

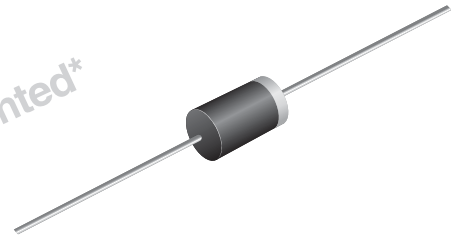
Automotive Transient Voltage Suppressors

High Temperature Stability & High Reliability Conditions

Major Ratings and Characteristics

| | |
|------------|---------------|
| $V_{(BR)}$ | 6.8 V to 47 V |
| P_{PPM} | 1500 W |
| P_D | 5.0 W |
| I_{FSM} | 200 A |
| T_j max. | 185 °C |

Patented*



Case Style 1.5KA

* Patent #'s
4,980,315
5,166,769
5,278,094

Features

- Patented PAR[®] construction
- Available in Unidirectional polarity only
- 1500 W peak pulse power capability with a 10/1000 μ s waveform
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Typical I_D less than 1.0 μ A above 15 V rating
- Solder Dip 260 °C, 40 seconds



Typical Applications

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive, and Telecommunication

Mechanical Data

Case: Molded plastic body over passivated junction
Epoxy meets UL-94V-0 Flammability rating

Terminals: Matte tin plated leads, solderable per J-STD-002B and JESD22-B102D

E3 suffix for commercial grade, HE3 suffix for high reliability grade (AEC Q101 qualified)

Polarity: Color band denotes cathode end

Maximum Ratings

($T_A = 25$ °C, unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|----------------|----------------|------|
| Peak pulse power dissipation with a 10/1000 μ s waveform ⁽¹⁾ (Fig. 1) | P_{PPM} | Minimum 1500 | W |
| Peak pulse current at $T_A = 25$ °C with a 10/1000 μ s waveform ⁽¹⁾ (Fig. 3) | I_{PPM} | See Next Table | A |
| Power dissipation on infinite heatsink at $T_L = 75$ °C (Fig. 5) | P_D | 5.0 | W |
| Peak forward surge current 8.3 ms single half sine-wave ⁽²⁾ | I_{FSM} | 200 | A |
| Maximum instantaneous forward voltage at 100 A ⁽²⁾ | V_F | 3.5 | V |
| Operating junction and storage temperature range | T_J, T_{STG} | - 65 to + 185 | °C |

Notes:

(1) Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25$ °C per Fig. 2

(2) 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minutes maximum

1.5KA6.8 thru 1.5KA47A



Vishay Semiconductors

Electrical Characteristics

(T_A = 25 °C unless otherwise noted)

