# MBRB4030G, NRVBB4030T4G

**Preferred Device**

# Switch-mode Power Rectifier

These state−of−the−art devices use the Schottky Barrier principle with a proprietary barrier metal.

### Features

- Guardring for Stress Protection
- Maximum Die Size
- 175°C Operating Junction Temperature
- Short Heat Sink Tab Manufactured − Not Sheared
- AEC−Q101 Qualified and PPAP Capable
- NRVBB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- All Packages are Pb−Free*

### Mechanical Characteristics:

- Case: Epoxy, Molded, Epoxy Meets UL 94 V−0
- Weight: 1.7 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads Readily Solderable
- Device Meets MSL1 Requirements
- ESD Ratings:
  - ♦ Machine Model = C (> 400 V)
  - ♦ Human Body Model = 3B (> 8000 V)

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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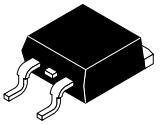
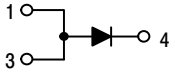
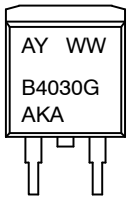
## SCHOTTKY BARRIER RECTIFIER 40 AMPERES, 30 VOLTS



**D²PAK**
**CASE 418B**
**STYLE 3**




### MARKING DIAGRAM




| | |
|---|---|
| A | = Assembly Location |
| Y | = Year |
| WW | = Work Week |
| B4030 | = Device Code |
| G | = Pb−Free Package |
| AKA | = Diode Polarity |

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

**Preferred** devices are recommended choices for future use and best overall value.

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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>$V_R$ | 30 | V |
| Average Rectified Forward Current<br>(At Rated $V_R$) $T_C$ = +115°C (Note 1) | $I_{F(AV)}$ | 40 | A |
| Peak Repetitive Forward Current<br>(At Rated $V_R$, Square Wave, 20 kHz), $T_C$ = +112°C | $I_{FRM}$ | 80 | A |
| Non−Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$ | 300 | A |
| Peak Repetitive Reverse Surge Current (2.0 μs, 1.0 kHz) | $I_{RRM}$ | 2.0 | A |
| Storage Temperature Range | $T_{stg}$ | −65 to +175 | °C |
| Operating Junction Temperature Range (Note 2) | $T_J$ | −65 to +175 | °C |
| Voltage Rate of Change (Rated $V_R$) | dv/dt | 10,000 | V/μs |
| Reverse Energy (Unclamped Inductive Surge), ($T_C$ = 25°C, L = 3.0 mH) | W | 600 | mJ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Rating applies when pins 1 and 3 are connected.
2. 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, Junction−to−Case | $R_{\theta JC}$ | 1.0 | °C/W |
| Thermal Resistance, Junction−to−Ambient (Note 3) | $R_{\theta JA}$ | 50 | °C/W |

3. Rating applies when surface mounted on the miniumum pad size recommended.

## ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Notes 4 and 5), per Device<br>($I_F$ = 20 A, $T_C$ = + 25°C)<br>($I_F$ = 20 A, $T_C$ = +150°C)<br>($I_F$ = 40 A, $T_C$ = + 25°C)<br>($I_F$ = 40 A, $T_C$ = +150°C) | $V_F$ | <br>0.46<br>0.34<br>0.55<br>0.45 | V |
| Maximum Instantaneous Reverse Current (Note 5), per Device<br>(Rated DC Voltage, $T_C$ = + 25°C)<br>(Rated DC Voltage, $T_C$ = +125°C) | $I_R$ | <br>0.35<br>150 | mA |

4. Rating applies when pins 1 and 3 are connected.
5. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%

## ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| MBRB4030G | $D^2$PAK<br>(Pb−Free) | 50 Units / Rail |
| MBRB4030T4G | $D^2$PAK<br>(Pb−Free) | 800 Units / Tape & Reel |
| NRVBB4030T4G | $D^2$PAK<br>(Pb−Free) | 800 Units / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

