73.80 | 90.20 | 1 | 1 | 118.0 | 3.6 |
| P4KE82A | 70.10 | 77.90 | 86.10 | 1 | 1 | 113.0 | 3.6 |
| P4KE91 | 73.70 | 81.90 | 100.00 | 1 | 1 | 131.0 | 3.2 |
| P4KE91A | 77.80 | 86.50 | 95.50 | 1 | 1 | 125.0 | 3.3 |
| P4KE100 | 81.00 | 90.00 | 110.00 | 1 | 1 | 144.0 | 2.9 |
| P4KE100A | 85.50 | 95.00 | 105.00 | 1 | 1 | 137.0 | 3.0 |
| P4KE110 | 89.20 | 99.90 | 121.00 | 1 | 1 | 158.0 | 2.7 |
| P4KE110A | 94.00 | 105.00 | 116.00 | 1 | 1 | 152.0 | 2.7 |

* = 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.

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 <= 10V, their ID limit is doubled.

= See General Information for Impulse Current Waveform.

SA Series – 500 Watt



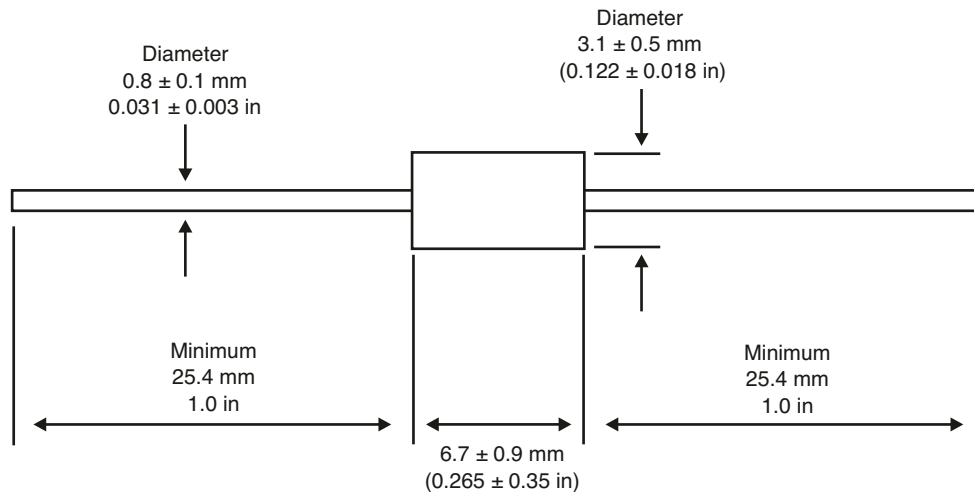
SA Series Features

- 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

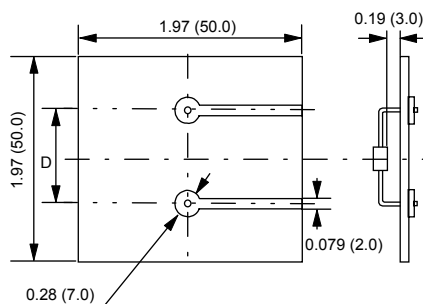
Absolute Maximum Ratings

| Parameter | Value |
|---|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 500W |
| Steady state power dissipation at lead temperature = 75°C (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



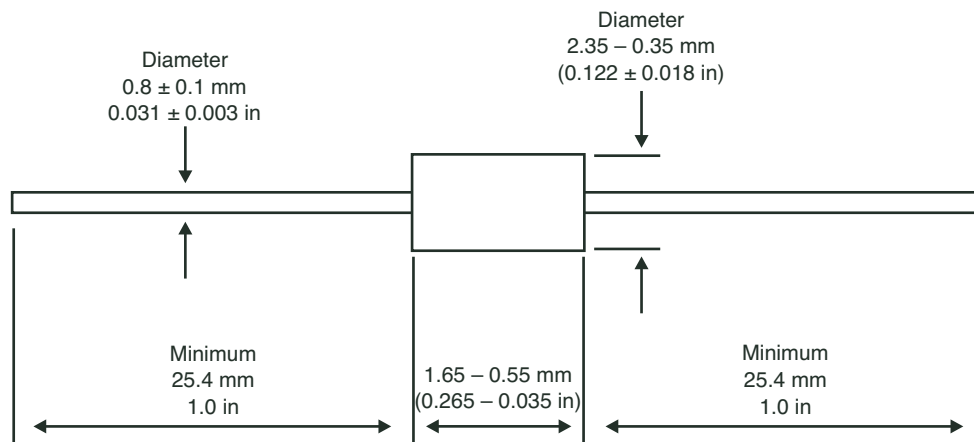
P6KE Series Features

- 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.)

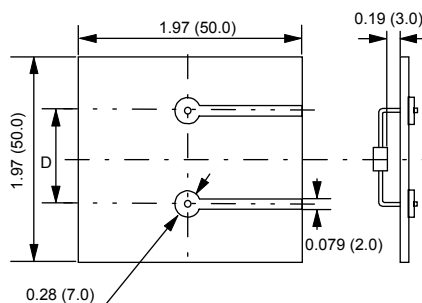
Absolute Maximum Ratings

| Parameter | Value |
|--|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 600W |
| Steady state power dissipation at lead temperature = 75°C (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 <= 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 <= 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 <= 10V, their ID limit is doubled.

= See General Information for Impulse Current Waveform.

1.5KE Series – 1500 Watt



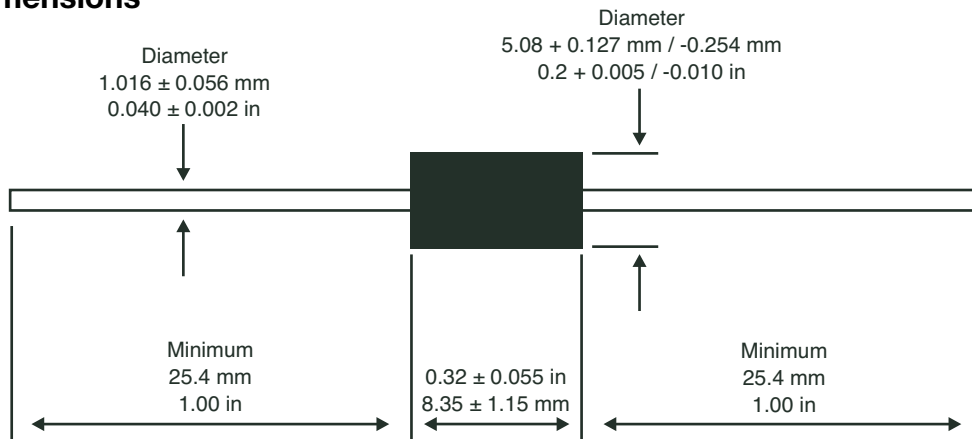
1.5KE Series Features

- 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.)

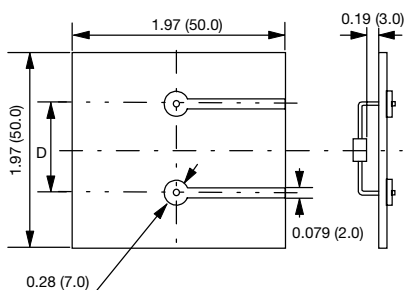
Absolute Maximum Ratings

| Parameter | Value |
|---|------------------|
| Peak pulse power dissipation (PPPM) at 25°C | 1500W |
| Steady state power dissipation at lead temperature = 75°C (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 | 10/1000 μ s Maximum Clamping Voltage @Ippm# Vc Max | 10/1000 μ s Rated Peak Impulse Current Ippm# |
|--------------|------------------------|-------------------|------|------|-----------------------------------|--|--|
| | | Vbr (Volts) | | @It | | | |
| | Vwm (Volts) | Min | Max | (mA) | (μ A) | (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 \leq 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



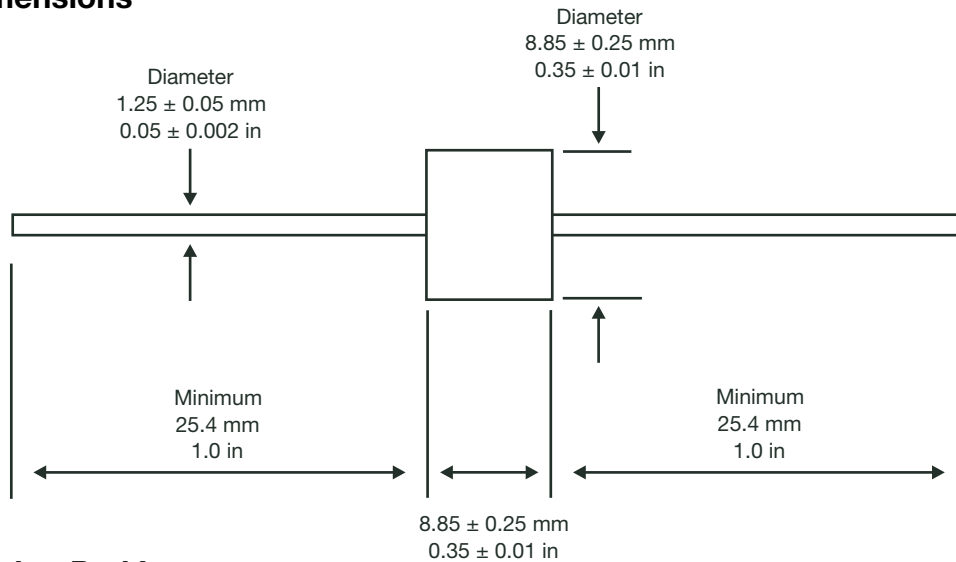
3KP Series Features

- 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.)

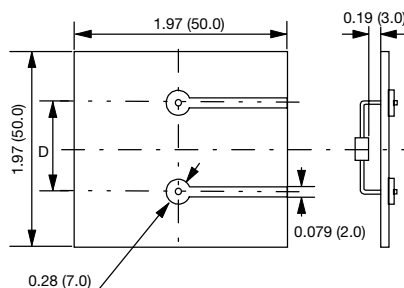
Absolute Maximum Ratings

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

Mechanical Dimensions



Standard Mounting Pad Layout



NOTE: Dimension D

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

Hole Diameter

- a.) 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 <= 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 <= 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 <= 10V, their ID limit is doubled.

= See General Information for Impulse Current Waveform.

5KP Series – 5000 Watt



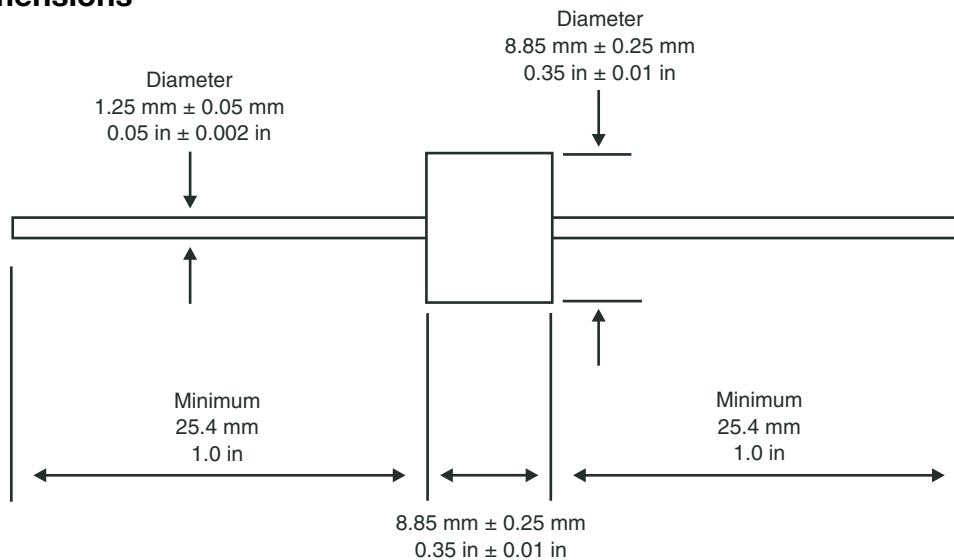
5KP Series Features

- 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.)

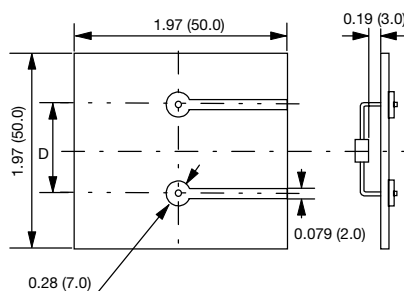
Absolute Maximum Ratings

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

Mechanical Dimensions



Standard Mounting Pad Layout



NOTE: Dimension D

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

- Hole Diameter**
- a.) 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 <= 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 <= 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 <= 10V, their ID limit is doubled.

