

# MBRB2060CTG, MBR2060CTG, NRVBB2060CTT4G

## SWITCHMODE Power Rectifiers

### TO-220/D<sup>2</sup>PAK Surface Mount Power Package

These state-of-the-art devices employ the use of the Schottky Barrier principle with a platinum barrier metal.

#### Features

- Package Designed for Power Surface Mount Applications (D<sup>2</sup>PAK)
- Center-Tap Configuration (D<sup>2</sup>PAK)
- 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 (D<sup>2</sup>PAK)
- Similar in Size to Industry Standard TO-220 Package
- 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:

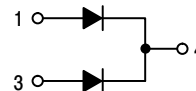
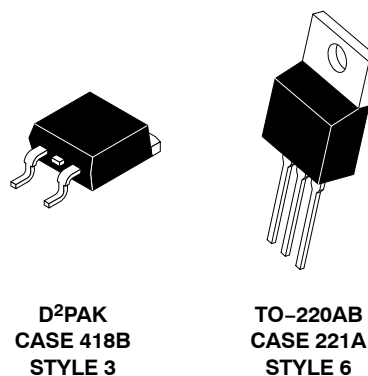
- Case: Epoxy, Molded, Epoxy Meets UL 94 V-0
- Weight: 1.7 Grams (Approximately) – D<sup>2</sup>PAK,  
1.9 Grams (Approximately) – TO-220
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds (D<sup>2</sup>PAK)
- Device Meets MSL1 Requirements (D<sup>2</sup>PAK)
- ESD Ratings:
  - ◆ Machine Model = C (> 400 V)
  - ◆ Human Body Model = 3B (> 8000 V)



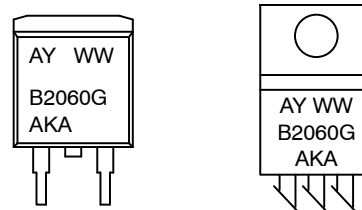
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### SCHOTTKY BARRIER RECTIFIERS 20 AMPERES, 60 VOLTS



#### MARKING DIAGRAMS



|       |                     |
|-------|---------------------|
| A     | = Assembly Location |
| Y     | = Year              |
| WW    | = Work Week         |
| B2060 | = 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.

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

# MBRB2060CTG, MBR2060CTG, NRVBB2060CTT4G

## MAXIMUM RATINGS (Per Leg)

| Rating                                                                                                      | Symbol                          | Value       | Unit             |
|-------------------------------------------------------------------------------------------------------------|---------------------------------|-------------|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                      | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 60          | V                |
| Average Rectified Forward Current<br>(Rated $V_R$ , $T_C = 110^\circ\text{C}$ ) Total Device                | $I_{F(AV)}$                     | 10<br>20    | A                |
| Peak Repetitive Forward Current<br>(Rated $V_R$ , Square Wave, 20 kHz, $T_C = 100^\circ\text{C}$ )          | $I_{FRM}$                       | 20          | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 150         | A                |
| Peak Repetitive Reverse Surge Current (2.0 $\mu\text{s}$ , 1.0 kHz)                                         | $I_{RRM}$                       | 0.5         | A                |
| Storage Temperature Range                                                                                   | $T_{stg}$                       | -65 to +175 | $^\circ\text{C}$ |
| Operating Junction Temperature (Note 1)                                                                     | $T_J$                           | -65 to +175 | $^\circ\text{C}$ |
| Voltage Rate of Change (Rated $V_R$ )                                                                       | $dv/dt$                         | 10,000      | V/ $\mu\text{s}$ |

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

## THERMAL CHARACTERISTICS (Per Leg)

| Characteristic                              | Symbol          | Value | Unit               |
|---------------------------------------------|-----------------|-------|--------------------|
| Thermal Resistance,<br>Junction-to-Case     | $R_{\theta JC}$ | 2.0   | $^\circ\text{C/W}$ |
| Junction-to-Ambient (Note 2)<br>MBRB2060CTG | $R_{\theta JA}$ | 50    |                    |
| Junction-to-Ambient (Note 2)<br>MBR2060CTG  | $R_{\theta JA}$ | 60    |                    |

