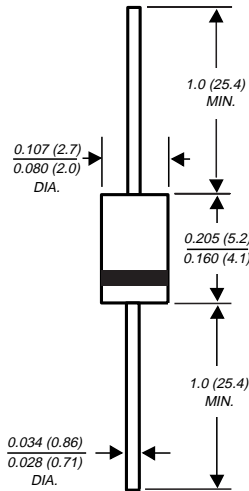


# BZW04P-5V8 THRU BZW04-376

**TRANSZORB™ TRANSIENT VOLTAGE SUPPRESSOR**  
**Stand-off Voltage - 5.8 to 376 Volts      Peak Pulse Power - 400 Watts**

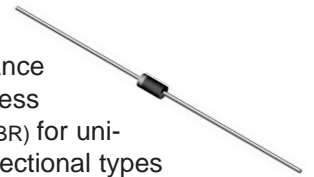
**DO204AL**



Dimensions are in inches  
and  
(millimeters)

## FEATURES

- ◆ Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- ◆ Glass passivated chip junction
- ◆ 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
- ◆ Fast response time: typically less than 1.0 ps from 0 Volts to  $V_{(BR)}$  for uni-directional and 5.0ns for bi-directional types
- ◆ Typical  $I_p$  less than 1 $\mu$ A above 10V rating
- ◆ High temperature soldering guaranteed: 265°C/10 seconds, 0.375" (9.5mm) lead length, 5lbs. (2.3 kg) tension



## MECHANICAL DATA

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

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

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

**Mounting Position:** Any

**Weight:** 0.012 ounce, 0.3 gram

## DEVICES FOR BIDIRECTIONAL APPLICATIONS

For bi-directional use add suffix Letter "B" (e.g. BZW04P-6V4B).  
Electrical characteristics apply in both directions.

## MAXIMUM RATINGS AND CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

	SYMBOL	VALUE	UNITS
Peak pulse power dissipation with a 10/1000 $\mu$ s waveform (NOTE 1, FIG. 1)	P <sub>PPM</sub>	Minimum 400	Watts
Peak pulse current with a 10/1000 $\mu$ s waveform (NOTE 1)	I <sub>PPM</sub>	SEE TABLE 1	Amps
Steady state power dissipation at $T_L=75^\circ\text{C}$ lead lengths, 0.375" (9.5mm) (NOTE 2)	P <sub>M(AV)</sub>	1.0	Watts
Peak forward surge current, 8.3ms single half Sine-wave superimposed on rated load (JEDEC Method) (NOTE 3) unidirectional only	I <sub>FSM</sub>	40.0	Amps
Maximum instantaneous forward voltage at 25A (NOTE 4) uni-directional only	V <sub>F</sub>	3.5/5.0	Volts
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

### NOTES:

- (1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig. 2
- (2) Mounted on copper pad area of 1.6 x 1.6" (40 x 40mm) per Fig. 5
- (3) 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum
- (4)  $V_F=3.5\text{V}$  max. for devices of  $V_{(BR)}\leq 220\text{V}$  and  $V_F=5.0$  Volt max. for devices of  $V_{(BR)}>220\text{V}$