= See General Information for Impulse Current Waveform

15KP Series –15000 Watt



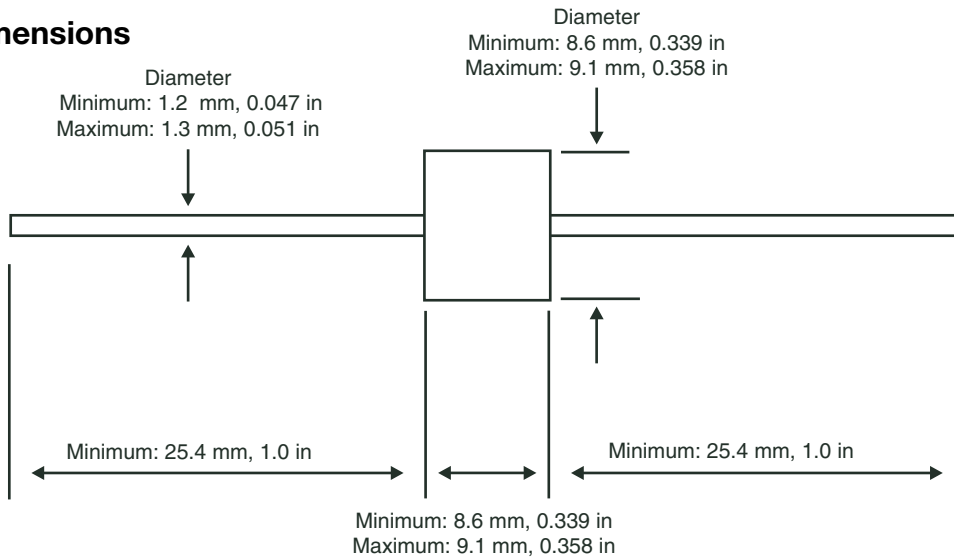
15KP Series Features

- 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)

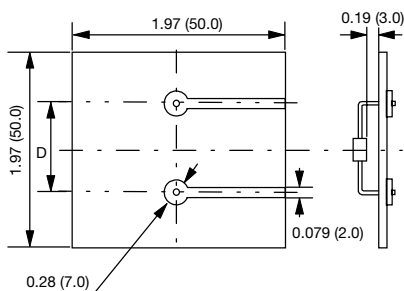
Absolute Maximum Ratings

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

Mechanical Dimensions



Standard Mounting Pad Layout



NOTE: Dimension D

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

Hole Diameter

- a.) 0.059 (1.5)

All dimensions in inches and (millimeters)

15KP Series – 15000 Watt (continued)

Electrical Characteristics

| Part Number* | Rated Standoff Voltage V _{wm} | Breakdown Voltage | | Maximum Stand By Current @V _{WM} + I _d | 10/1000µs Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000µs Rated Peak Impulse Current I _{ppm} # |
|--------------|---|-------------------------|-----------------|---|---|---|
| | | V _{br} (Volts) | @I _t | | | |
| | V _{wm} (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 V _{wm} | Breakdown Voltage | | Maximum Stand By Current @V _{wm} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|---|-------------------------|-----------------|---|---|---|
| | | V _{br} (Volts) | @I _t | | | |
| | V _{wm} (Volts) | Min | (mA) | (μ A) | (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



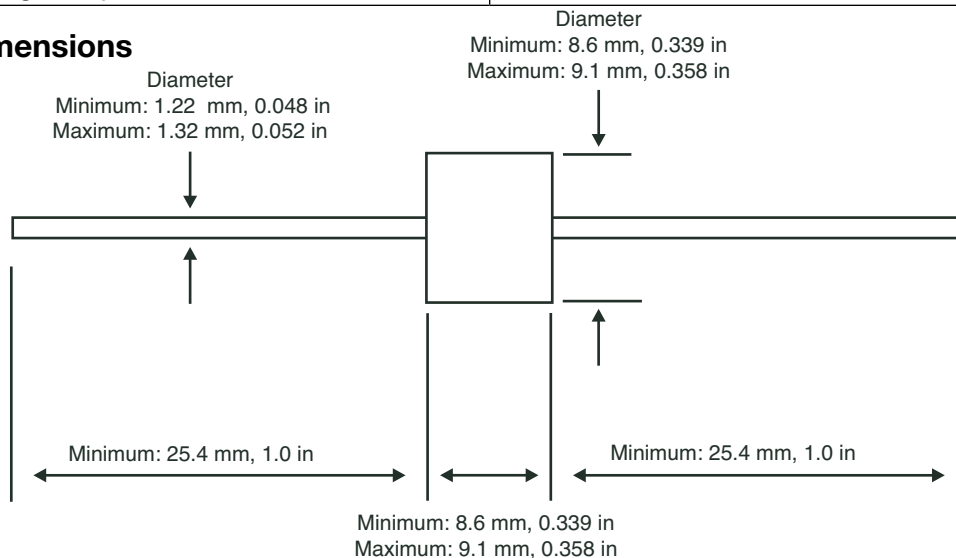
20KP Series Features

- 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

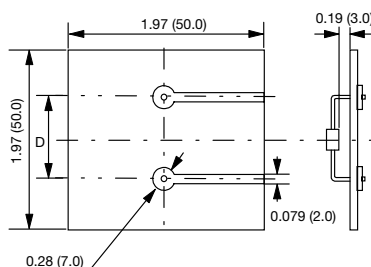
Absolute Maximum Ratings

| Parameter | Value |
|---|-----------------|
| Peak pulse power dissipation (PPPM) at 25°C | 20000W |
| Steady state power dissipation at lead temperature = 75°C (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 (continued)

Electrical Characteristics

| Part Number* | Rated Standoff Voltage V _{wm} | Breakdown Voltage | | Maximum Stand By Current @V _{WM} + I _d | 10/1000µs Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000µs Rated Peak Impulse Current I _{ppm} # |
|--------------|---|-------------------------|-----------------|--|--|---|
| | | V _{br} (Volts) | @I _t | | | |
| | V _{wm} (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



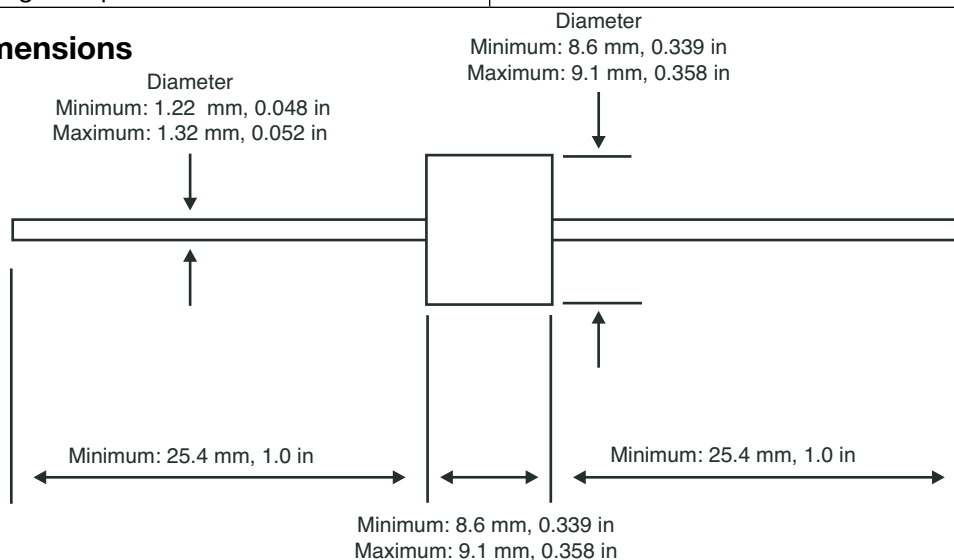
30KP Series Features

- 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

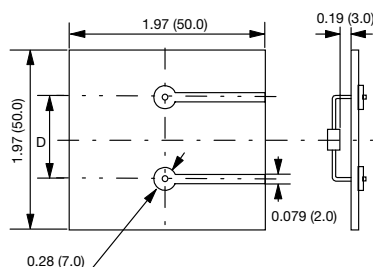
Absolute Maximum Ratings

| Parameter | Value |
|---|-----------------|
| Peak pulse power dissipation (PPPM) at 25°C | 30000W |
| Steady state power dissipation at lead temperature = 75°C (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)

TVS Diodes

30KP Series – 30000 Watt (continued)

Electrical Characteristics

| Part Number* | Rated Standoff Voltage V _{wm} | Breakdown Voltage | | Maximum Stand By Current @V _{WM} +I _d | 10/1000µs Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000µs Rated Peak Impulse Current I _{ppm} # |
|--------------|---|-------------------------|-----------------|--|---|---|
| | | V _{br} (Volts) | @I _t | | | |
| | V _{wm} (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

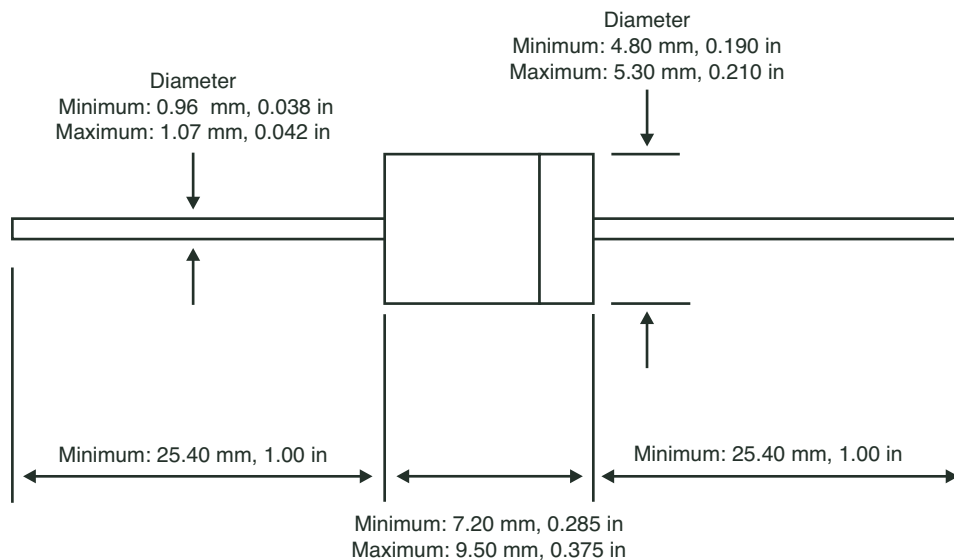
WLCE Series – Low Capacitance (continued)



WLCE Series Features

- RoHS Compliant
- 1500 WATT Peak Pulse Power capability at 10/1000 μ s waveform
- Available in voltages 6.5V to 28V
- Glass Passivated junction
- Low incremented surge resistance
- Fast response time: typically less than 5 μ 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 (continued)

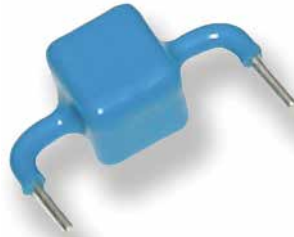
Electrical Characteristics

| Part Number | Reverse Stand-Off Voltage V_{RWM} | Breakdown Voltage | | Test Current | Maximum Reverse Leakage @ V_{RWM} | Maximum Peak Pulse Current | Maximum Clamping Voltage @ I_{PP} | Maximum Junction Capacitance @ 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 (μ 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

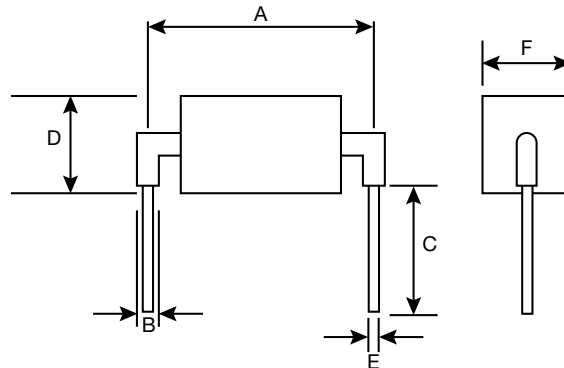


Absolute Maximum Ratings

| 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



| WFOA, WFOB, WFOC (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. |

| WFOC (012, 015, 200, 240)/WFOD 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. |

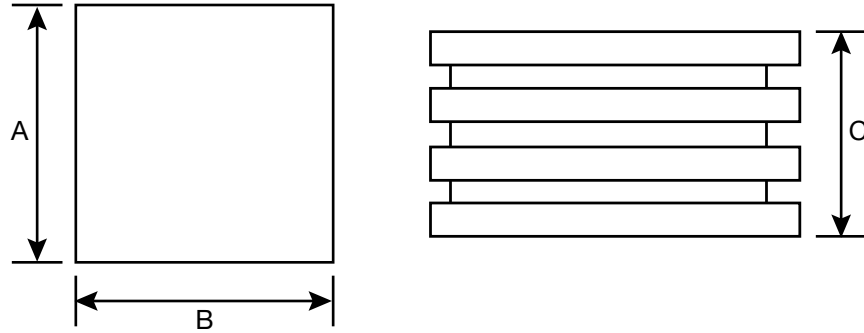
| WFOB (430) SERIES DIMENSIONS | | |
|------------------------------|---------------|--------------|
| DIMENSIONS | INCHES | MILLIMETERS |
| A | 1.063 ± 0.047 | 27.00 ± 1.20 |
| B | 0.055 min. | 1.40 min. |
| C | 0.079 min. | 2.00 min. |
| D | 0.512 max. | 13.0 max. |
| E | 0.05 ± 0.004 | 1.28 ± 0.10 |
| F | 0.512 max. | 13.0 max. |

| WFOC (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 (continued)

