

# MBR20L60CT MBRF20L60CT

## SWITCHMODE™ Power Rectifier 60 V, 20 A

### Features and Benefits

- Low Power Loss/High Efficiency
- High Surge Capacity
- 20 A Total (10 A Per Diode Leg)
- Guard-Ring for Stress Protection
- These are Pb-Free Devices

### Applications

- Power Supply – Output Rectification
- Power Management
- Instrumentation

### Mechanical Characteristics:

- Case: Epoxy, Molded
- Epoxy Meets UL 94 V-0 @ 0.125 in
- 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
- Shipped 50 Units Per Plastic Tube

### MAXIMUM RATINGS

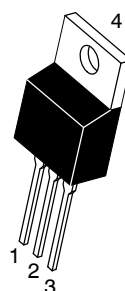
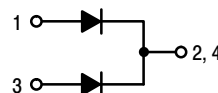
Please See the Table on the Following Page



ON Semiconductor®

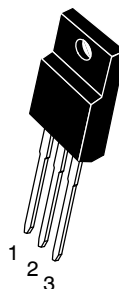
<http://onsemi.com>

## SCHOTTKY BARRIER RECTIFIER 20 AMPERES 60 VOLTS



TO-220AB  
CASE 221A  
PLASTIC

### MARKING DIAGRAM



TO-220 FULLPAK™  
CASE 221D  
STYLE 3



A = Assembly Location  
Y = Year  
WW = Work Week  
B20L60 = Device Code  
G = Pb-Free Package  
AKA = Polarity Designator

### ORDERING INFORMATION

| Device       | Package               | Shipping        |
|--------------|-----------------------|-----------------|
| MBR20L60CTG  | TO-220AB<br>(Pb-Free) | 50 Units / Rail |
| MBRF20L60CTG | TO-220FP<br>(Pb-Free) | 50 Units / Rail |

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

# MBR20L60CT MBRF20L60CT

## 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>MBR20L60CT (Rated $V_R$ ) $T_C = 138^\circ\text{C}$ Per Diode<br>MBRF20L60CT (Rated $V_R$ ) $T_C = 123^\circ\text{C}$ Per Device | $I_{F(AV)}$                     | 10<br>20            | A                |
| Nonrepetitive Peak Surge Current<br>(Surge applied at rated load conditions halfwave, single phase, 60 Hz)                                                            | $I_{FSM}$                       | 240                 | A                |
| Operating Junction Temperature (Note 1)                                                                                                                               | $T_J$                           | $-55$ to $+150$     | $^\circ\text{C}$ |
| Storage Temperature                                                                                                                                                   | $T_{stg}$                       | $-65$ to $+175$     | $^\circ\text{C}$ |
| ESD Ratings:<br>Machine Model = C<br>Human Body Model = 3B                                                                                                            |                                 | $> 400$<br>$> 8000$ | V                |

## THERMAL CHARACTERISTICS

|                                                                                                                                                       |                                                                          |                        |                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------|--------------------|
| Maximum Thermal Resistance<br>MBR20L60CT<br>– Junction–to–Case<br>– Junction–to–Ambient<br>MBRF20L60CT<br>– Junction–to–Case<br>– Junction–to–Ambient | $R_{\theta JC}$<br>$R_{\theta JA}$<br>$R_{\theta JC}$<br>$R_{\theta JA}$ | 2.3<br>70<br>5.2<br>75 | $^\circ\text{C/W}$ |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------|--------------------|

## ELECTRICAL CHARACTERISTICS (Per Diode Leg)

| Rating                                                                                                                                                                                                                                   | Symbol | Typ                          | Max                          | Unit                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------|------------------------------|---------------------|
| Maximum Instantaneous Forward Voltage (Note 2)<br>( $I_F = 10$ A, $T_C = 25^\circ\text{C}$ )<br>( $I_F = 10$ A, $T_C = 125^\circ\text{C}$ )<br>( $I_F = 20$ A, $T_C = 25^\circ\text{C}$ )<br>( $I_F = 20$ A, $T_C = 125^\circ\text{C}$ ) | $V_F$  | 0.53<br>0.49<br>0.68<br>0.64 | 0.57<br>0.54<br>0.73<br>0.69 | V                   |
| Maximum Instantaneous Reverse Current (Note 2)<br>(Rated DC Voltage, $T_C = 25^\circ\text{C}$ )<br>(Rated DC Voltage, $T_C = 125^\circ\text{C}$ )                                                                                        | $i_R$  | 118<br>52                    | 380<br>96                    | $\mu\text{A}$<br>mA |

