

### TRANSIENT VOLTAGE SUPPRESSOR

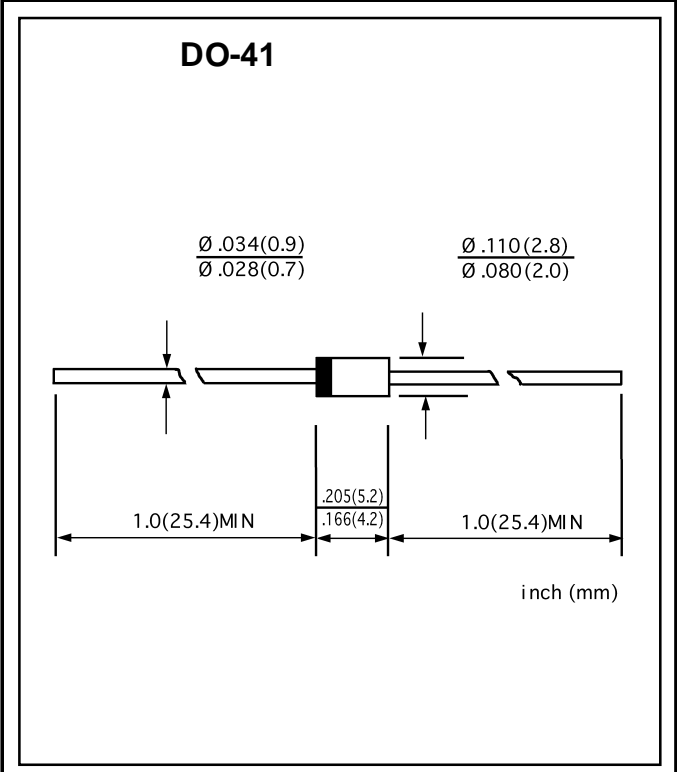
**BREAKDOWN VOLTAGE: 5.8 --- 376 V**  
**PEAK PULSE POWER: 400 W**

#### 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 $T_L=75^\circ C$<br>Lead lengths 0.375"(9.5mm) (NOTE 2)                     | $P_{M(AV)}$    | 1.0         | W    |
| Peak forward surge current, 8.3ms single half<br>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 40mm<sup>2</sup>) 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<sub>A</sub>=25°C unless otherwise noted)**

**TABLE 1**

| Device type    |               | Breakdown voltage V <sub>(BR)</sub> (V) <sup>(NOTE1)</sup> |      | Test current at I <sub>r</sub> (mA) | Stand-off voltage V <sub>WM</sub> (V) | Maximum reverse leakage at V <sub>WM</sub> I <sub>b</sub> <sup>(NOTE3)</sup> (μA) | Maximum peak pulse I <sub>PPM</sub> <sup>(NOTE2)</sup> (A) | Maximum clamping voltage at I <sub>PPM</sub> V <sub>C</sub> (V) | Maximum temperature coefficient of V <sub>(BR)</sub> (%/°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<sub>A</sub>=25 °C unless otherwise noted)**

**TABLE 1(Cont' d)**

| Device type    |               | Breakdown voltage V <sub>(BR)</sub> (V) <sub>(NOTE1)</sub> |      | Test current at I <sub>T</sub> (mA) | Stand-off voltage V <sub>WM</sub> (V) | Maximum reverse leakage at V <sub>WM</sub> I <sub>D</sub> (NOTE3)(μA) | Maximum peak pulse I <sub>PPM</sub> (NOTE2) (A) | Maximum clamping voltage at I <sub>PPM</sub> V <sub>C</sub> (V) | Maximum temperature coefficient of V <sub>(BR)</sub> (%/°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<sub>p</sub> ≤ 50ms.

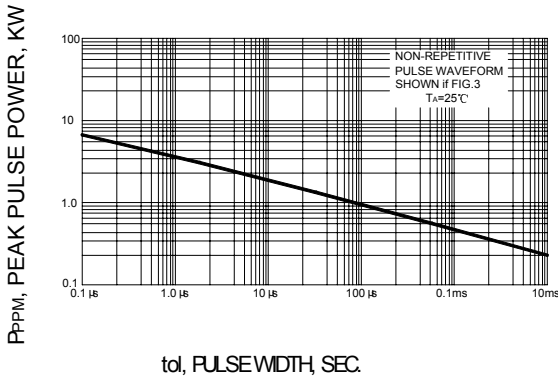
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(2) Surge current waveform per Fig. 3 and derated Fig. 2

