

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:

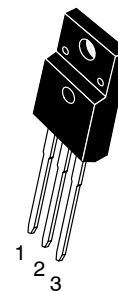
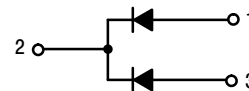
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds



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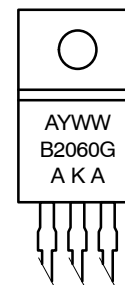
www.onsemi.com

**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 (Pb-Free) | 50 Units/Rail |

MBRF2060CTG

MAXIMUM RATINGS (Per Leg)

| Rating | Symbol | Value | Unit |
|--|---------------------------------|--------------|------------------|
| Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage | V_{RRM} V_{RWM} V_R | 60 | V |
| Average Rectified Forward Current (Rated V_R), $T_C = 133^\circ\text{C}$ | $I_{F(AV)}$ | 10 20 | A |
| Peak Repetitive Forward Current (Rated V_R , Square Wave, 20 kHz), $T_C = 133^\circ\text{C}$ | I_{FRM} | 20 | A |
| Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz) | I_{FSM} | 150 | A |
| Peak Repetitive Reverse Surge Current (2.0 μs , 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/ μs |
| RMS Isolation Voltage (t = 0.3 second, R.H. \leq 30%, $T_A = 25^\circ\text{C}$) (Note 2) | 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 | $^\circ\text{C/W}$ |
| 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) ($i_F = 10$ Amp, $T_C = 25^\circ\text{C}$) ($i_F = 10$ Amp, $T_C = 125^\circ\text{C}$) ($i_F = 20$ Amp, $T_C = 25^\circ\text{C}$) ($i_F = 20$ Amp, $T_C = 125^\circ\text{C}$) | V_F | 0.85 0.75 0.95 0.85 | V |
| Maximum Instantaneous Reverse Current (Note 3) (Rated DC Voltage, $T_C = 25^\circ\text{C}$) (Rated DC Voltage, $T_C = 125^\circ\text{C}$) | i_R | 0.15 150 | mA |

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

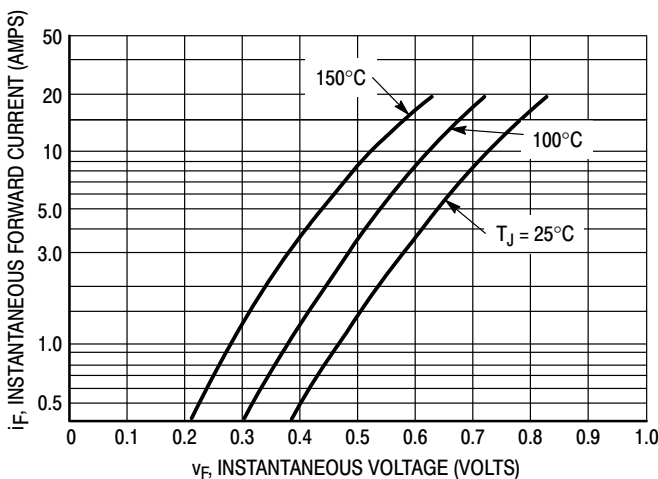


Figure 1. Typical Forward Voltage Per Diode

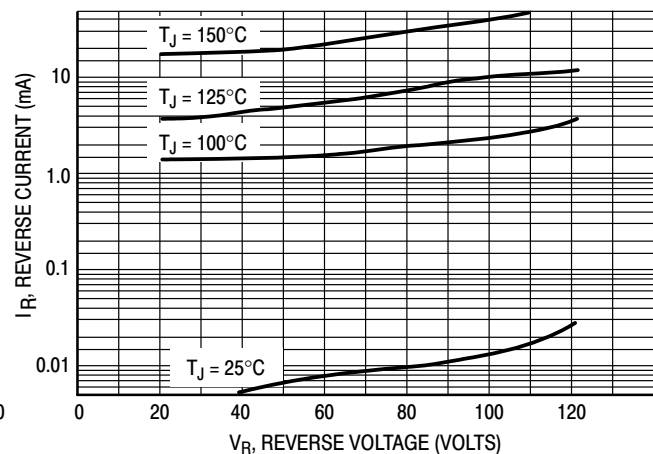


Figure 2. Typical Reverse Current Per Diode

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TEST CONDITION FOR ISOLATION TEST*

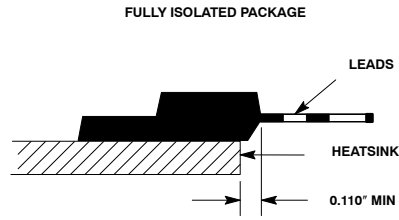
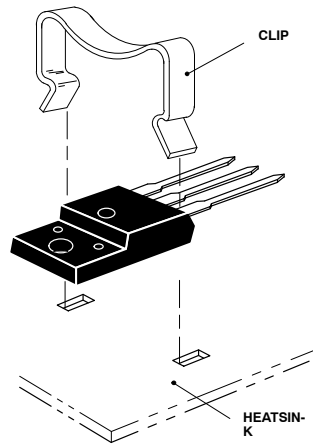


Figure 3. Mounting Position

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

MOUNTING INFORMATION



Clip-Mounted

Figure 4. Typical Mounting Technique

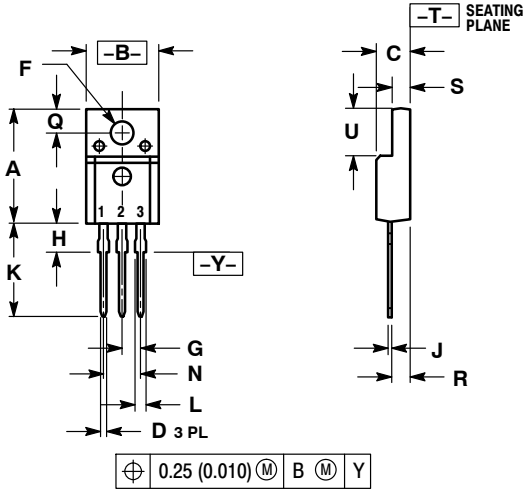
MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



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.

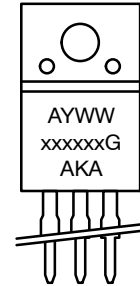
| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.617 | 0.635 | 15.67 | 16.12 |
| B | 0.392 | 0.419 | 9.96 | 10.63 |
| C | 0.177 | 0.193 | 4.50 | 4.90 |
| D | 0.024 | 0.039 | 0.60 | 1.00 |
| F | 0.116 | 0.129 | 2.95 | 3.28 |
| G | 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

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



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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| DESCRIPTION: | TO-220 FULLPAK | PAGE 1 OF 1 |

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