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

## ELECTRICAL CHARACTERISTICS (Per Leg)

| Characteristic                                                                                                                                    | Symbol | Value        | Unit |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|------|
| Maximum Instantaneous Forward Voltage (Note 3)<br>( $I_F = 20$ Amps, $T_J = 125^\circ\text{C}$ )<br>( $I_F = 20$ Amps, $T_J = 25^\circ\text{C}$ ) | $V_F$  | 0.85<br>0.95 | V    |
| Maximum Instantaneous Reverse Current (Note 3)<br>(Rated dc Voltage, $T_J = 125^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ ) | $i_R$  | 35<br>0.15   | mA   |

3. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

## ORDERING INFORMATION

| Device         | Package                         | Shipping <sup>†</sup>   |
|----------------|---------------------------------|-------------------------|
| MBRB2060CTG    | D <sup>2</sup> PAK<br>(Pb-Free) | 50 Units / Rail         |
| MBRB2060CTT4G  | D <sup>2</sup> PAK<br>(Pb-Free) | 800 Units / Tape & Reel |
| NRVBB2060CTT4G | D <sup>2</sup> PAK<br>(Pb-Free) | 800 Units / Tape & Reel |
| MBR2060CTG     | TO-220<br>(Pb-Free)             | 50 Units / Rail         |

<sup>†</sup>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.

