

# PAR<sup>®</sup> Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions



DO-204AL (DO-41)

PRIMARY CHARACTERISTICS	
$V_{WM}$	5.50 V to 36.8 V
$V_{BR}$	6.8 V to 43 V
$P_{PPM}$	400 W
$P_D$	1.5 W
$I_{FSM}$	40 A
$T_J$ max.	185 °C
Polarity	Uni-directional
Package	DO-204AL (DO-41)

## FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185$  °C capability suitable for high reliability and automotive requirement
- 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 275 °C max. 10 s, per JESD 22-B106
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**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, AEC-Q101 qualified

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes cathode end

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

### Notes

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25$  °C per fig. 2

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



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)									
DEVICE TYPE	BREAKDOWN VOLTAGE V <sub>BR</sub> <sup>(1)</sup> AT I <sub>T</sub> (V)		TEST CURRENT I <sub>T</sub> (mA)	STAND-OFF VOLTAGE V <sub>WM</sub> (V)	MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> I <sub>D</sub> (μA)	T <sub>J</sub> = 150 °C MAXIMUM REVERSE LEAKAGE AT V <sub>WM</sub> I <sub>D</sub> (μA)	MAXIMUM PEAK PULSE SURGE CURRENT I <sub>PPM</sub> <sup>(2)</sup> (A)	MAXIMUM CLAMPING VOLTAGE AT I <sub>PPM</sub> V <sub>C</sub> (V)	MAXIMUM TEMPERATURE COEFFICIENT OF V <sub>BR</sub> (%/°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

**Note**

- (1) Pulse test: t<sub>p</sub> ≤ 50 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) AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES**

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

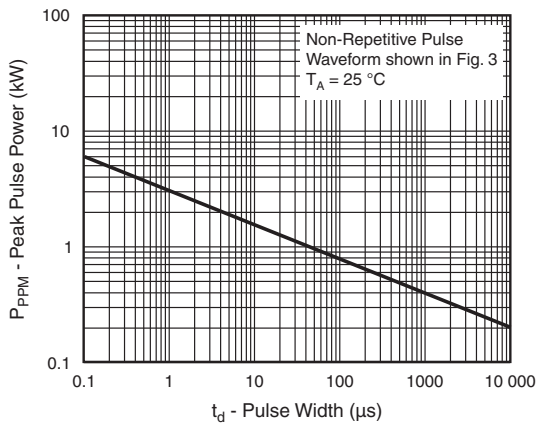


Fig. 1 - Peak Pulse Power Rating Curve

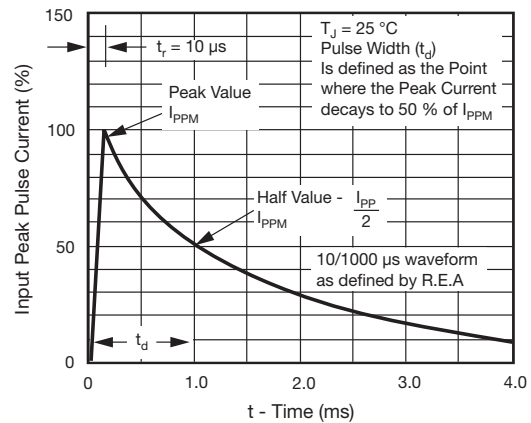


Fig. 3 - Pulse Waveform

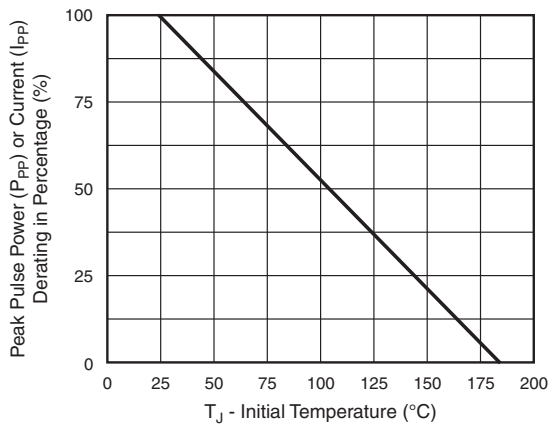


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

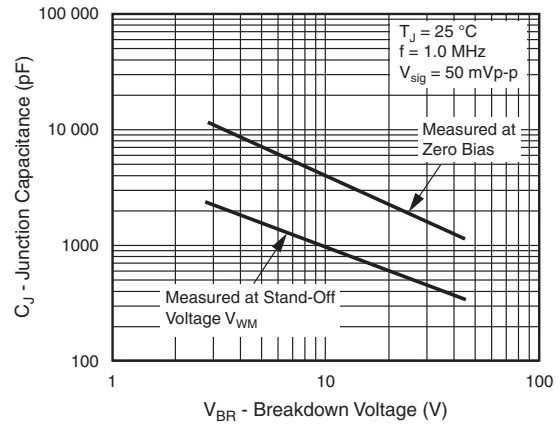


Fig. 4 - Typical Junction Capacitance

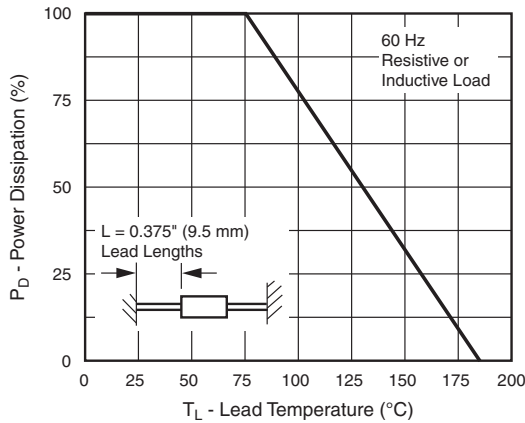


Fig. 5 - Power Derating Curve

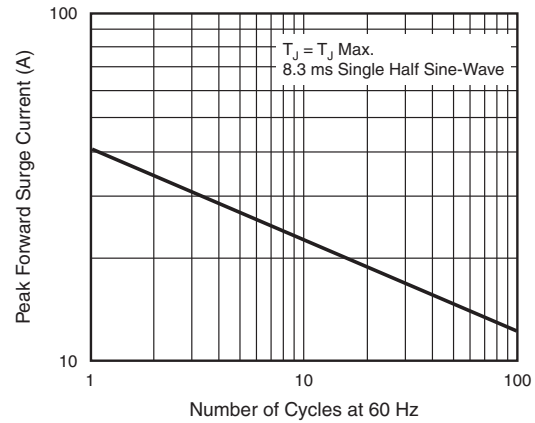
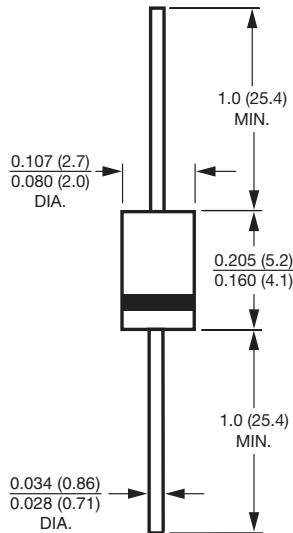


Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current

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

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



**Note**

- Available in uni-directional only



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