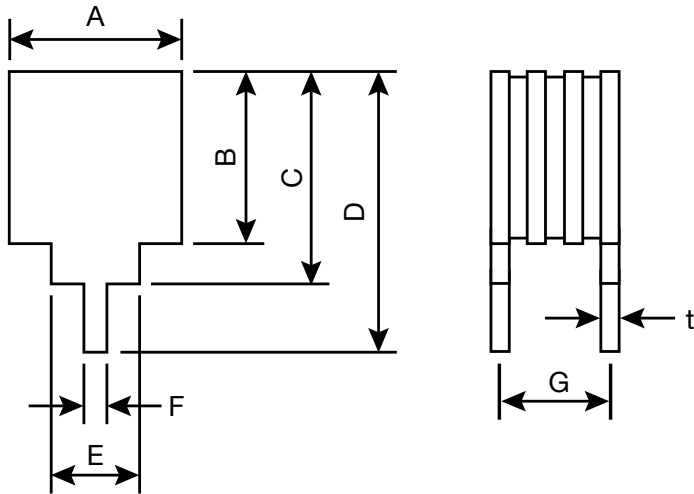
Package Dimensions (continued)

Cell Series



| WFC A, WFC B, WFC C SERIES DIMENSIONS | | |
|---------------------------------------|--------------|-------------|
| DIMENSIONS | INCHES | MILLIMETERS |
| A | 0.37 ± 0.016 | 9.4 ± 0.4 |
| B | 0.37 ± 0.016 | 9.4 ± 0.4 |
| C | 0.787 max. | 20 max. |

Stack Series



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

TVS Diodes

WFC Series (continued)

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 |
| WFC A | | | | | | | | | |
| 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 |
| WFC 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 (continued)

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 |
| WFCC | | | | | | | | | |
| 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 |
| WFCD | | | | | | | | | |
| 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:

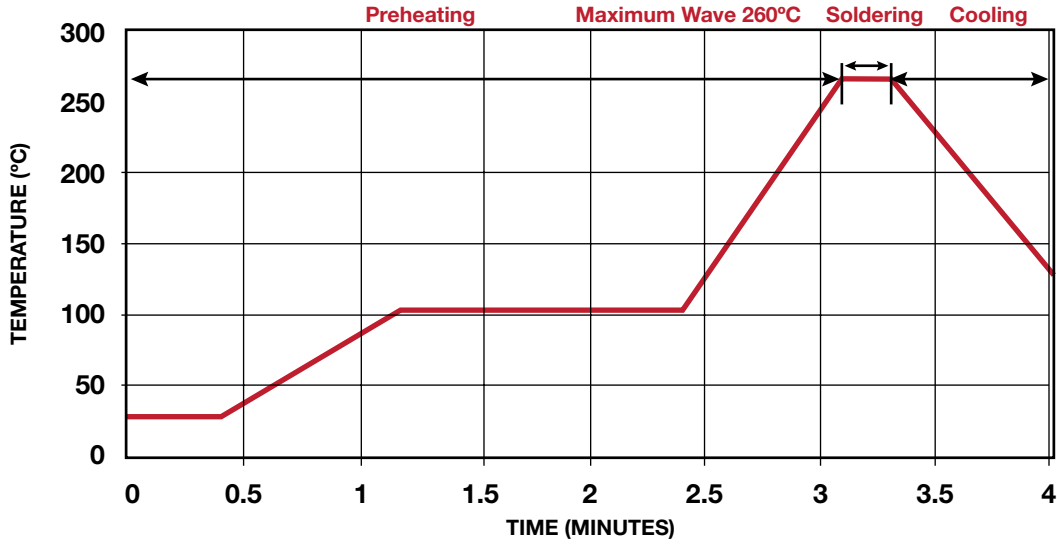
1. Ta=25°C unless otherwise specified.
2. Using 8/20 us wave shape pulses as defined in IEC61000-4-5.

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

WFC Series (continued)

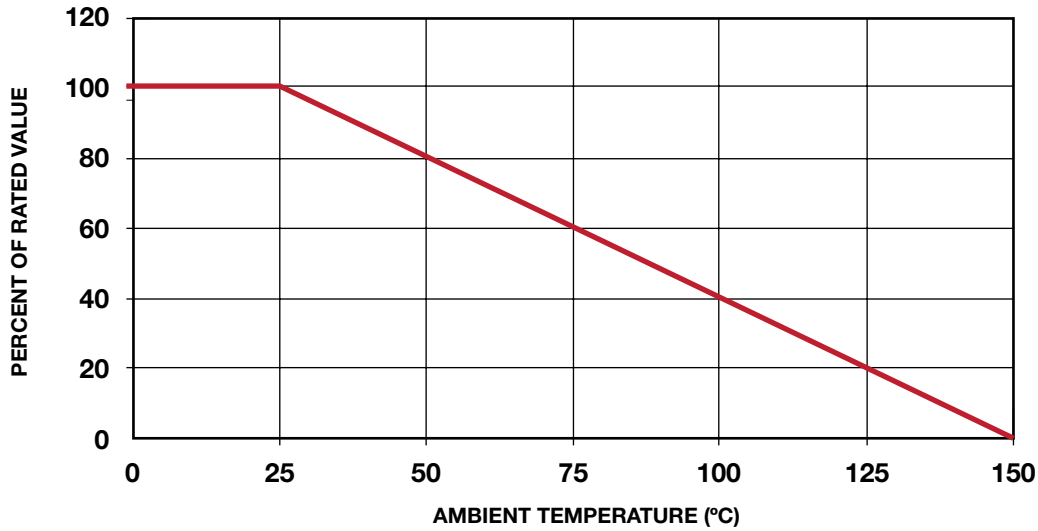
FLOW/WAVE SOLDERING RECOMMENDATION PARAMETERS

Flow/wave Soldering



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

PEAK POWER DERATING



TVS Diodes



WPA Series – Automotive TVS Diode

WPA Series Features

- Halogen-Free
- RoHS compliant
- Glass passivated junction for reliability
- Patented construction
- Suitable for standard ISO 7637-2 or ISO16750-2
- Fast response time
- Excellent clamping capability
- Low incremental surge resistance
- Plastic package has Underwriters Laboratory Flammability classification 94V-0 Absolute Maximum Ratings



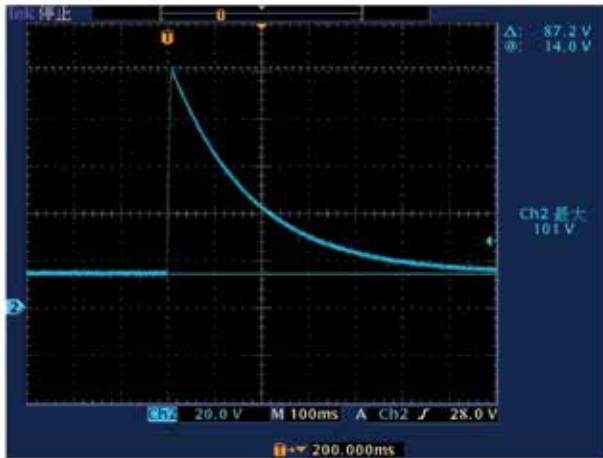
| APPLICATIONS | TEST BACKGROUND |
|--|--|
| Designed to protect sensitive electronics from: -Inductive Load Switching -Alternator Load Dump -GPS Navigation Systems | This test is a simulation of load dump transient, occurring in the event of a discharged battery being disconnected while the alternator is generating charging current and with other loads remaining on the alternator circuit at this moment; the load dump amplitude depends on the alternator speed and on the level of the alternator field excitation at the moment the battery is disconnected. In most new alternators, the load dump amplitude is suppressed (clamped) by the addition of the limiting diodes. |

| MAXIMUM RATINGS AND THERMAL CHARACTERISTICS (T _A =25°C unless otherwise noted.) | | | | TEST PARAMETERS | | |
|--|-----------------------------------|------------|------|-----------------|--|----------------|
| PARAMETER | Symbol | Value | Unit | PARAMETER | 12V System | 24V System |
| Operating Junction and Storage Temperature Range | T _J , T _{STG} | -50 to 150 | °C | U _s | 65V to 87V | 123V to 174V |
| Typical Thermal Resistance Junction to Lead | R _{wJL} | 8.0 | °C/W | R _i | 0.5Ω to 4Ω | 1Ω to 8Ω |
| Typical Thermal Resistance Junction to Ambient | R _{wJA} | 40 | °C/W | td | 40ms to 400ms | 100ms to 350ms |
| | | | | tr | (10 ⁰⁻⁵) ms | |
| | | | | Note | Pulse waveform see Figure 1 & Figure 2 | |

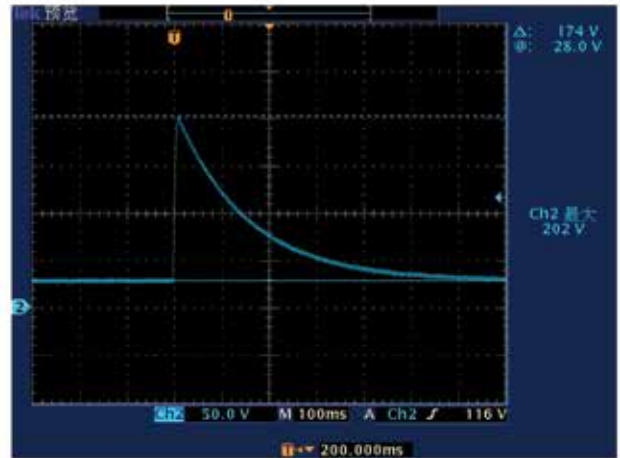
WPA Series – Automotive TVS Diode (continued)

ISO 7637-2 2004 5a Waveform Simulation Test

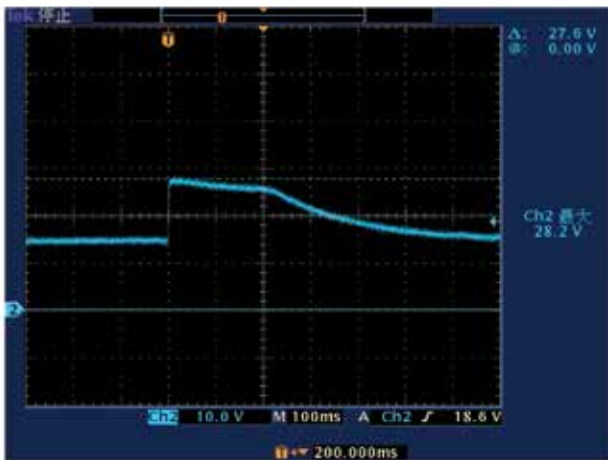
12V System 87V 1Ω 400mS DC14V
Original Pulse Waveform



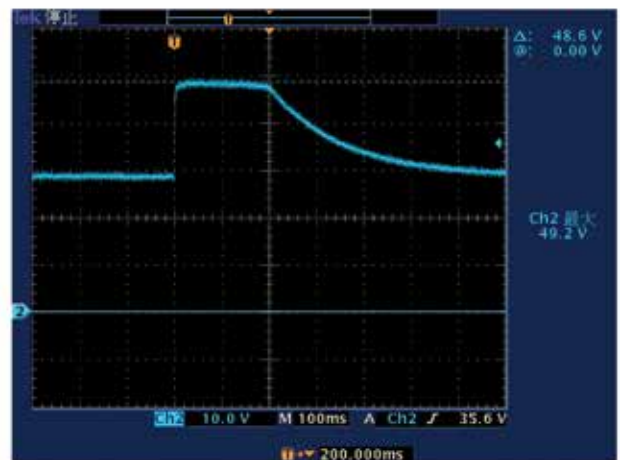
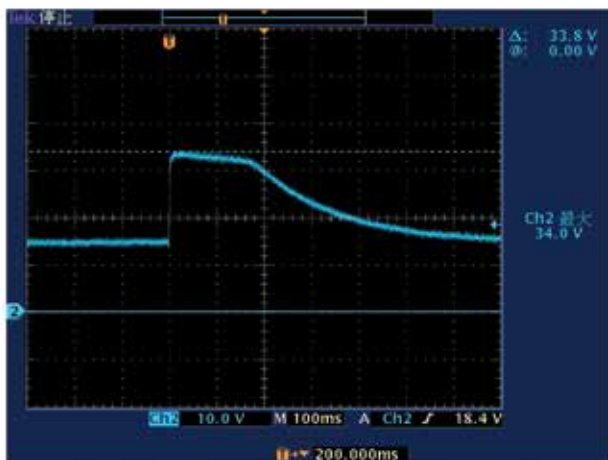
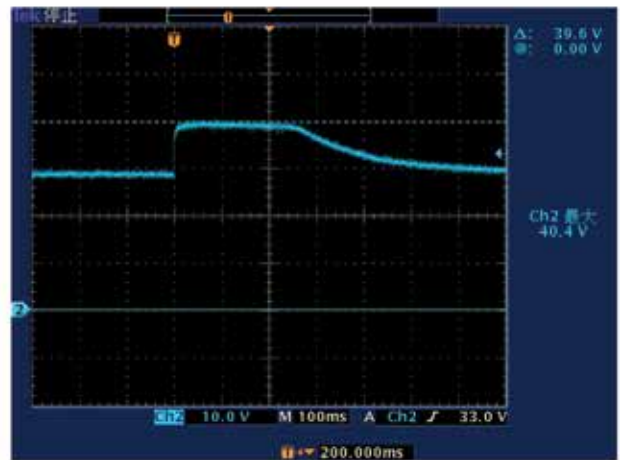
24V System 174V 3Ω 350mS DC28V
Original Pulse Waveform



Overvoltage transient suppressors (WPA20C/
WPA24C) Clamped pulse waveform.



Overvoltage transient suppressors (WPA30C/
WPA36C) Clamped pulse waveform.



