

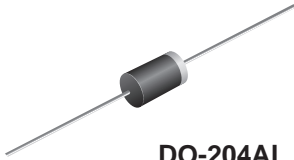


# P4KA6.8 thru P4KA43A

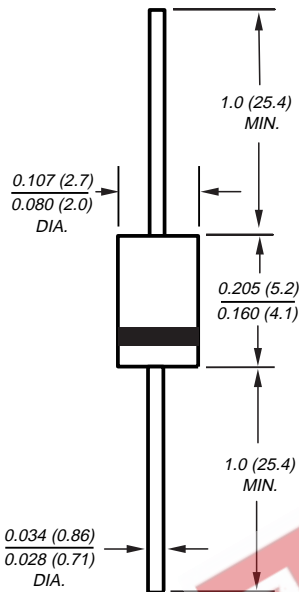
Vishay Semiconductors  
formerly General Semiconductor

## Automotive Transient Voltage Suppressors

**Breakdown Voltage** 6.8 to 43V  
**Peak Pulse Power** 400W



DO-204AL (DO-41)



Available in uni-directional only

Dimensions in inches and (millimeters)

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

Patented\*

### Features

- Plastic package has underwriters laboratory flammability classification 94V-0
- Designed for under the hood applications
- Exclusive patented PAR<sup>®</sup> oxide-passivated chip construction
- 400W peak pulse power capability with a 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time
- For devices with  $V_{(BR)} \geq 10V$ ,  $I_D$  are typically less than 1.0 $\mu$ A at  $T_A = 150^\circ C$
- High temperature soldering guaranteed: 300 $^\circ C$ /10 seconds, 0.375" (9.5mm) lead length, 5lbs. (2.3 kg) tension

### Mechanical Data

**Case:** JEDEC DO-204AL molded plastic body over passivated junction

**Terminals:** Plated axial leads, solderable per MIL-STD-750, Method 2026

**Polarity:** The color band denotes the cathode, which is positive with respect to the anode under normal TVS operation

**Mounting Position:** Any

**Weight:** 0.012 oz., 0.3 g

**Packaging codes/options:**

- 1/5K per Bulk Box, 50K/box
- 4/5.5K per 13" Reel (52mm Tape), 22K/box
- 23/3K per Ammo Box (52mm Tape), 27K/box

## Maximum Ratings and Thermal Characteristics ( $T_A = 25^\circ C$ unless otherwise noted)

| Parameter   | Symbol         | Value          | Unit       |
|---|----------------|----------------|------------|
| Peak pulse power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (Fig. 1)            | PPPM           | Minimum 400    | W          |
| Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (Fig.3)                       | IPPM           | See Next Table | A          |
| Steady state power dissipation at $T_L = 75^\circ C$ lead lengths 0.375" (9.5mm) <sup>(2)</sup> | $P_{M(AV)}$    | 1.0            | W          |
| Peak forward surge current, 8.3ms single half sine-wave <sup>(3)</sup>                          | $I_{FSM}$      | 40             | A          |
| Maximum instantaneous forward voltage at 25A  | $V_F$          | 3.5            | V          |
| Operating junction and storage temperature range  | $T_J, T_{STG}$ | -65 to +185    | $^\circ C$ |

**Notes:** (1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25^\circ C$  per Fig. 2

(2) Mounted on copper pad area of 1.6 x 1.6" (40 x 40mm) per Fig. 5

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## Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

