# MBR10L60CTG, MBRF10L60CTG

# Switch-mode Power Rectifier 60 V, 10 A

ON Semiconductor®

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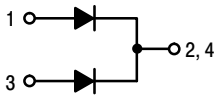
**SCHOTTKY BARRIER RECTIFIER 10 AMPERES, 60 VOLTS**




### Features and Benefits

- Low Forward Voltage
- Low Power Loss/High Efficiency
- High Surge Capability
- 10 A Total (5 A Per Diode Leg)
- Guard−Ring for Stress Protection
- These Devices are Pb−Free and are RoHS Compliant

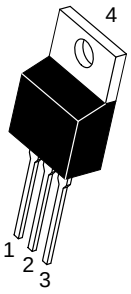
### Applications

- Power Supply − Output Rectification
- Power Management
- Instrumentation

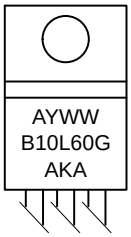
### Mechanical Characteristics:

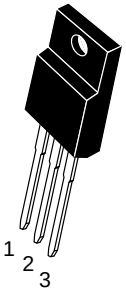
- Case: Epoxy, Molded
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight (Approximately): 1.9 Grams
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds

### MARKING DIAGRAMS

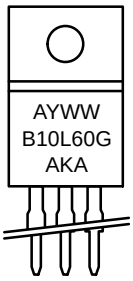



**TO−220**
**CASE 221A**
**STYLE 6**




**TO−220 FULLPAK™**
**CASE 221AH**




| | |
|---|---|
| A | = Assembly Location |
| Y | = Year |
| WW | = Work Week |
| B10L60 | = Device Code |
| G | = Pb−Free Device |
| AKA | = Polarity Designator |

### ORDERING INFORMATION

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

**MAXIMUM RATINGS** (Per Diode 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 $V_R$) $T_C$ = 140°C | (Per Leg)<br>(Per Device) | $I_{F(AV)}$ | 5<br>10 | A |
| Non-repetitive Peak Surge Current<br>(Surge applied at rated load conditions halfwave, single phase, 60 Hz) | | $I_{FSM}$ | 200 | A |
| Operating Junction Temperature (Note 1) | | $T_J$ | −55 to +150 | °C |
| Storage Temperature | | $T_{stg}$ | −65 to +175 | °C |
| ESD Ratings:<br>Machine Model = C<br>Human Body Model = 3B | | | <br>> 400<br>> 8000 | 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.

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**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Maximum Thermal Resistance | | | °C/W |
| MBR10L60CTG | | | |
| Junction−to−Case | $R_{\theta JC}$ | 2.8 | |
| Junction−to−Ambient | $R_{\theta JA}$ | 70 | |
| MBRF10L60CTG | | | |
| Junction−to−Case | $R_{\theta JC}$ | 5.7 | |
| Junction−to−Ambient | $R_{\theta JA}$ | 75 | |

**ELECTRICAL CHARACTERISTICS** (Per Diode Leg)

| Rating | Symbol | Typ | Max | Unit |
|---|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Note 2) | $v_F$ | | | V |
| ($I_F$ = 5 A, $T_C$ = 25°C) | | 0.49 | 0.57 | |
| ($I_F$ = 5 A, $T_C$ = 125°C) | | 0.43 | 0.49 | |
| ($I_F$ = 10 A, $T_C$ = 25°C) | | 0.60 | 0.66 | |
| ($I_F$ = 10 A, $T_C$ = 125°C) | | 0.53 | 0.61 | |
| Maximum Instantaneous Reverse Current (Note 2) | $i_R$ | | | |
| (Rated DC Voltage, $T_C$ = 25°C) | | 77 | 220 | μA |
| (Rated DC Voltage, $T_C$ = 125°C) | | 33 | 60 | mA |

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.

