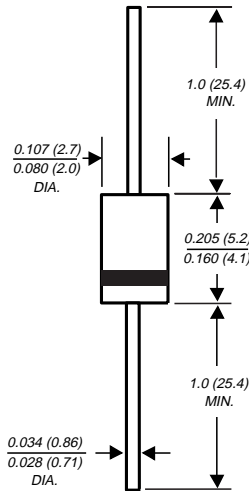


# BZW04P-5V8 THRU BZW04-376

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

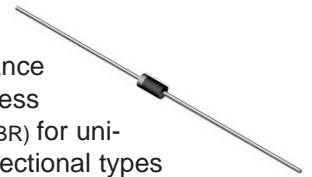
**DO204AL**



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

### 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<br>V(BR)<br>Volts (NOTE 1) |      | Test<br>Current<br>at Ir<br>(mA) | Stand-off<br>Voltage<br>VWM<br>(Volts) | Maximum<br>Reverse<br>Leakage<br>at VWM<br>Id (µA)<br>(NOTE4) | Maximum<br>Peak Pulse<br>Current<br>IPPM<br>(Amps)<br>(NOTE 2) | Maximum<br>Clamping<br>Voltage at<br>IPPM<br>Vc (Volts) | Maximum<br>Temperature<br>Coefficient<br>of V(BR)<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<br>V <sub>(BR)</sub><br>Volts (NOTE 1) |      | Test<br>Current<br>at I <sub>T</sub><br>(mA) | Stand-off<br>Voltage<br>V <sub>WM</sub><br>(Volts) | Maximum<br>Reverse<br>Leakage<br>at V <sub>WM</sub><br>I <sub>D</sub> (μA)<br>(NOTE4) | Maximum<br>Peak Pulse<br>Current<br>I <sub>PPM</sub><br>(Amps)<br>(NOTE 2) | Maximum<br>Clamping<br>Voltage at<br>I <sub>PPM</sub><br>V <sub>C</sub> (Volts) | Maximum<br>Temperature<br>Coefficient<br>of V <sub>(BR)</sub><br>(% / 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