## ELECTRICAL CHARACTERISTICS

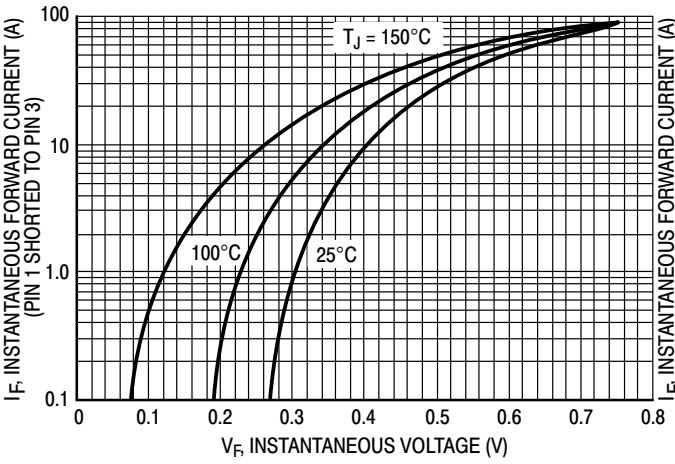



**Figure 1. Maximum Forward Voltage**

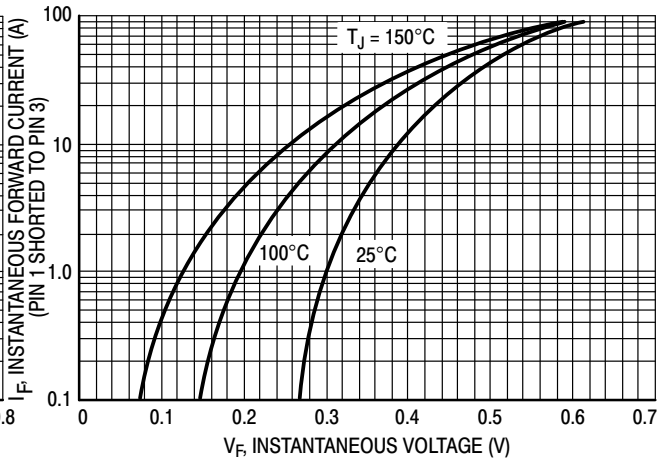



**Figure 2. Typical Forward Voltage**

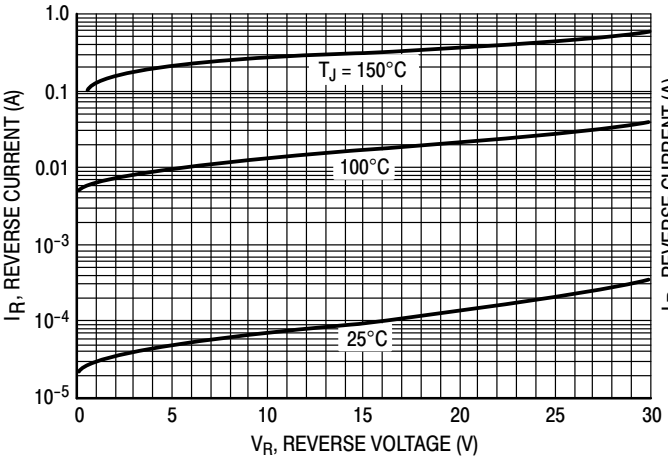



**Figure 3. Maximum Reverse Current**

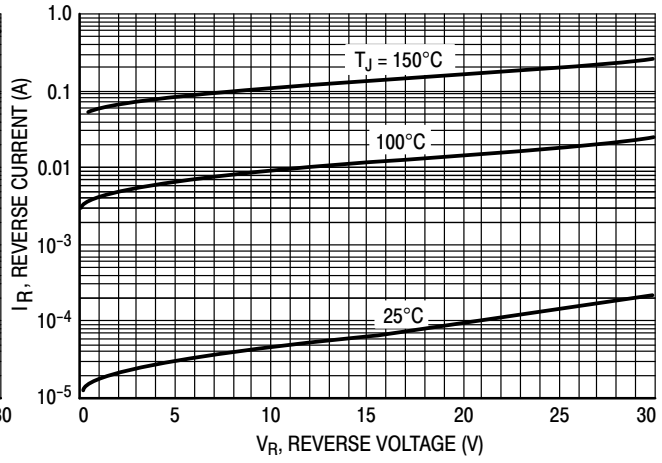