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

**DEVICE ORDERING INFORMATION**

| Device Order Number | Package Type | Shipping |
|---|---|---|
| MBR10L60CTG | TO−220<br>(Pb−Free) | 50 Units / Rail |
| MBRF10L60CTG | TO−220 FULLPAK<br>(Pb−Free) | 50 Units / Rail |

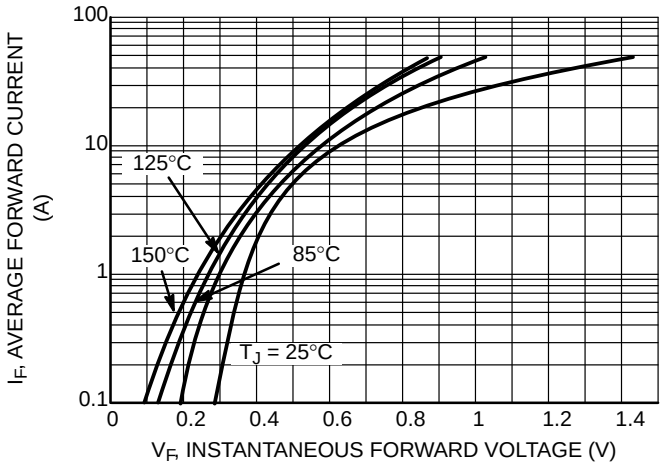