| Device Type | Breakdown Voltage V _(BR) ⁽¹⁾ at I _T (V) | | Test Current I _T (mA) | Stand-off Voltage V _{WM} (Volts) | Maximum Reverse Leakage at V _{WM} I _D (μA) | T _J = 150 °C | Peak Pulse Current I _{PPM} ⁽²⁾ (Amps) | Maximum Clamping Voltage at I _{PPM} V _C (Volts) | Maximum Temp. Coefficient of V _(BR) (% / °C) |
|-------------|--|------|---|--|--|--|---|---|--|
| | Min | Max | | | | Maximum Reverse Leakage at V _{WM} I _D (μA) | | | |
| 1.5KA6.8 | 6.12 | 7.48 | 10 | 5.50 | 1000 | 10000 | 139 | 10.8 | 0.057 |
| 1.5KA6.8A | 6.45 | 7.14 | 10 | 5.80 | 1000 | 10000 | 143 | 10.5 | 0.057 |
| 1.5KA7.5 | 6.75 | 8.25 | 10 | 6.05 | 500 | 5000 | 128 | 11.7 | 0.061 |
| 1.5KA7.5A | 7.13 | 7.88 | 10 | 6.40 | 500 | 5000 | 133 | 11.3 | 0.061 |
| 1.5KA8.2 | 7.38 | 9.02 | 10 | 6.63 | 200 | 2000 | 120 | 12.5 | 0.065 |
| 1.5KA8.2A | 7.79 | 8.61 | 10 | 7.02 | 200 | 2000 | 124 | 12.1 | 0.065 |
| 1.5KA9.1 | 8.19 | 10.0 | 1.0 | 7.37 | 50 | 500 | 109 | 13.8 | 0.068 |
| 1.5KA9.1A | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 500 | 112 | 13.4 | 0.068 |
| 1.5KA10 | 9.00 | 11.0 | 1.0 | 8.10 | 20 | 200 | 100 | 15.0 | 0.073 |
| 1.5KA10A | 9.50 | 10.5 | 1.0 | 8.55 | 20 | 200 | 103 | 14.5 | 0.073 |
| 1.5KA11 | 9.90 | 12.1 | 1.0 | 8.92 | 5.0 | 50 | 92.6 | 16.2 | 0.075 |
| 1.5KA11A | 10.5 | 11.6 | 1.0 | 9.40 | 5.0 | 50 | 96.2 | 15.6 | 0.076 |
| 1.5KA12 | 10.8 | 13.2 | 1.0 | 9.72 | 2.0 | 10 | 86.7 | 17.3 | 0.076 |
| 1.5KA12A | 11.4 | 12.6 | 1.0 | 10.2 | 2.0 | 10 | 89.8 | 16.7 | 0.078 |
| 1.5KA13 | 11.7 | 14.3 | 1.0 | 10.5 | 2.0 | 10 | 78.9 | 19.0 | 0.081 |
| 1.5KA13A | 12.4 | 13.7 | 1.0 | 11.1 | 2.0 | 10 | 82.4 | 18.2 | 0.081 |
| 1.5KA15 | 13.5 | 16.3 | 1.0 | 12.1 | 1.0 | 10 | 68.2 | 22.0 | 0.084 |
| 1.5KA15A | 14.3 | 15.8 | 1.0 | 12.8 | 1.0 | 10 | 70.8 | 21.2 | 0.084 |
