

# **MDE Semiconductor, Inc.**

78-150 Calle Tampico, Unit 210, La Quinta, CA., USA 92253 Tel: 760-564-8656 • Fax: 760-564-2414  
1-800-831-4881 Email: sales@mdesemiconductor.com Web: www.mdesemiconductor.com

## **BZW04 SERIES**

### **GLASS PASSIVATED JUNCTION TRANSIENT VOLTAGE SUPPRESSOR VOLTAGE-6.8 TO 376 Volts 400 Watt Peak Pulse Power**

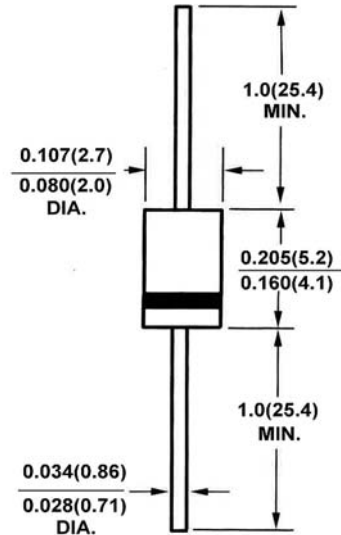
#### **FEATURES**

- Plastic package has Underwriters Laboratory Flammability Classification 94 V-O
- Glass passivated chip junction in DO-41 package
- 400W surge capability at 1ms
- Excellent clamping capability
- Low zener impedance
- Low incremental surge resistance
- Excellent clamping capability
- Fast response time: typically less than 1.0 ps from 0 volts to BV min
- Typical IR less than 1 $\mu$ A above 10V
- High temperature soldering guaranteed: 300°C/10 seconds/ .375", (9.5mm) lead length, 5lbs., (2.3kg) tension

#### **MECHANICAL DATA**

Case: JEDEC DO-41 Molded plastic  
Terminals: Axial leads, solderable per MIL-STD-750, Method 2026  
Polarity: Color band denoted positive end (cathode) except Bipolar  
Mounting Position: Any  
Weight: 0.012 ounces, 0.3 grams

**DO-204AL (DO-41 Plastic)**



Dimensions in inches (millimeters)

#### **DEVICES FOR BIPOLAR APPLICATIONS**

For Bidirectional use C or CA Suffix for types BZW-04-5V8 thru types BZW04-376 (e.g. BZW04-5V8B, BZW04-376B)  
Electrical characteristics apply in both directions.

#### **MAXIMUM RATINGS AND CHARACTERISTICS**

Ratings at 25°C ambient temperature unless otherwise specified.

Single phase, half wave, 60Hz, resistive or inductive load.

For Capacitive load, derate current by 20%

| RATING                                                                                                        | SYMBOL                            | VALUE       | UNITS |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------|-------|
| Peak Pulse Power Dissipation at TA = 25 °C, TP = 1ms<br>(NOTE 1)                                              | P <sub>PPM</sub>                  | Minimum 400 | Watts |
| Peak Pulse Current of on 10/1000 $\mu$ s waveform (Note 1)                                                    | I <sub>ppm</sub>                  | SEE TABLE 1 | Amps  |
| Steady State Power Dissipation at TL = 75°C<br>lengths .375", 9.5mm (Note 2)                                  | P <sub>M(AV)</sub>                | 1.0         | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine-wave<br>Superimposed on Rated Load, (JEDEC Method)(Note 3) | I <sub>FSM</sub>                  | 40          | Amps  |
| Operatings and Storage Temperature Range                                                                      | T <sub>J</sub> , T <sub>STG</sub> | -55 +175    | °C    |

#### **NOTES:**

1. Non-repetitive current pulse, per Fig.3 and derated above Ta=25 °C per Fig.2.
2. Mounted on Copper Pad area of 1.6x1.6" (40x40mm) per Fig.5.
3. 8.3ms single half sine-wave, or equivalent square wave, Duty cycle=4 pulses per minutes maximum.

