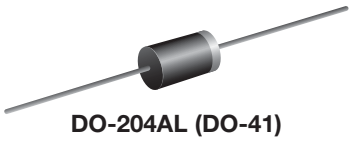
TransZorb® Transient Voltage Suppressors



DO-204AL (DO-41)

FEATURES

- Glass passivated chip junction
- Available in uni-directional and bi-directional
- 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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb e3 RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
V_{WM}	5.8 V to 376 V
P_{PPM}	400 W
P_D	1.5 W
I_{FSM} (uni-directional only)	40 A
T_J max.	175 °C

DEVICES FOR BI-DIRECTION APPLICATIONS

For bi-directional types, use B suffix (e.g. BZW04P-6V4B).

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 and telecommunication.

MECHANICAL DATA

Case: DO-204AL, molded epoxy 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 JESD22-B102
E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

Note

BZW04-213(B) ~ BZW04-376(B) for commercial grade only

Polarity: For uni-directional types the color band denotes cathode end, no marking on bi-directional types

MAXIMUM RATINGS AND THERMAL CHARACTERISTICS (T_A = 25 °C unles 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 uni-directional only (2)	I_{FSM}	40	A
Maximum instantaneous forward voltage at 25 A for uni-directional 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) Measured on 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 BZW04P(-)188 and below; V_F = 5.0 V for BZW04P(-)213 and above