| Device Type | Breakdown Voltage<br>V <sub>(BR)</sub> <sup>(1)</sup> at I <sub>T</sub><br>(V) |      | Test<br>Current<br>I <sub>T</sub><br>(mA) | Stand-off<br>Voltage<br>V <sub>WM</sub><br>(V) | Maximum<br>Reverse<br>Leakage<br>at V <sub>WM</sub><br>I <sub>D</sub> (μA) | T <sub>J</sub> = 150°C<br>Maximum<br>Reverse<br>Leakage<br>at V <sub>WM</sub><br>I <sub>D</sub> (μA) | Maximum<br>Peak Pulse<br>Surge<br>Current<br>I <sub>PPM</sub> <sup>(2)</sup><br>(A) | Maximum<br>Clamping<br>Voltage<br>at I <sub>PPM</sub><br>V <sub>C</sub> (V) | Maximum<br>Temp.<br>Coefficient<br>of<br>V <sub>(BR)</sub><br>(% / °C) |
|-------------|--|------|---|--|--|--|---|---|--|
|             | Min  | Max  |   |  |  |  |   |   |  |
| P4KA6.8     | 6.12   | 7.48 | 10  | 5.50   | 300  | 1000   | 37.0  | 10.8  | 0.057  |
| P4KA6.8A    | 6.45   | 7.14 | 10  | 5.80   | 300  | 1000   | 38.1  | 10.5  | 0.057  |
| P4KA7.5     | 6.75   | 8.25 | 10  | 6.05   | 150  | 500  | 34.2  | 11.7  | 0.060  |
| P4KA7.5A    | 7.13   | 7.88 | 10  | 6.40   | 150  | 500  | 35.4  | 11.3  | 0.061  |
| P4KA8.2     | 7.38   | 9.02 | 10  | 6.63   | 50   | 200  | 32.0  | 12.5  | 0.065  |
| P4KA8.2A    | 7.79   | 8.61 | 10  | 7.02   | 50   | 200  | 33.1  | 12.1  | 0.065  |
| P4KA9.1     | 8.19   | 10.0 | 1.0                                       | 7.37   | 10   | 50   | 29.0  | 13.8  | 0.068  |
| P4KA9.1A    | 8.65   | 9.55 | 1.0                                       | 7.78   | 10   | 50   | 29.9  | 13.4  | 0.068  |
| P4KA10      | 9.00   | 11.0 | 1.0                                       | 8.10   | 5.0  | 20   | 26.7  | 15.0  | 0.073  |
| P4KA10A     | 9.50   | 10.5 | 1.0                                       | 8.55   | 5.0  | 20   | 27.6  | 14.5  | 0.073  |
| P4KA11      | 9.90   | 12.1 | 1.0                                       | 8.92   | 1.0  | 5.0  | 24.7  | 16.2  | 0.075  |
| P4KA11A     | 10.5   | 11.6 | 1.0                                       | 9.40   | 1.0  | 5.0  | 25.6  | 15.6  | 0.075  |
| P4KA12      | 10.8   | 13.2 | 1.0                                       | 9.72   | 1.0  | 5.0  | 23.1  | 17.3  | 0.076  |
| P4KA12A     | 11.4   | 12.6 | 1.0                                       | 10.2   | 1.0  | 5.0  | 24.0  | 16.7  | 0.078  |
| P4KA13      | 11.7   | 14.3 | 1.0                                       | 10.5   | 1.0  | 5.0  | 21.1  | 19.0  | 0.081  |
| P4KA13A     | 12.4   | 13.7 | 1.0                                       | 11.1   | 1.0  | 5.0  | 22.0  | 18.2  | 0.081  |
| P4KA15      | 13.5   | 16.3 | 1.0                                       | 12.1   | 1.0  | 5.0  | 18.2  | 22.0  | 0.084  |
| P4KA15A     | 14.3   | 15.8 | 1.0                                       | 12.8   | 1.0  | 5.0  | 18.9  | 21.2  | 0.084  |