**Figure 1. Typical Forward Voltage**

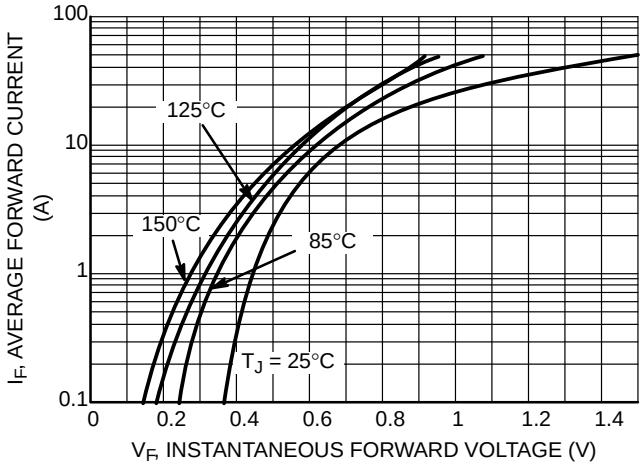



**Figure 2. Maximum Forward Voltage**

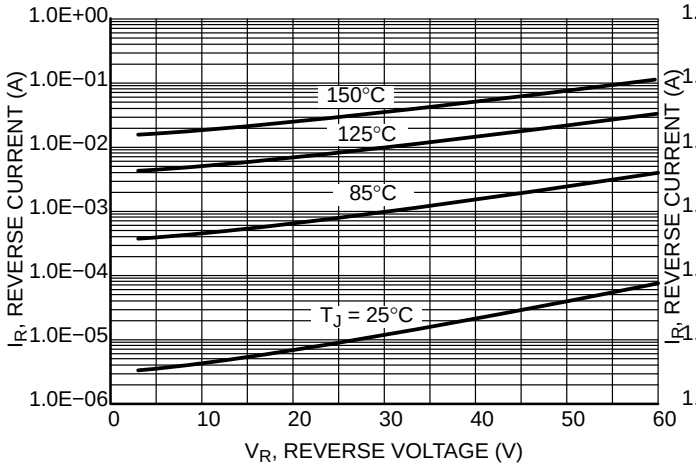



**Figure 3. Typical Reverse Current**

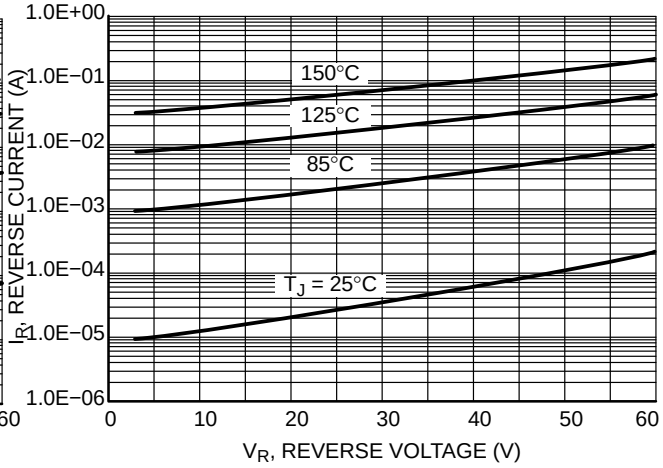



**Figure 4. Maximum Reverse Current**

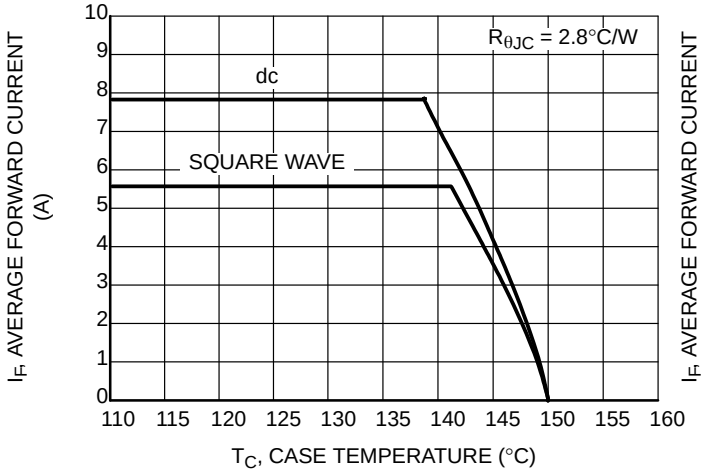



