

TRANSIENT VOLTAGE SUPPRESSOR

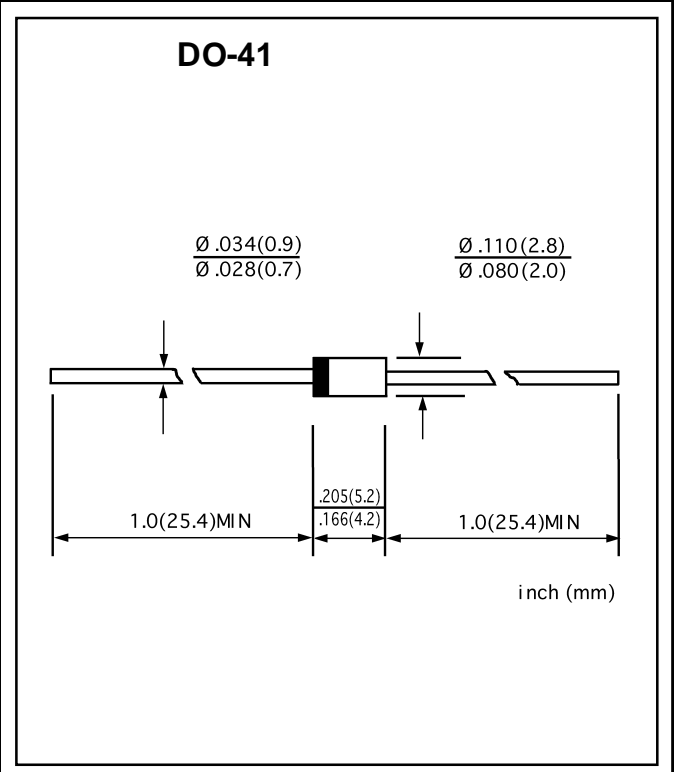
BREAKDOWN VOLTAGE: 5.8 --- 376 V
PEAK PULSE POWER: 400 W

FEATURES

- ◇ Plastic package has underwriters laboratory flammability classification 94V-0
- ◇ Glass passivated junction
- ◇ 400W peak pulse power capability with a 10/1000µs waveform, repetition rate (duty cycle): 0.01%
- ◇ Excellent clamping capability
- ◇ Fast response time: typically less than 1.0ps from 0 Volts to $V_{(BR)}$ for uni-directional and 5.0ns for bi-directional types
- ◇ Devices with $V_{(BR)} \geq 10V$ I_D are typically I_D less than 1.0 µA
- ◇ High temperature soldering guaranteed: 265 °C / 10 seconds, 0.375"(9.5mm) lead length, 5lbs. (2.3kg) tension

MECHANICAL DATA

- ◇ Case: JEDEC DO-41, molded plastic body over passivated junction
- ◇ Terminals: axial leads, solderable per MIL-STD-750, method 2026
- ◇ Polarity: for uni-directional types the color band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- ◇ Weight: 0.012 ounces, 0.34 grams
- ◇ Mounting position: any



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 | UNIT |
|---|----------------|-------------|------|
| Peak power dissipation with a 10/1000µs waveform (NOTE 1, FIG.1) | P_{PPM} | Minimum 400 | W |
| Peak pulse current with a 10/1000µs waveform (NOTE 1) | I_{PPM} | See table 1 | A |
| Steady state power dissipation at $T_L=75^\circ C$ Lead lengths 0.375"(9.5mm) (NOTE 2) | $P_{M(AV)}$ | 1.0 | W |
| Peak forward surge current, 8.3ms single half Sine-wave superimposed on rated load (JEDEC Method) (NOTE 3) | I_{FSM} | 40.0 | A |
| Maximum instantaneous forward voltage at 25A for unidirectional only (NOTE 4) | V_F | 3.5/6.5 | V |
| Operating junction and storage temperature range | T_J, T_{STG} | -50---+175 | °C |

NOTES: (1) Non-repetitive current pulses, per Fig. 3 and derated above $T_A=25^\circ C$ per Fig. 2

(2) Mounted on copper pad area of 1.6" x 1.6" (40 x 40mm²) per Fig. 5

(3) Measured of 8.3ms single half sine-wave or square wave, duty cycle=4 pulses per minute maximum