| P4KA16      | 14.4   | 17.6 | 1.0                                       | 12.9   | 1.0  | 5.0  | 17.0  | 23.5  | 0.086  |
| P4KA16A     | 15.2   | 16.8 | 1.0                                       | 13.6   | 1.0  | 5.0  | 17.8  | 22.5  | 0.086  |
| P4KA18      | 16.2   | 19.8 | 1.0                                       | 14.5   | 1.0  | 5.0  | 15.1  | 26.5  | 0.088  |
| P4KA18A     | 17.1   | 18.9 | 1.0                                       | 15.3   | 1.0  | 5.0  | 15.9  | 25.5  | 0.088  |
| P4KA20      | 18.0   | 22.0 | 1.0                                       | 16.2   | 1.0  | 5.0  | 13.7  | 29.1  | 0.090  |
| P4KA20A     | 19.0   | 21.0 | 1.0                                       | 17.0   | 1.0  | 5.0  | 14.4  | 27.7  | 0.090  |
| P4KA22      | 19.8   | 24.2 | 1.0                                       | 17.8   | 1.0  | 5.0  | 12.5  | 31.9  | 0.092  |
| P4KA22A     | 20.9   | 23.1 | 1.0                                       | 18.8   | 1.0  | 5.0  | 13.1  | 30.6  | 0.092  |
| P4KA24      | 21.6   | 26.4 | 1.0                                       | 19.4   | 1.0  | 5.0  | 11.5  | 34.2  | 0.094  |
| P4KA24A     | 22.8   | 25.2 | 1.0                                       | 20.5   | 1.0  | 5.0  | 12.0  | 33.2  | 0.094  |
| P4KA27      | 24.3   | 29.7 | 1.0                                       | 21.8   | 1.0  | 5.0  | 10.2  | 39.1  | 0.096  |
| P4KA27A     | 25.7   | 28.4 | 1.0                                       | 23.1   | 1.0  | 5.0  | 10.7  | 37.5  | 0.096  |
| P4KA30      | 27.0   | 33.0 | 1.0                                       | 24.3   | 1.0  | 5.0  | 9.2   | 43.5  | 0.097  |
| P4KA30A     | 28.5   | 31.5 | 1.0                                       | 25.6   | 1.0  | 5.0  | 9.7   | 41.4  | 0.097  |
| P4KA33      | 29.7   | 36.3 | 1.0                                       | 26.8   | 1.0  | 5.0  | 8.4   | 47.7  | 0.098  |
| P4KA33A     | 31.4   | 34.7 | 1.0                                       | 28.2   | 1.0  | 5.0  | 8.8   | 45.7  | 0.098  |
| P4KA36      | 32.4   | 39.6 | 1.0                                       | 29.1   | 1.0  | 5.0  | 7.7   | 52.0  | 0.099  |
| P4KA36A     | 34.2   | 37.8 | 1.0                                       | 30.8   | 1.0  | 5.0  | 8.0   | 49.9  | 0.099  |
| P4KA39      | 35.1   | 42.9 | 1.0                                       | 31.6   | 1.0  | 5.0  | 7.1   | 56.4  | 0.100  |
| P4KA39A     | 37.1   | 41.0 | 1.0                                       | 33.3   | 1.0  | 5.0  | 7.4   | 53.9  | 0.100  |
| P4KA43      | 38.7   | 47.3 | 1.0                                       | 34.8   | 1.0  | 5.0  | 6.5   | 61.9  | 0.101  |
| P4KA43A     | 40.9   | 45.2 | 1.0                                       | 36.8   | 1.0  | 5.0  | 6.7   | 59.3  | 0.101  |

