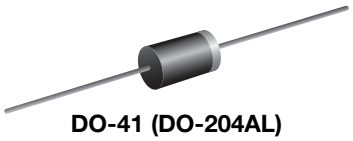
TRANSZORB® Transient Voltage Suppressors



DO-41 (DO-204AL)

FEATURES

- Glass passivated chip junction
- Available in unidirectional and bidirectional
- 400 W peak pulse power capability with a 10/1000 µs 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

RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
V_{WM}	5.8 V to 459 V
V_{BR} unidirectional	6.8 V to 540 V
V_{BR} bidirectional	6.8 V to 440 V
P_{PPM}	400 W
P_D	1.5 W
I_{FSM} (unidirectional only)	40 A
T_J max.	175 °C
Polarity	Unidirectional, bidirectional
Package	DO-41 (DO-204AL)

DEVICES FOR BI-DIRECTION APPLICATIONS

For bidirectional types, use CA suffix (e.g. P4KE440CA). Electrical characteristics apply in both directions.

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-41 (DO-204AL), molded epoxy body over passivated chip
Molding compound meets UL 94 V-0 flammability rating
Base P/N-E3 - RoHS-compliant, commercial grade
Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

Note

- P4KE250CA to P4KE540A and P4KE250A to P4KE440CA for commercial grade only

Polarity: for unidirectional types the color band denotes cathode end, no marking on bidirectional types

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Peak pulse power dissipation with a 10/1000 µs waveform (1) (fig.1)	P_{PPM}	400	W
Peak pulse current with a 10/1000 µs waveform (1)	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 unidirectional only (2)	I_{FSM}	40	A
Maximum instantaneous forward voltage at 25 A for unidirectional only (3)	V_F	3.5/5.0	V
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +175	°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
(3) V_F = 3.5 V for P4KE220A and below; V_F = 5.0 V for P4KE250A and above

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

DEVICE TYPE	BREAKDOWN VOLTAGE V_{BR} AT I_T (1) (V)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (3) (µA)	MAXIMUM PEAK PULSE CURRENT I_{PPM} (2) (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	MAXIMUM TEMPERATURE COEFFICIENT AT V_{BR} (%/°C)
	MIN.	MAX.						
P4KE6.8A	6.45	7.14	10	5.80	1000	38.1	10.5	0.057
P4KE7.5A	7.13	7.88	10	6.40	500	35.4	11.3	0.061
P4KE8.2A	7.79	8.61	10	7.02	200	33.1	12.1	0.060
P4KE9.1A	8.65	9.55	1.0	7.78	50	29.9	13.4	0.068
P4KE10A	9.5	10.5	1.0	8.55	10	27.6	14.5	0.073
P4KE11A	10.5	11.6	1.0	9.40	5.0	25.6	15.6	0.075
P4KE12A	11.4	12.6	1.0	10.2	1.0	24.0	16.7	0.078
P4KE13A	12.4	13.7	1.0	11.1	1.0	22.0	18.2	0.081
P4KE15A	14.3	15.8	1.0	12.8	1.0	18.9	21.2	0.084
P4KE16A	15.2	16.8	1.0	13.6	1.0	17.8	22.5	0.086
P4KE18A	17.1	18.9	1.0	15.3	1.0	15.9	25.2	0.088
P4KE20A	19.0	21.0	1.0	17.1	1.0	14.4	27.7	0.090
P4KE22A	20.9	23.1	1.0	18.8	1.0	13.1	30.6	0.092
P4KE24A	22.8	25.2	1.0	20.5	1.0	12.0	33.2	0.094
P4KE27A	25.7	28.4	1.0	23.1	1.0	10.7	37.5	0.096
P4KE30A	28.5	31.5	1.0	25.6	1.0	9.7	41.4	0.097
P4KE33A	31.4	34.7	1.0	28.2	1.0	8.8	45.7	0.098
P4KE36A	34.2	37.8	1.0	30.8	1.0	8.0	49.9	0.099
P4KE39A	37.1	41.0	1.0	33.3	1.0	7.4	53.9	0.100
P4KE43A	40.9	45.2	1.0	36.8	1.0	6.7	59.3	0.101
P4KE47A	44.7	49.4	1.0	40.2	1.0	6.2	64.8	0.101
P4KE51A	48.5	53.6	1.0	43.6	1.0	5.7	70.1	0.102
P4KE56A	53.2	58.8	1.0	47.8	1.0	5.2	77.0	0.103
P4KE62A	58.9	65.1	1.0	53.0	1.0	4.7	85.0	0.104
P4KE68A	64.6	71.4	1.0	58.1	1.0	4.3	92.0	0.104
P4KE75A	71.3	78.8	1.0	64.1	1.0	3.9	103	0.105
P4KE82A	77.9	86.1	1.0	70.1	1.0	3.5	113	0.105
P4KE91A	86.5	95.5	1.0	77.8	1.0	3.2	125	0.106
P4KE100A	95.0	105	1.0	85.5	1.0	2.9	137	0.106
P4KE110A	105	116	1.0	94.0	1.0	2.6	152	0.107
P4KE120A	114	126	1.0	102	1.0	2.4	165	0.107
P4KE130A	124	137	1.0	111	1.0	2.2	179	0.107
P4KE150A	143	158	1.0	128	1.0	1.9	207	0.108
P4KE160A	152	168	1.0	136	1.0	1.8	219	0.108
P4KE170A	162	179	1.0	145	1.0	1.7	234	0.108
P4KE180A	171	189	1.0	154	1.0	1.6	246	0.108
P4KE200A	190	210	1.0	171	1.0	1.5	274	0.108
P4KE220A	209	231	1.0	185	1.0	1.2	328	0.108
P4KE250A	237	263	1.0	214	1.0	1.2	344	0.110
P4KE300A	285	315	1.0	256	1.0	1.00	414	0.110
P4KE350A	333	368	1.0	300	1.0	0.83	482	0.110
P4KE400A	380	420	1.0	342	1.0	0.73	548	0.110
P4KE440A	418	462	1.0	376	1.0	0.66	602	0.110
P4KE480A	456	504	1.0	408	1.0	0.61	658	0.110
P4KE510A	485	535	1.0	434	1.0	0.57	698	0.110
P4KE540A	513	567	1.0	459	1.0	0.54	740	0.110