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

PART NUMBER		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 (4) (A)	MAXIMUM PEAK PULSE CURRENT I_{PPM} (2) (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	MAXIMUM TEMPERATURE COEFFICIENT OF V_{BR} (%/°C)
UNI-DIRECTIONAL	BI-DIRECTIONAL	MIN.	MAX.						
BZW04P5V8	BZW04P5V8B	6.45	7.48	10.0	5.80	1000	38.0	10.5	0.057
BZW04-5V8	BZW04-5V8B	6.45	7.14	10.0	5.80	1000	38.0	10.5	0.057
BZW04P6V4	BZW04P6V4B	7.13	8.25	10.0	6.40	500	35.4	11.3	0.061
BZW04-6V4	BZW04-6V4B	7.13	7.88	10.0	6.40	500	35.4	11.3	0.061
BZW04P7V0	BZW04P7V0B	7.79	9.02	10.0	7.02	200	33.0	12.1	0.065
BZW04-7V0	BZW04-7V0B	7.79	8.61	10.0	7.02	200	33.0	12.1	0.065
BZW04P7V8	BZW04P7V8B	8.65	10.0	1.0	7.78	50	30.0	13.4	0.068
BZW04-7V8	BZW04-7V8B	8.65	9.55	1.0	7.78	50	30.0	13.4	0.073
BZW04P8V5	BZW04P8V5B	9.50	11.0	1.0	8.55	10	27.6	14.5	0.07
BZW04-8V5	BZW04-8V5B	9.50	10.5	1.0	8.55	10	27.6	14.5	0.075
BZW04P9V4	BZW04P9V4B	10.5	12.1	1.0	9.4	5.0	25.7	15.6	0.075
BZW04-9V4	BZW04-9V4B	10.5	11.6	1.0	9.4	5.0	25.7	15.6	0.075
BZW04P10	BZW04P10B	11.4	13.2	1.0	10.2	1.0	24.0	16.7	0.078
BZW04-10	BZW04-10B	11.4	12.6	1.0	10.2	1.0	24.0	16.7	0.078
BZW04P11	BZW04P11B	12.4	14.3	1.0	11.1	1.0	22.0	18.2	0.081
BZW04-11	BZW04-11B	12.4	13.7	1.0	11.1	1.0	22.0	18.2	0.081
BZW04P13	BZW04P13B	14.3	16.5	1.0	12.8	1.0	19.0	21.2	0.084
BZW04-13	BZW04-13B	14.3	15.8	1.0	12.8	1.0	19.0	21.2	0.084
BZW04P14	BZW04P14B	15.2	17.6	1.0	13.6	1.0	17.8	22.5	0.086
BZW04-14	BZW04-14B	15.2	16.8	1.0	13.6	1.0	17.8	22.5	0.086
BZW04P15	BZW04P15B	17.1	19.8	1.0	15.3	1.0	16.0	25.2	0.088
BZW04-15	BZW04-15B	17.1	18.9	1.0	15.3	1.0	16.0	25.2	0.088
BZW04P17	BZW04P17B	19.0	22.0	1.0	17.1	1.0	14.5	27.7	0.090
BZW04-17	BZW04-17B	19.0	21.0	1.0	17.1	1.0	14.5	27.7	0.090
BZW04P19	BZW04P19B	20.9	24.2	1.0	18.8	1.0	13.0	30.6	0.092
BZW04-19	BZW04-19B	20.9	23.1	1.0	18.8	1.0	13.0	30.6	0.092
BZW04P20	BZW04P20B	22.8	26.4	1.0	20.5	1.0	12.0	33.2	0.094
BZW04-20	BZW04-20B	22.8	25.2	1.0	20.5	1.0	12.0	33.2	0.094
BZW04P23	BZW04P23B	25.7	29.7	1.0	23.1	1.0	10.7	37.5	0.096
BZW04-23	BZW04-23B	25.7	28.4	1.0	23.1	1.0	10.7	37.5	0.096
BZW04P26	BZW04P26B	28.5	33.0	1.0	25.6	1.0	9.6	41.5	0.097
BZW04-26	BZW04-26B	28.5	31.5	1.0	25.6	1.0	9.6	41.5	0.097
BZW04P28	BZW04P28B	31.4	36.3	1.0	28.2	1.0	8.8	45.7	0.098
BZW04-28	BZW04-28B	31.4	34.7	1.0	28.2	1.0	8.8	45.7	0.098
BZW04P31	BZW04P31B	34.2	39.6	1.0	30.8	1.0	8.0	49.9	0.099
BZW04-31	BZW04-31B	34.2	37.8	1.0	30.8	1.0	8.0	49.9	0.099
BZW04P33	BZW04P33B	37.1	42.9	1.0	33.3	1.0	7.4	53.9	0.100
BZW04-33	BZW04-33B	37.1	41.0	1.0	33.3	1.0	7.4	53.9	0.100
BZW04P37	BZW04P37B	40.9	47.3	1.0	36.8	1.0	6.7	59.3	0.101
BZW04-37	BZW04-37B	40.9	45.2	1.0	36.8	1.0	6.7	59.3	0.101
BZW04P40	BZW04P40B	44.7	51.7	1.0	40.2	1.0	6.2	64.8	0.101
BZW04-40	BZW04-40B	44.7	49.4	1.0	40.2	1.0	6.2	64.8	0.101
BZW04P44	BZW04P44B	48.5	56.1	1.0	43.6	1.0	5.7	70.1	0.102
BZW04-44	BZW04-44B	48.5	53.6	1.0	43.6	1.0	5.7	70.1	0.102
BZW04P48	BZW04P48B	53.2	61.6	1.0	47.8	1.0	5.2	77.0	0.103
BZW04-48	BZW04-48B	53.2	58.8	1.0	47.8	1.0	5.2	77.0	0.103
BZW04P53	BZW04P53B	58.9	68.2	1.0	53.0	1.0	4.7	85.0	0.104
BZW04-53	BZW04-53B	58.9	65.1	1.0	53.0	1.0	4.7	85.0	0.104
BZW04P58	BZW04P58B	64.6	74.8	1.0	58.1	1.0	4.3	92.0	0.104
BZW04-58	BZW04-58B	64.6	71.4	1.0	58.1	1.0	4.3	92.0	0.104
BZW04P64	BZW04P64B	71.3	82.5	1.0	64.1	1.0	3.9	103	0.105
BZW04-64	BZW04P64B	71.3	78.8	1.0	64.1	1.0	3.9	103	0.105