(4) $V_F=3.5$ Volt max. for devices of $V_{(BR)} \leq 220V$, and $V_F=5.0$ Volt max. for devices of $V_{(BR)} > 220V$

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

TABLE 1

| Device type | | Breakdown voltage V _(BR) (V) _(NOTE1) | | Test current at I _r (mA) | Stand-off voltage V _{WM} (V) | Maximum reverse leakage at V _{WM} I _b (NOTE3)(μA) | Maximum peak pulse I _{PPM} (NOTE2) (A) | Maximum clamping voltage at I _{PPM} V _C (V) | Maximum temperature coefficient of V _(BR) (%/°C) |
|----------------|---------------|--|------|-------------------------------------|---------------------------------------|---|---|---|---|
| Unidirectional | Bidirectional | Min | Max | | | | | | |
| BZW04P5V8 | BZW04P5V8B | 6.45 | 7.48 | 10 | 5.80 | 1000 | 38.0 | 10.5 | 0.057 |
| BZW04-5V8 | BZW04-5V8B | 6.45 | 7.14 | 10 | 5.80 | 1000 | 38.0 | 10.5 | 0.057 |
| BZW04P6V4 | BZW04P6V4B | 7.13 | 8.25 | 10 | 6.40 | 500 | 35.4 | 11.3 | 0.061 |
| BZW04-6V4 | BZW04-6V4B | 7.13 | 7.88 | 10 | 6.40 | 500 | 35.4 | 11.3 | 0.061 |
| BZW04P7V0 | BZW04P7V0B | 7.79 | 9.02 | 10 | 7.02 | 200 | 33.0 | 12.1 | 0.065 |
| BZW04-7V0 | BZW04-7V0B | 7.79 | 8.61 | 10 | 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 | 0.070 |
| 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 | 9.40 | 5.0 | 25.7 | 15.6 | 0.075 |
| BZW04-9V4 | BZW04-9V4B | 10.5 | 11.6 | 1.0 | 9.40 | 5.0 | 25.7 | 15.6 | 0.075 |
| BZW04P10 | BZW04P10B | 11.4 | 13.2 | 1.0 | 10.2 | 5.0 | 24.0 | 16.7 | 0.078 |
| BZW04-10 | BZW04-10B | 11.4 | 12.6 | 1.0 | 10.2 | 5.0 | 24.0 | 16.7 | 0.078 |
| BZW04P11 | BZW04P11B | 12.4 | 14.3 | 1.0 | 11.1 | 5.0 | 22.0 | 18.2 | 0.081 |
| BZW04-11 | BZW04-11B | 12.4 | 13.7 | 1.0 | 11.1 | 5.0 | 22.0 | 18.2 | 0.081 |
| BZW04P13 | BZW04P13B | 14.3 | 16.5 | 1.0 | 12.8 | 5.0 | 19.0 | 21.2 | 0.084 |
| BZW04-13 | BZW04-13B | 14.3 | 15.8 | 1.0 | 12.8 | 5.0 | 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 |

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

TABLE 1(Cont' d)