| 1.5KA16 | 14.4 | 17.6 | 1.0 | 12.9 | 1.0 | 10 | 63.8 | 23.5 | 0.086 |
| 1.5KA16A | 15.2 | 16.8 | 1.0 | 13.6 | 1.0 | 10 | 66.7 | 22.5 | 0.086 |
| 1.5KA18 | 16.2 | 19.8 | 1.0 | 14.5 | 1.0 | 10 | 56.6 | 26.5 | 0.088 |
| 1.5KA18A | 17.1 | 18.9 | 1.0 | 15.3 | 1.0 | 10 | 59.5 | 25.2 | 0.088 |
| 1.5KA20 | 18.0 | 22.0 | 1.0 | 16.2 | 1.0 | 10 | 51.5 | 29.1 | 0.090 |
| 1.5KA20A | 19.0 | 21.0 | 1.0 | 17.1 | 1.0 | 10 | 54.2 | 27.7 | 0.090 |
| 1.5KA22 | 19.8 | 24.2 | 1.0 | 17.8 | 1.0 | 10 | 47.0 | 31.9 | 0.092 |
| 1.5KA22A | 20.9 | 23.1 | 1.0 | 18.8 | 1.0 | 10 | 49.0 | 30.6 | 0.092 |
| 1.5KA24 | 21.6 | 26.4 | 1.0 | 19.4 | 1.0 | 10 | 43.2 | 34.7 | 0.094 |
| 1.5KA24A | 22.8 | 25.2 | 1.0 | 20.5 | 1.0 | 10 | 45.2 | 33.2 | 0.094 |
| 1.5KA27 | 24.3 | 29.7 | 1.0 | 21.8 | 1.0 | 10 | 38.4 | 39.1 | 0.096 |
| 1.5KA27A | 25.7 | 28.4 | 1.0 | 23.1 | 1.0 | 10 | 40.0 | 37.5 | 0.096 |
| 1.5KA30 | 27.0 | 33.0 | 1.0 | 24.3 | 1.0 | 10 | 34.5 | 43.5 | 0.097 |
| 1.5KA30A | 28.5 | 31.5 | 1.0 | 25.6 | 1.0 | 10 | 36.2 | 41.4 | 0.097 |
| 1.5KA33 | 29.7 | 36.3 | 1.0 | 26.8 | 1.0 | 10 | 31.4 | 47.7 | 0.098 |
| 1.5KA33A | 31.4 | 34.7 | 1.0 | 28.2 | 1.0 | 10 | 32.8 | 45.7 | 0.098 |
| 1.5KA36 | 32.4 | 39.6 | 1.0 | 29.1 | 1.0 | 10 | 28.8 | 52.0 | 0.099 |
| 1.5KA36A | 34.2 | 37.8 | 1.0 | 30.8 | 1.0 | 10 | 30.1 | 49.9 | 0.099 |
| 1.5KA39 | 35.1 | 42.9 | 1.0 | 31.6 | 1.0 | 10 | 26.6 | 56.4 | 0.100 |
| 1.5KA39A | 37.1 | 41.0 | 1.0 | 33.3 | 1.0 | 10 | 27.8 | 53.9 | 0.100 |
| 1.5KA43 | 38.7 | 47.3 | 1.0 | 34.8 | 1.0 | 20 | 24.2 | 61.9 | 0.101 |
| 1.5KA43A | 40.9 | 45.2 | 1.0 | 36.8 | 1.0 | 20 | 25.3 | 59.3 | 0.101 |
| 1.5KA47 | 42.3 | 51.7 | 1.0 | 38.1 | 1.0 | 20 | 22.1 | 67.8 | 0.101 |
| 1.5KA47A | 44.7 | 49.4 | 1.0 | 40.2 | 1.0 | 20 | 23.1 | 64.8 | 0.101 |