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

PART NUMBER		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 (4) (A)	MAXIMUM PEAK PULSE CURRENT I_{PPM} (2) (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	MAXIMUM TEMPERATURE COEFFICIENT OF V_{BR} (%/°C)
UNI-DIRECTIONAL	BI-DIRECTIONAL	MIN.	MAX.						
BZW04P70	BZW04P70B	77.9	90.2	1.0	70.1	1.0	3.5	113	0.105
BZW04-70	BZW04-70B	77.9	86.1	1.0	70.1	1.0	3.5	113	0.105
BZW04P78	BZW04P78B	86.5	100	1.0	78.0	1.0	3.2	125	0.105
BZW04-78	BZW04-78B	86.5	95.5	1.0	78.0	1.0	3.2	125	0.105
BZW04P85	BZW04P85B	95.0	110	1.0	85.5	1.0	2.9	137	0.106
BZW04-85	BZW04-85B	95.0	105	1.0	85.5	1.0	2.9	137	0.106
BZW04P94	BZW04P94B	105	121	1.0	94.0	1.0	2.6	152	0.107
BZW04-94	BZW04-94B	105	116	1.0	94.0	1.0	2.6	152	0.107
BZW04P102	BZW04P102B	114	132	1.0	102	1.0	2.4	165	0.107
BZW04-102	BZW04-102B	114	126	1.0	102	1.0	2.4	165	0.107
BZW04P110	BZW04P110B	124	143	1.0	111	1.0	2.2	179	0.107
BZW04-110	BZW04-110B	124	137	1.0	111	1.0	2.2	179	0.107
BZW04P128	BZW04P128B	143	165	1.0	128	1.0	2.0	207	0.108
BZW04-128	BZW04-128B	143	158	1.0	128	1.0	2.0	207	0.108
BZW04P136	BZW04P136B	152	176	1.0	136	1.0	1.8	219	0.108
BZW404-136	BZW404-136B	152	168	1.0	136	1.0	1.8	219	0.108
BZW04P145	BZW04P145B	161	187	1.0	145	1.0	1.7	234	0.108
BZW04-145	BZW04-145B	161	179	1.0	145	1.0	1.7	234	0.108
BZW04P154	BZW04P154B	171	198	1.0	154	1.0	1.6	246	0.108
BZW04-154	BZW04-154B	171	189	1.0	154	1.0	1.6	246	0.108
BZW04P171	BZW04P171B	190	220	1.0	171	1.0	1.5	274	0.108
BZW04-171	BZW04-171B	190	210	1.0	171	1.0	1.5	274	0.108
BZW04P188	BZW04P188B	209	242	1.0	188	1.0	1.4	301	0.108
BZW04-188	BZW04-188B	209	231	1.0	188	1.0	1.4	301	0.108
BZW04P213	BZW04P213B	237	275	1.0	213	1.0	1.2	344	0.110
BZW04-213	BZW04-213B	237	263	1.0	213	1.0	1.2	344	0.110
BZW04P239	BZW04P239B	266	308	1.0	239	1.0	1.1	384	0.110
BZW04-239	BZW04-239B	266	294	1.0	239	1.0	1.1	384	0.110
BZW04P256	BZW04P256B	285	330	1.0	256	1.0	1.0	414	0.110
BZW04-256	BZW04-256B	285	315	1.0	256	1.0	1.0	414	0.110
BZW04P273	BZW04P273B	304	352	1.0	273	1.0	0.90	438	0.110
BZW04-273	BZW04-273B	304	336	1.0	273	1.0	0.90	438	0.110
BZW04P299	BZW04P299B	332	385	1.0	299	1.0	0.80	482	0.110
BZW04-299	BZW04-299B	332	368	1.0	299	1.0	0.80	482	0.110
BZW04P342	BZW04P342B	380	440	1.0	342	1.0	0.75	548	0.110
BZW04-342	BZW04-342B	380	420	1.0	342	1.0	0.75	548	0.110
BZW04P376	BZW04P376B	418	484	1.0	376	1.0	0.67	603	0.110
BZW04-376	BZW04-376B	418	462	1.0	376	1.0	0.67	603	0.110

Notes

(1) Pulse test: $t_p \geq 50$ 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

(4) For bi-directional types having V_{WM} of 10 V and less, the I_D limit is doubled

ORDERING INFORMATION (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
BZW04P10-E3/54	0.350	54	550	13" diameter paper tape and reel
BZW04P10HE3/54 (1)	0.350	54	550	13" diameter paper tape and reel

