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# MBRD5H100T4G, NBRD5H100T4G
# Switch-mode Schottky Power Rectifier

## Surface Mount Power Package

This series of Power Rectifiers employs the Schottky Barrier principle in a large metal−to−silicon power diode. State−of−the−art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for use in low voltage, high frequency switching power supplies, free wheeling diodes, and polarity protection diodes.

**Features**

- Guardring for Stress Protection
- Low Forward Voltage
- 175°C Operating Junction Temperature
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Short Heat Sink Tab Manufactured − Not Sheared!
- NBRD Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant*

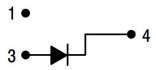
**Mechanical Characteristics:**

- Case: Epoxy, Molded, Epoxy Meets UL 94 V−0
- Weight: 0.4 grams (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Device Meets MSL1 Requirements
- ESD Ratings:
  - Machine Model = C (> 400 V)
  - Human Body Model = 3B (> 8000 V)

**SCHOTTKY BARRIER RECTIFIER 5 AMPERES, 100 VOLTS**

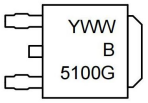


**DPAK**
**CASE 369C**




(Pin 1: No Connect)

**MARKING DIAGRAM**




| | |
|---|---|
| Y | = Year |
| WW | = Work Week |
| B5100 | = Device Code |
| G | = Pb−Free Package |

**ORDERING INFORMATION**

| Device | Package | Shipping† |
|---|---|---|
| MBRD5H100T4G | DPAK (Pb−Free) | 2,500 / Tape & Reel |
| NBRD5H100T4G | DPAK (Pb−Free) | 2,500 / Tape & Reel |
| NBRD5H100T4G−VF01 | DPAK (Pb−Free) | 2,500 / Tape & Reel |

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## MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 100 | V |
| Average Rectified Forward Current<br>(Rated $V_R$) $T_C$ = 171°C | $I_{F(AV)}$ | 5 | A |
| Peak Repetitive Forward Current<br>(Rated $V_R$, Square Wave, 20 kHz) $T_C$ = 171°C | $I_{FRM}$ | 10 | A |
| Nonrepetitive Peak Surge Current<br>(Surge applied at rated load conditions halfwave, single phase, 60 Hz) | $I_{FSM}$ | 105 | A |
| Operating Junction and Storage Temperature Range (Note 1) | $T_J$, $T_{stg}$ | −65 to +175 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. The heat generated must be less than the thermal conductivity from Junction−to−Ambient: $dP_D/dT_J < 1/R_{\theta JA}$.

## THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance<br>Junction−to−Case (Note 2)<br>Junction−to−Ambient (Note 2) | <br>$R_{\theta JC}$<br>$R_{\theta JA}$ | <br>1.6<br>95.8 | °C/W |

2. When mounted using minimum recommended pad size on FR−4 board.

## ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Note 3)<br>($I_F$ = 5 A, $T_J$ = 25°C)<br>($I_F$ = 5 A, $T_J$ = 125°C) | $V_F$ | <br>0.71<br>0.60 | V |
| Maximum Instantaneous Reverse Current (Note 3)<br>(Rated dc Voltage, $T_J$ = 125°C)<br>(Rated dc Voltage, $T_J$ = 25°C) | $I_R$ | <br>4.5<br>3.5 | <br>mA<br>μA |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%