WPA Series – Automotive TVS Diode (continued)

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted.)

| Part Number | Breakdown Voltage @ I_T | | Test Current | Reverse Stand-Off Voltage | Reverse Leakage @ V_{RWM} |
|-------------|---------------------------|----------------------|--------------|---------------------------|-----------------------------|
| | V_{BR} min (Volts) | V_{BR} max (Volts) | I_T (mA) | V_{RWM} | I_R (μA) |
| WPA20C | 21.0 | 25.0 | 5.0 | 20.0 | 10.0 |
| WPA24C | 25.0 | 30.0 | 5.0 | 24.0 | 10.0 |
| WPA30C | 33.0 | 38.0 | 5.0 | 30.0 | 10.0 |
| WPA33C | 35.0 | 40.0 | 5.0 | 33.0 | 10.0 |
| WPA36C | 38.0 | 45.0 | 5.0 | 36.0 | 10.0 |

| Part Number | Suitable ISA 7637-2 2004 5a Test Waveform | | | | | | | | |
|-------------|---|---------------|---------------|------------------|------------|------------|------------|------------|------------|
| | Maximum Clamping Voltage | Voltage Level | | Resistance Level | | | | | |
| | V_C (Volts) | 87V 400mS | 174V 350mS | 0.5 Ω | 1 Ω | 2 Ω | 3 Ω | 4 Ω | 8 Ω |
| WPA20C | 33.0 | X | -- | -- | X | X | X | X | X |
| WPA24C | 39.0 | X | -- | -- | X | X | X | X | X |
| WPA30C | 50.0 | -- | X | -- | -- | -- | X | X | X |
| WPA33C | 54.0 | -- | X | -- | -- | -- | X | X | X |
| WPA36C | 57.0 | -- | X | -- | -- | -- | X | X | X |

Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted.)

Figure 1. (Pulse 5a) without centralized load dump suppression.

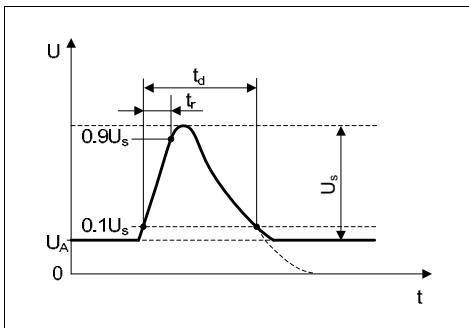


Figure 2. (Pulse 5a) without centralized load dump suppression.

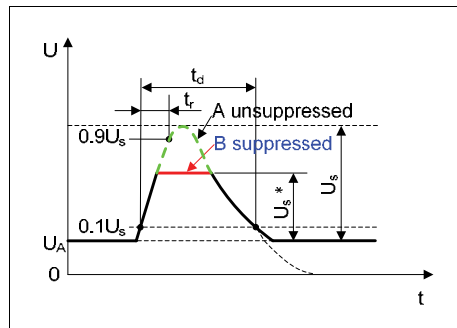


Figure 3. Pulse Derating Curve

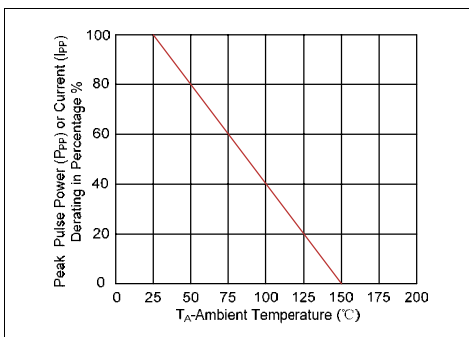
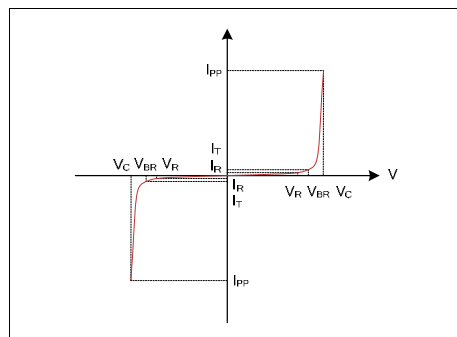


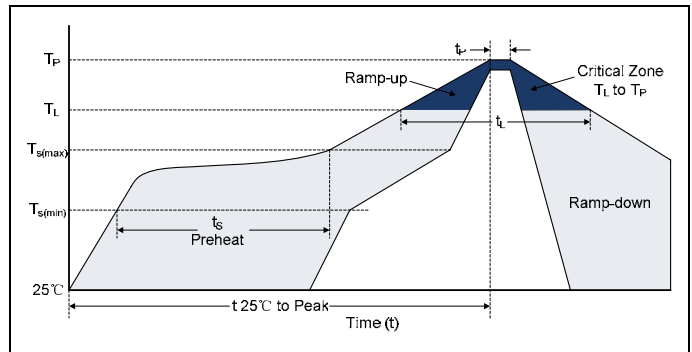
Figure 4. I-V Curve Characteristics



WPA Series – Automotive TVS Diode (continued)

Soldering Parameters

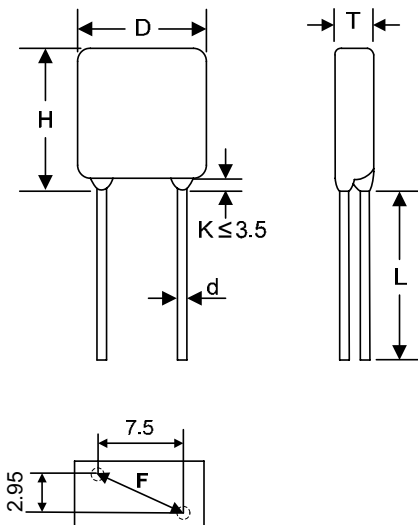
| Reflow Condition | | Lead-free Assembly |
|--|------------------------------------|--------------------|
| Pre Heat | - Temperature Min ($T_{S(min)}$) | 150°C |
| | - Temperature Max ($T_{S(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60~180 seconds |
| Average Ramp-up Rate (Liquidus Temp (T_L) to peak. | | 3°C/second max |
| $T_{S(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquidus) | 217°C |
| | - Time (min to max) (t_s) | 60~150 seconds |
| Peak Temperature (T_P) | | 260 +0/.5°C |
| Time within 5°C if actual Peak Temperature (t_p) | | 20~40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to Peak Temperature (T_P) | | 8 minutes max |
| Do not exceed | | 280°C |



Flow/Wave Soldering (Solder Dipping)

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

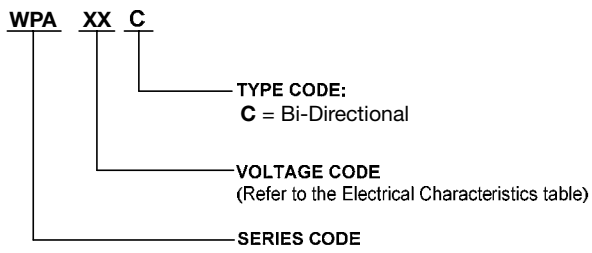
Dimensions



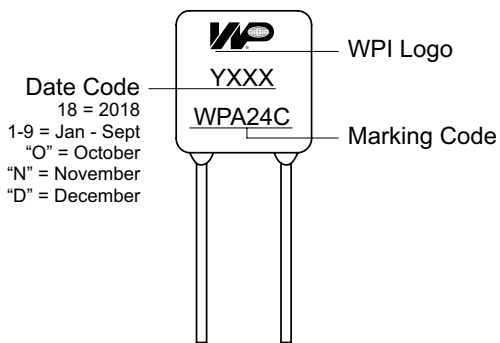
| Items | WPA Series | | | |
|-------|-------------|------|---------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| D | -- | 13.0 | -- | 0.512 |
| H | -- | 16.0 | -- | 0.630 |
| T | -- | 6.5 | -- | 0.256 |
| L | 10.0 | -- | 0.394 | -- |
| K | -- | 3.5 | -- | 0.138 |
| F | 8.05 ± 0.8 | | 0.317 ± 0.031 | |
| d | 0.8 ± 0.1 | | 0.031 ± 0.004 | |

WPA Series – Automotive TVS Diode (continued)

Part Numbering System

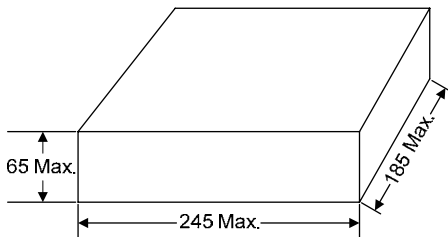


Part Making System

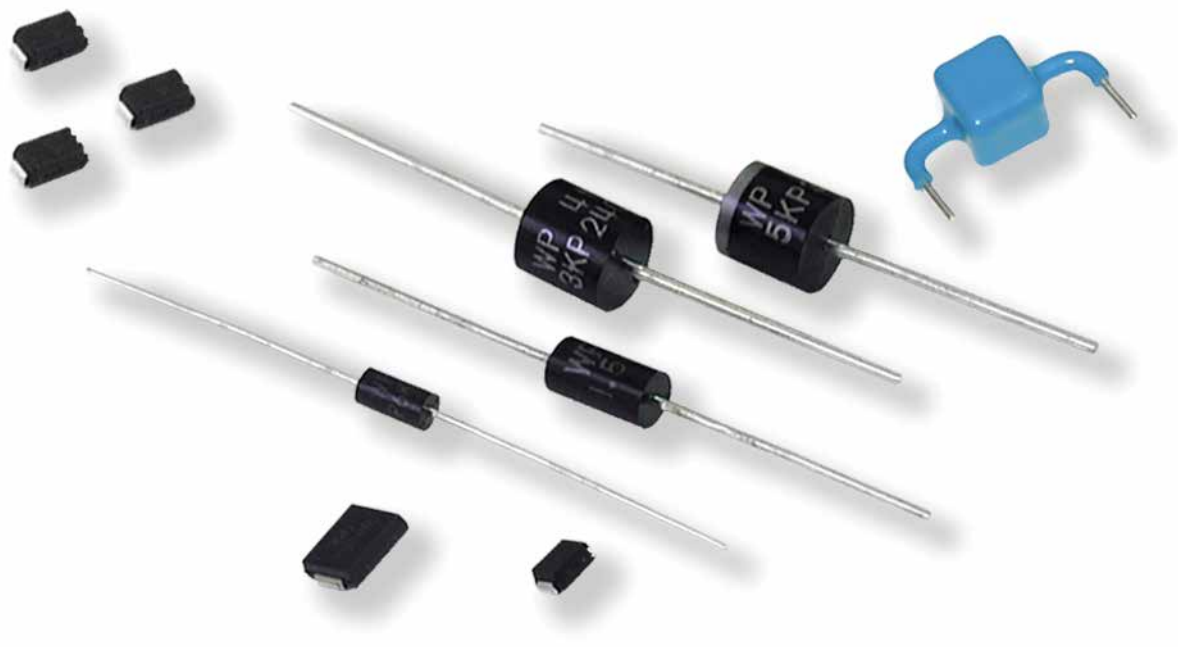


Bulk Packaging

200pcs/box



TVS Diodes



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.)

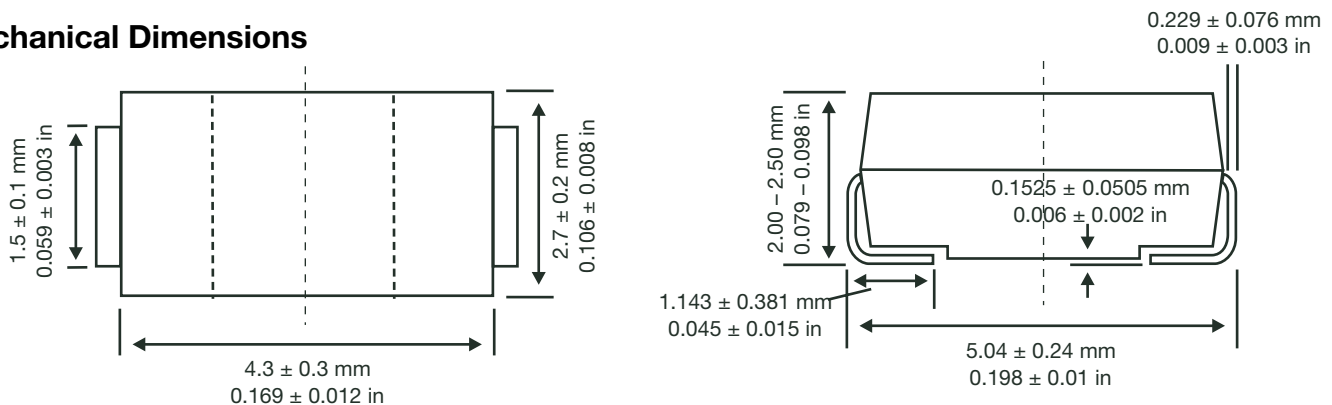
Absolute Maximum Ratings

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

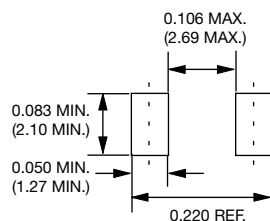
Mechanical Characteristics

- DO-214AC 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 V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|--------------------|-------------------|--|-------------------------|------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 V_{WM} <= 10V, their I_D limit is doubled.

= See General Information for Impulse Current Waveform.

TVS Diodes

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 | | | |
| 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 <= 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 | | | |
| 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 V _{WM} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{PPM} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{PPM} # |
|--------------|--------------------|-------------------|--|-------------------------|-----|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 V_{WM} <= 10V, their I_D 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.)

