

# Switch-mode Schottky Power Rectifier

## MBRF2060CTG

The Switch-mode Power Rectifier employs the Schottky Barrier principle in a large area metal-to-silicon power diode. State-of-the-art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for use as rectifiers in very low-voltage, high-frequency switching power supplies, free wheeling diodes and polarity protection diodes.

### Features

- Highly Stable Oxide Passivated Junction
- Very Low Forward Voltage Drop
- Matched Dual Die Construction
- High Junction Temperature Capability
- High dv/dt Capability
- Excellent Ability to Withstand Reverse Avalanche Energy Transients
- Guardring for Stress Protection
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Electrically Isolated. No Isolation Hardware Required.
- These Devices are Pb-Free and are RoHS Compliant

### Mechanical Characteristics:

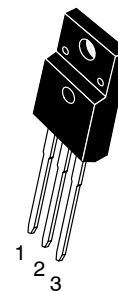
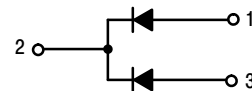
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds



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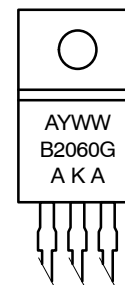
[www.onsemi.com](http://www.onsemi.com)

## SCHOTTKY BARRIER RECTIFIER 20 AMPERES, 60 VOLTS



TO-220 FULLPAK  
CASE 221D

### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
B2060 = Device Code  
G = Pb-Free Package  
AKA = Polarity Designator

### ORDERING INFORMATION

| Device      | Package               | Shipping      |
|-------------|-----------------------|---------------|
| MBRF2060CTG | TO-220FP<br>(Pb-Free) | 50 Units/Rail |

# MBRF2060CTG

## 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 $V_R$ ), $T_C = 133^\circ\text{C}$                             | $I_{F(AV)}$                     | 10<br>20     | A                |
| Peak Repetitive Forward Current<br>(Rated $V_R$ , Square Wave, 20 kHz), $T_C = 133^\circ\text{C}$          | $I_{FRM}$                       | 20           | A                |
| Nonrepetitive 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                |
| Operating Junction and Storage Temperature Range (Note 1)  | $T_J, T_{stg}$                  | - 65 to +175 | $^\circ\text{C}$ |
| Voltage Rate of Change (Rated $V_R$ )  | $dv/dt$                         | 10000        | V/ $\mu\text{s}$ |
| RMS Isolation Voltage (t = 0.3 second, R.H. $\leq$ 30%, $T_A = 25^\circ\text{C}$ ) (Note 2)                | Per Figure 3<br>$V_{iso1}$      | 4500         | V                |

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.

## THERMAL CHARACTERISTICS (Per Leg)

| Rating  | Symbol          | Value | Unit                      |
|---|-----------------|-------|---------------------------|
| Maximum Thermal Resistance, Junction-to-Case                            | $R_{\theta JC}$ | 4.0   | $^\circ\text{C}/\text{W}$ |
| Lead Temperature for Soldering Purposes: 1/8 in from Case for 5 Seconds | $T_L$           | 260   | $^\circ\text{C}$          |

## ELECTRICAL CHARACTERISTICS (Per Leg)

| Characteristic   | Symbol | Max                          | Unit |
|--|--------|------------------------------|------|
| Maximum Instantaneous Forward Voltage (Note 3)<br>( $i_F = 10$ Amp, $T_C = 25^\circ\text{C}$ )<br>( $i_F = 10$ Amp, $T_C = 125^\circ\text{C}$ )<br>( $i_F = 20$ Amp, $T_C = 25^\circ\text{C}$ )<br>( $i_F = 20$ Amp, $T_C = 125^\circ\text{C}$ ) | $V_F$  | 0.85<br>0.75<br>0.95<br>0.85 | V    |
| Maximum Instantaneous Reverse Current (Note 3)<br>(Rated DC Voltage, $T_C = 25^\circ\text{C}$ )<br>(Rated DC Voltage, $T_C = 125^\circ\text{C}$ )  | $i_R$  | 0.15<br>150                  | mA   |

- The heat generated must be less than the thermal conductivity from Junction-to-Ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ .
- Proper strike and creepage distance must be provided.
- Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq$  2.0%