# MBRB2060CTG, MBR2060CTG, NRVBB2060CTT4G

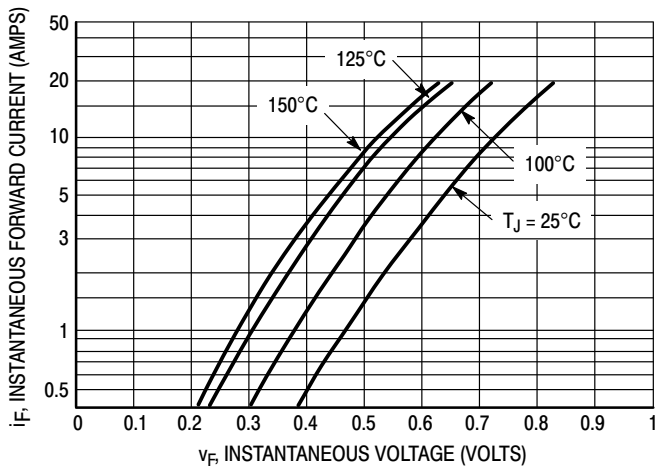


Figure 1. Typical Forward Voltage Per Diode

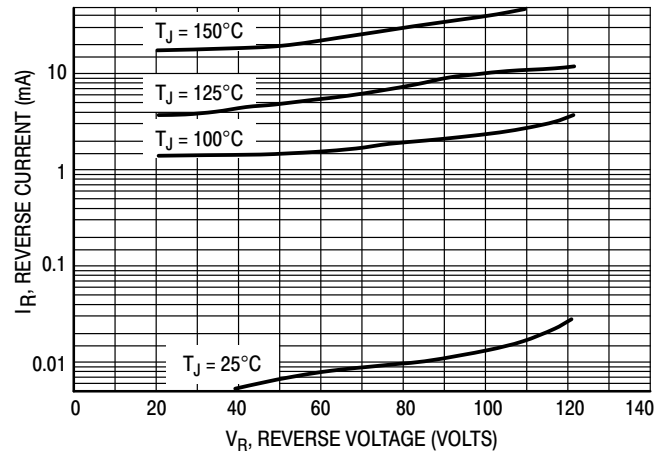


Figure 2. Typical Reverse Current Per Diode

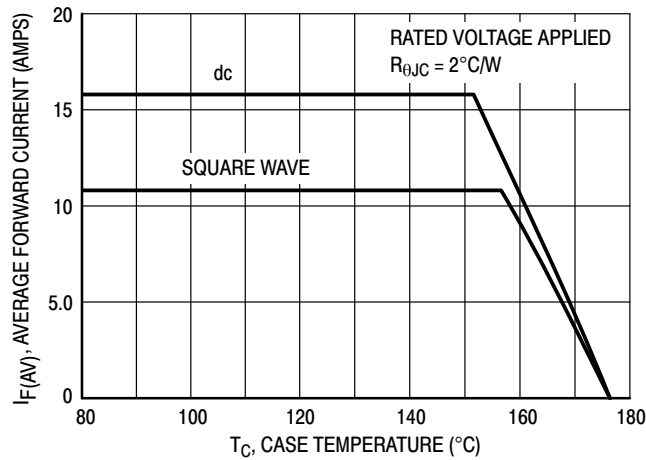


Figure 3. Typical Current Derating, Case, Per Leg

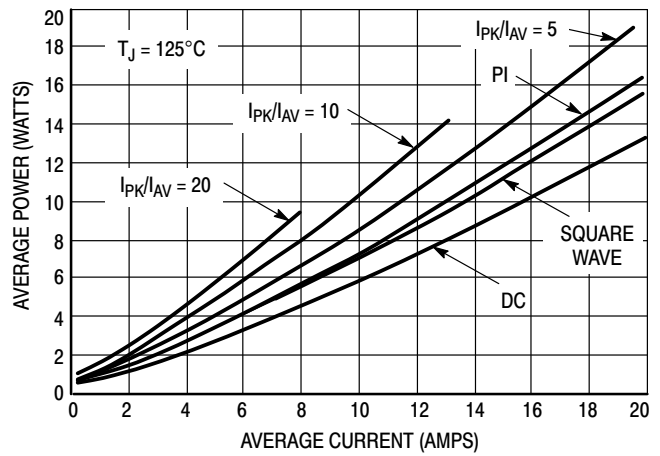
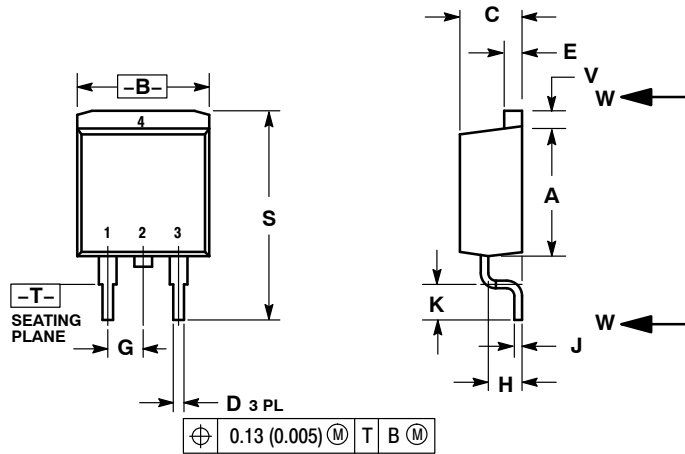