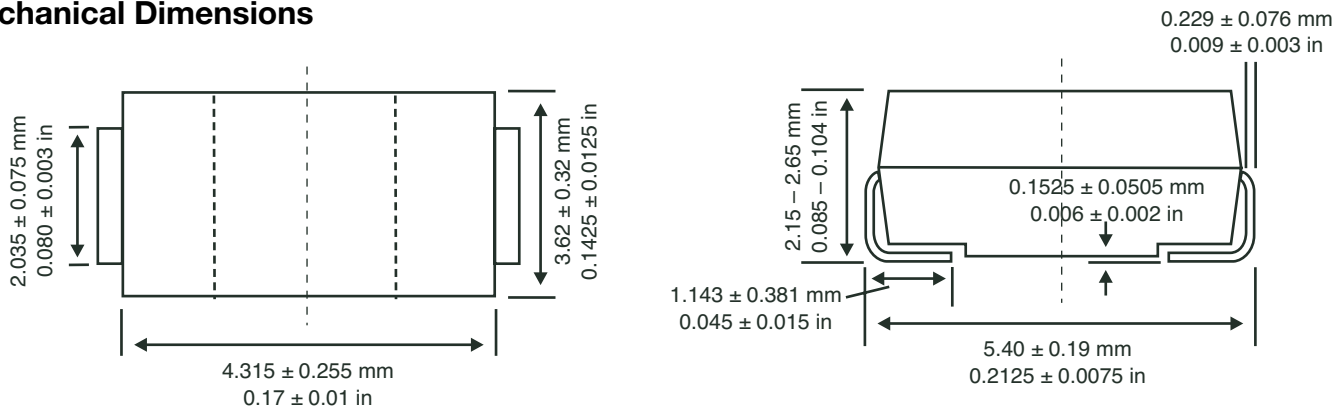
Absolute Maximum Ratings

| 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 |

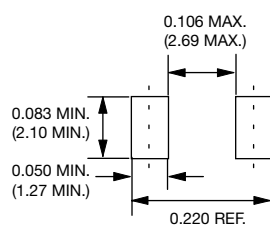
Mechanical Characteristics

- DO-214AA 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 V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|------------------|-----------------|--|-------------------------|------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 V_{WM} <= 10V, their I_D limit is doubled.

= See General Information for Impulse Current Waveform.

TVS Diodes

P6SMBJ Series – 600 Watt Surface Mount (continued)

Electrical Characteristics (continued)

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|------------------|-----------------|--|-------------------------|------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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_{WM} <= 10V, their I_D 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 _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|------------------|-----------------|--|-------------------------|-------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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_{WM} <= 10V, their I_D 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 _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|------------------|-----------------|--|-------------------------|-------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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_{WM} <= 10V, their I_D 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.)

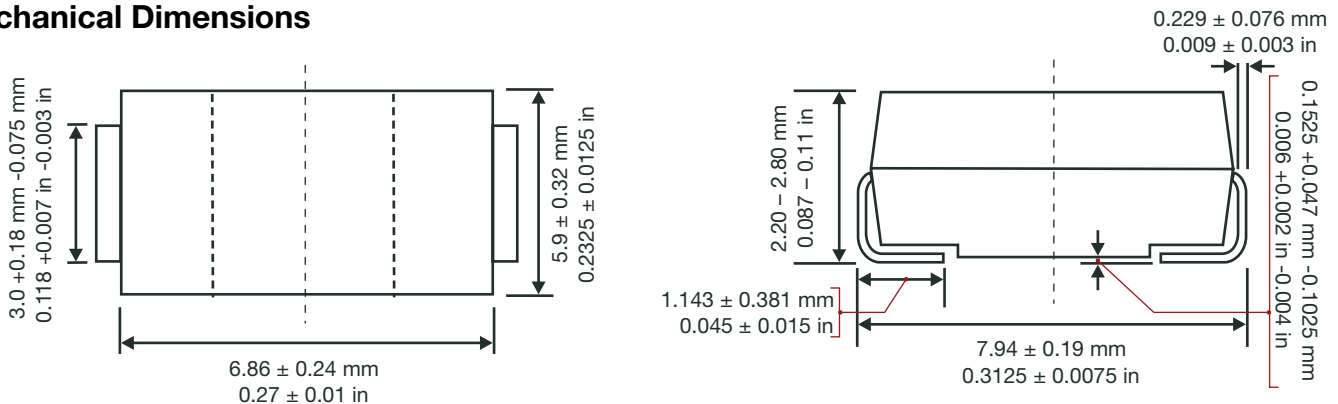
Absolute Maximum Ratings

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

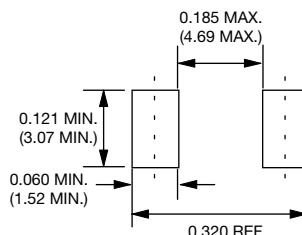
Mechanical Characteristics

- DO-214AB 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 V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|------------------|-----------------|--|-------------------------|------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 V_{WM} <= 10V, their I_D limit is doubled.

= See General Information for Impulse Current Waveform.

TVS Diodes

1.5SMCJ Series – 1500 Watt Surface Mount (continued)

Electrical Characteristics (continued)

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000µs Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000µs Rated Peak Impulse Current I _{ppm} # |
|--------------|------------------|-----------------|--|-------------------------|------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 V_{WM} <= 10V, their I_D limit is doubled.

= See General Information for Impulse Current Waveform.

TVS Diodes

1.5SMCJ Series – 1500 Watt Surface Mount (continued)

Electrical Characteristics (continued)

| Part Number* | Uni Part Marking | Bi Part Marking | Rated Standoff Voltage V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000µs Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000µs Rated Peak Impulse Current I _{ppm} # |
|--------------|------------------|-----------------|--|-------------------------|-------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 V_{WM} <= 10V, their I_D 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 _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|------------------|-----------------|--|-------------------------|-------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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_{WM} <= 10V, their I_D 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.)

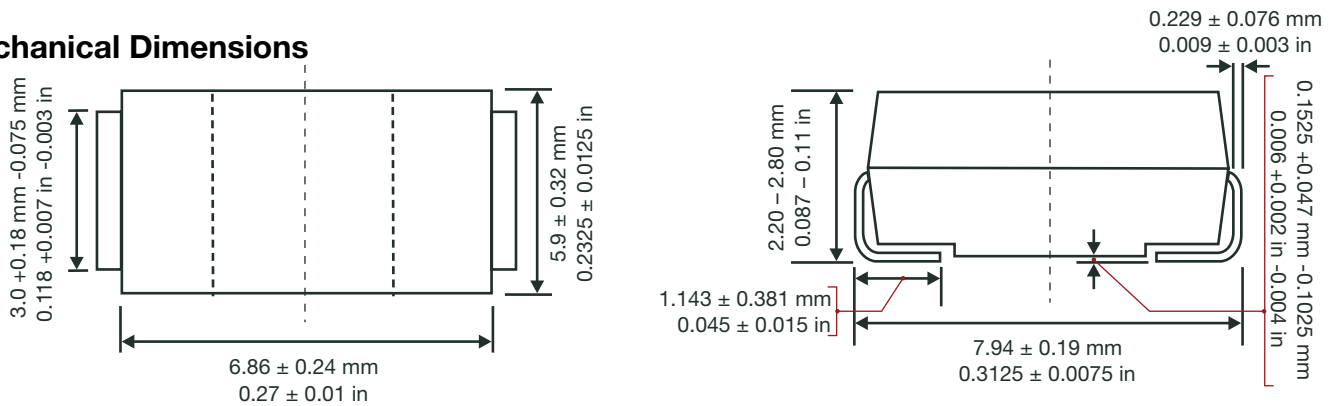
Absolute Maximum Ratings

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

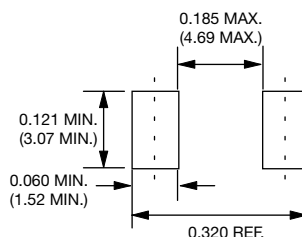
Mechanical Characteristics

- DO-214AB 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 V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM+} I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|--------------------|-------------------|--|-------------------------|------|-----------------|---|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 V_{WM} <= 10V, their I_D 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 | | | |
| 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 | HFK/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 | | | |
| 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 | HFV | IFV | 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 V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} + I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|--------------------|-------------------|--|-------------------------|-------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 |

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

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

+ = For Bidirectional Types Having V_{WM} <= 10V, their I_D limit is doubled.

= 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.)

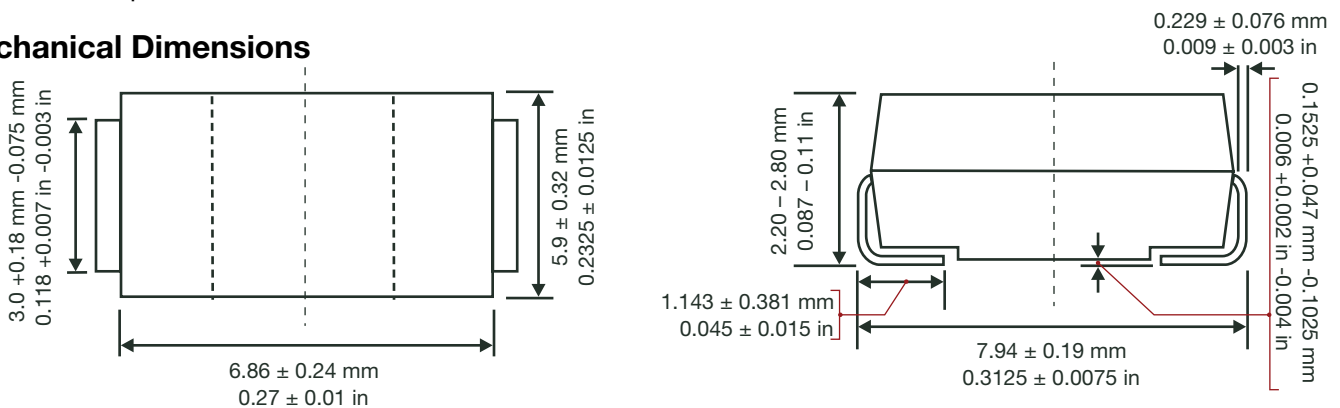
Absolute Maximum Ratings

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

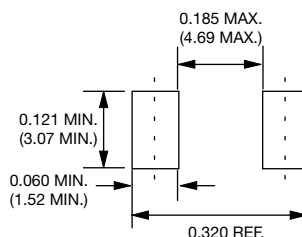
Mechanical Characteristics

- DO-214AB 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 (continued)

Electrical Characteristics (continued)

| Part Number* | Uni Part Marking** | Bi Part Marking** | Rated Standoff Voltage V _{wm} | Breakdown Voltage | | | Maximum Stand By Current @V _{WM} I _d | 10/1000 μ s Maximum Clamping Voltage @I _{ppm} # V _c Max | 10/1000 μ s Rated Peak Impulse Current I _{ppm} # |
|--------------|--------------------|-------------------|--|-------------------------|-------|-----------------|--|---|---|
| | | | | V _{br} (Volts) | | @I _t | | | |
| | | | | (Volts) | Min | Max | | | |
| 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 V_{WM} <= 10V, their ID limit is doubled.

= See General Information for Impulse Current Waveform.

6.6SMEJ Series – 6600 Watt Surface Mount



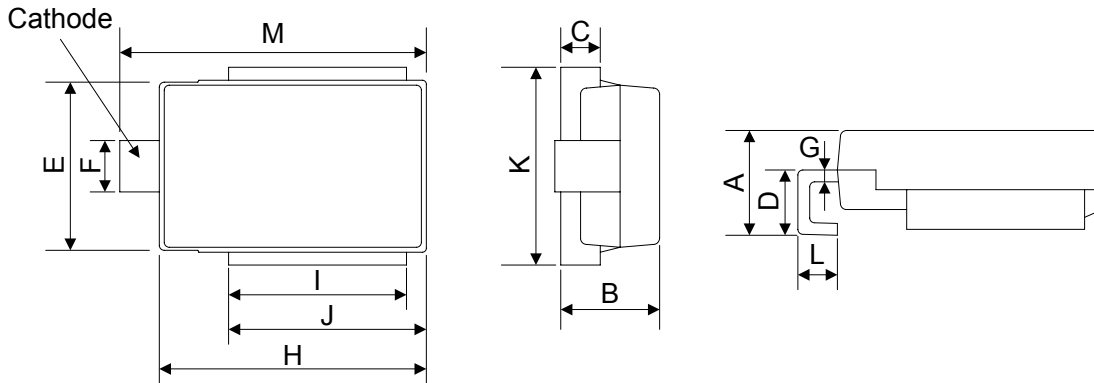
6.6SMEJ Series Features

- 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 (continued)

Electrical Characteristics

| Part Number* | Marking | Standoff Voltage V_{RWM} (V) | Breakdown Voltage | | | Surge Discharge Current | Maximum Clamping Voltage | Reverse Leakage |
|--------------|---------|-----------------------------------|-------------------|------|---------|----------------------------------|--------------------------|-----------------------------|
| | | | V_{br} (Volts) | | @ I_t | | | |
| | | (Volts) | Min. | Max. | (mA) | I_{PP} (A) @10/1000 μ s | V_C (V) @ I_{PP} | I_R (μ 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 |

PA4SMAJ Series (continued)



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 μ 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 μ s waveform. (Note1 & 2, Fig. 1) | P _{PPM} | Minimum 400 | Watts |
| Peak Pulse Current on 10/1000 μ s waveform. (Note 1, Fig. 2) | I _{PPM} | See Table | Amps |
| Steady State Power Dissipation at TL = 75°C. Lead lengths .375 in. (9.5mm). (Note 2, Fig. 5) | P _{M(AV)} | 3.3 | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method). (Note 3, Fig. 6) | I _{FSM} | 40 | Amps |
| Operating junction and Storage Temperature Range. | T _J , T _{STG} | -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

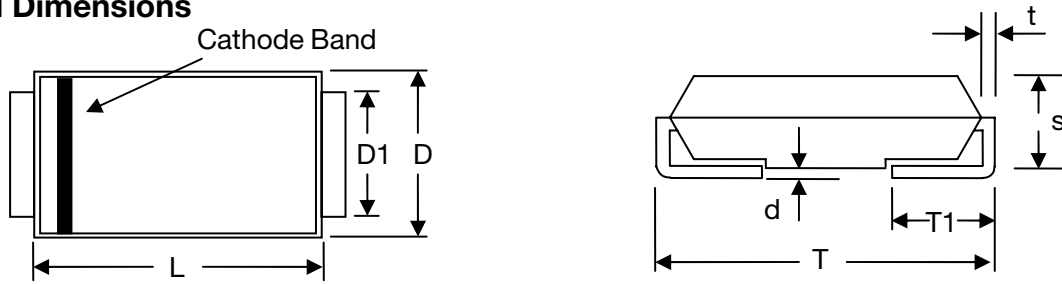
- Case: JEDEC DO-214AC. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted positive end (cathode) except Bi-directional
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.002 ounce, 0.061 grams

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.