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## TYPICAL CHARACTERISTICS

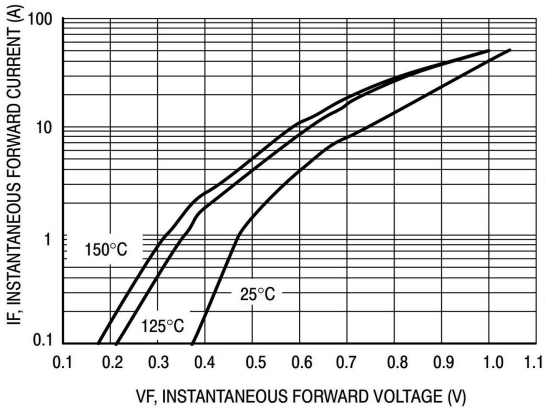


**Figure 1. Typical Forward Voltage**

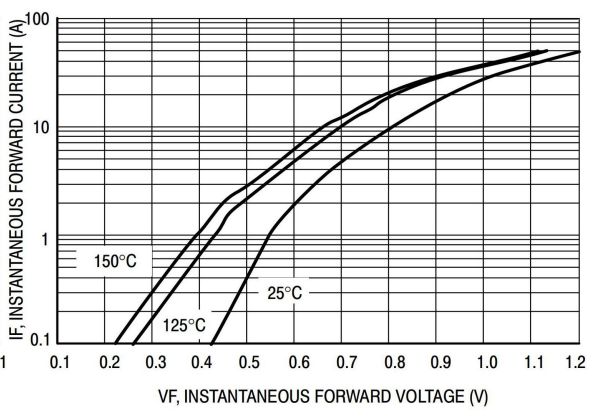


**Figure 2. Maximum Forward Voltage**

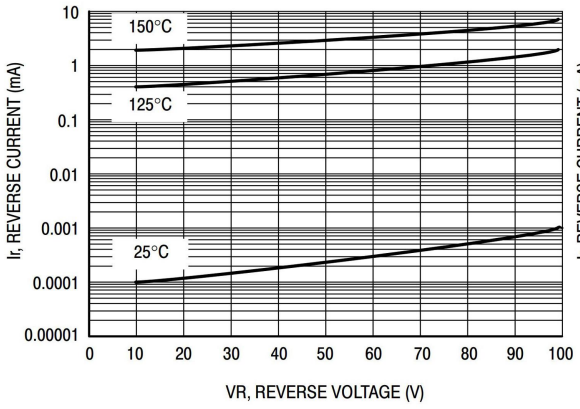


**Figure 3. Typical Reverse Current**

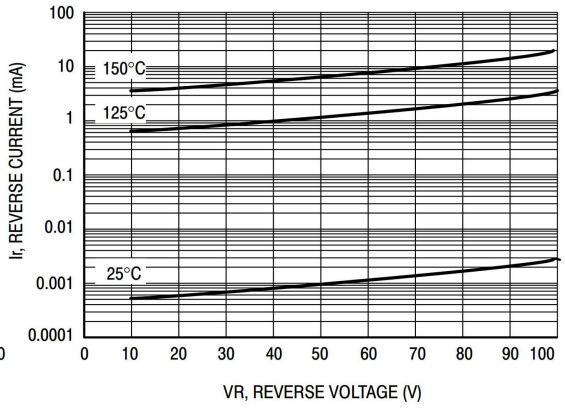


**Figure 4. Maximum Reverse Current**

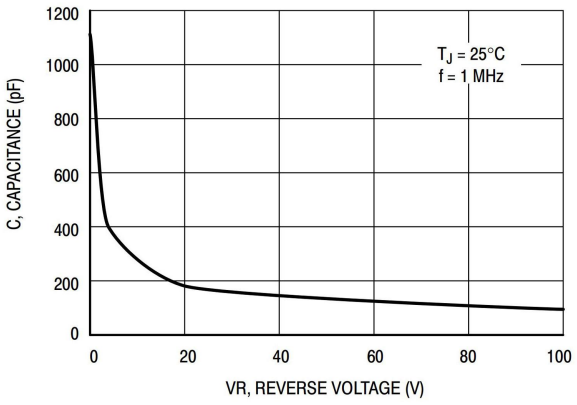


**Figure 5. Typical Capacitance**

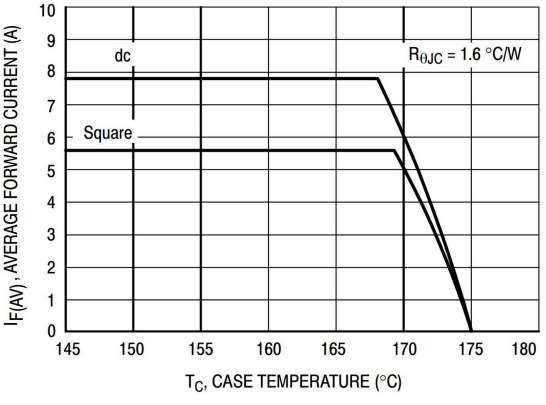


**Figure 6. Current Derating, Case**

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## TYPICAL CHARACTERISTICS

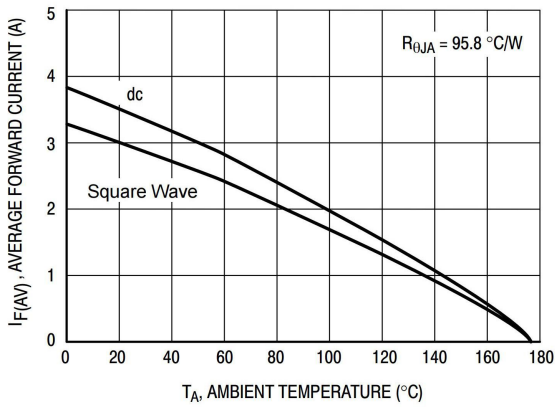


**Figure 7. Current Derating, Ambient**

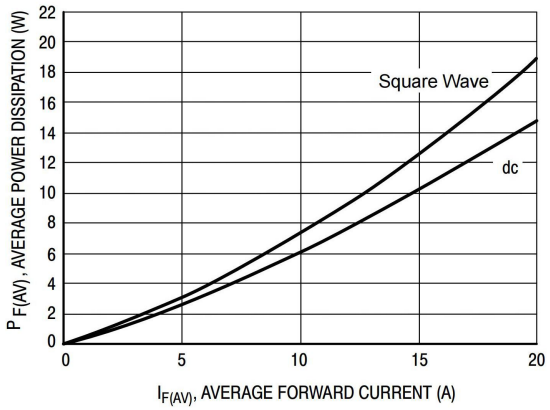


**Figure 8. Forward Power Dissipation**

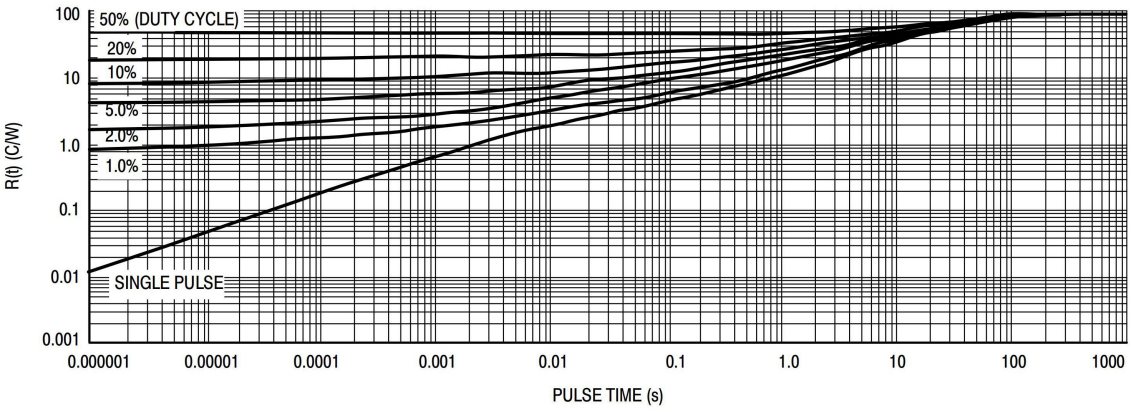


**Figure 9. Thermal Response, Junction−to−Case**

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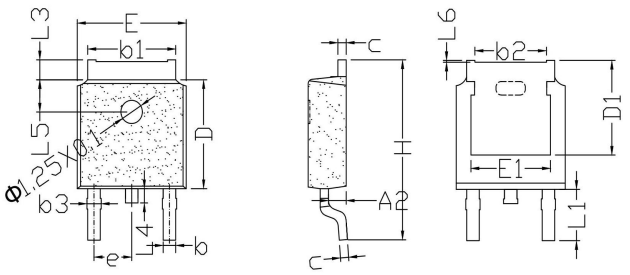
## Ordering Information

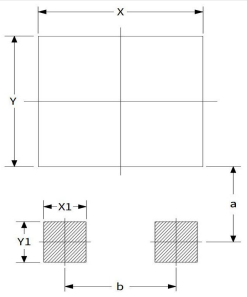