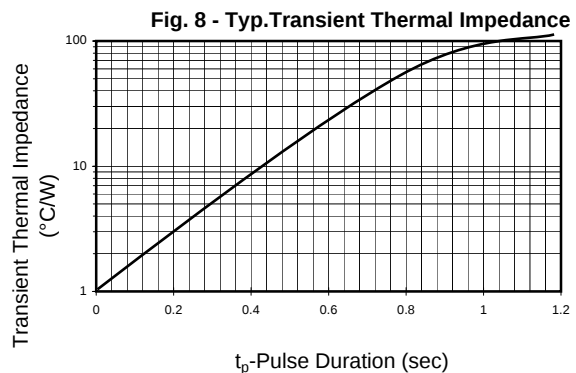
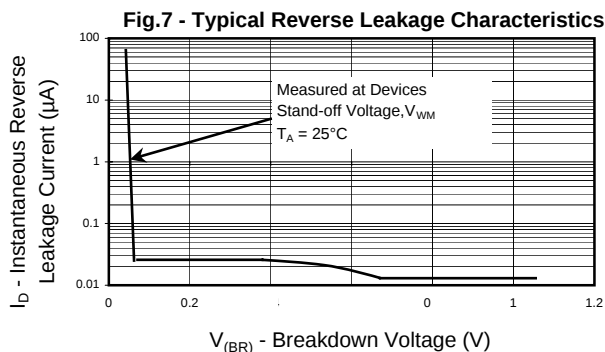
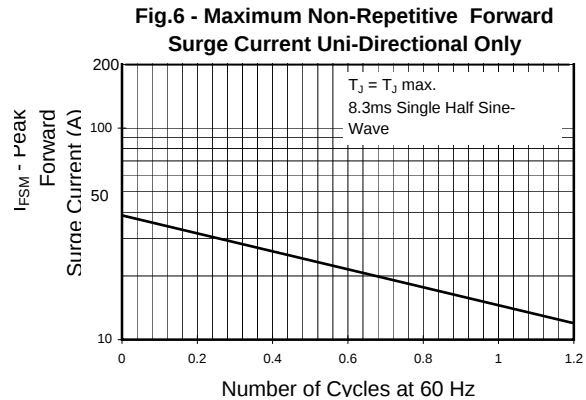
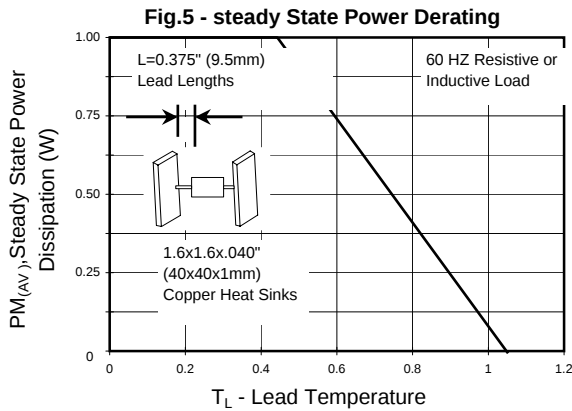
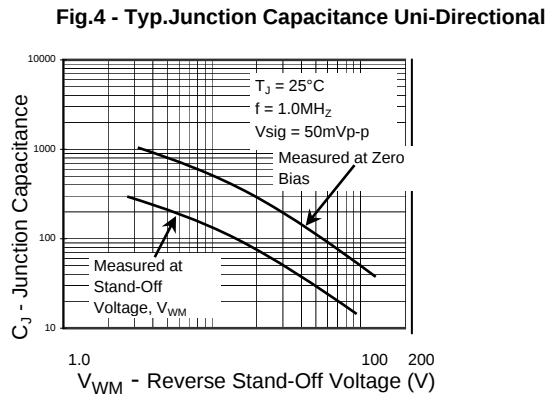