**Figure 4. Typical Reverse Current**

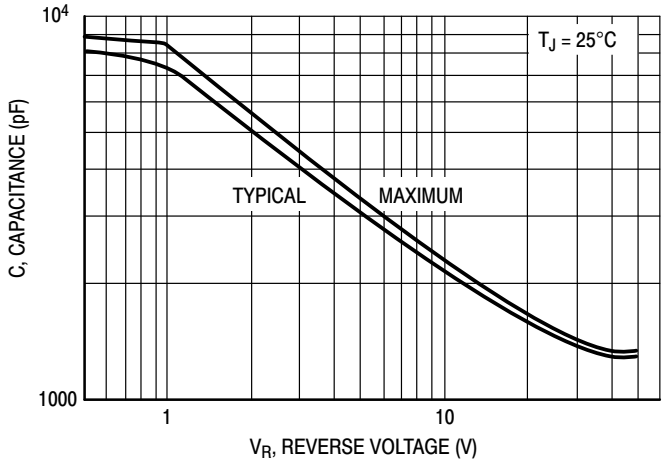



**Figure 5. Maximum and Typical Capacitance**

## ELECTRICAL CHARACTERISTICS

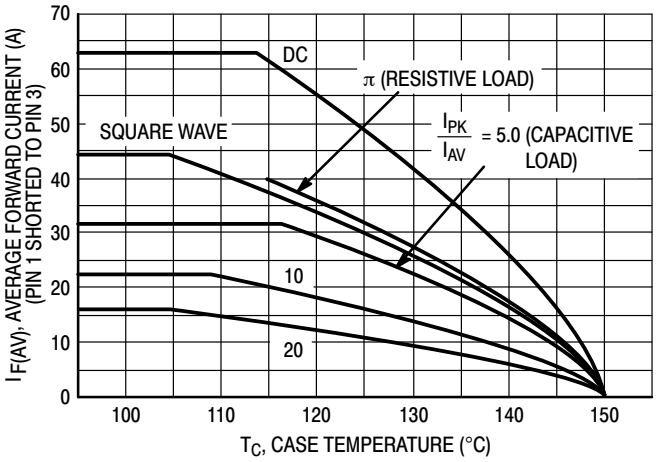



**Figure 6. Current Derating, Infinite Heatsink**

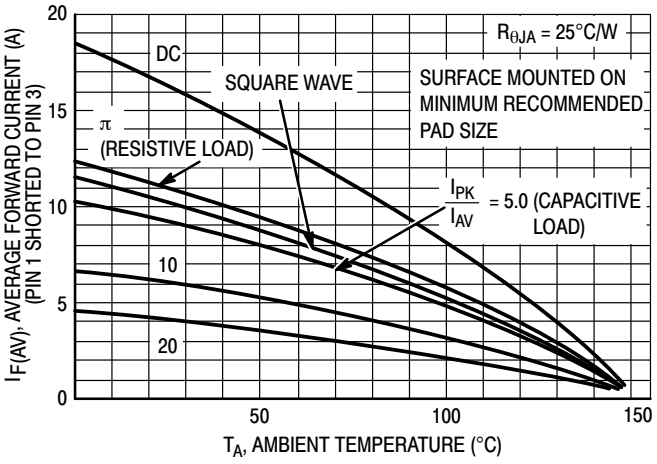