PA4SMAJ Series (continued)

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

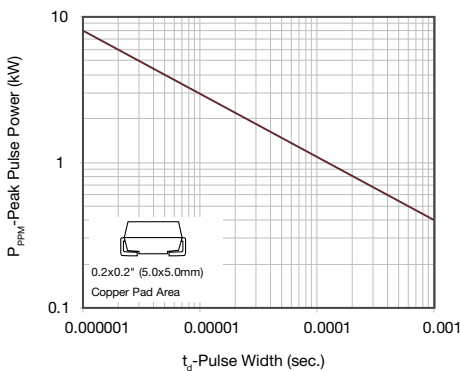


Figure 2 - Pulse Derating Curve

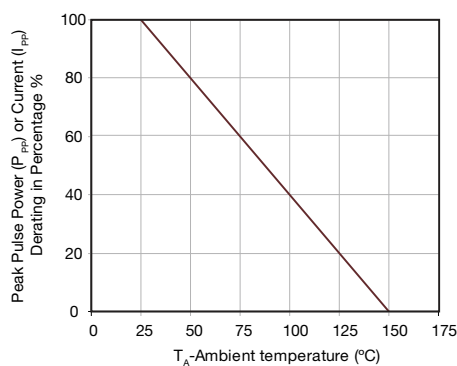


Figure 3 - Pulse Waveform

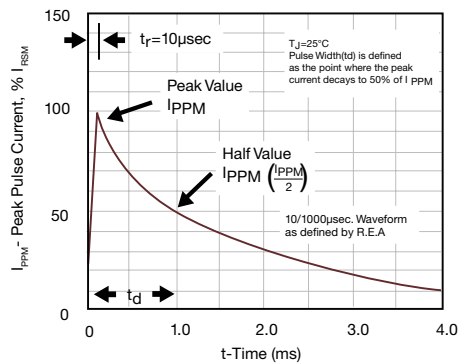


Figure 4 - Typical Junction Capacitance

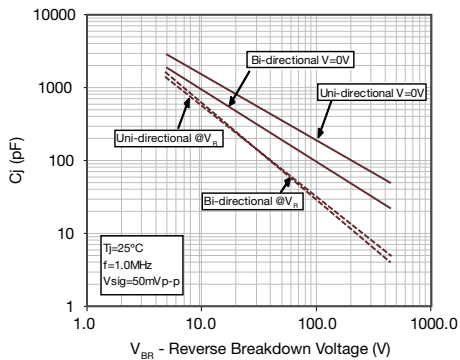


Figure 5 - Steady State Power Dissipation Derating Curve

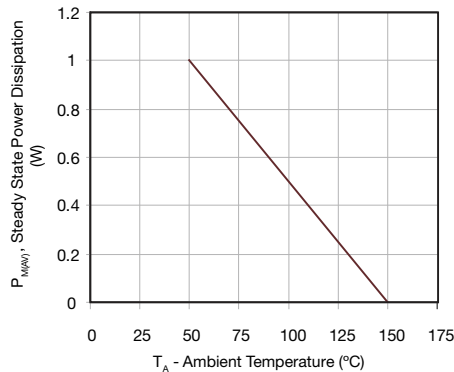
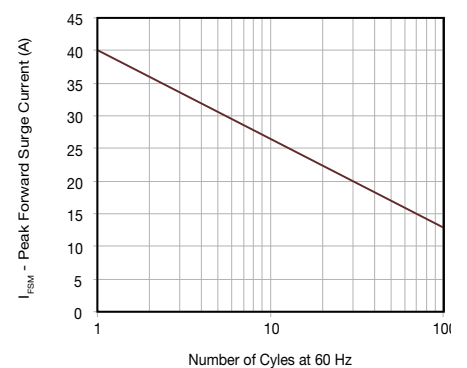


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



PA4SMAJ Series (continued)

Electrical Characteristics

| Part Number | | Device Marking Code | | Reverse Standoff Voltage | Breakdown Voltage @I _T | | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} |
|-------------|--------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|---|---------------------|-----------------------------------|
| Uni Polar | Bi Polar | UNI | BI | V _{RWM} (V) | V _{BR} MIN. (V) | V _{BR} MAX. (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (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_{RWM} of 10 volts and less, the I_R limit is double.

PA4SMAJ Series (continued)

Electrical Characteristics (continued)

| Part Number | | Device Marking Code | | Reverse Standoff Voltage | Breakdown Voltage @I _T | | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} |
|-------------|--------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|---|---------------------|-----------------------------------|
| Uni Polar | Bi Polar | UNI | BI | V _{RWM} (V) | V _{BR} MIN. (V) | V _{BR} MAX. (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (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_{RWM} of 10 volts and less, the I_R 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 μ 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 μ s waveform. (Note1 & 2, Fig. 1) | P _{PPM} | Minimum 600 | Watts |
| Peak Pulse Current on 10/1000 μ s waveform. (Note 1, Fig. 3) | I _{PPM} | See Table | Amps |
| Steady State Power Dissipation at TL = 75°C. Lead lengths .375 in. (9.5mm). (Note 2, Fig. 5) | P _{M(AV)} | 5.0 | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method). (Note 3, Fig. 6) | I _{FSM} | 100 | Amps |
| Operating junction and Storage Temperature Range. | T _J , T _{STG} | -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

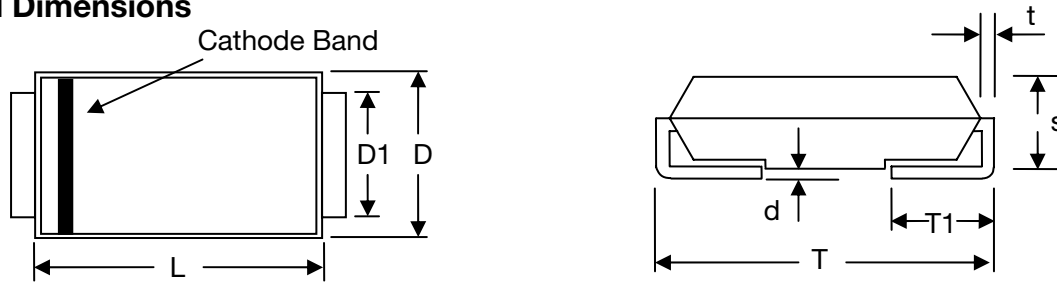
- Case: JEDEC DO-214AA. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted positive end (cathode) except Bi-directional
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.003 ounce, 0.093 grams

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.

PA6SMBJ Series (continued)

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

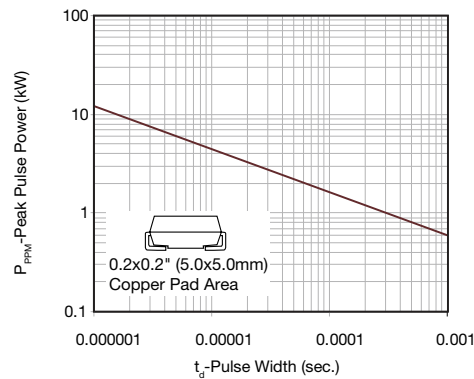


Figure 2 - Pulse Derating Curve

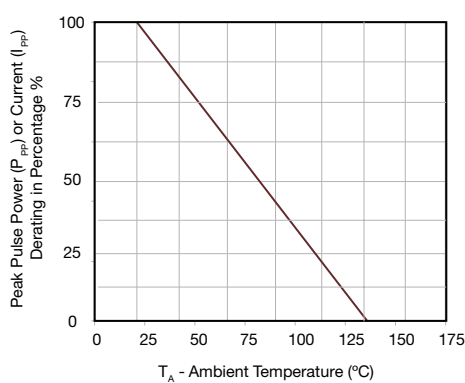


Figure 3 - Pulse Waveform

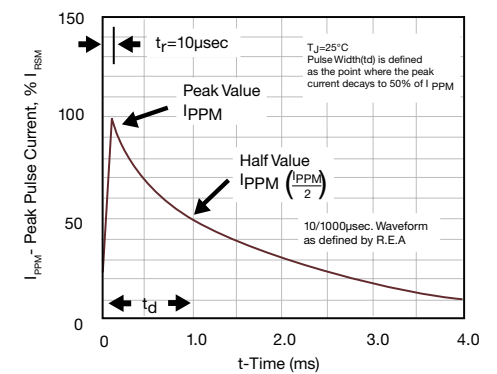


Figure 4 - Typical Junction Capacitance

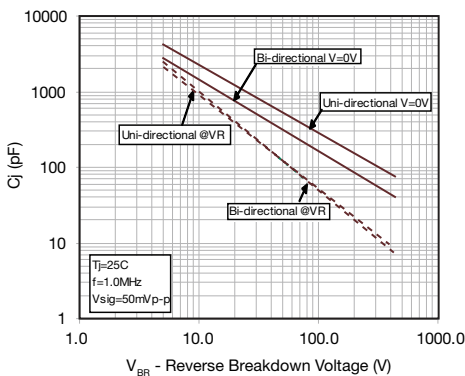


Figure 5 - Steady State Power Dissipation Derating Curve

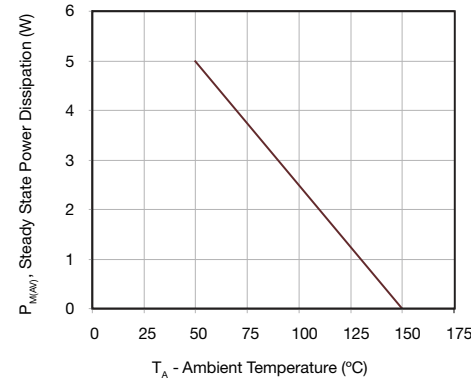
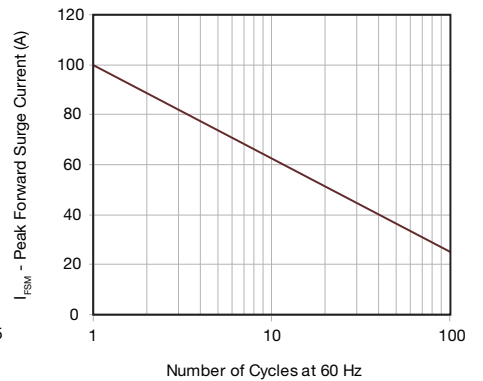


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



PA6SMBJ Series (continued)

Electrical Characteristics

| Part Number | | Device Marking Code | | Reverse Standoff Voltage | Breakdown Voltage @I _T | | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} |
|-------------|--------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|---|---------------------|-----------------------------------|
| Uni Polar | Bi Polar | UNI | BI | V _{RWM} (V) | V _{BR} MIN. (V) | V _{BR} MAX. (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (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_{RWM} of 10 volts and less, the I_R limit is double.

PA6SMBJ Series (continued)

Electrical Characteristics (continued)

| Part Number | | Device Marking Code | | Reverse Standoff Voltage | Breakdown Voltage @I _T | | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} |
|-------------|--------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|---|---------------------|-----------------------------------|
| Uni Polar | Bi Polar | UNI | BI | V _{RWM} (V) | V _{BR} MIN. (V) | V _{BR} MAX. (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (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_{RWM} of 10 volts and less, the I_R 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 μ 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 μ s waveform. (Note1 & 2, Fig. 1) | P _{PPM} | Minimum 1500 | Watts |
| Peak Pulse Current on 10/1000 μ s waveform. (Note 1, Fig. 3) | I _{PPM} | See Table | Amps |
| Steady State Power Dissipation at TL = 75°C. Lead lengths .375 in. (9.5mm). (Note 2, Fig. 5) | P _{M(AV)} | 6.5 | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method). (Note 3, Fig. 6) | I _{FSM} | 200 | Amps |
| Operating junction and Storage Temperature Range. | T _J , T _{STG} | -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

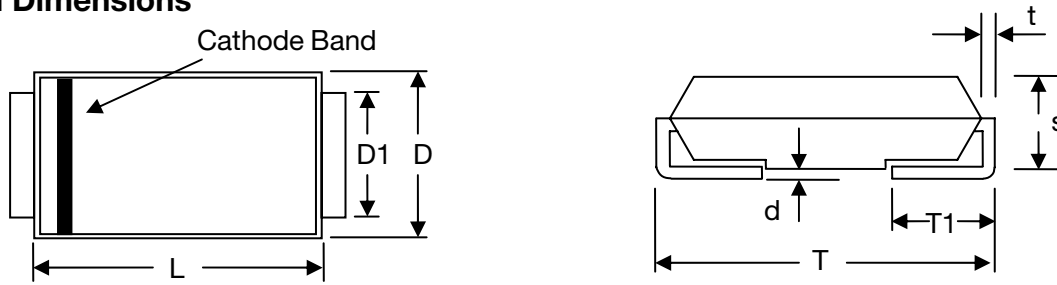
- Case: JEDEC DO-214AB. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted positive end (cathode) except Bi-directional
- Standard Packaging: 16mm tape (EIA STD RS-481)
- Weight: 0.007 ounce, 0.21 grams

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.