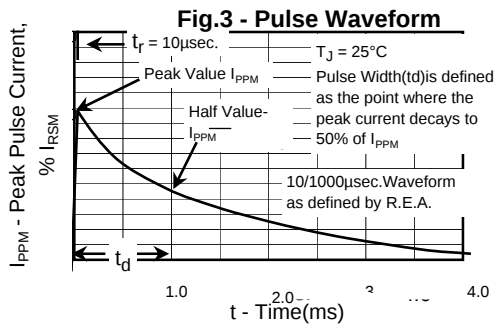
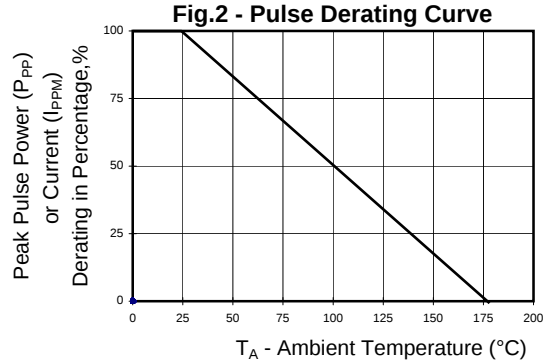
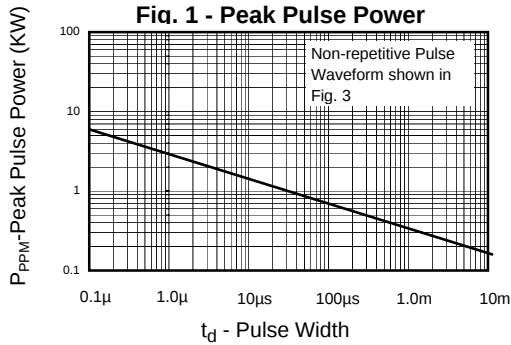
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## RATINGS AND CHARACTERISTIC CURVES BZW04 SERIES

