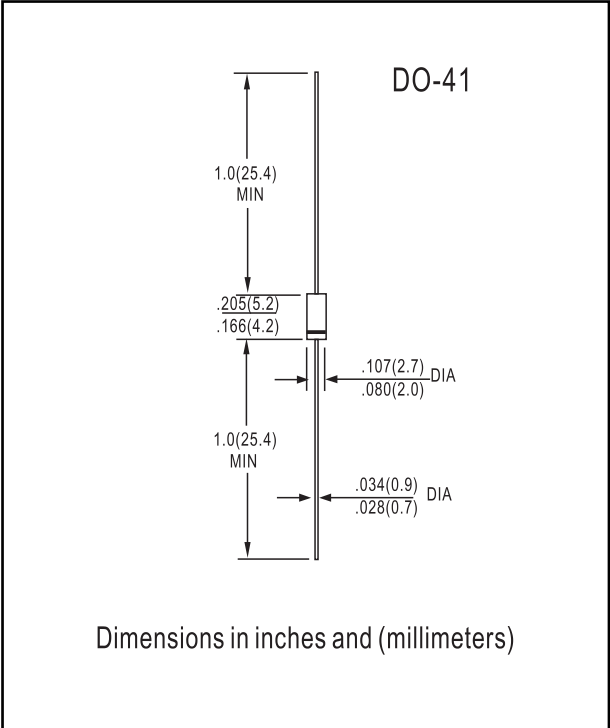




- FEATURES**
- Glass passivated chip junction
 - Available in uni-directional and bi-directional
 - 400 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle): 0.01 %
 - Excellent clamping capability
 - Very fast response time
 - Low incremental surge resistance
 - Solder dip 260 °C, 40 s
 - Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



MECHANICAL DATA

Case: DO-204AL, molded epoxy over passivated chip
Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS compliant, commercial grade
Base P/NHE3 - RoHS compliant, high reliability/automotive grade (AEC Q101 qualified)

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD22-B102
E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

Note: BZW04-213(B) ~ BZW04-376(B) for commercial grade only

Polarity: For uni-directional types the color band denotes cathode end, no marking on bi-directional types

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

| MAXIMUM RATINGS AND THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | |
|---|----------------|----------------|------------------|
| PARAMETER | SYMBOL | LIMIT | UNIT |
| Peak pulse power dissipation with a 10/1000 μ s waveform ⁽¹⁾ (Fig. 1) | P_{PPM} | 400 | W |
| Peak pulse current with a 10/1000 μ s waveform ⁽¹⁾ | I_{PPM} | See next table | A |
| Power dissipation on infinite heatsink at $T_L = 75\text{ }^\circ\text{C}$ (Fig. 5) | P_D | 1.5 | W |
| Peak forward surge current, 8.3 ms single half sine-wave uni-directional only ⁽²⁾ | I_{FSM} | 40 | A |
| Maximum instantaneous forward voltage at 25 A for uni-directional only ⁽³⁾ | V_F | 3.5/5.0 | V |
| 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 $T_A = 25\text{ }^\circ\text{C}$ per Fig. 2
- (2) Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum
- (3) $V_F = 3.5\text{ V}$ for BZW04P(-)188 and below; $V_F = 5.0\text{ V}$ for BZW04P(-)213 and above



ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | | | | | |
|---|------------|---|------|----------------------------------|---------------------------------------|--|---|---|---|
| PART NUMBER | | BREAKDOWN VOLTAGE V _{BR} AT I _T (1) | | TEST CURRENT I _T (mA) | STAND-OFF VOLTAGE V _{WM} (V) | MAXIMUM REVERSE LEAKAGE AT V _{WM} I _D (4) (μA) | MAXIMUM PEAK PULSE CURRENT I _{PPM} (2) (A) | MAXIMUM CLAMPING VOLTAGE AT I _{PPM} V _C (V) | MAXIMUM TEMPERATURE COEFFICIENT OF V _{BR} (%/°C) |
| | | MIN. | MAX. | | | | | | |
| BZW04P5V8 | BZW04P5V8B | 6.45 | 7.48 | 10.0 | 5.80 | 1000 | 38.0 | 10.5 | 0.057 |
| BZW04-5V8 | BZW04-5V8B | 6.45 | 7.14 | 10.0 | 5.80 | 1000 | 38.0 | 10.5 | 0.057 |
| BZW04P6V4 | BZW04P6V4B | 7.13 | 8.25 | 10.0 | 6.40 | 500 | 35.4 | 11.3 | 0.061 |
| BZW04-6V4 | BZW04-6V4B | 7.13 | 7.88 | 10.0 | 6.40 | 500 | 35.4 | 11.3 | 0.061 |
| BZW04P7V0 | BZW04P7V0B | 7.79 | 9.02 | 10.0 | 7.02 | 200 | 33.0 | 12.1 | 0.065 |
| BZW04-7V0 | BZW04-7V0B | 7.79 | 8.61 | 10.0 | 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 | 0.07 |
| 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 | 9.4 | 5.0 | 25.7 | 15.6 | 0.075 |
| BZW04-9V4 | BZW04-9V4B | 10.5 | 11.6 | 1.0 | 9.4 | 5.0 | 25.7 | 15.6 | 0.075 |
| BZW0P10 | BZW0P10B | 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 |
| 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 | BZW04P64B | 71.3 | 78.8 | 1.0 | 64.1 | 1.0 | 3.9 | 103 | 0.105 |



ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

| PART NUMBER | | BREAKDOWN VOLTAGE V_{BR} AT I_T ⁽¹⁾ (V) | | TEST CURRENT I_T (mA) | STAND-OFF VOLTAGE V_{WM} (V) | MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D ⁽⁴⁾ (μ A) | MAXIMUM PEAK PULSE CURRENT I_{PPM} ⁽²⁾ (A) | MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V) | MAXIMUM TEMPERATURE COEFFICIENT OF V_{BR} (%/ $^\circ$ C) |
|-------------|-------------|--|------|-------------------------|--------------------------------|---|---|---|---|
| | | MIN. | MAX. | | | | | | |
| 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 | 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 | 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 |
| BZW404-136 | BZW404-136B | 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 | 1.2 | 344 | 0.110 |
| BZW04-213 | BZW04-213B | 237 | 263 | 1.0 | 213 | 1.0 | 1.2 | 344 | 0.110 |
| BZW04P239 | BZW04P239B | 266 | 308 | 1.0 | 239 | 1.0 | 1.1 | 384 | 0.110 |
| BZW04-239 | BZW04-239B | 266 | 294 | 1.0 | 239 | 1.0 | 1.1 | 384 | 0.110 |
| BZW04P256 | BZW04P256B | 285 | 330 | 1.0 | 256 | 1.0 | 1.0 | 414 | 0.110 |
| BZW04-256 | BZW04-256B | 285 | 315 | 1.0 | 256 | 1.0 | 1.0 | 414 | 0.110 |
| BZW04P273 | BZW04P273B | 304 | 352 | 1.0 | 273 | 1.0 | 0.90 | 438 | 0.110 |
| BZW04-273 | BZW04-273B | 304 | 336 | 1.0 | 273 | 1.0 | 0.90 | 438 | 0.110 |
| BZW04P299 | BZW04P299B | 332 | 385 | 1.0 | 299 | 1.0 | 0.80 | 482 | 0.110 |
| BZW04-299 | BZW04-299B | 332 | 368 | 1.0 | 299 | 1.0 | 0.80 | 482 | 0.110 |
| BZW04P342 | BZW04P342B | 380 | 440 | 1.0 | 342 | 1.0 | 0.75 | 548 | 0.110 |
| BZW04-342 | BZW04-342B | 380 | 420 | 1.0 | 342 | 1.0 | 0.75 | 548 | 0.110 |
| BZW04P376 | BZW04P376B | 418 | 484 | 1.0 | 376 | 1.0 | 0.67 | 603 | 0.110 |
| BZW04-376 | BZW04-376B | 418 | 462 | 1.0 | 376 | 1.0 | 0.67 | 603 | 0.110 |

Notes:

- (1) Pulse test: $t_p \leq 50$ ms
- (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 types having V_{WM} of 10 V and less, the I_D limit is doubled