**Figure 5. Current Derating, Case per Leg**
**MBR10L60CT**

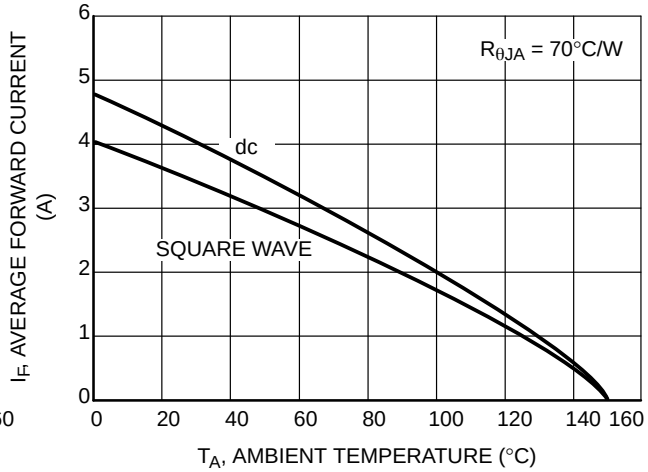



**Figure 6. Current Derating, Ambient per Leg**
**MBR10L60CT**

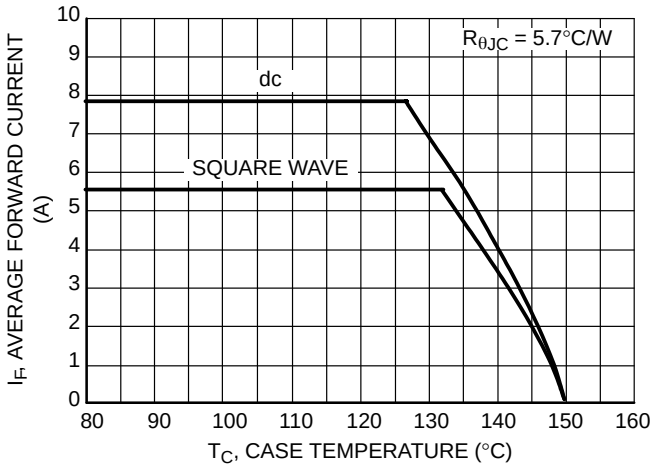



**Figure 7. Current Derating, Case per Leg MBRF10L60CT**

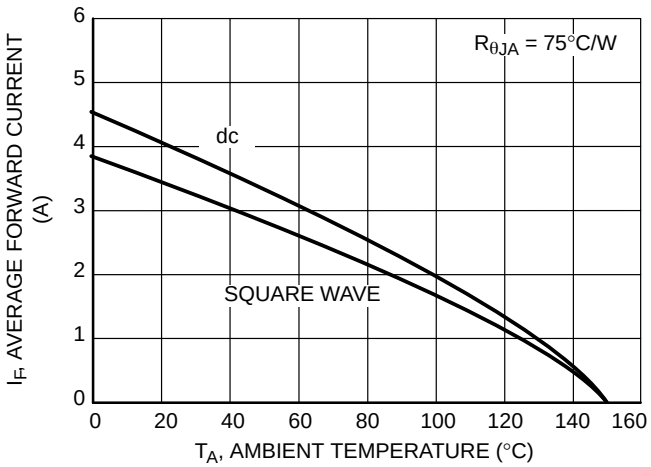