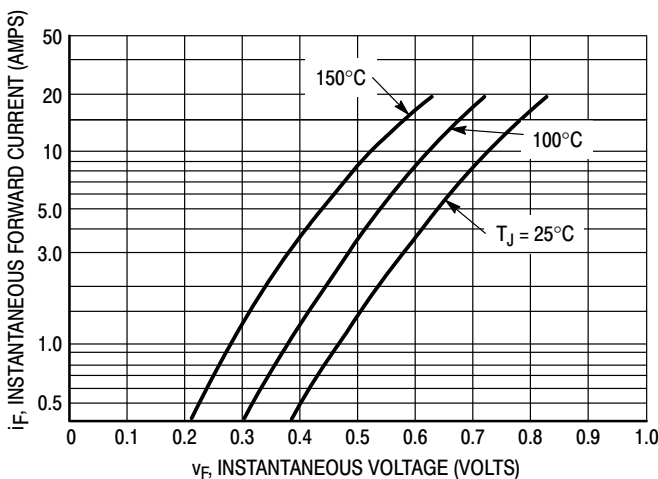


Figure 1. Typical Forward Voltage Per Diode

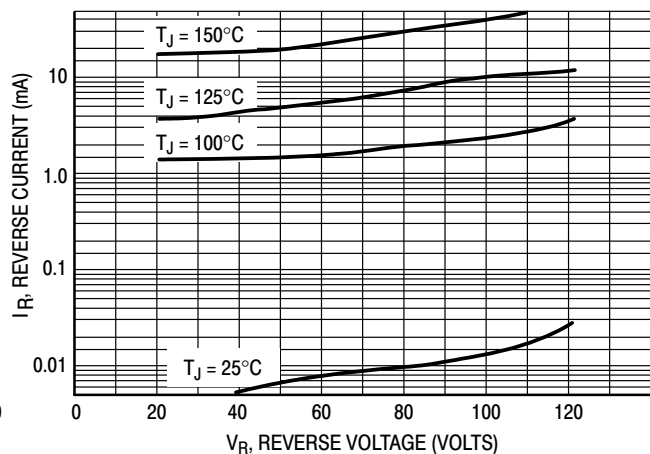


Figure 2. Typical Reverse Current Per Diode

# MBRF2060CTG

## TEST CONDITION FOR ISOLATION TEST\*

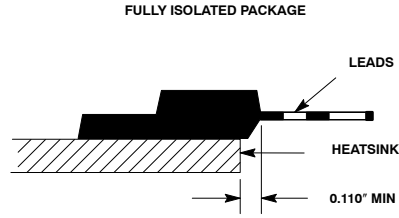
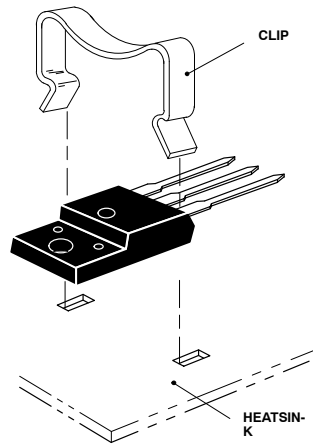


Figure 3. Mounting Position

\*Measurement made between leads and heatsink with all leads shorted together.

## MOUNTING INFORMATION



Clip-Mounted

Figure 4. Typical Mounting Technique

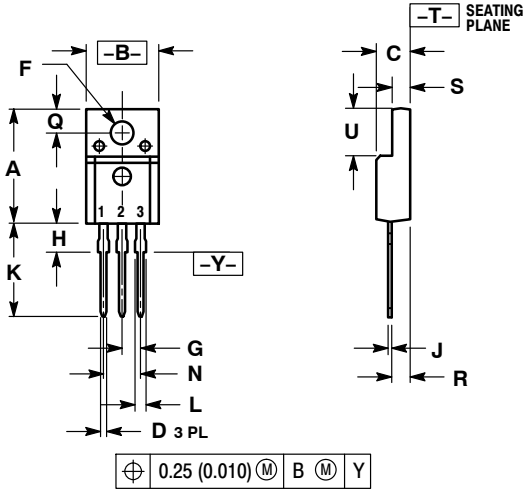
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 1:1

## TO-220 FULLPAK CASE 221D-03 ISSUE K

DATE 27 FEB 2009



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH
  3. 221D-01 THRU 221D-02 OBSOLETE, NEW STANDARD 221D-03.

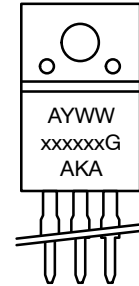
| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.617     | 0.635 | 15.67       | 16.12 |
| B   | 0.392     | 0.419 | 9.96        | 10.63 |
| C   | 0.177     | 0.193 | 4.50        | 4.90  |
| D   | 0.024     | 0.039 | 0.60        | 1.00  |
| F   | 0.116     | 0.129 | 2.95        | 3.28  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.118     | 0.135 | 3.00        | 3.43  |
| J   | 0.018     | 0.025 | 0.45        | 0.63  |
| K   | 0.503     | 0.541 | 12.78       | 13.73 |
| L   | 0.048     | 0.058 | 1.23        | 1.47  |
| N   | 0.200 BSC |       | 5.08 BSC    |       |
| Q   | 0.122     | 0.138 | 3.10        | 3.50  |
| R   | 0.099     | 0.117 | 2.51        | 2.96  |
| S   | 0.092     | 0.113 | 2.34        | 2.87  |
| U   | 0.239     | 0.271 | 6.06        | 6.88  |

### MARKING DIAGRAMS

- |  |   |  |
|--|---|--|
| STYLE 1:<br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE     | STYLE 2:<br>PIN 1. BASE<br>2. COLLECTOR<br>3. EMITTER | STYLE 3:<br>PIN 1. ANODE<br>2. CATHODE<br>3. ANODE |
| STYLE 4:<br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE | STYLE 5:<br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE     | STYLE 6:<br>PIN 1. MT 1<br>2. MT 2<br>3. GATE      |



**Bipolar**



**Rectifier**

- |                               |                           |
|-------------------------------|---------------------------|
| xxxxxx = Specific Device Code | A = Assembly Location     |
| G = Pb-Free Package           | Y = Year                  |
| A = Assembly Location         | WW = Work Week            |
| Y = Year                      | xxxxxx = Device Code      |
| WW = Work Week                | G = Pb-Free Package       |
|                               | AKA = Polarity Designator |

|                         |                       |  |
|-------------------------|-----------------------|--|
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| <b>DESCRIPTION:</b>     | <b>TO-220 FULLPAK</b> | <b>PAGE 1 OF 1</b>   |

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