**ELECTRICAL CHARACTERISTICS at (TA=25°C unless otherwise noted) TABLE 1**

Device Type	Breakdown Voltage V(BR) Volts (NOTE 1)		Test Current at Ir (mA)	Stand-off Voltage VWM (Volts)	Maximum Reverse Leakage at VWM Id (µA) (NOTE4)	Maximum Peak Pulse Current IPPM (Amps) (NOTE 2)	Maximum Clamping Voltage at IPPM Vc (Volts)	Maximum Temperature Coefficient of V(BR) (% / C)
	MIN	MAX						
BZW04P5V8	6.45	7.48	10.0	5.80	1000	38.0	10.5	0.057
BZW04-5V8	6.45	7.14	10.0	5.80	1000	38.0	10.5	0.057
BZW04P6V4	7.13	8.25	10.0	6.40	500	35.4	11.3	0.061
BZW04-6V4	7.13	7.88	10.0	6.40	500	35.4	11.3	0.061
BZW04P7V0	7.79	9.02	10.0	7.02	200	33.0	12.1	0.065
BZW04-7V0	7.79	8.61	10.0	7.02	200	33.0	12.1	0.065
BZW04P7V8	8.65	10.0	1.0	7.78	50.0	30.0	13.4	0.068
BZW04-7V8	8.65	9.55	1.0	7.78	50.0	30.0	13.4	0.073
BZW04P8V5	9.50	11.0	1.0	8.55	10.0	27.6	14.5	0.073
BZW04-8V5	9.50	10.5	1.0	8.55	10.0	27.6	14.5	0.075
BZW04P9V4	10.5	12.1	1.0	9.4	5.0	25.7	15.6	0.075
BZW04-9V4	10.5	11.6	1.0	9.4	5.0	25.7	15.6	0.075
BZW0P10	11.4	13.2	1.0	10.2	5.0	24.0	16.7	0.078
BZW04-10	11.4	12.6	1.0	10.2	5.0	24.0	16.7	0.078
BZW04P11	12.4	14.3	1.0	11.1	5.0	22.0	18.2	0.081
BZW04-11	12.4	13.7	1.0	11.1	5.0	22.0	18.2	0.081
BZW04P13	14.3	16.5	1.0	12.8	5.0	19.0	21.2	0.084
BZW04-13	14.3	15.8	1.0	12.8	5.0	19.0	21.2	0.084
BZW04P14	15.2	17.6	1.0	13.6	5.0	17.8	22.5	0.086
BZW04-14	15.2	16.8	1.0	13.6	5.0	17.8	22.5	0.086
BZW04P15	17.1	19.8	1.0	15.3	5.0	16.0	25.2	0.088
BZW04-15	17.1	18.9	1.0	15.3	5.0	16.0	25.2	0.088
BZW04P17	19.0	22.0	1.0	17.1	5.0	14.5	27.7	0.090
BZW04-17	19.0	21.0	1.0	17.1	5.0	14.5	27.7	0.090
BZW04P19	20.9	24.2	1.0	18.8	5.0	13.0	30.6	0.092
BZW04-19	20.9	23.1	1.0	18.8	5.0	13.0	30.6	0.092
BZW04P20	22.8	26.4	1.0	20.5	5.0	12.0	33.2	0.094
BZW04-20	22.8	25.2	1.0	20.5	5.0	12.0	33.2	0.094
BZW04P23	25.7	29.7	1.0	23.1	5.0	10.7	37.5	0.096
BZW04-23	25.7	28.4	1.0	23.1	5.0	10.7	37.5	0.096
BZW04P26	28.5	33.0	1.0	25.6	5.0	9.6	41.5	0.097
BZW04-26	28.5	31.5	1.0	25.6	5.0	9.6	41.5	0.097
BZW04P28	31.4	36.3	1.0	28.2	5.0	8.8	45.7	0.098
BZW04-28	31.4	34.7	1.0	28.2	5.0	8.8	45.7	0.098
BZW04P31	34.2	39.6	1.0	30.8	5.0	8.0	49.9	0.099
BZW04-31	34.2	37.8	1.0	30.8	5.0	8.0	49.9	0.099
BZW04P33	37.1	42.9	1.0	33.3	5.0	7.4	53.9	0.100
BZW04-33	37.1	41.0	1.0	33.3	5.0	7.4	53.9	0.100
BZW04P37	40.9	47.3	1.0	36.8	5.0	6.7	59.3	0.101
BZW04-37	40.9	45.2	1.0	36.8	5.0	6.7	59.3	0.101
BZW04P40	44.7	51.7	1.0	40.2	5.0	6.2	64.8	0.101
BZW04-40	44.7	49.4	1.0	40.2	5.0	6.2	64.8	0.101
BZW04P44	48.5	56.1	1.0	43.6	5.0	5.7	70.1	0.102
BZW04-44	48.5	53.6	1.0	43.6	5.0	5.7	70.1	0.102
BZW04P48	53.2	61.6	1.0	47.8	5.0	5.2	77.0	0.103
BZW04-48	53.2	58.8	1.0	47.8	5.0	5.2	77.0	0.103