1.5ASMCJ Series (continued)

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

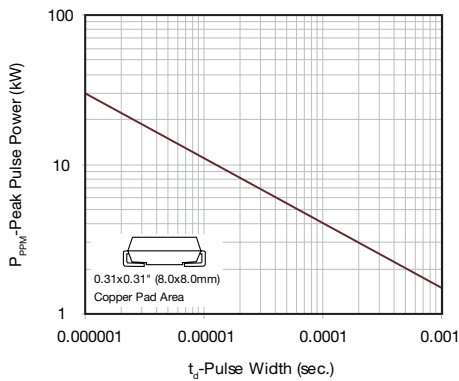


Figure 2 - Pulse Derating Curve

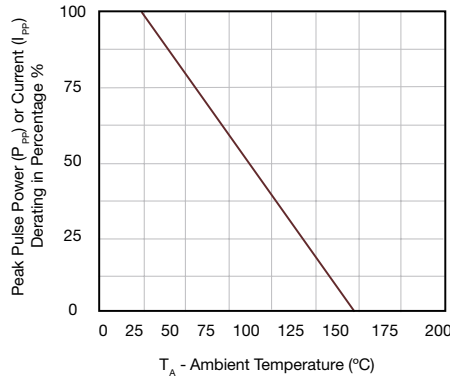


Figure 3 - Pulse Waveform

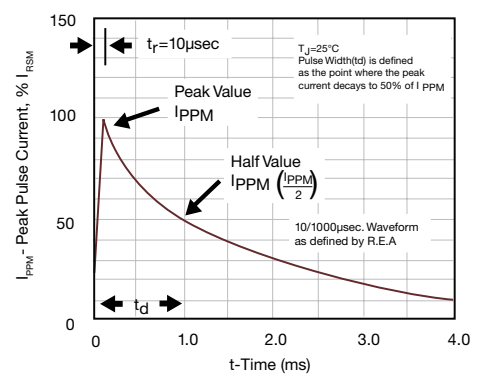


Figure 4 - Typical Junction Capacitance

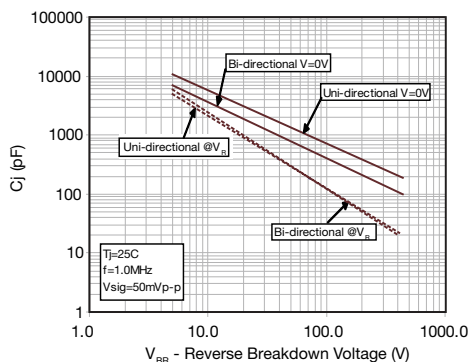


Figure 5 - Steady State Power Dissipation Derating Curve

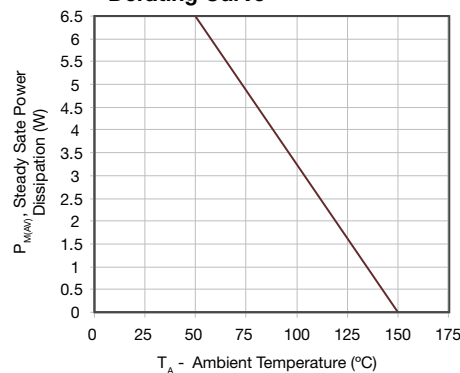
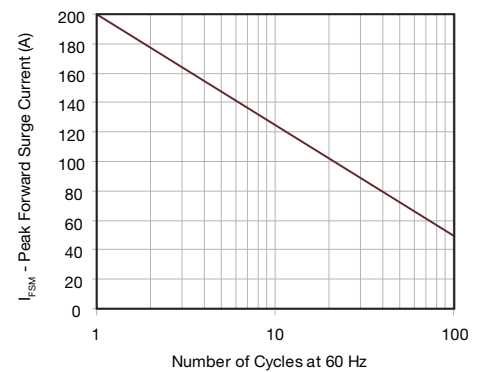


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



1.5ASMCJ Series (continued)

Electrical Characteristics

| Part Number | | Device Marking Code | | Reverse Standoff Voltage | Breakdown Voltage @I _T | | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} |
|--------------|---------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|---|---------------------|-----------------------------------|
| Uni Polar | Bi Polar | UNI | BI | V _{RWM} (V) | V _{BR} MIN. (V) | V _{BR} MAX. (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (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_{RWM} of 10 volts and less, the I_R limit is double.

1.5ASMCJ Series (continued)**Electrical Characteristics (continued)**

| Part Number | | Device Marking Code | | Reverse Standoff Voltage | Breakdown Voltage @I _T | | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} |
|--------------|---------------|---------------------|------|--------------------------|-----------------------------------|--------------------------|---------------------|---|---------------------|-----------------------------------|
| Uni Polar | Bi Polar | UNI | BI | V _{RWM} (V) | V _{BR} MIN. (V) | V _{BR} MAX. (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (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_{RWM} of 10 volts and less, the I_R limit is double.

P6SMAJ Series



P6SMAJ Series Features

- For surface mounted applications in order to optimize board space
- Low profile package
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical I_R less than 1 μ A above 10V
- High Temperature soldering: 260°C/10 seconds at terminals
- Plastic package has underwriter laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020
- UL497B Recognized, File #E135015

Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

| Rating | Symbol | Value | Units |
|---|------------------------------------|-------------|-------|
| Peak pulse power dissipation on 10/1000 μ s waveform. (Note 1 & 2, Fig. 1) | P _{PPM} | Minimum 600 | Watts |
| Peak Pulse Current on 10/1000 μ s waveform. (Note 1, Fig. 3) | I _{PPM} | See Table | Amps |
| Steady State Power Dissipation at T _A = 50°C. (Fig. 5) | P _{M(AV)} | 3.3 | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method). (Note 3, Fig. 6) | I _{FSM} | 100 | Amps |
| Operating junction and Storage Temperature Range. | T _J , T _{STG} | -65 to +150 | °C |
| Typical Thermal Resistance Junction to Lead | R _{θJL} | 20 | °C/W |
| Typical Thermal Resistance Junction to Ambient | R _{θJA} | 100 | °C/W |

- Notes:**
1. Non-repetitive current pulse, per Fig. 3 and derated above T_A = 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

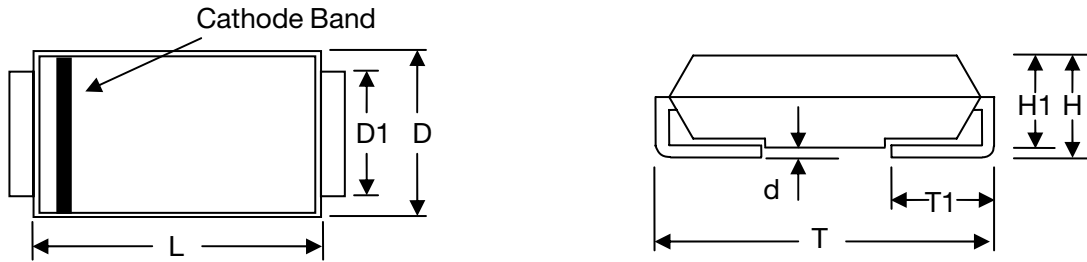
- Case: JEDEC DO-214AC. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denoted positive end (cathode) except Bi-directional models
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.07 grams

Applications

- I/O Interface
- AC/DC Power Supply
- Low Frequency Transmission Line (RS232, RS485, etc.)

P6SMAJ Series (continued)

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 |
| H | 2.00 | 2.50 | 0.079 | 0.098 |
| H1 | 1.98 | 2.29 | 0.078 | 0.090 |

Ratings and Characteristics Curves

(TA = 25°C unless otherwise noted)

Figure 1 - Peak Pulse Power Rating Curve

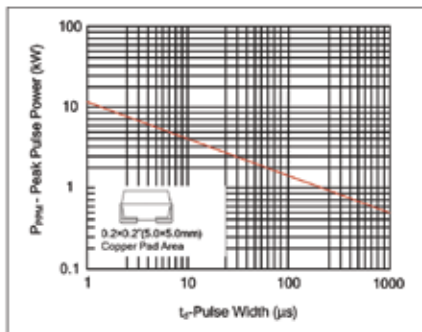


Figure 2 - Pulse Derating Curve

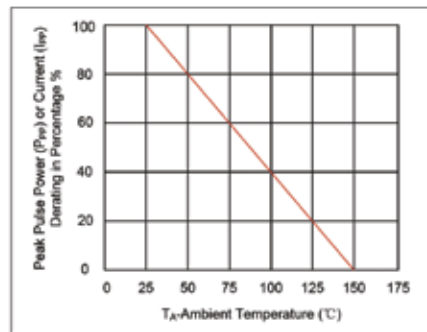


Figure 3 - Pulse Waveform

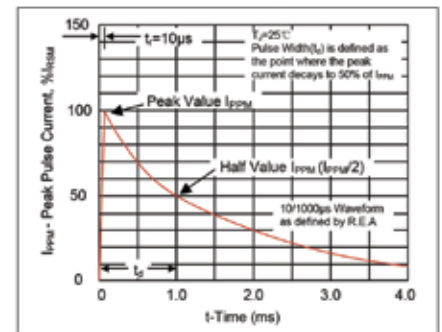


Figure 4 - Typical Junction Capacitance

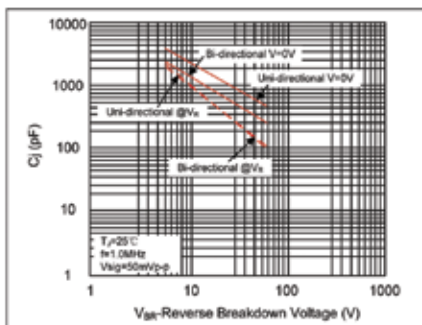


Figure 5 - Steady State Power Dissipation Derating Curve

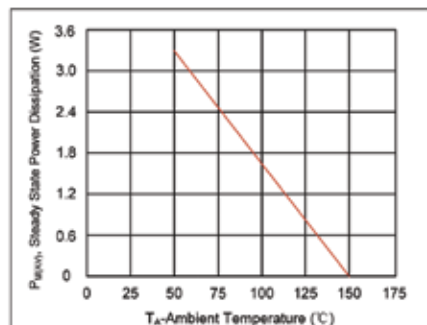
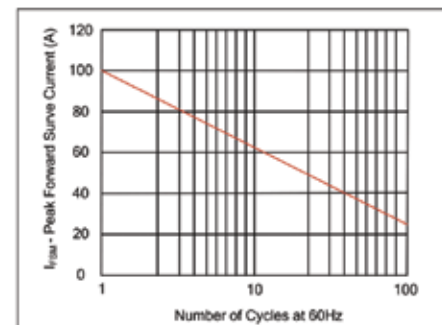