Notes

(1) Pulse test: $t_p \leq$ 50 ms

(2) Surge current waveform per fig. 3 and derate per fig. 2

(3) For bidirectional types with V_{WM} of 10 V and less the I_D limit is doubled

(4) All terms and symbols are consistent with ANSI/EEE CA62.35

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VALUE**	**UNIT**
Typical thermal resistance, junction to lead	$R_{\theta JL}$	66	°C/ W
Typical thermal resistance, junction to ambient L_{Lead} = 10 mm	$R_{\theta JA}$	100	

ORDERING INFORMATION (Example)				
PREFERRED PIN	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
P4KE6.8A-E3/54	0.350	54	5500	13" diameter paper tape and reel
P4KE6.8AHE3/54 (1)	0.350	54	5500	13" diameter paper tape and reel

Note

(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

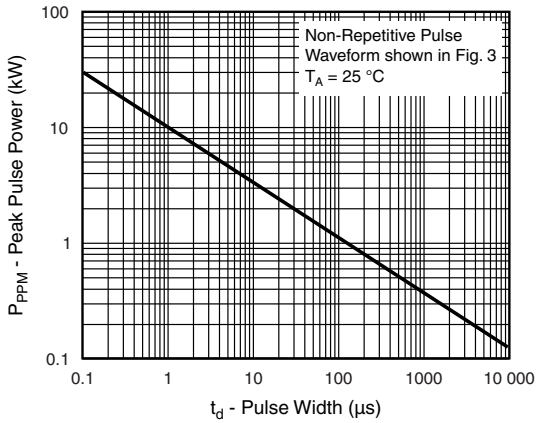


Fig. 1 - Peak Pulse Power Rating Curve

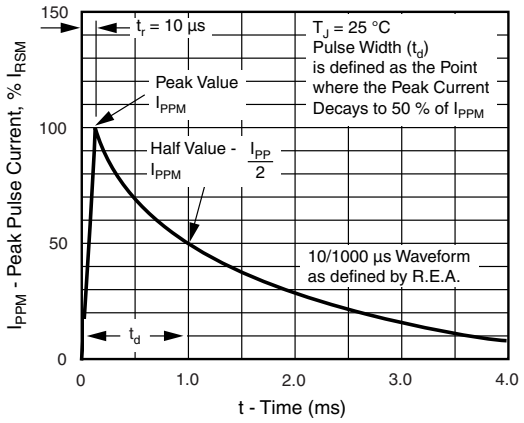


Fig. 3 - Pulse Waveform

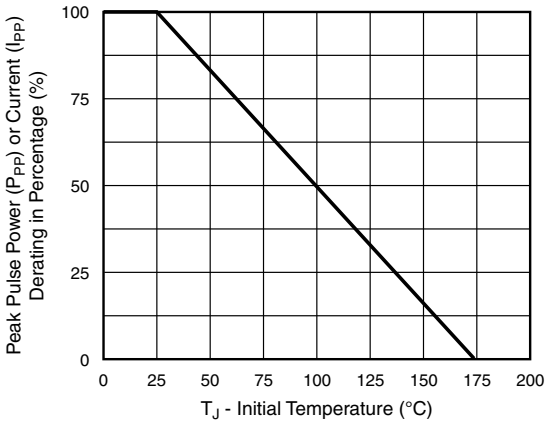


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

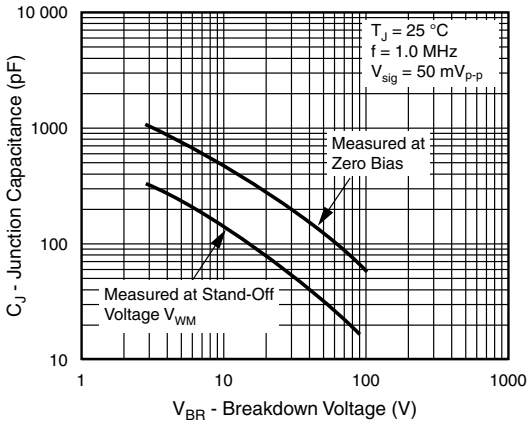


Fig. 4 - Typical Junction Capacitance Unidirectional

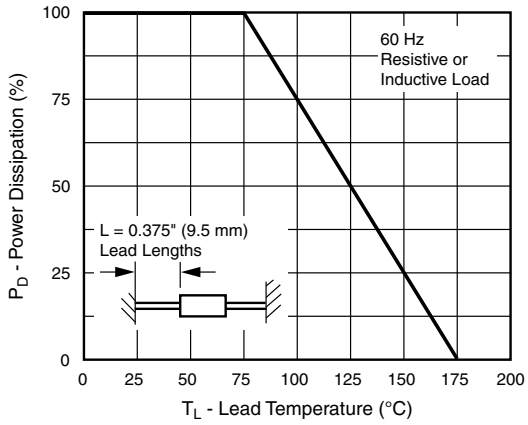


Fig. 5 - Power Derating Curve

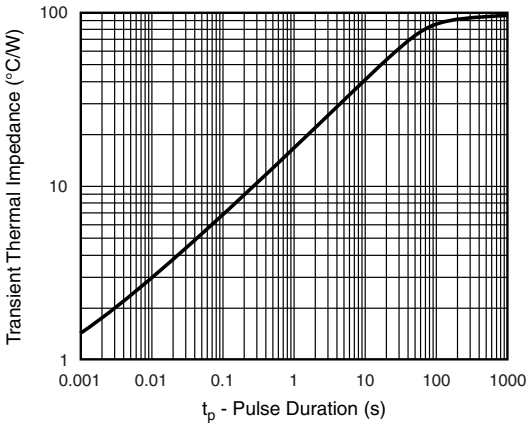


Fig. 7 - Typical Transient Thermal Impedance

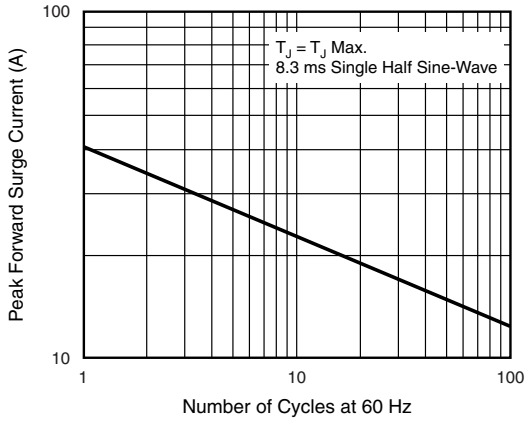
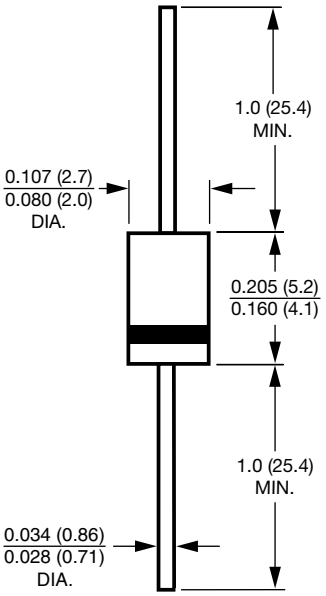


Fig. 6 - Maximum Non-Repetitive Forward Surge Current
Unidirectional Only

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-41 (DO-204AL)



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