**Notes:**

(1) V<sub>(BR)</sub> measured after I<sub>T</sub> applied for 300μs, I<sub>T</sub> = square wave pulse or equivalent

(2) Surge current waveform per Fig. 3 and derated per Fig. 2

(3) All terms and symbols are consistent with ANSI/IEEE C62.35

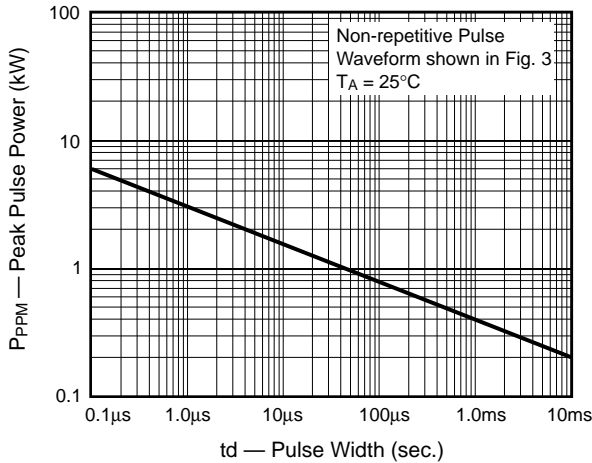


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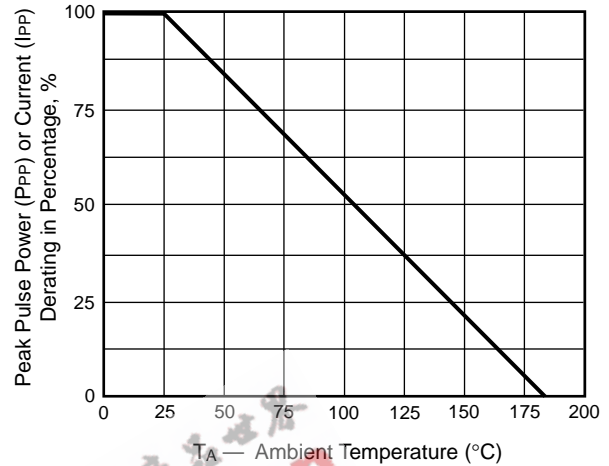
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## Ratings and Characteristic Curves ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

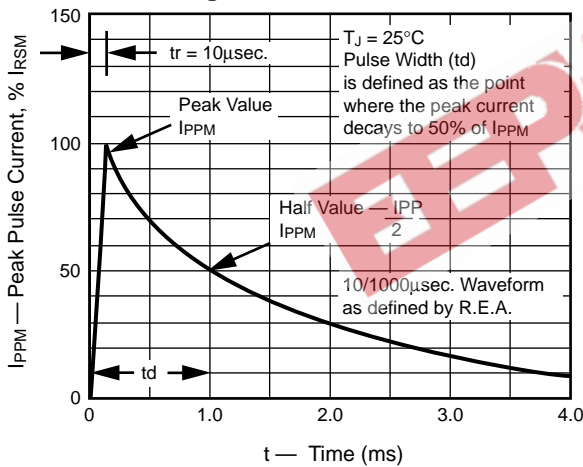
**Fig. 1 – Peak Pulse Power Rating Curve**



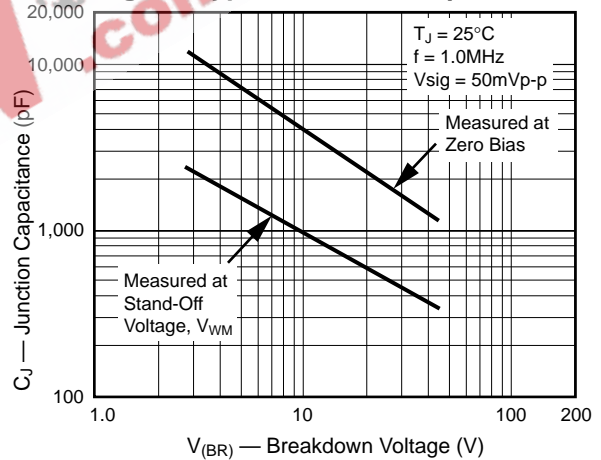
**Fig. 2 – Pulse Derating Curve**



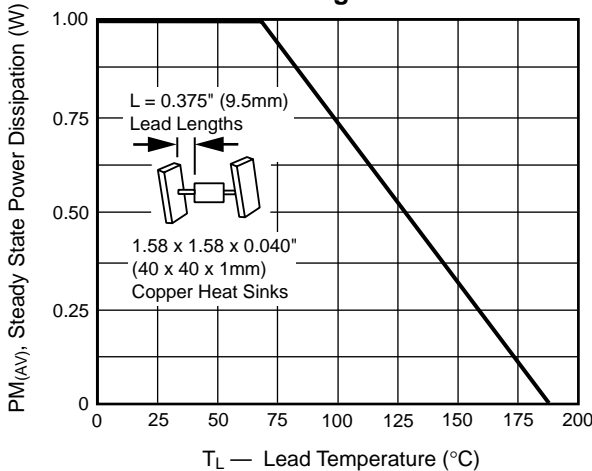
**Fig. 3 – Pulse Waveform**



**Fig. 4 – Typical Junction Capacitance**



**Fig. 5 – Steady State Power Derating Curve**



**Fig. 6 - Maximum Non-Repetitive/Peak Forward Surge Current**