**ELECTRICAL CHARACTERISTICS at (TA=25°C unless otherwise noted) TABLE 1 (Cont'd)**

Device Type	Breakdown Voltage V <sub>(BR)</sub> Volts (NOTE 1)		Test Current at I <sub>T</sub> (mA)	Stand-off Voltage V <sub>WM</sub> (Volts)	Maximum Reverse Leakage at V <sub>WM</sub> I <sub>D</sub> (μA) (NOTE4)	Maximum Peak Pulse Current I <sub>PPM</sub> (Amps) (NOTE 2)	Maximum Clamping Voltage at I <sub>PPM</sub> V <sub>C</sub> (Volts)	Maximum Temperature Coefficient of V <sub>(BR)</sub> (% / C)
	MIN	MAX						
BZW04P53	58.9	68.2	1.0	53.0	5.0	4.7	85.0	0.104
BZW04-53	58.9	65.1	1.0	53.0	5.0	4.7	85.0	0.104
BZW04P58	64.6	74.8	1.0	58.1	5.0	4.3	92.0	0.104
BZW04-58	64.6	71.4	1.0	58.1	5.0	4.3	92.0	0.104
BZW04P64	71.3	82.5	1.0	64.1	5.0	3.9	103	0.105
BZW04-64	71.3	78.8	1.0	64.1	5.0	3.9	103	0.105
BZW04P70	77.9	90.2	1.0	70.1	5.0	3.5	113	0.105
BZW04-70	77.9	86.1	1.0	70.1	5.0	3.5	113	0.105
BZW04P78	86.5	100	1.0	78.0	5.0	3.2	125	0.105
BZW04-78	86.5	95.5	1.0	78.0	5.0	3.2	125	0.105
BZW04P85	95.0	110	1.0	85.5	5.0	2.9	137	0.106
BZW04-85	95.0	105	1.0	85.5	5.0	2.9	137	0.106
BZW04P94	105	121	1.0	94.0	5.0	2.6	152	0.107
BZW04-94	105	116	1.0	94.0	5.0	2.6	152	0.107
BZW04P102	114	132	1.0	102	5.0	2.4	165	0.107
BZW04-102	114	126	1.0	102	5.0	2.4	165	0.107
BZW04P110	124	143	1.0	111	5.0	2.2	179	0.107
BZW04-110	124	137	1.0	111	5.0	2.2	179	0.107
BZW04P128	143	165	1.0	128	5.0	2.0	207	0.108
BZW04-128	143	158	1.0	128	5.0	2.0	207	0.108
BZW04P136	152	176	1.0	136	5.0	1.8	219	0.108
BZW404-136	152	168	1.0	136	5.0	1.8	219	0.108
BZW04P145	161	187	1.0	145	5.0	1.7	234	0.108
BZW04-145	161	179	1.0	145	5.0	1.7	234	0.108
BZW04P154	171	198	1.0	154	5.0	1.6	246	0.108
BZW04-154	171	189	1.0	154	5.0	1.6	246	0.108
BZW04P171	190	220	1.0	171	5.0	1.5	274	0.108
BZW04-171	190	210	1.0	171	5.0	1.5	274	0.108
BZW04P188	209	242	1.0	188	5.0	1.4	301	0.108
BZW04-188	209	231	1.0	188	5.0	1.4	301	0.108
BZW04P213	237	275	1.0	213	5.0	1.5	344	0.110
BZW04-213	237	263	1.0	213	5.0	1.5	344	0.110
BZW04P239	266	308	1.0	239	5.0	1.5	384	0.110
BZW04-239	266	294	1.0	239	5.0	1.5	384	0.110
BZW04P256	285	330	1.0	256	5.0	1.2	414	0.110
BZW04-256	285	315	1.0	256	5.0	1.2	414	0.110
BZW04P273	304	352	1.0	273	5.0	1.2	438	0.110
BZW04-273	304	336	1.0	273	5.0	1.2	438	0.110
BZW04P299	332	385	1.0	299	5.0	0.90	482	0.110
BZW04-299	332	368	1.0	299	5.0	0.90	482	0.110
BZW04P342	380	440	1.0	342	5.0	0.90	548	0.110
BZW04-342	380	420	1.0	342	5.0	0.90	548	0.110
BZW04P376	418	484	1.0	376	5.0	0.80	603	0.110
BZW04-376	418	462	1.0	376	5.0	0.80	603	0.110

**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
- (4) For bi-directional devices with V<sub>WM</sub> of 10 Volts and less, the I<sub>D</sub> limit is doubled

