

Automotive Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



FEATURES

- Patented PAR[®] construction
- Available in uni-directional 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
- Solder dip 260 °C, 40 s
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



RoHS
COMPLIANT

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 epoxy body over passivated junction
Molding compound meets UL 94 V-0 flammability rating

Base P/NHE3 - RoHS compliant, high reliability/automotive grade (AEC Q101 qualified)

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD22-B102

HE3 suffix meets JESD 201 class 2 whisker test

Polarity: Color band denotes cathode end

| PRIMARY CHARACTERISTICS | |
|-------------------------|---------------|
| V_{BR} | 6.8 V to 47 V |
| P_{PPM} | 1500 W |
| P_D | 6.5 W |
| I_{FSM} | 200 A |
| T_J max. | 185 °C |

| 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} | 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 | 6.5 | 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 minute maximum

1.5KA6.8 thru 1.5KA47A

Vishay General Semiconductor



| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | | | | |
|--|--|------|-------------------------|--------------------------------|---|---|---|---|---|
| DEVICE TYPE | BREAKDOWN VOLTAGE V_{BR} ⁽¹⁾ AT I_T (V) | | TEST CURRENT I_T (mA) | STAND-OFF VOLTAGE V_{WM} (V) | MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (μA) | $T_J = 150\text{ }^\circ\text{C}$ MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (μA) | PEAK PULSE CURRENT I_{PPM} ⁽²⁾ (A) | MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V) | MAXIMUM TEMP. COEFFICIENT OF V_{BR} ($\%/^\circ\text{C}$) |
| | MIN. | MAX. | | | | | | | |
| 1.5KA6.8 | 6.12 | 7.48 | 10 | 5.50 | 1000 | 10 000 | 139 | 10.8 | 0.057 |
| 1.5KA6.8A | 6.45 | 7.14 | 10 | 5.80 | 1000 | 10 000 | 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

| ORDERING INFORMATION (Example) | | | | |
|--------------------------------|-----------------|------------------------|---------------|----------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| 1.5KA6.8AHE3/54 ⁽¹⁾ | 0.916 | 54 | 1400 | 13" diameter paper tape and reel |

Note:

(1) Automotive grade AEC Q101 qualified

RATINGS AND CHARACTERISTICS CURVES

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

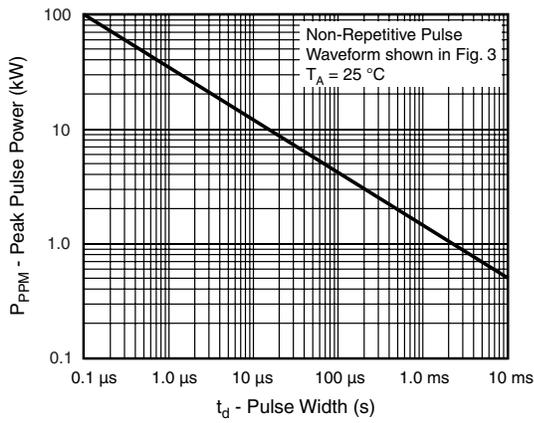


Figure 1. Peak Pulse Power Rating Curve

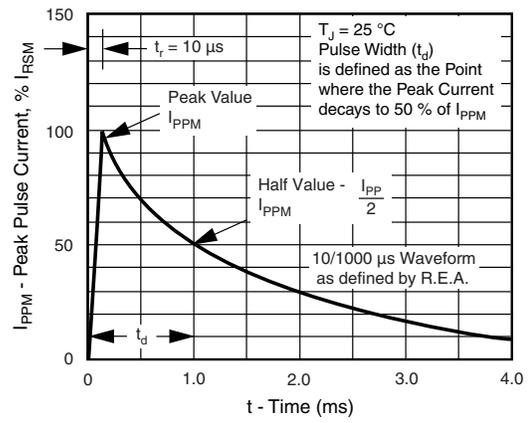


Figure 3. Pulse Waveform

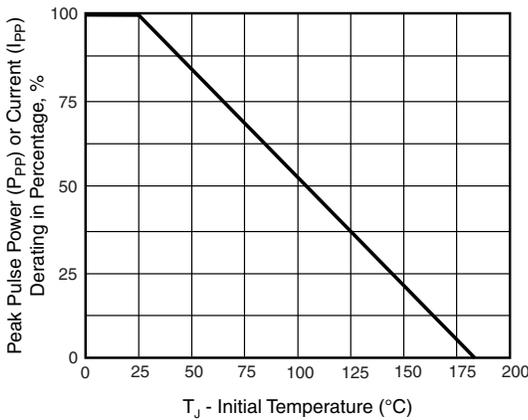


Figure 2. Pulse Power or Current vs. Initial Junction Temperature

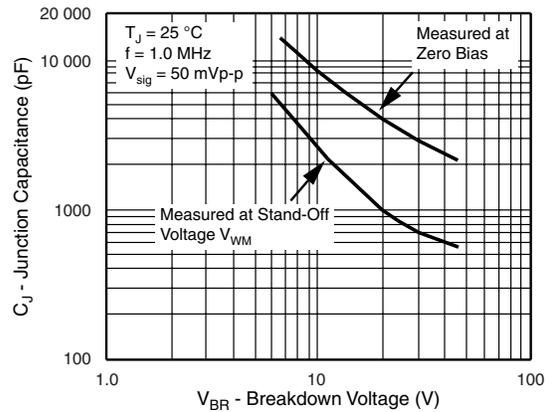


Figure 4. Typical Junction Capacitance Unidirectional

1.5KA6.8 thru 1.5KA47A

Vishay General Semiconductor

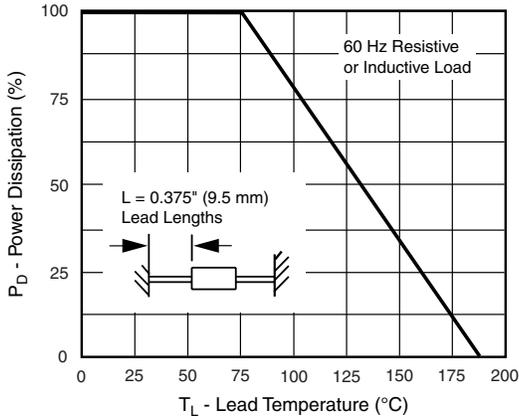


Figure 5. Power Derating Curve

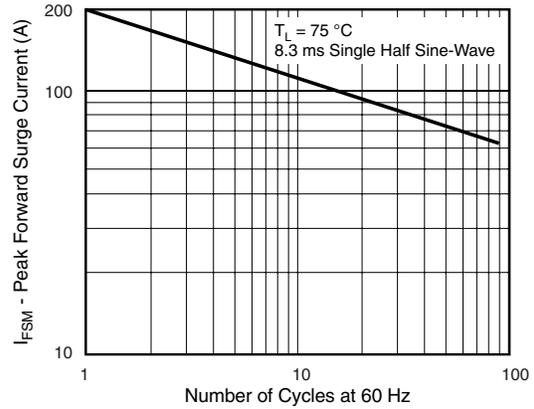
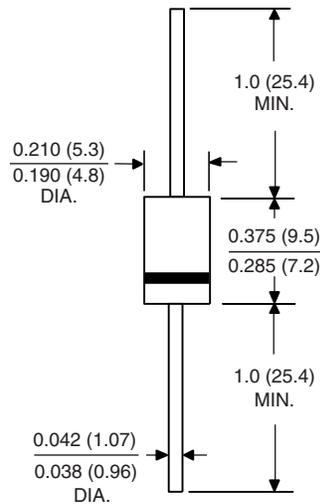


Figure 6. Maximum Non-Repetitive/Peak Forward Surge Current

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

Case Style 1.5KA



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