### Ratings and

### Characteristic Curves ( $T_A = 25^\circ\text{C}$ unless otherwise noted)



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## **400 Watt TVS**

| <b>BZW04</b> |             | REVERSE<br>STAND-<br>OFF<br>VOLTAGE<br>$V_{RWM}(V)$ | BREAKDOWN<br>VOLTAGE<br>$V_{BR}(V)$<br>MIN.@ $I_T$ | BREAKDOWN<br>VOLTAGE<br>$V_{BR}(V)$<br>MAX.@ $I_T$ | TEST<br>CURRENT<br>$I_T$ (mA) | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>@ $I_{pp}$ $V_c(V)$ | PEAK<br>PULSE<br>CURRENT<br>$I_{pp}$ (A) | REVERSE<br>LEAKAGE<br>@ $V_{RWM}$<br>$I_R(\mu A)$ |
|--------------|-------------|-----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|-------------------------------|-------------------------------------------------------|------------------------------------------|---------------------------------------------------|
| UNI- POLAR   | BI-POLAR    |                                                     |                                                    |                                                    |                               |                                                       |                                          |                                                   |
| BZW 04P5V8   | BZW 04P5V8B | 5.80                                                | 6.45                                               | 7.48                                               | 10.0                          | 10.5                                                  | 38.00                                    | 900                                               |
| BZW 04-5V8   | BZW 04-5V8B | 5.90                                                | 6.45                                               | 7.14                                               | 10.0                          | 10.5                                                  | 38.00                                    | 900                                               |
| BZW 04P6V4   | BZW 04P6V4B | 6.40                                                | 7.13                                               | 8.25                                               | 10.0                          | 11.3                                                  | 35.00                                    | 500                                               |
| BZW 04-6V4   | BZW 04-6V4B | 6.40                                                | 7.13                                               | 7.88                                               | 10.0                          | 11.3                                                  | 35.00                                    | 500                                               |
| BZW 04P7V0   | BZW 04P7V0B | 7.02                                                | 7.79                                               | 9.02                                               | 1.0                           | 12.1                                                  | 33.00                                    | 200                                               |
| BZW 04-7V0   | BZW 04-7V0B | 7.02                                                | 7.79                                               | 8.61                                               | 1.0                           | 12.1                                                  | 33.00                                    | 200                                               |
| BZW 04P7V8   | BZW 04P7V8B | 7.78                                                | 8.65                                               | 10.00                                              | 1.0                           | 13.4                                                  | 30.00                                    | 50                                                |
| BZW 04-7V8   | BZW 04-7V8B | 7.78                                                | 8.65                                               | 9.55                                               | 1.0                           | 13.4                                                  | 30.00                                    | 50                                                |
| BZW 04P8V5   | BZW 04P8V5B | 8.55                                                | 9.50                                               | 11.00                                              | 1.0                           | 14.5                                                  | 28.00                                    | 10.0                                              |
| BZW04-8V5    | BZW04-8V5B  | 8.55                                                | 9.50                                               | 10.50                                              | 1.0                           | 14.5                                                  | 28.00                                    | 10.0                                              |
| BZW 04P9V4   | BZW 04P9V4B | 9.40                                                | 10.50                                              | 12.10                                              | 1.0                           | 15.6                                                  | 25.70                                    | 5.0                                               |
| BZW 04-9V4   | BZW 04-9V4B | 9.40                                                | 10.50                                              | 11.60                                              | 1.0                           | 15.6                                                  | 25.70                                    | 5.0                                               |
| BZW 04P10    | BZW 04P10B  | 10.20                                               | 11.40                                              | 13.20                                              | 1.0                           | 16.7                                                  | 24.00                                    | 5.0                                               |
| BZW 04-10    | BZW 04-10B  | 10.20                                               | 11.40                                              | 12.60                                              | 1.0                           | 16.7                                                  | 24.00                                    | 5.0                                               |
| BZW 04P11    | BZW 04P11B  | 11.10                                               | 12.40                                              | 14.30                                              | 1.0                           | 18.2                                                  | 22.00                                    | 5.0                                               |
| BZW 04-11    | BZW 04-11B  | 11.10                                               | 12.40                                              | 13.70                                              | 1.0                           | 18.2                                                  | 22.00                                    | 5.0                                               |
| BZW 04P13    | BZW 04P13B  | 12.80                                               | 14.30                                              | 16.50                                              | 1.0                           | 21.2                                                  | 19.00                                    | 5.0                                               |
| BZW 04-13    | BZW 04-13B  | 12.80                                               | 14.30                                              | 15.80                                              | 1.0                           | 21.2                                                  | 19.00                                    | 5.0                                               |
| BZW 04P14    | BZW 04P14B  | 13.60                                               | 15.20                                              | 17.60                                              | 1.0                           | 22.5                                                  | 17.80                                    | 5.0                                               |
| BZW 04-14    | BZW 04-14B  | 13.60                                               | 15.20                                              | 16.80                                              | 1.0                           | 22.5                                                  | 17.80                                    | 5.0                                               |