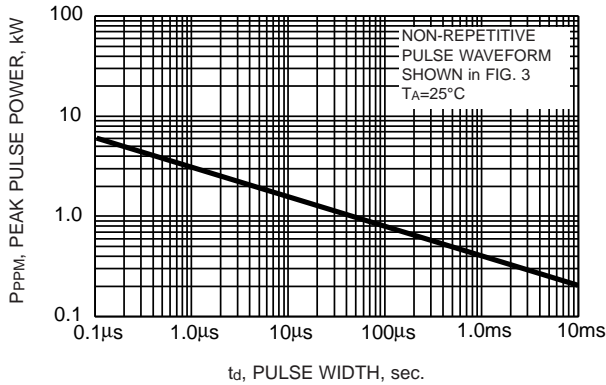


FIG. 2 - PULSE DERATING CURVE

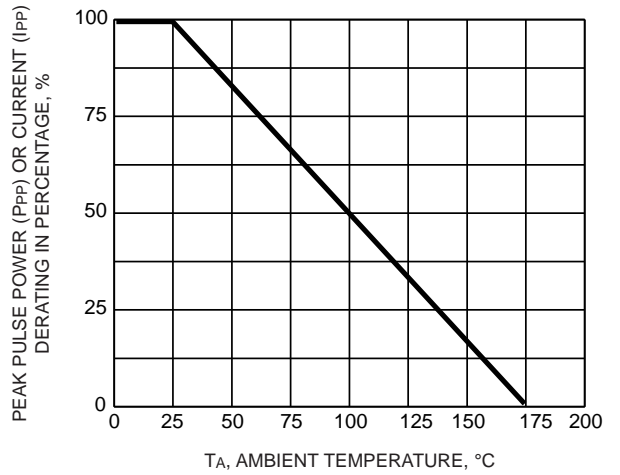


FIG. 3 - PULSE WAVEFORM

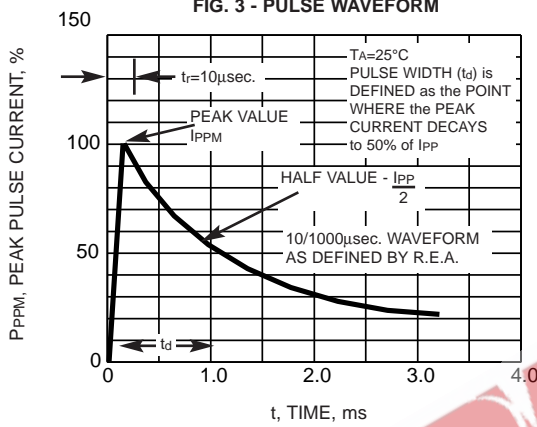


FIG. 4 - TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL

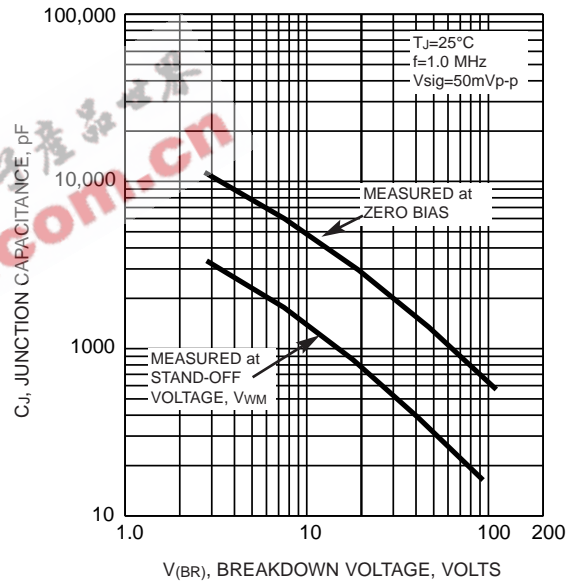


FIG. 5 - STEADY STATE POWER DERATING CURVE

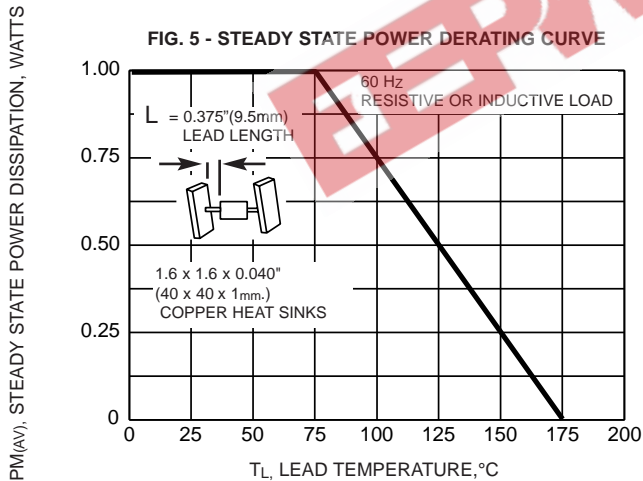


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL

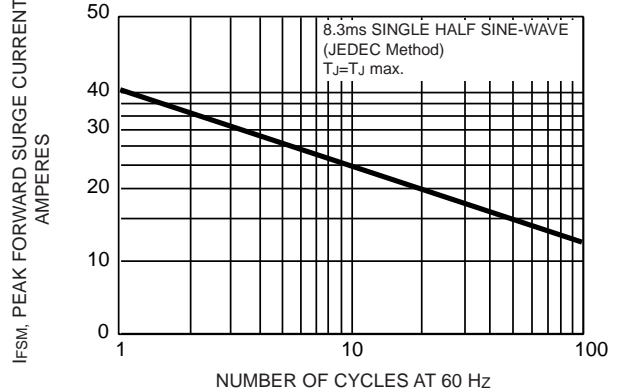


FIG. 7 - TYPICAL REVERSE LEAKAGE CHARACTERISTICS