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:  $dP_D/dT_J < 1/R_{\theta JA}$ .
2. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# MBR20L60CT MBRF20L60CT

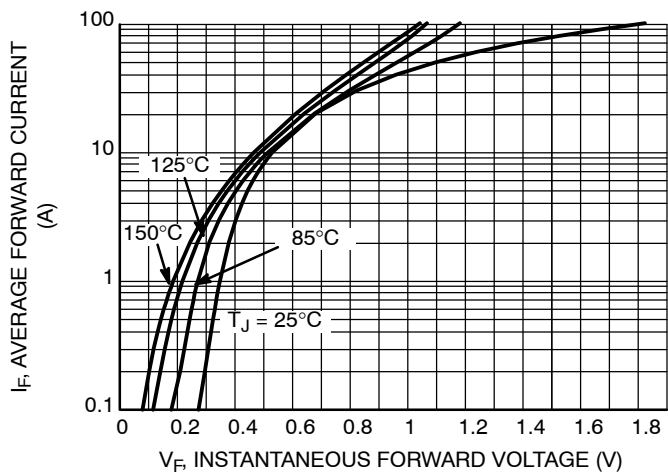


Figure 1. Typical Forward Voltage

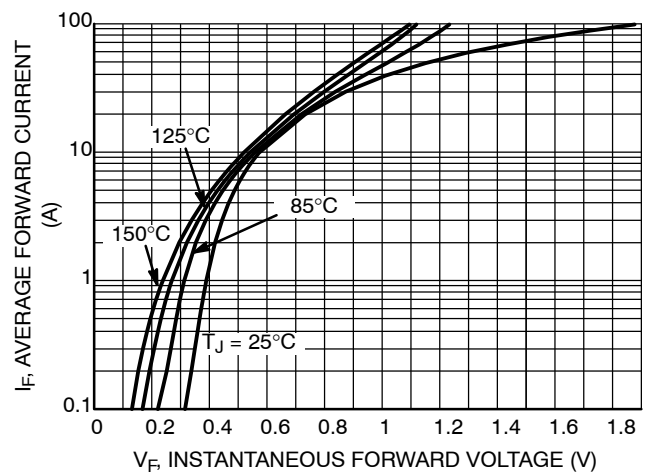


Figure 2. Maximum Forward Voltage

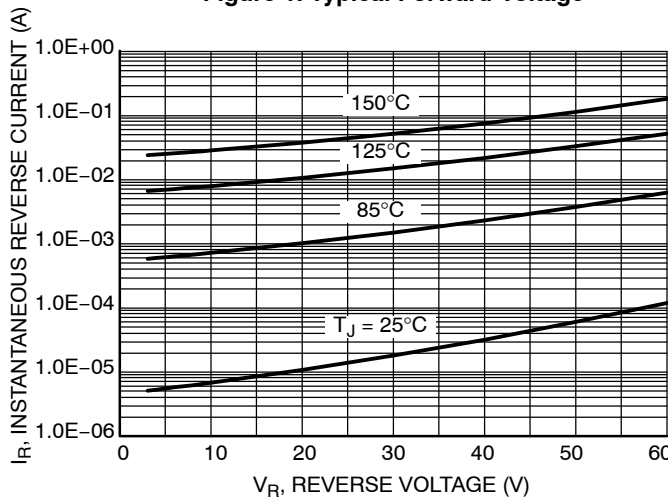