| BZW 04P15    | BZW 04P15B  | 15.30                                               | 17.10                                              | 19.80                                              | 1.0                           | 25.2                                                  | 16.00                                    | 5.0                                               |
| BZW 04-15    | BZW 04-15B  | 15.30                                               | 17.10                                              | 18.90                                              | 1.0                           | 25.2                                                  | 16.00                                    | 5.0                                               |
| BZW 04P17    | BZW 04P17B  | 17.10                                               | 19.00                                              | 22.00                                              | 1.0                           | 27.7                                                  | 14.50                                    | 5.0                                               |
| BZW 04-17    | BZW 04-17B  | 17.10                                               | 19.00                                              | 21.00                                              | 1.0                           | 27.7                                                  | 14.50                                    | 5.0                                               |
| BZW 04P19    | BZW 04P19B  | 18.80                                               | 20.90                                              | 24.20                                              | 1.0                           | 30.6                                                  | 13.00                                    | 5.0                                               |
| BZW 04-19    | BZW 04-19B  | 18.80                                               | 20.90                                              | 23.10                                              | 1.0                           | 30.6                                                  | 13.00                                    | 5.0                                               |
| BZW 04P20    | BZW 04P20B  | 20.50                                               | 22.80                                              | 26.40                                              | 1.0                           | 33.2                                                  | 12.00                                    | 5.0                                               |
| BZW 04-20    | BZW 04-20B  | 20.50                                               | 22.80                                              | 25.20                                              | 1.0                           | 33.2                                                  | 12.00                                    | 5.0                                               |
| BZW 04P23    | BZW 04P23B  | 23.10                                               | 25.70                                              | 29.70                                              | 1.0                           | 37.5                                                  | 10.70                                    | 5.0                                               |
| BZW 04-23    | BZW 04-23B  | 23.10                                               | 25.70                                              | 28.40                                              | 1.0                           | 37.5                                                  | 10.70                                    | 5.0                                               |
| BZW 04P26    | BZW 04P26B  | 26.50                                               | 28.50                                              | 33.00                                              | 1.0                           | 41.5                                                  | 9.60                                     | 5.0                                               |
| BZW 04-26    | BZW 04-26B  | 26.50                                               | 28.50                                              | 31.50                                              | 1.0                           | 41.5                                                  | 9.60                                     | 5.0                                               |
| BZW 04 P28   | BZW 04P28B  | 28.20                                               | 31.40                                              | 36.30                                              | 1.0                           | 45.7                                                  | 8.80                                     | 5.0                                               |
| BZW 04-28    | BZW 04-28B  | 28.20                                               | 31.40                                              | 34.70                                              | 1.0                           | 45.7                                                  | 8.80                                     | 5.0                                               |
| BZW 04P31    | BZW 04P31B  | 30.80                                               | 34.20                                              | 39.60                                              | 1.0                           | 49.9                                                  | 8.00                                     | 5.0                                               |
| BZW 04-31    | BZW 04-31B  | 30.80                                               | 34.20                                              | 37.80                                              | 1.0                           | 49.9                                                  | 8.00                                     | 5.0                                               |
| BZW 04P33    | BZW 04P33B  | 33.35                                               | 37.10                                              | 42.90                                              | 1.0                           | 53.9                                                  | 7.40                                     | 5.0                                               |
| BZW 04-33    | BZW 04-33B  | 33.35                                               | 37.10                                              | 41.00                                              | 1.0                           | 53.9                                                  | 7.40                                     | 5.0                                               |
| BZW 04P37    | BZW 04P37B  | 36.80                                               | 40.90                                              | 47.30                                              | 1.0                           | 59.3                                                  | 6.70                                     | 5.0                                               |
| BZW 04-37    | BZW 04-37B  | 36.80                                               | 40.90                                              | 45.20                                              | 1.0                           | 59.3                                                  | 6.70                                     | 5.0                                               |
| BZW 04P40    | BZW 04P40B  | 40.20                                               | 44.70                                              | 51.70                                              | 1.0                           | 64.8                                                  | 6.20                                     | 5.0                                               |
| BZW 04-40    | BZW 04-40B  | 40.20                                               | 44.70                                              | 49.40                                              | 1.0                           | 64.8                                                  | 6.20                                     | 5.0                                               |
| BZW 04P44    | BZW 04P44B  | 43.60                                               | 48.50                                              | 56.10                                              | 1.0                           | 70.1                                                  | 5.70                                     | 5.0                                               |
| BZW 04-44    | BZW 04-44B  | 43.60                                               | 48.50                                              | 53.60                                              | 1.0                           | 70.1                                                  | 5.70                                     | 5.0                                               |