| Device type | | Breakdown voltage V _(BR) (V) _(NOTE1) | | Test current at I _T (mA) | Stand-off voltage V _{WM} (V) | Maximum reverse leakage at V _{WM} I _D (NOTE3)(μA) | Maximum peak pulse I _{PPM} (NOTE2) (A) | Maximum clamping voltage at I _{PPM} V _C (V) | Maximum temperature coefficient of V _(BR) (%/°C) |
|----------------|---------------|--|------|-------------------------------------|---------------------------------------|---|---|---|---|
| Unidirectional | Bidirectional | Min | Max | | | | | | |
| 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 | BZW04-64B | 71.3 | 78.8 | 1.0 | 64.1 | 1.0 | 3.9 | 103 | 0.105 |
| 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 | 105.0 | 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 | 102.0 | 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 |
| BZW04-136 | BZW04-136B | 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 | 1.5 | 344 | 0.110 |
| BZW04-213 | BZW04-213B | 237 | 263 | 1.0 | 213 | 1.0 | 1.5 | 344 | 0.110 |
| BZW04P239 | BZW04P239B | 266 | 308 | 1.0 | 239 | 1.0 | 1.5 | 384 | 0.110 |
| BZW04-239 | BZW04-239B | 266 | 294 | 1.0 | 239 | 1.0 | 1.5 | 384 | 0.110 |
| BZW04P256 | BZW04P256B | 285 | 330 | 1.0 | 256 | 1.0 | 1.20 | 414 | 0.110 |
| BZW04-256 | BZW04-256B | 285 | 315 | 1.0 | 256 | 1.0 | 1.20 | 414 | 0.110 |
| BZW04P273 | BZW04P273B | 304 | 352 | 1.0 | 273 | 1.0 | 1.20 | 438 | 0.110 |
| BZW04-273 | BZW04-273B | 304 | 336 | 1.0 | 273 | 1.0 | 1.20 | 438 | 0.110 |
| BZW04P299 | BZW04P299B | 332 | 385 | 1.0 | 299 | 1.0 | 0.90 | 482 | 0.110 |
| BZW04-299 | BZW04-299B | 332 | 368 | 1.0 | 299 | 1.0 | 0.90 | 482 | 0.110 |
| BZW04P342 | BZW04P342B | 380 | 440 | 1.0 | 342 | 1.0 | 0.90 | 548 | 0.110 |
| BZW04-342 | BZW04-342B | 380 | 420 | 1.0 | 342 | 1.0 | 0.90 | 548 | 0.110 |
| BZW04P376 | BZW04P376B | 418 | 484 | 1.0 | 376 | 1.0 | 0.80 | 603 | 0.110 |
| BZW04-376 | BZW04-376B | 418 | 462 | 1.0 | 376 | 1.0 | 0.80 | 603 | 0.110 |

NOTE: (1) Pulse test: t_p ≤ 50ms.

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(2) Surge current waveform per Fig. 3 and derated Fig. 2

(3) For bidirectional types having V_{WM} of 10 volts and less, the I_D limit is doubled

(4) All terms and symbols are consistent with ANSI/IEEE C62.35

FIG.1 – PEAK PULSE POWER RATING CURVE



FIG.3 – PULSE WAVEFORM

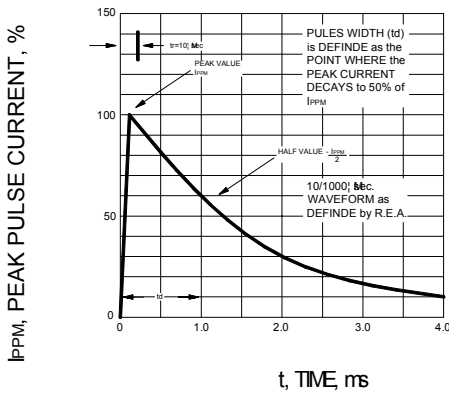


FIG.5 – STEADY STATE POWER DERATING CURVE



FIG.7 – TYPICAL REVERSE LEAKAGE CHARACTERISTICS



FIG.2 – PULSE DERATING CURVE

PEAK PULSE POWER (P_{pp}) OR CURRENT (I_{ppm}) DERATING IN PERCENTAGE, %



FIG.4 – TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL

C_j , JUNCTION CAPACITANCE, pF

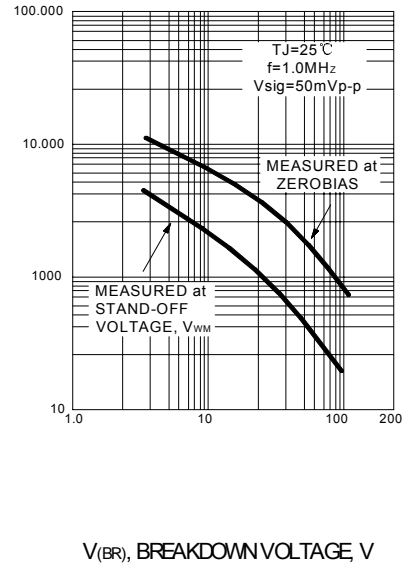


FIG.6 – MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

I_{FSM} , PEAK FORWARD SURGE CURRENT, A