**Figure 8. Current Derating, Ambient per Leg MBRF10L60CT**

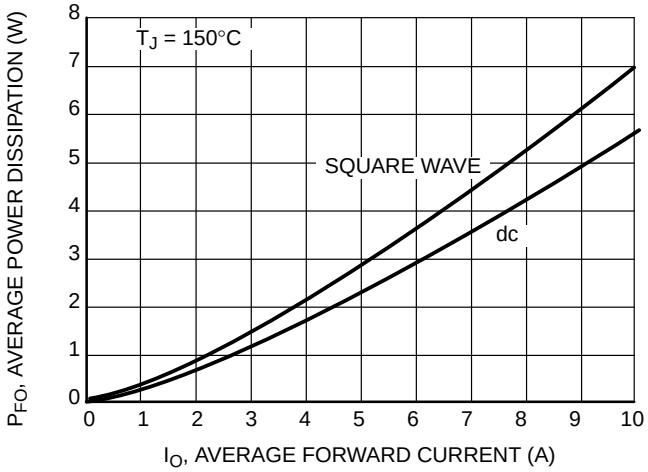



**Figure 9. Forward Power Dissipation**

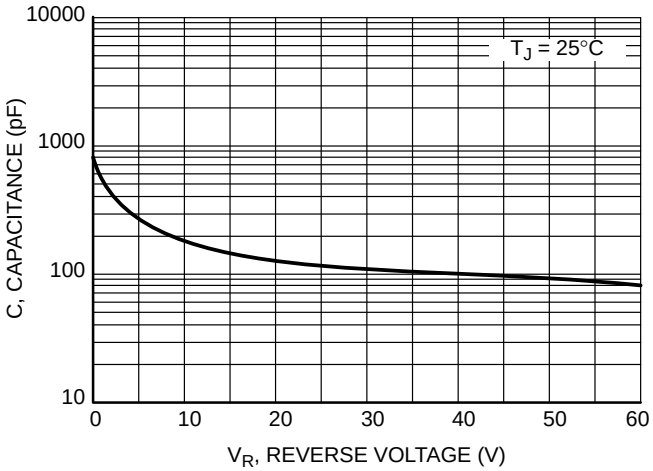



**Figure 10. Capacitance**

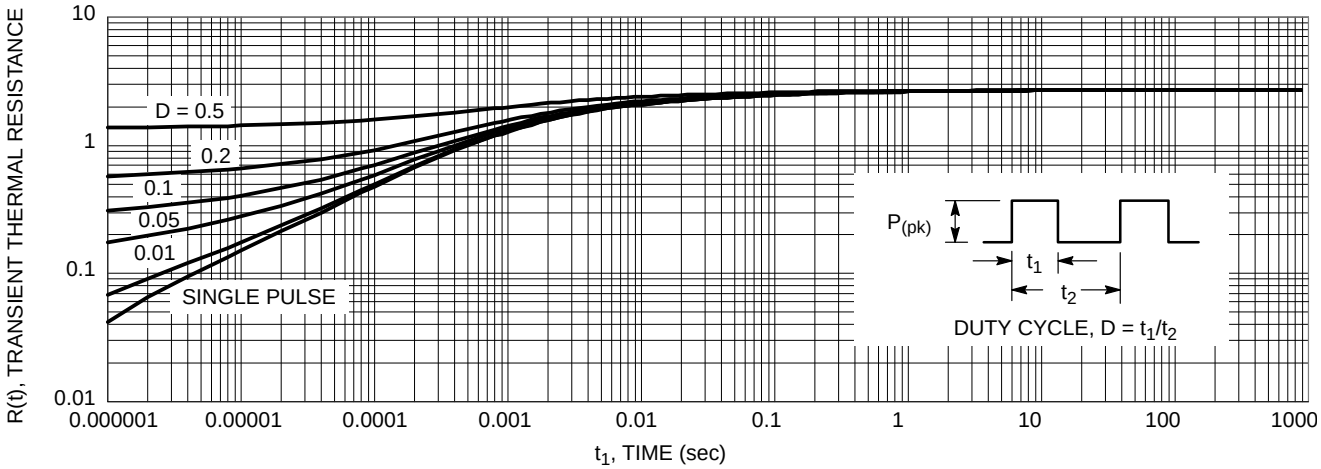



**Figure 11. Thermal Response Junction−to−Case for