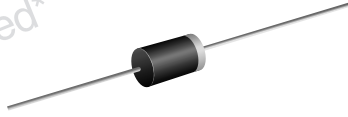


## Automotive Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions

Patented\*



DO-204AL (DO-41)

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

### FEATURES

- Patented PAR<sup>®</sup> construction
- Available in uni-directional polarity only
- 400 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle): 0.01 %
- 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:** DO-204AL, molded epoxy 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 <sub>BR</sub>	6.8 V to 43 V
P <sub>PPM</sub>	400 W
P <sub>D</sub>	1.5 W
I <sub>FSM</sub>	40 A
T <sub>J</sub> max.	185 °C

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak pulse power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (Fig. 1)	P <sub>PPM</sub>	400	W
Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (Fig. 3)	I <sub>PPM</sub>	See next table	A
Power dissipation on infinite heatsink at T <sub>L</sub> = 75 °C (Fig. 5)	P <sub>D</sub>	1.5	W
Peak forward surge current 8.3 ms single half sine-wave <sup>(2)</sup>	I <sub>FSM</sub>	40	A
Maximum instantaneous forward voltage at 25 A	V <sub>F</sub>	3.5	V
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	- 65 to + 185	°C

**Notes:**

(1) Non-repetitive current pulse, per Fig. 3 and derated above T<sub>A</sub> = 25 °C per Fig. 2

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

# P4KA6.8 thru P4KA43A

Vishay General Semiconductor



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ 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 $V_{WM}$ $I_D$ ( $\mu\text{A}$ )	$T_J = 150\text{ }^\circ\text{C}$ MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ )	MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}^{(2)}$ (A)	MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V)	MAXIMUM TEMPERATURE COEFFICIENT OF $V_{BR}$ ( $\%/^\circ\text{C}$ )
	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) Pulse test:  $t_p \leq 50\text{ ms}$
- (2) Surge current waveform per Fig. 3 and derated 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
P4KA6.8AHE3/54 <sup>(1)</sup>	0.336	54	5500	13" diameter paper tape and reel

**Note:**

(1) Automotive grade AEC Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES**