For bidirectional type having  $V_{RWM}$  of 10 volts and less, the IR limit is double.

For Part No. which use the character "p" , the VBR is  $\pm 10\%$

Certified RoHS Compliant

UL File # E223026

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|--------------|-------------|-----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|-------------------------------|-------------------------------------------------------|------------------------------------------|---------------------------------------------------|
| UNI- POLAR   | BI-POLAR    |                                                     |                                                    |                                                    |                               |                                                       |                                          |                                                   |
| BZW 04P48    | BZW 04P48B  | 47.80                                               | 53.20                                              | 61.60                                              | 1.0                           | 77.0                                                  | 5.20                                     | 5.0                                               |
| BZW 04-48    | BZW 04-48B  | 47.80                                               | 53.20                                              | 58.80                                              | 1.0                           | 77.0                                                  | 5.20                                     | 5.0                                               |
| BZW 04P53    | BZW 04P53B  | 53.00                                               | 58.90                                              | 68.20                                              | 1.0                           | 85.0                                                  | 4.70                                     | 5.0                                               |
| BZW 04-53    | BZW 04-53B  | 53.00                                               | 58.90                                              | 65.10                                              | 1.0                           | 85.0                                                  | 4.70                                     | 5.0                                               |
| BZW 04P58    | BZW 04P58B  | 58.10                                               | 64.60                                              | 74.80                                              | 1.0                           | 92.0                                                  | 4.30                                     | 5.0                                               |
| BZW 04-58    | BZW 04-58B  | 58.10                                               | 64.60                                              | 71.40                                              | 1.0                           | 92.0                                                  | 4.30                                     | 5.0                                               |
| BZW 04P64    | BZW 04P64B  | 64.10                                               | 71.30                                              | 82.50                                              | 1.0                           | 103.0                                                 | 3.90                                     | 5.0                                               |
| BZW 04-64    | BZW 04-64B  | 64.10                                               | 71.30                                              | 78.80                                              | 1.0                           | 103.0                                                 | 3.90                                     | 5.0                                               |
| BZW 04P70    | BZW 04P70B  | 70.10                                               | 77.90                                              | 90.20                                              | 1.0                           | 113.0                                                 | 3.50                                     | 5.0                                               |
| BZW 04-70    | BZW 04-70B  | 70.10                                               | 77.90                                              | 86.10                                              | 1.0                           | 113.0                                                 | 3.50                                     | 5.0                                               |
| BZW 04P78    | BZW 04P78B  | 78.00                                               | 86.50                                              | 100.00                                             | 1.0                           | 125.0                                                 | 3.20                                     | 5.0                                               |
| BZW 04-78    | BZW 04-78B  | 78.00                                               | 86.50                                              | 95.50                                              | 1.0                           | 125.0                                                 | 3.20                                     | 5.0                                               |
| BZW 04P85    | BZW 04P85B  | 85.80                                               | 95.00                                              | 110.00                                             | 1.0                           | 137.0                                                 | 2.90                                     | 5.0                                               |
| BZW 04-85    | BZW 04-85B  | 85.50                                               | 95.00                                              | 105.00                                             | 1.0                           | 137.0                                                 | 2.90                                     | 5.0                                               |
| BZW 04P94    | BZW 04P94B  | 94.00                                               | 105.00                                             | 121.00                                             | 1.0                           | 152.0                                                 | 2.60                                     | 5.0                                               |
| BZW 04-94    | BZW 04-94B  | 94.00                                               | 105.00                                             | 116.00                                             | 1.0                           | 152.0                                                 | 2.60                                     | 5.0                                               |
| BZW 04P102   | BZW 04P102B | 102.00                                              | 114.00                                             | 132.00                                             | 1.0                           | 165.0                                                 | 2.40                                     | 5.0                                               |
| BZW 04-102   | BZW 04-102B | 102.00                                              | 114.00                                             | 126.00                                             | 1.0                           | 165.0                                                 | 2.40                                     | 5.0                                               |
| BZW 04P110   | BZW 04P110B | 111.00                                              | 124.00                                             | 143.00                                             | 1.0                           | 179.0                                                 | 2.20                                     | 5.0                                               |
| BZW 04-110   | BZW 04-110B | 111.00                                              | 124.00                                             | 137.00                                             | 1.0                           | 179.0                                                 | 2.20                                     | 5.0                                               |
| BZW 04P128   | BZW 04P128B | 128.00                                              | 143.00                                             | 165.00                                             | 1.0                           | 207.0                                                 | 2.00                                     | 5.0                                               |
| BZW 04-128   | BZW 04-128B | 128.00                                              | 143.00                                             | 158.00                                             | 1.0                           | 207.0                                                 | 2.00                                     | 5.0                                               |