| PACKAGE | PACKAGE CODE | UNIT WEIGHT(g) | REEL(pcs) | BOX(pcs) | CARTON(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| TO-252 | R3 | 0.305 | 2500 | 5000 | 25000 | 13'' |

## Package Outline Dimensions (TO-252)




| Symbol | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A2 | 0.90 | 1.10 | 0.035 | 0.043 |
| b | 0.66 | 0.86 | 0.026 | 0.034 |
| b1 | 5.10 | 5.46 | 0.201 | 0.215 |
| b2 | 4.27 | 4.37 | 0.168 | 0.172 |
| b3 | 0.78 | 0.90 | 0.031 | 0.035 |
| c | 0.45 | 0.55 | 0.018 | 0.022 |
| D | 5.90 | 6.30 | 0.232 | 0.248 |
| D1 | 5.35 REF. | | 0.211REF. | |
| E | 6.30 | 6.70 | 0.248 | 0.264 |
| E1 | 4.83 REF. | | 0.190 REF. | |
| e | 2.18 | 2.38 | 0.086 | 0.094 |
| H | 9.80 | 10.4 | 0.386 | 0.409 |
| L1 | 2.70 | 3.10 | 0.106 | 0.122 |
| L3 | 0.80 | 1.20 | 0.031 | 0.047 |
| L4 | 0.60 | 1.00 | 0.024 | 0.039 |
| L5 | 1.8 REF. | | 0.071 REF. | |
| L6 | - | 0.12 | - | 0.005 |

## Suggested Pad Layout




| Symbol | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| a | 3.70 | - | 0.146 | - |
| b | 4.37 | - | 0.172 | - |
| X | - | 5.80 | - | 0.228 |
| X1 | - | 1.20 | - | 0.047 |
| Y | - | 5.85 | - | 0.230 |
| Y1 | - | 2.00 | - | 0.079 |