MBR10L60CT**

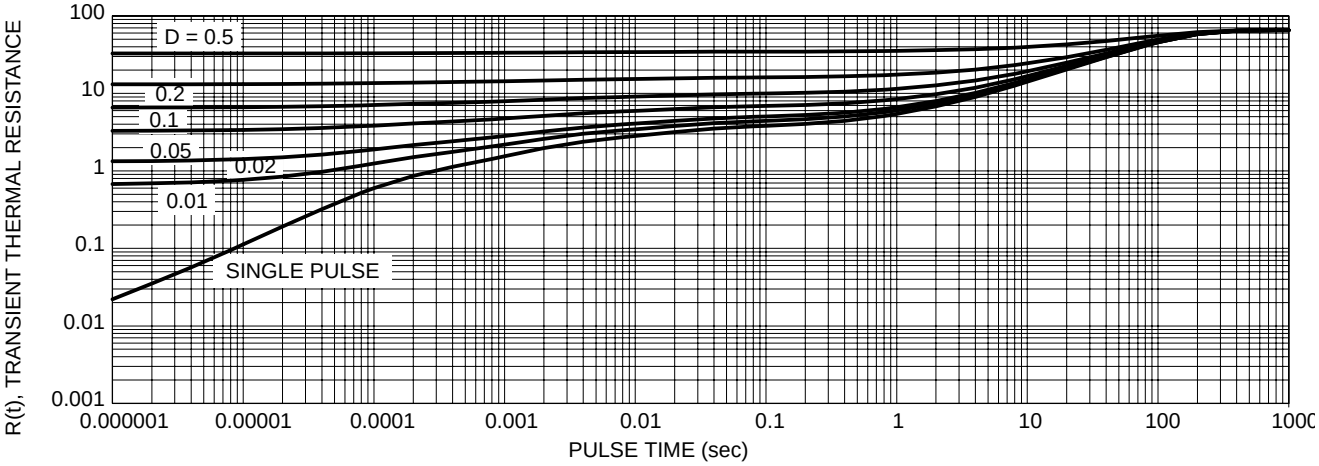



**Figure 12. Thermal Response Junction−to−Ambient for MBR10L60CT**

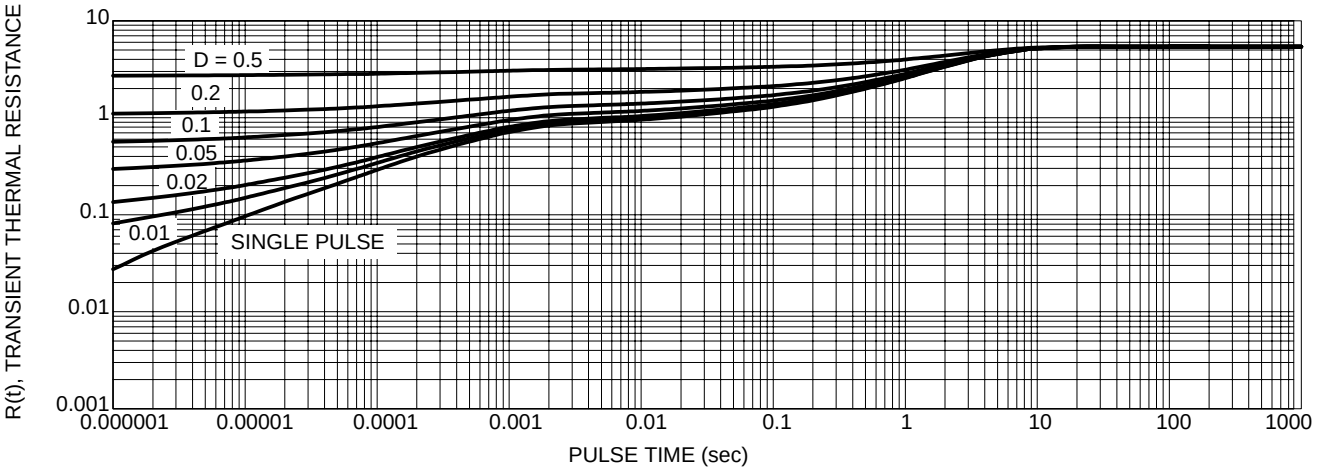



**Figure 13. Thermal Response Junction−to−Case for MBRF10L60CT**

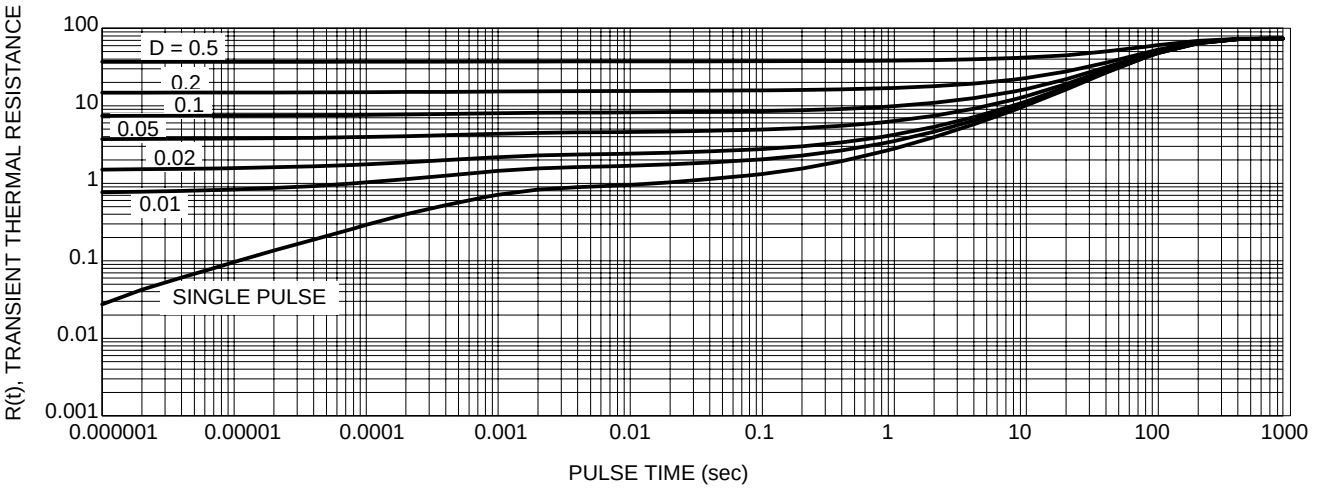
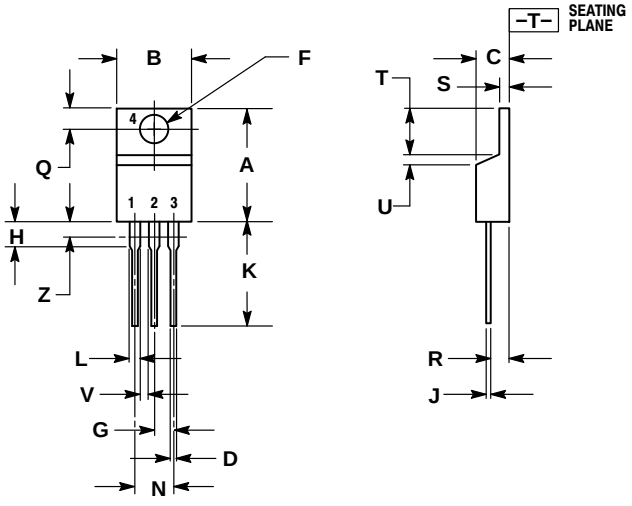