**Figure 7. Current Derating**

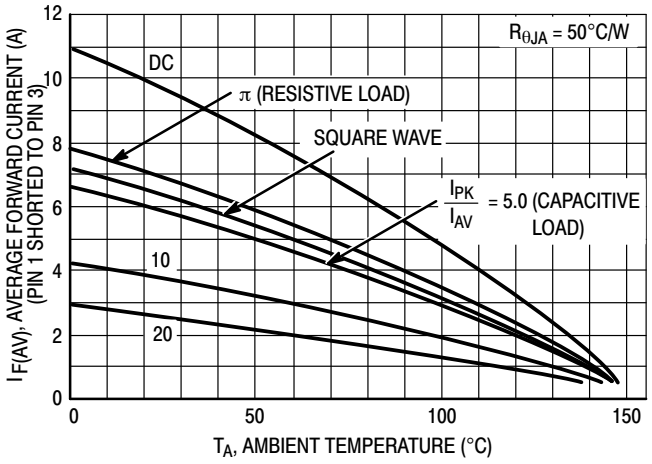



**Figure 8. Current Derating, Free Air**

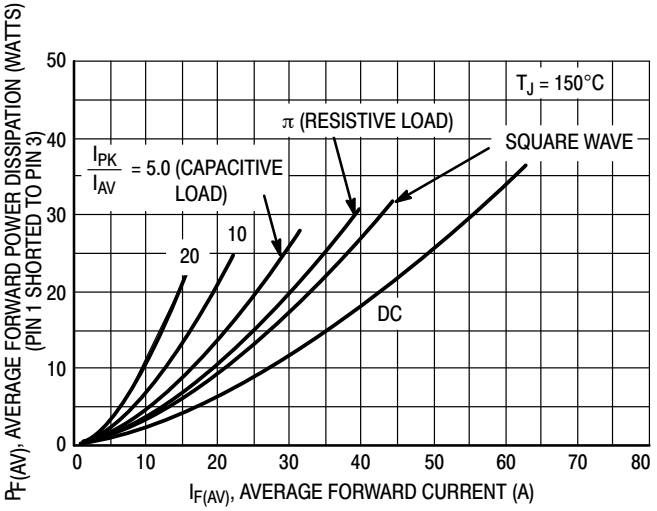



**Figure 9. Forward Power Dissipation**

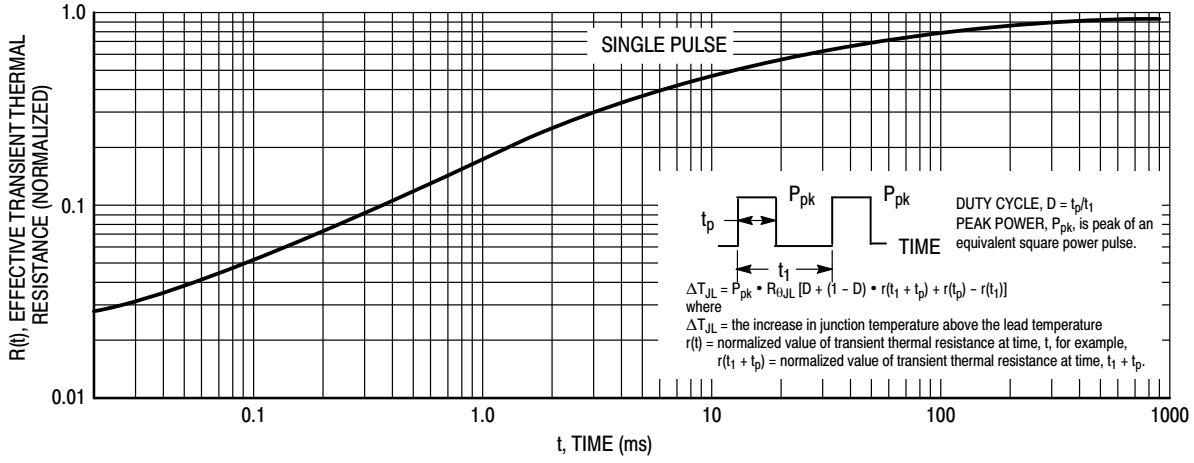
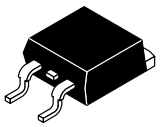