Note

(1) AEC Q101 qualified

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

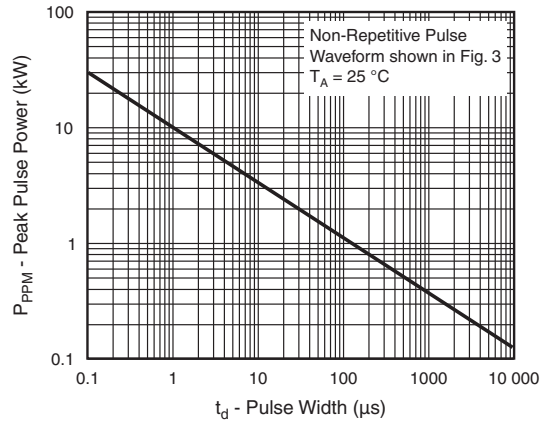


Fig. 1 - Peak Pulse Power Rating Curve

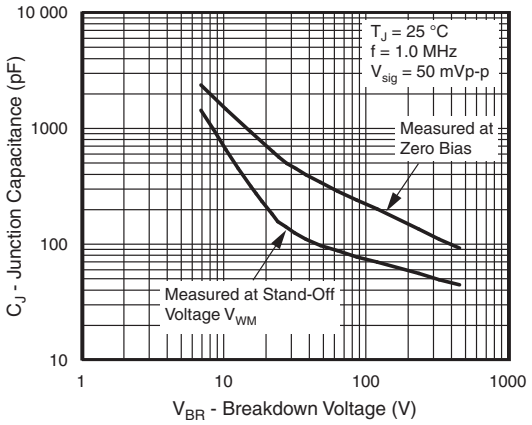


Fig. 4 - Typical Junction Capacitance

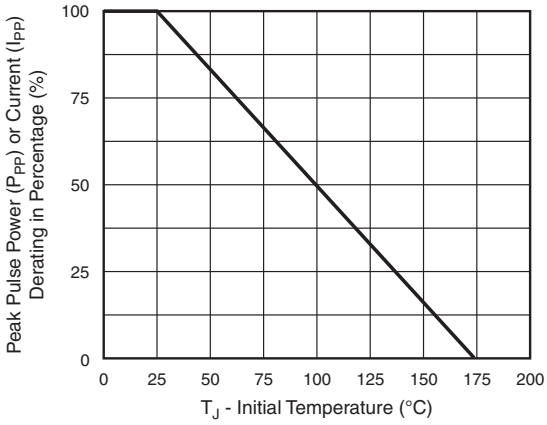


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

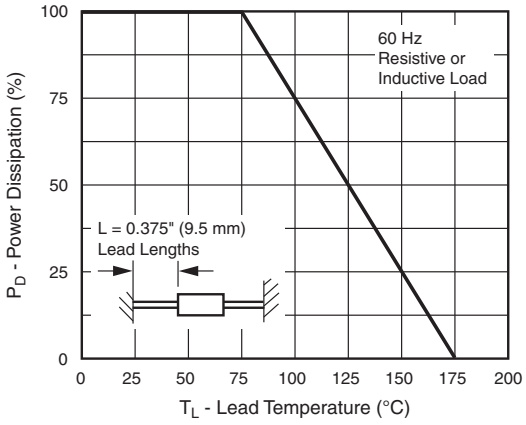


Fig. 5 - Power Derating Curve

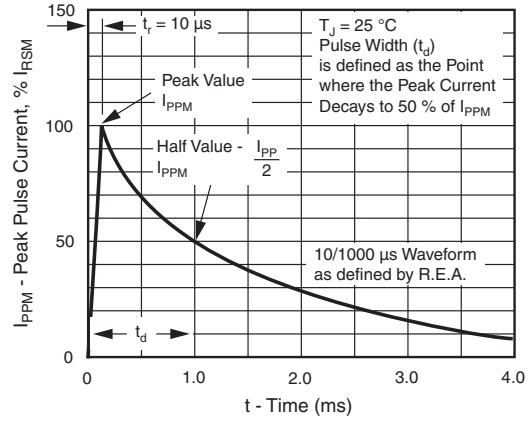


Fig. 3 - Pulse Waveform

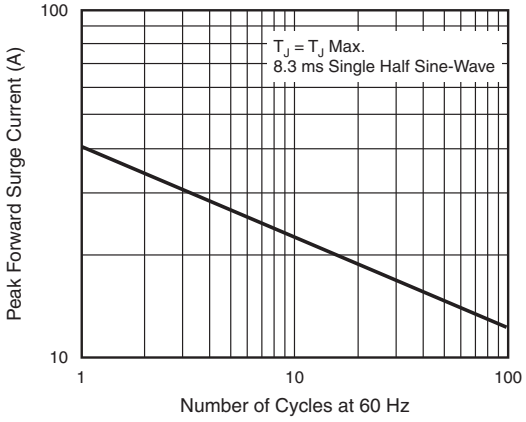
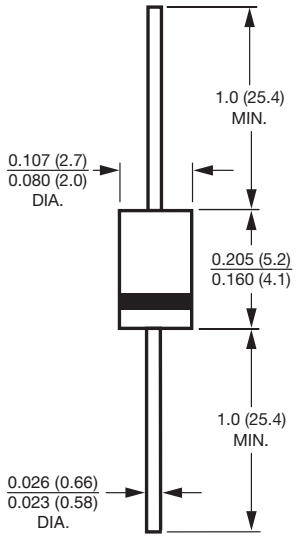


Fig. 6 - Max. Non-Repetitive Forward Surge Current
Uni-Directional Only

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-204AL (DO-41)



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Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

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>>Vishay(威世)