RATINGS AND CHARACTERISTIC CURVES BYW04P-5V8 THRU BZW04-376

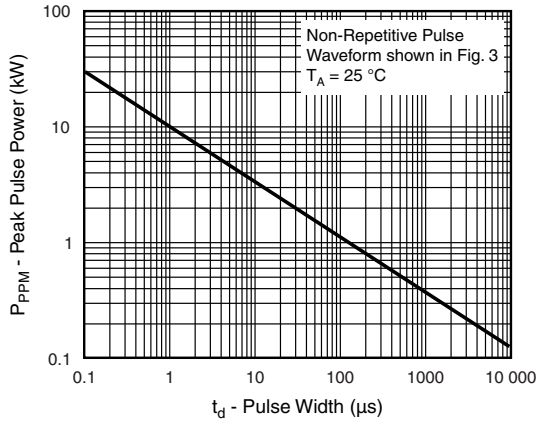


Figure 1. Peak Pulse Power Rating Curve

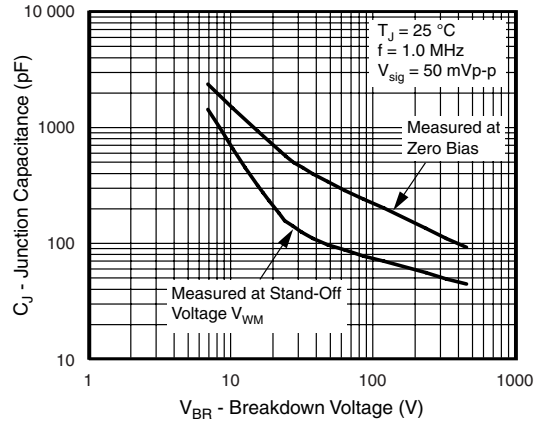


Figure 4. Typical Junction Capacitance

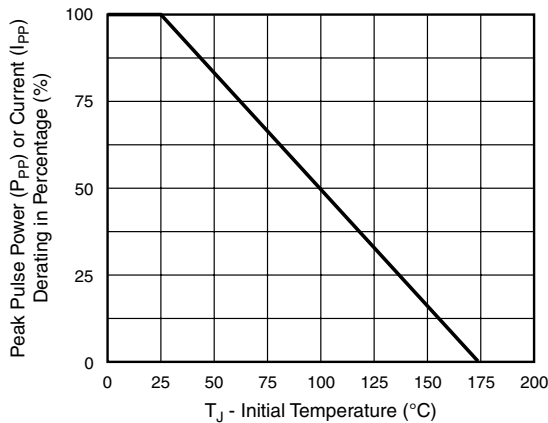


Figure 2. Pulse Power or Current vs. Initial Junction Temperature

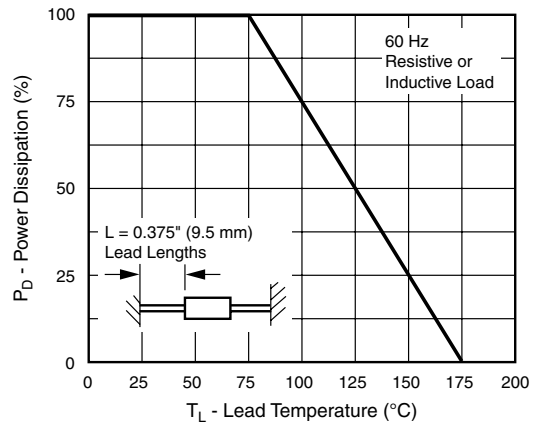


Figure 5. Power Derating Curve

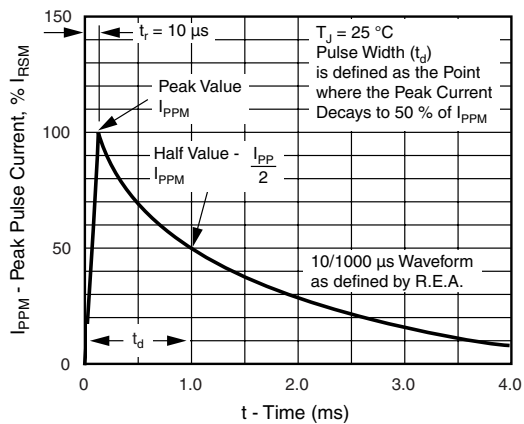


Figure 3. Pulse Waveform

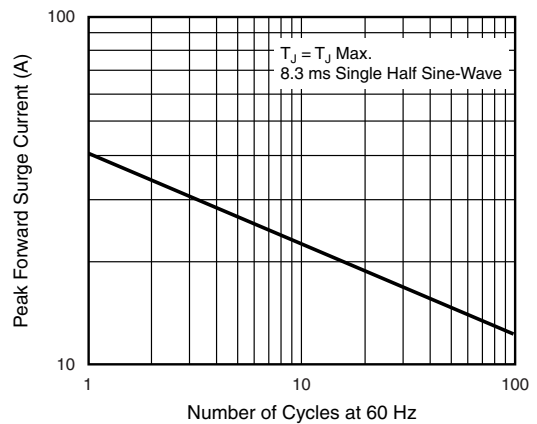


Figure 6. Max. Non-Repetitive Forward Surge Current Uni-Directional Only