**Figure 14. Thermal Response Junction−to−Ambient for MBRF10L60CT**

## PACKAGE DIMENSIONS

**TO−220**
CASE 221A−09
ISSUE AH



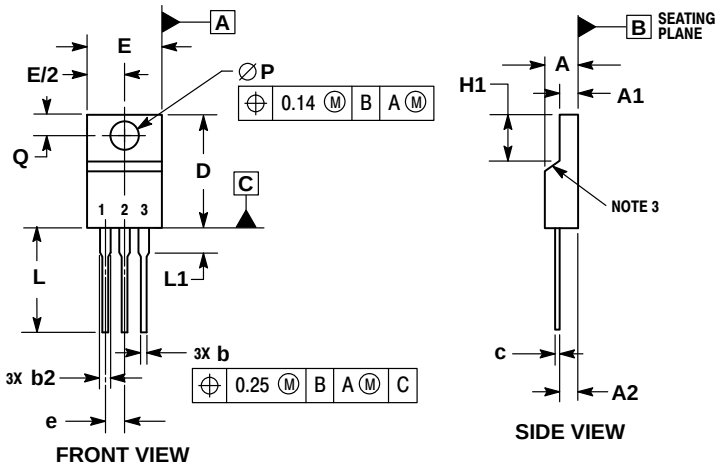

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 0.570 | 0.620 | 14.48 | 15.75 |
| B | 0.380 | 0.415 | 9.66 | 10.53 |
| C | 0.160 | 0.190 | 4.07 | 4.83 |
| D | 0.025 | 0.038 | 0.64 | 0.96 |
| F | 0.142 | 0.161 | 3.61 | 4.09 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.161 | 2.80 | 4.10 |
| J | 0.014 | 0.024 | 0.36 | 0.61 |
| K | 0.500 | 0.562 | 12.70 | 14.27 |
| L | 0.045 | 0.060 | 1.15 | 1.52 |
| N | 0.190 | 0.210 | 4.83 | 5.33 |
| Q | 0.100 | 0.120 | 2.54 | 3.04 |
| R | 0.080 | 0.110 | 2.04 | 2.79 |
| S | 0.045 | 0.055 | 1.15 | 1.39 |
| T | 0.235 | 0.255 | 5.97 | 6.47 |
| U | 0.000 | 0.050 | 0.00 | 1.27 |
| V | 0.045 | --- | 1.15 | --- |
| Z | --- | 0.080 | --- | 2.04 |

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

## PACKAGE DIMENSIONS

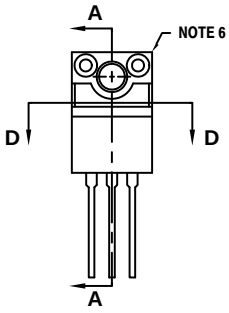
**TO−220 FULLPACK, 3−LEAD**
CASE 221AH
ISSUE F



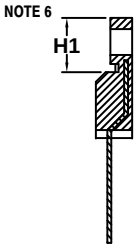

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR UNCONTROLLED IN THIS AREA.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH AND GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEASURED AT OUTERMOST EXTREME OF THE PLASTIC BODY.
5. DIMENSION b2 DOES NOT INCLUDE DAMBAR PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 2.00.
6. CONTOURS AND FEATURES OF THE MOLDED PACKAGE BODY MAY VARY WITHIN THE ENVELOP DEFINED BY DIMENSIONS A1 AND H1 FOR MANUFACTURING PURPOSES.

| | MILLIMETERS | |
|---|---|---|
| DIM | MIN | MAX |
| A | 4.30 | 4.70 |
| A1 | 2.50 | 2.90 |
| A2 | 2.50 | 2.90 |
| b | 0.54 | 0.84 |
| b2 | 1.10 | 1.40 |
| c | 0.49 | 0.79 |
| D | 14.70 | 15.30 |
| E | 9.70 | 10.30 |
| e | 2.54 BSC | |
| H1 | 6.60 | 7.10 |
| L | 12.50 | 14.73 |
| L1 | --- | 2.80 |
| P | 3.00 | 3.40 |
| Q | 2.80 | 3.20 |

SECTION D−D




ALTERNATE CONSTRUCTION




SECTION A−A

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