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

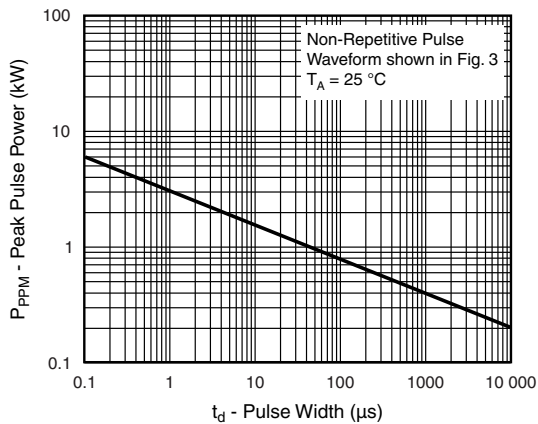


Figure 1. Peak Pulse Power Rating Curve

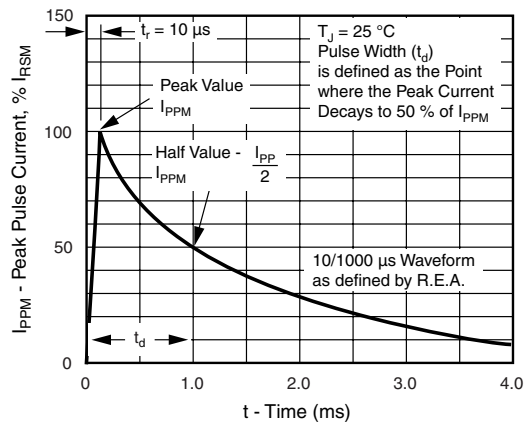


Figure 3. Pulse Waveform

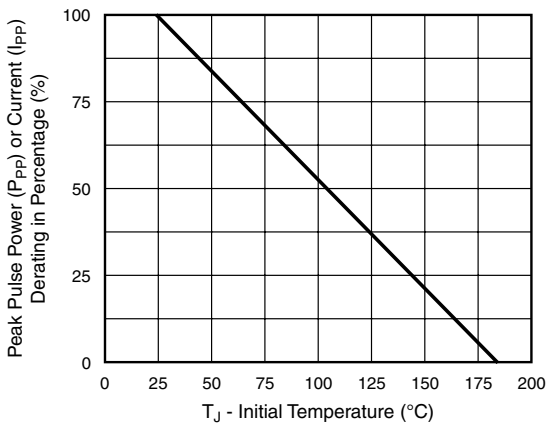


Figure 2. Pulse Power or Current vs. Initial Junction Temperature

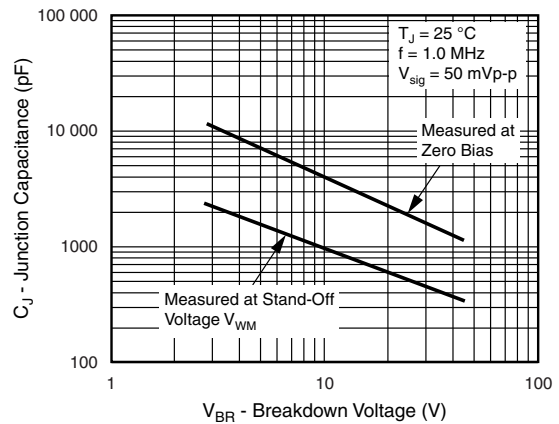


Figure 4. Typical Junction Capacitance

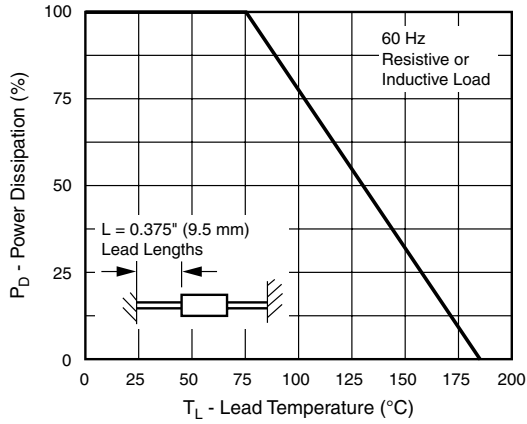


Figure 5. Power Derating Curve

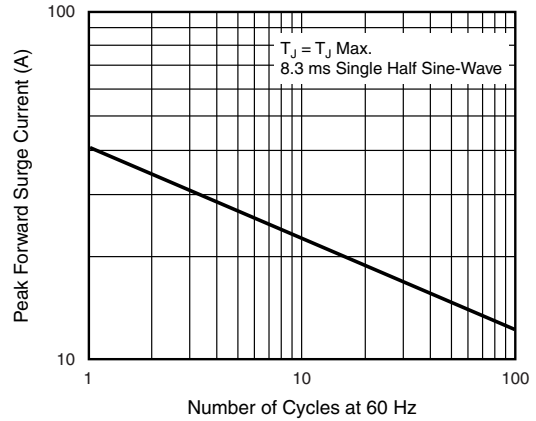
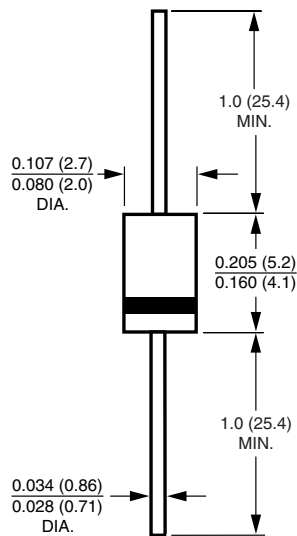


Figure 6. Maximum Non-Repetitive/Peak Forward Surge Current

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**DO-204AL (DO-41)**



Available in uni-directional only



## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.