# RATINGS AND CHARACTERISTIC CURVES BZW04P5V8 THRU BZW04-376

FIG. 1 - PEAK PULSE POWER RATING CURVE

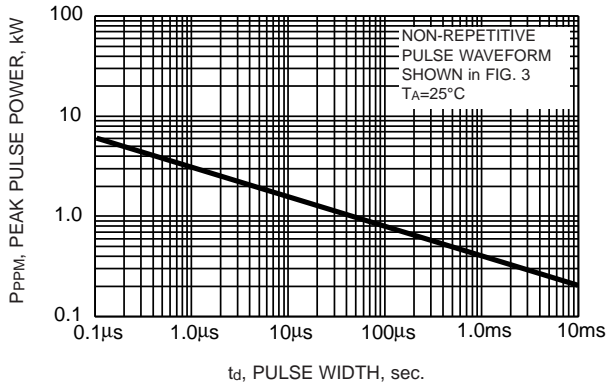


FIG. 2 - PULSE DERATING CURVE

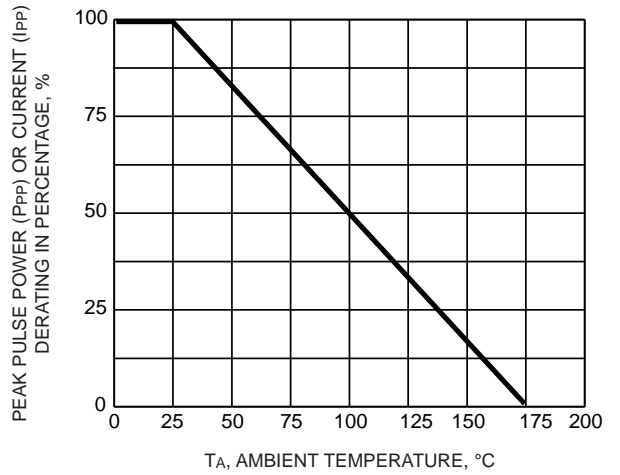


FIG. 3 - PULSE WAVEFORM

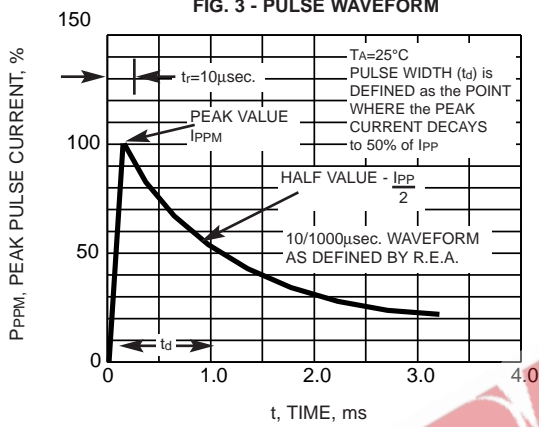


FIG. 4 - TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL

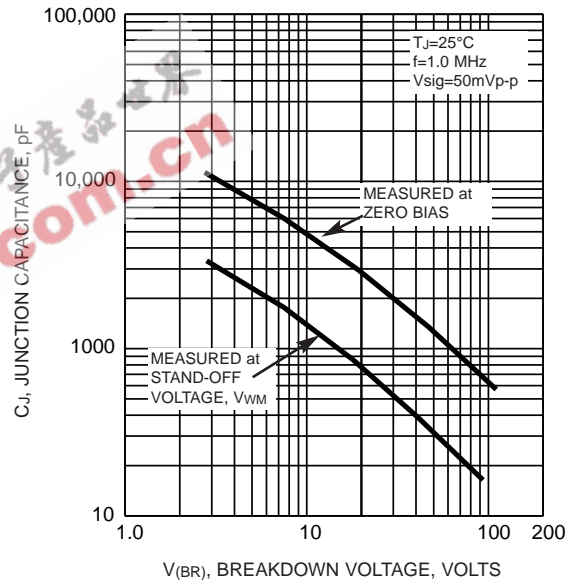


FIG. 5 - STEADY STATE POWER DERATING CURVE

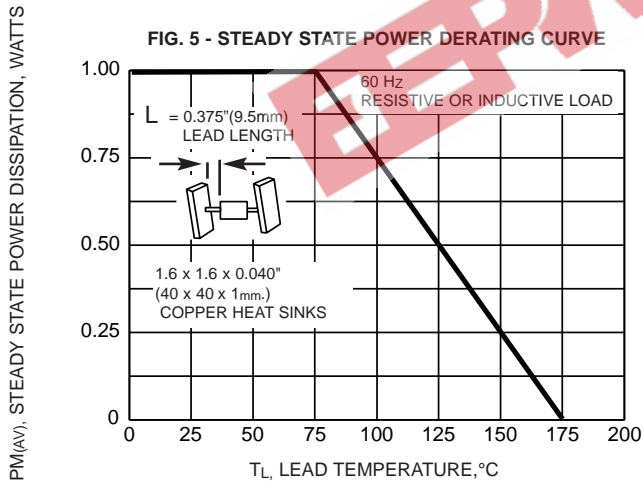


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL

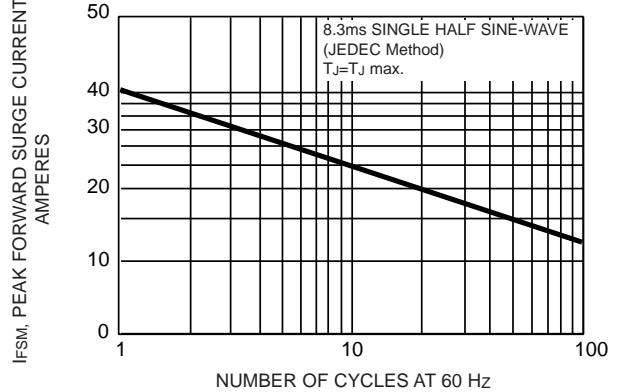


FIG. 7 - TYPICAL REVERSE LEAKAGE CHARACTERISTICS