Notes:

- (1) V_(BR) measured after I_T applied for 300 μs = square wave pulse or equivalent
- (2) Surge current waveform per Fig. 3 and derate per Fig. 2
- (3) All terms and symbols are consistent with ANSI/IEEE C62.35

Ratings and Characteristics Curves

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

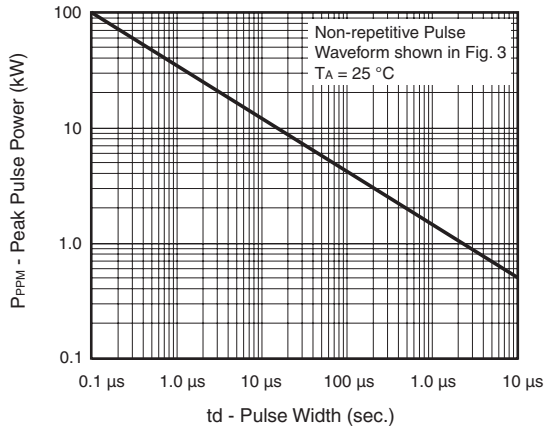


Figure 1. Peak Pulse Power Rating Curve

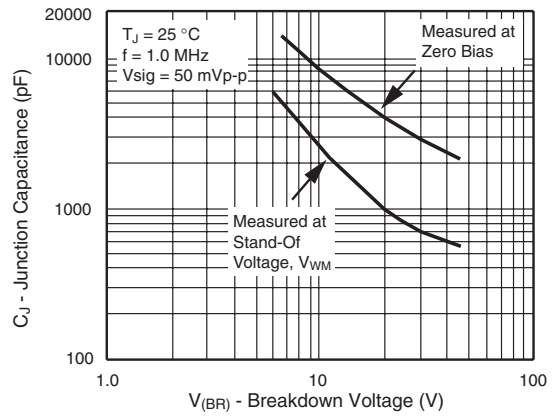


Figure 4. Typical Junction Capacitance Unidirectional

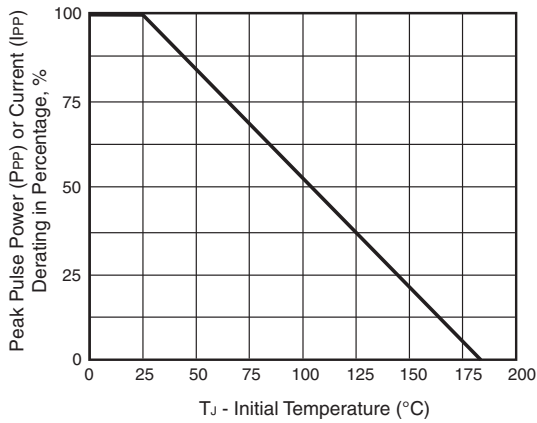


Figure 2. Pulse Power or Current versus Initial Junction Temperature

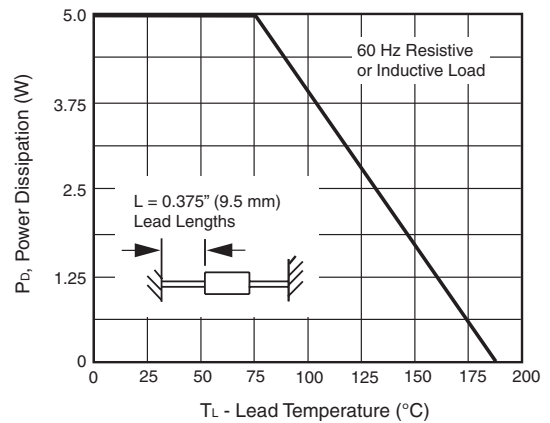


Figure 5. Power Derating Curve

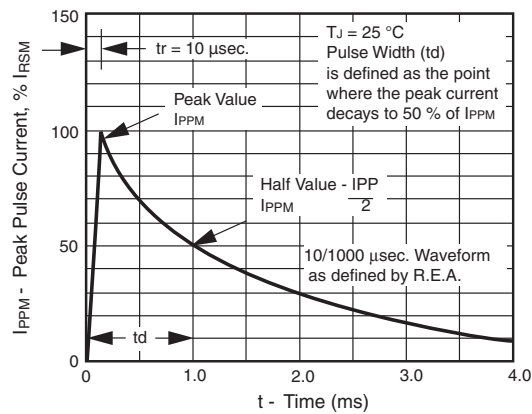


Figure 3. Pulse Waveform

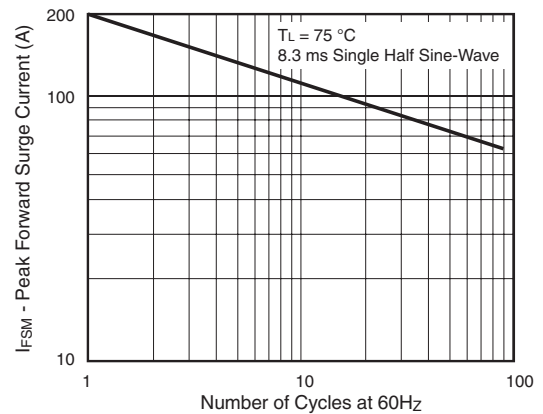


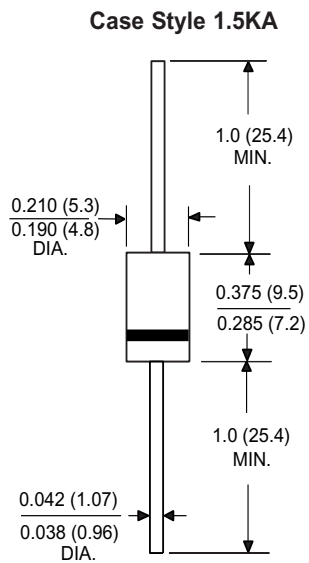
Figure 6. Maximum Non-Repetitive/Peak Forward Surge Current

1.5KA6.8 thru 1.5KA47A

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Package outline dimensions in inches (millimeters)





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