Figure 4. Average Power Dissipation and Average Current

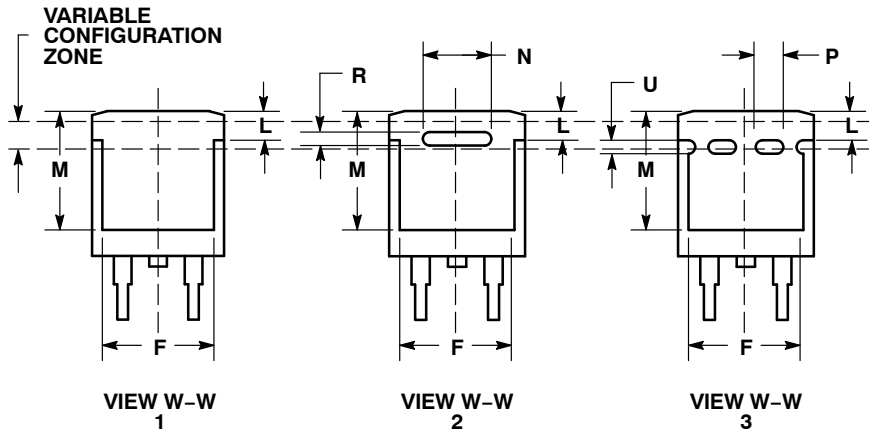
PACKAGE DIMENSIONS

D<sup>2</sup>PAK 3  
CASE 418B-04  
ISSUE K



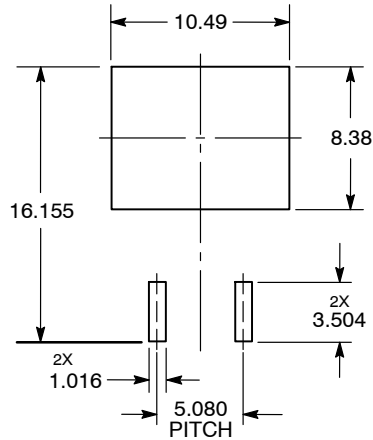
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | 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  |



- STYLE 3:
- PIN 1. ANODE
  - CATHODE
  - ANODE
  - CATHODE

SOLDERING FOOTPRINT\*



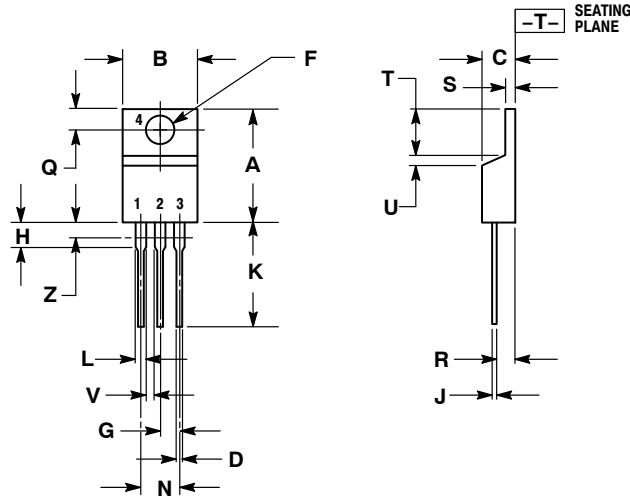
DIMENSIONS: MILLIMETERS

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# MBRB2060CTG, MBR2060CTG, NRVBB2060CTT4G

## PACKAGE DIMENSIONS

TO-220  
CASE 221A-09  
ISSUE AG



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.570  | 0.620 | 14.48       | 15.75 |
| B   | 0.380  | 0.405 | 9.66        | 10.28 |
| C   | 0.160  | 0.190 | 4.07        | 4.82  |
| D   | 0.025  | 0.036 | 0.64        | 0.91  |
| E   | 0.142  | 0.161 | 3.61        | 4.09  |
| F   | 0.095  | 0.105 | 2.42        | 2.66  |
| G   | 0.110  | 0.161 | 2.80        | 4.10  |
| H   | 0.014  | 0.025 | 0.36        | 0.64  |
| I   | 0.500  | 0.562 | 12.70       | 14.27 |
| J   | 0.045  | 0.060 | 1.15        | 1.52  |
| K   | 0.190  | 0.210 | 4.83        | 5.33  |
| L   | 0.100  | 0.120 | 2.54        | 3.04  |
| M   | 0.080  | 0.110 | 2.04        | 2.79  |
| N   | 0.045  | 0.055 | 1.15        | 1.39  |
| O   | 0.235  | 0.255 | 5.97        | 6.47  |
| P   | 0.000  | 0.050 | 0.00        | 1.27  |
| Q   | 0.045  | ---   | 1.15        | ---   |
| R   | ---    | 0.080 | ---         | 2.04  |

### STYLE 6:

- PIN 1: ANODE  
2: CATHODE  
3: ANODE  
4: CATHODE

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