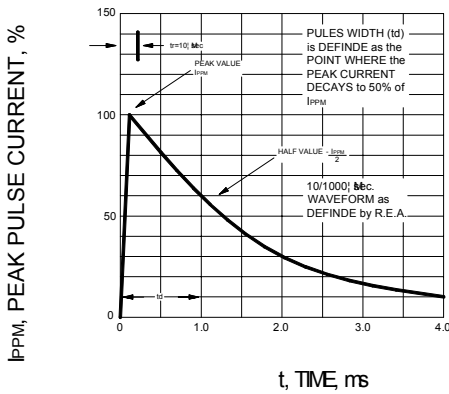
(3) For bidirectional types having V<sub>WM</sub> of 10 volts and less, the I<sub>D</sub> limit is doubled

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

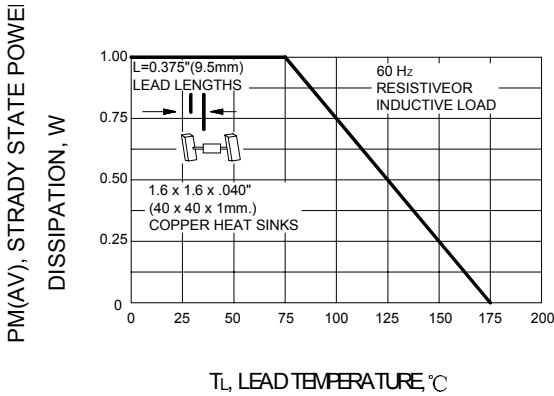
**FIG.1 – PEAK PULSE POWER RATING CURVE**



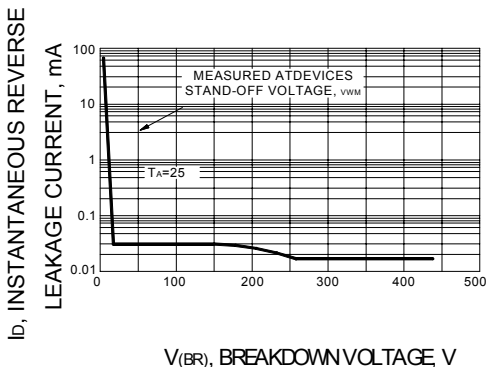
**FIG.3 – PULSE WAVEFORM**



**FIG.5 – STEADY STATE POWER DERATING CURVE**

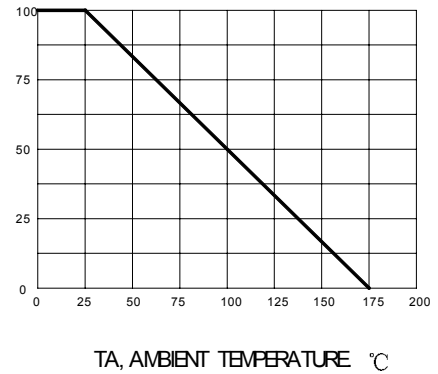


**FIG.7 – TYPICAL REVERSE LEAKAGE CHARACTERISTICS**



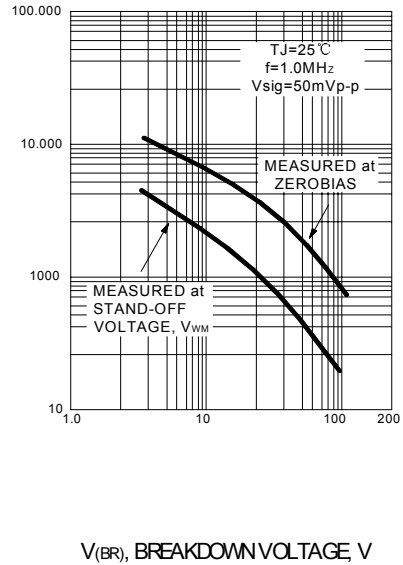
**FIG.2 – PULSE DERATING CURVE**

PEAK PULSE POWER (P<sub>pp</sub>) OR CURRENT (I<sub>ppm</sub>) DERATING IN PERCENTAGE, %



**FIG.4 – TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL**

C<sub>j</sub>, JUNCTION CAPACITANCE, pF



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

F<sub>sm</sub>, PEAK FORWARD SURGE CURRENT, A