| BZW 04P136   | BZW 04P136B | 136.00                                              | 152.00                                             | 176.00                                             | 1.0                           | 219.0                                                 | 1.80                                     | 5.0                                               |
| BZW 04-136   | BZW 04-136B | 136.00                                              | 152.00                                             | 168.00                                             | 1.0                           | 219.0                                                 | 1.80                                     | 5.0                                               |
| BZW 04P145   | BZW 04P145B | 145.00                                              | 161.00                                             | 187.00                                             | 1.0                           | 234.0                                                 | 1.70                                     | 5.0                                               |
| BZW 04-145   | BZW 04-145B | 145.00                                              | 161.00                                             | 179.00                                             | 1.0                           | 234.0                                                 | 1.70                                     | 5.0                                               |
| BZW 04P154   | BZW 04P154B | 154.00                                              | 171.00                                             | 198.00                                             | 1.0                           | 246.0                                                 | 1.60                                     | 5.0                                               |
| BZW 04-154   | BZW 04-154B | 154.00                                              | 171.00                                             | 189.00                                             | 1.0                           | 246.0                                                 | 1.60                                     | 5.0                                               |
| BZW 04P171   | BZW 04P171B | 171.00                                              | 190.00                                             | 220.00                                             | 1.0                           | 274.0                                                 | 1.50                                     | 5.0                                               |
| BZW 04-171   | BZW 04-171B | 171.00                                              | 190.00                                             | 210.00                                             | 1.0                           | 274.0                                                 | 1.50                                     | 5.0                                               |
| BZW 04P188   | BZW 04P188B | 188.00                                              | 209.00                                             | 242.00                                             | 1.0                           | 301.0                                                 | 1.40                                     | 5.0                                               |
| BZW 04-188   | BZW 04-188B | 188.00                                              | 209.00                                             | 231.00                                             | 1.0                           | 301.0                                                 | 1.40                                     | 5.0                                               |
| BZW 04P213   | BZW 04P213B | 213.00                                              | 237.00                                             | 275.00                                             | 1.0                           | 344.0                                                 | 1.50                                     | 5.0                                               |
| BZW 04-213   | BZW 04-213B | 213.00                                              | 237.00                                             | 263.00                                             | 1.0                           | 344.0                                                 | 1.50                                     | 5.0                                               |
| BZW 04P239   | BZW 04P239B | 239.00                                              | 266.00                                             | 308.00                                             | 1.0                           | 384.0                                                 | 1.50                                     | 5.0                                               |
| BZW 04-239   | BZW 04-239B | 239.00                                              | 266.00                                             | 294.00                                             | 1.0                           | 384.0                                                 | 1.50                                     | 5.0                                               |
| BZW 04P256   | BZW 04P256B | 256.00                                              | 285.00                                             | 330.00                                             | 1.0                           | 414.0                                                 | 1.20                                     | 5.0                                               |
| BZW 04-256   | BZW 04-256B | 256.00                                              | 285.00                                             | 315.00                                             | 1.0                           | 414.0                                                 | 1.20                                     | 5.0                                               |
| BZW 04P273   | BZW 04P273B | 273.00                                              | 304.00                                             | 352.00                                             | 1.0                           | 438.0                                                 | 1.20                                     | 5.0                                               |
| BZW 04-273   | BZW 04-273B | 273.00                                              | 304.00                                             | 336.00                                             | 1.0                           | 438.0                                                 | 1.20                                     | 5.0                                               |
| BZW 04P299   | BZW 04P299B | 299.00                                              | 332.00                                             | 385.00                                             | 1.0                           | 482.0                                                 | 0.90                                     | 5.0                                               |
| BZW 04-299   | BZW 04-299B | 299.00                                              | 332.00                                             | 368.00                                             | 1.0                           | 482.0                                                 | 0.90                                     | 5.0                                               |
| BZW 04P342   | BZW 04P342B | 342.00                                              | 380.00                                             | 440.00                                             | 1.0                           | 548.0                                                 | 0.90                                     | 5.0                                               |
| BZW 04-342   | BZW 04-342B | 342.00                                              | 380.00                                             | 420.00                                             | 1.0                           | 548.0                                                 | 0.90                                     | 5.0                                               |
| BZW 04P376   | BZW 04P376B | 376.00                                              | 418.00                                             | 484.00                                             | 1.0                           | 603.0                                                 | 0.80                                     | 5.0                                               |
| BZW 04-376   | BZW 04-376B | 376.00                                              | 418.00                                             | 462.00                                             | 1.0                           | 603.0                                                 | 0.80                                     | 5.0                                               |

For bidirectional type having  $V_{RWM}$  of 10 volts and less, the IR limit is double.

For Part No. which use the character "p" , the  $V_{BR}$  is  $\pm 10\%$

Certified RoHS Compliant

UL File # E223026