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



P6SMAJ Series (continued)**Electrical Characteristics (T_A = 25°C)**

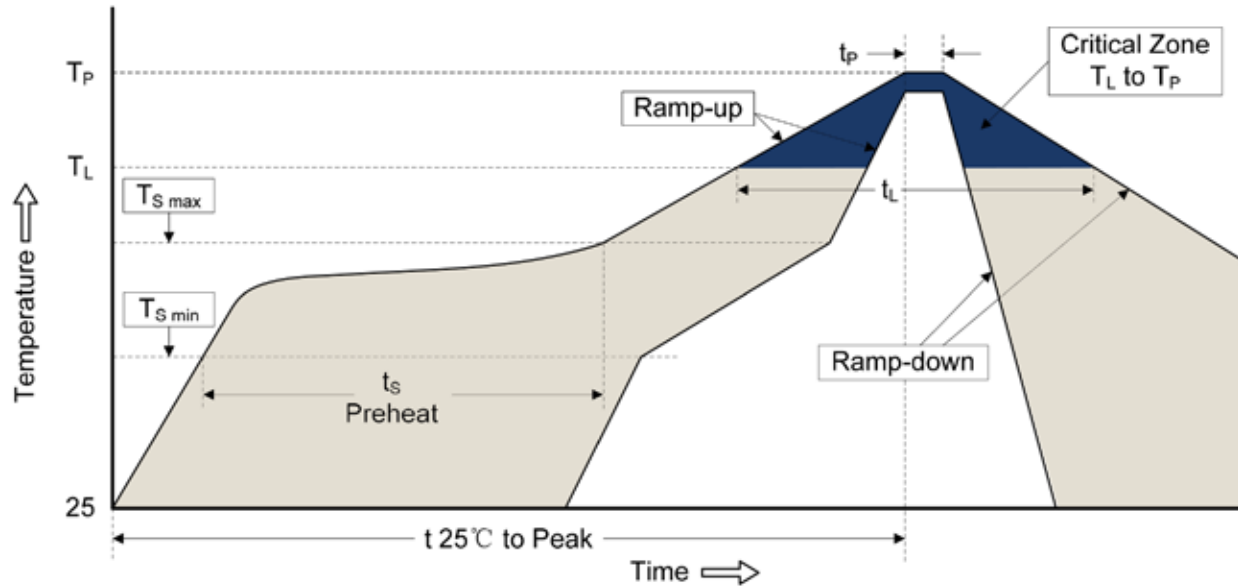
| Part Number | | Device Marking Code | | Reverse Standoff Voltage | Breakdown Voltage @I _T | Test Current | Maximum Clamping Voltage @I _{PP} | Peak Pulse Current | Reverse Leakage @V _{RWM} |
|----------------|---------------|---------------------|----|--------------------------|-----------------------------------|--------------|---|--------------------|-----------------------------------|
| Unidirectional | Bidirectional | UNI | BI | V _{RWM} (V) | V _{BR} (V) | | | | |
| P6SMAJ6.0A | P6SMAJ6.0CA | AG | WG | 6.0 | 6.67~7.37 | 10 | 10.3 | 58.3 | 800 |
| P6SMAJ6.5A | P6SMAJ6.5CA | AK | WK | 6.5 | 7.22~7.98 | 10 | 11.2 | 53.6 | 500 |
| P6SMAJ7.0A | P6SMAJ7.0CA | AM | WM | 7.0 | 7.78~8.60 | 10 | 12.0 | 50.0 | 200 |
| P6SMAJ7.5A | P6SMAJ7.5CA | AP | WP | 7.5 | 8.33~9.21 | 1 | 12.9 | 46.6 | 100 |
| P6SMAJ8.0A | P6SMAJ8.0CA | AR | WR | 8.0 | 8.89~9.83 | 1 | 13.6 | 44.2 | 50 |
| P6SMAJ8.5A | P6SMAJ8.5CA | AT | WT | 8.5 | 9.44~10.40 | 1 | 14.4 | 41.7 | 20 |
| P6SMAJ9.0A | P6SMAJ9.0CA | AV | WV | 9.0 | 10.00~11.10 | 1 | 15.4 | 39.0 | 10 |
| P6SMAJ10A | P6SMAJ10CA | AX | WX | 10.0 | 11.10~12.30 | 1 | 17.0 | 35.3 | 5 |
| P6SMAJ11A | P6SMAJ11CA | AZ | WZ | 11.0 | 12.20~13.50 | 1 | 18.2 | 33.0 | 1 |
| P6SMAJ12A | P6SMAJ12CA | BE | XE | 12.0 | 13.30~14.70 | 1 | 19.9 | 30.2 | 1 |
| P6SMAJ13A | P6SMAJ13CA | BG | XG | 13.0 | 14.40~15.90 | 1 | 21.5 | 28.0 | 1 |
| P6SMAJ14A | P6SMAJ14CA | BK | XK | 14.0 | 15.60~17.20 | 1 | 23.2 | 25.9 | 1 |
| P6SMAJ15A | P6SMAJ15CA | BM | XM | 15.0 | 16.70~18.50 | 1 | 24.4 | 24.6 | 1 |
| P6SMAJ16A | P6SMAJ16CA | BP | XP | 16.0 | 17.80~19.70 | 1 | 26.0 | 23.1 | 1 |
| P6SMAJ17A | P6SMAJ17CA | BR | XR | 17.0 | 18.90~20.90 | 1 | 27.6 | 21.8 | 1 |
| P6SMAJ18A | P6SMAJ18CA | BT | XT | 18.0 | 20.00~22.10 | 1 | 29.2 | 20.6 | 1 |
| P6SMAJ20A | P6SMAJ20CA | BV | XV | 20.0 | 22.20~24.50 | 1 | 32.4 | 18.6 | 1 |
| P6SMAJ22A | P6SMAJ22CA | BX | XX | 22.0 | 24.40~26.90 | 1 | 35.5 | 16.9 | 1 |
| P6SMAJ24A | P6SMAJ24CA | BZ | XZ | 24.0 | 26.70~29.50 | 1 | 38.9 | 15.5 | 1 |
| P6SMAJ26A | P6SMAJ26CA | CE | YE | 26.0 | 28.90~31.90 | 1 | 42.1 | 14.3 | 1 |
| P6SMAJ28A | P6SMAJ28CA | CG | YG | 28.0 | 31.10~34.40 | 1 | 45.4 | 13.3 | 1 |
| P6SMAJ30A | P6SMAJ30CA | CK | YK | 30.0 | 33.30~36.80 | 1 | 48.4 | 12.4 | 1 |
| P6SMAJ33A | P6SMAJ 33CA | CM | YM | 33.0 | 36.70~40.60 | 1 | 53.3 | 11.3 | 1 |
| P6SMAJ36A | P6SMAJ36CA | CP | YP | 36.0 | 40.00~44.20 | 1 | 58.1 | 10.4 | 1 |
| P6SMAJ40A | P6SMAJ40CA | CR | YR | 40.0 | 44.40~49.10 | 1 | 64.5 | 9.3 | 1 |

Note: For bi-directional type having V_{RWM} of 10 volts and less, the I_R limit is double.

P6SMAJ Series (continued)

Recommended Soldering Conditions

Reflow Soldering

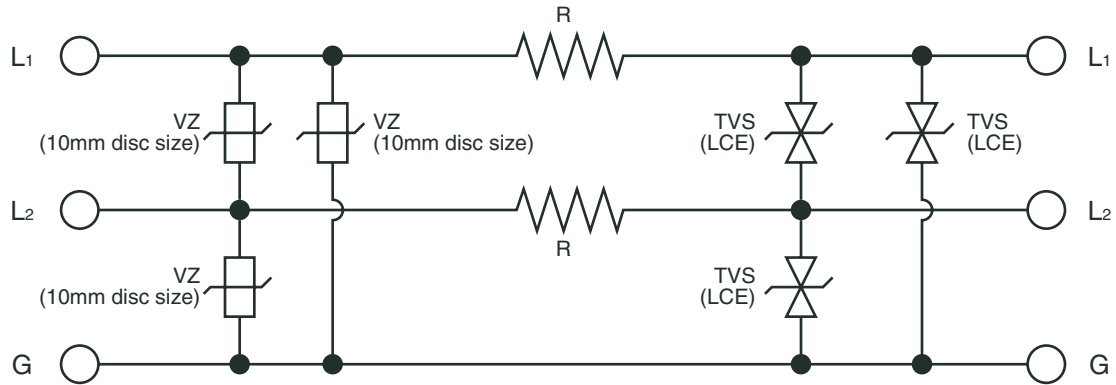


Recommended Conditions

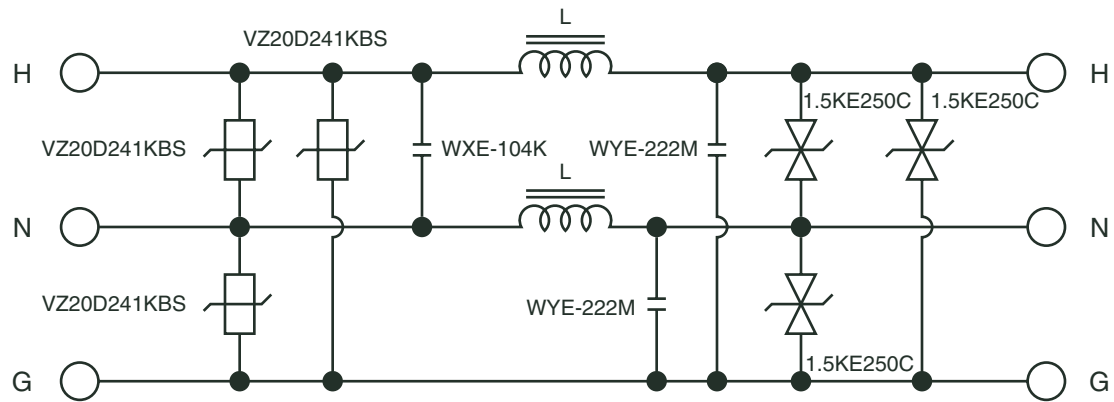
| Profile Feature | Pb-Free Assembly |
|--|------------------|
| Average Ramp-Up Rate (T_L to T_P) | 3°C/second max. |
| Preheat: | |
| -Temperature Min (T_S min) | 150°C |
| -Temperature Max (T_S max) | 200°C |
| -Time (min to max) (t_s) | 60-180 seconds |
| T_S max to T_L | |
| -Ramp-Up Rate | 3°C/second max. |
| Time Maintained above: | |
| -Temperature (T_L) | 217°C |
| -Time (t_L) | 60-150 seconds |
| Peak Temperature (T_P) | 260°C |
| Time within 5°C of actual Peak Temperature (t_p) | 20-40 seconds |
| Ramp-Down Rate | 6°C/second max. |
| Time 25°C to Peak Temperature | 8 minutes max. |

Circuit Examples

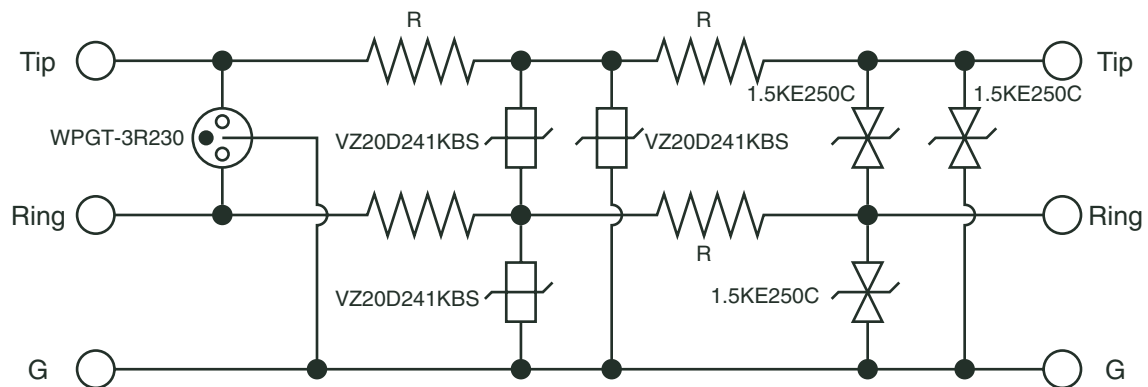
Data Line Protection



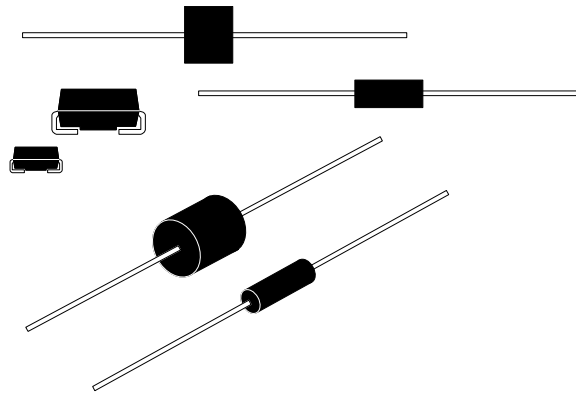
AC Line Protection



Telecom Circuit Protection

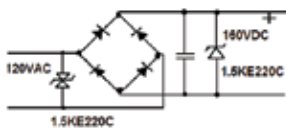


Applications

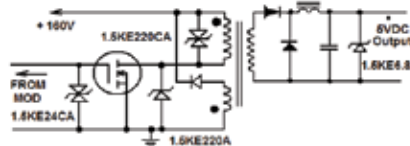


Transient Voltage Suppression Diodes or TVSD is a semiconductor diode with a single P-N junction which may operate in either direction and employs its breakdown characteristics as part of its function. This device limits (clamp) transient voltages and diverts transient currents.

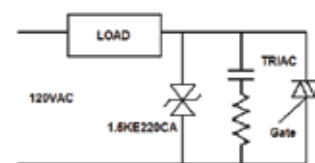
TVSD in Bridge Rectifier Protection



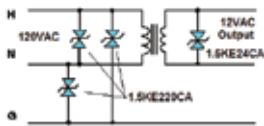
TVSD in SMPS Output Protection



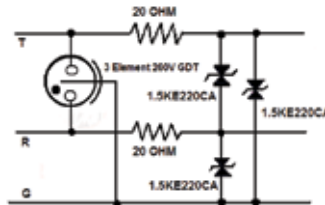
TVSD in Triac Protection



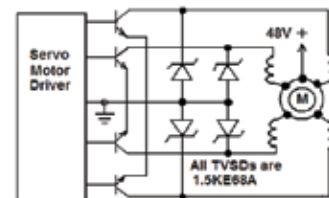
TVSD in AC Line Protection



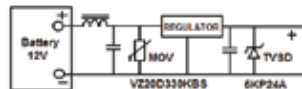
GDT & TVSD In Telephone Line Protection



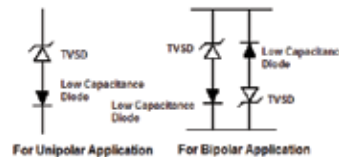
TVSD in Servo Motor Protection



TVSD in Automotive Equipment Protection



TVSD in Low Capacitance Applications



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