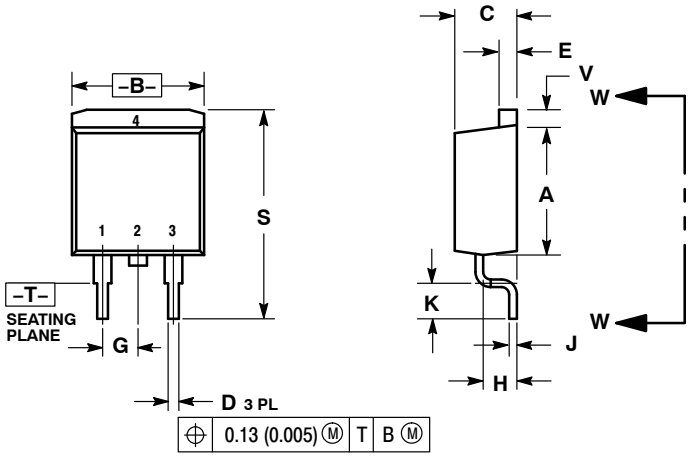

**Figure 10. Thermal Response**



**D²PAK 3**
CASE 418B–04
ISSUE L

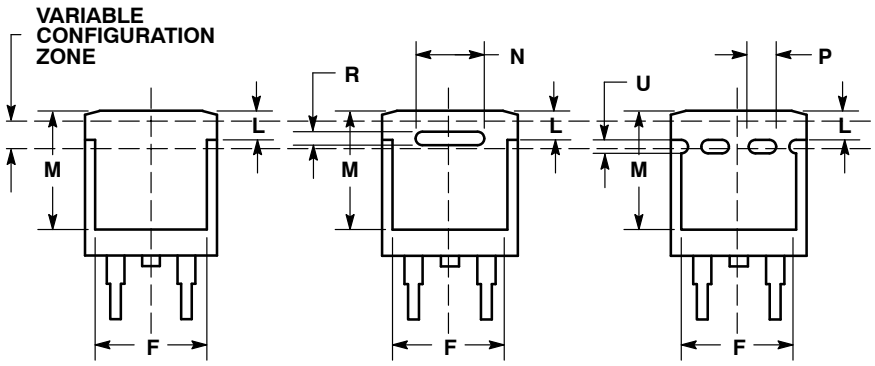
DATE 17 FEB 2015

**SCALE 1:1**




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B–01 THRU 418B–03 OBSOLETE, NEW STANDARD 418B–04.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 0.340 | 0.380 | 8.64 | 9.65 |
| B | 0.380 | 0.405 | 9.65 | 10.29 |
| C | 0.160 | 0.190 | 4.06 | 4.83 |
| D | 0.020 | 0.035 | 0.51 | 0.89 |
| E | 0.045 | 0.055 | 1.14 | 1.40 |
| F | 0.310 | 0.350 | 7.87 | 8.89 |
| G | 0.100 BSC | | 2.54 BSC | |
| H | 0.080 | 0.110 | 2.03 | 2.79 |
| J | 0.018 | 0.025 | 0.46 | 0.64 |
| K | 0.090 | 0.110 | 2.29 | 2.79 |
| L | 0.052 | 0.072 | 1.32 | 1.83 |
| M | 0.280 | 0.320 | 7.11 | 8.13 |
| N | 0.197 REF | | 5.00 REF | |
| P | 0.079 REF | | 2.00 REF | |
| R | 0.039 REF | | 0.99 REF | |
| S | 0.575 | 0.625 | 14.60 | 15.88 |
| V | 0.045 | 0.055 | 1.14 | 1.40 |




VIEW W–W 1 | VIEW W–W 2 | VIEW W–W 3

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 3:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

STYLE 4:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 5:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

STYLE 6:
PIN 1. NO CONNECT
2. CATHODE
3. ANODE
4. CATHODE


**MARKING INFORMATION AND FOOTPRINT ON PAGE 2**





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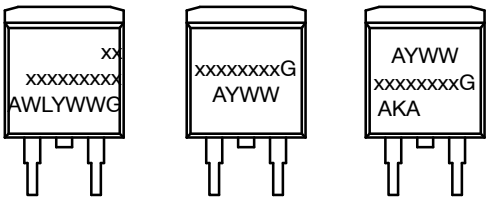
**D²PAK 3**
CASE 418B−04
ISSUE L

DATE 17 FEB 2015

**GENERIC**
**MARKING DIAGRAM***

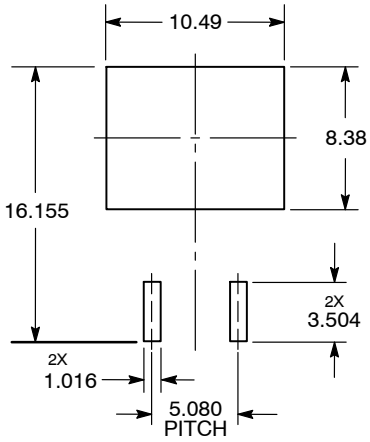



**IC** **Standard** **Rectifier**

| | |
|---|---|
| xx | = Specific Device Code |
| A | = Assembly Location |
| WL | = Wafer Lot |
| Y | = Year |
| WW | = Work Week |
| G | = Pb−Free Package |
| AKA | = Polarity Indicator |

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

**SOLDERING FOOTPRINT***




DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

| | | | |
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