Figure 3. Typical Reverse Current

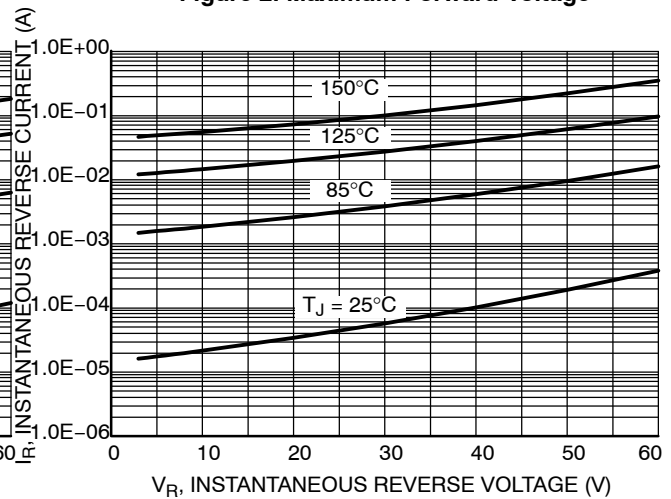


Figure 4. Maximum Reverse Current

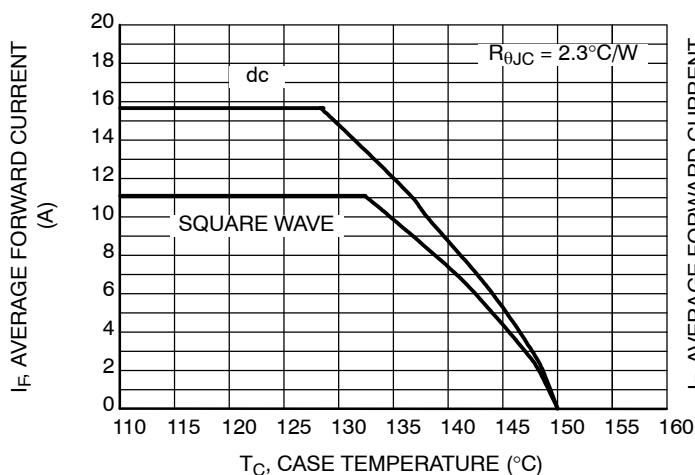


Figure 5. Current Derating, Case per Leg  
MBR20L60CT

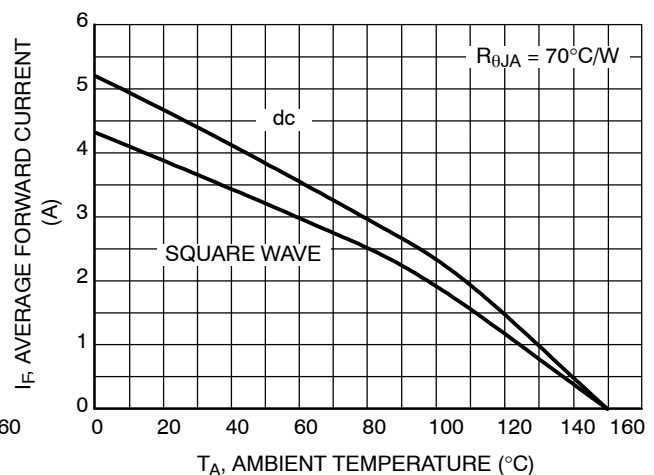
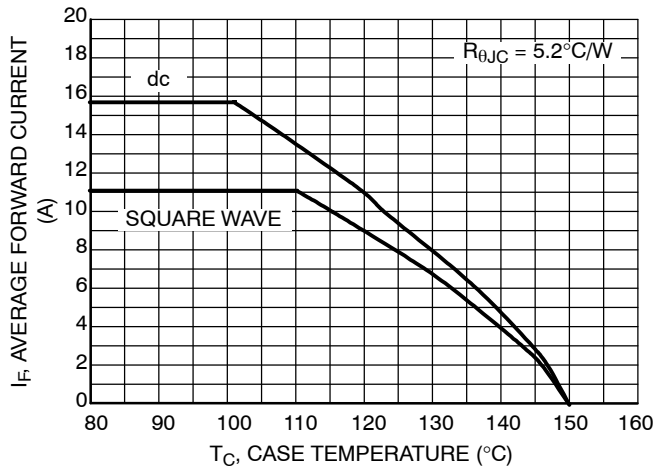
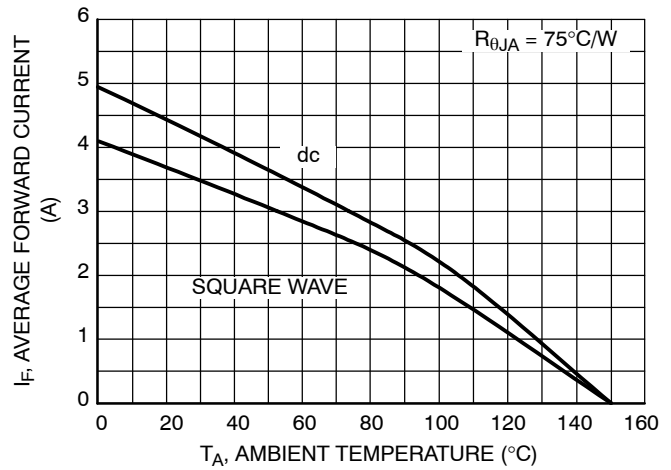


Figure 6. Current Derating, Ambient per Leg  
MBR20L60CT

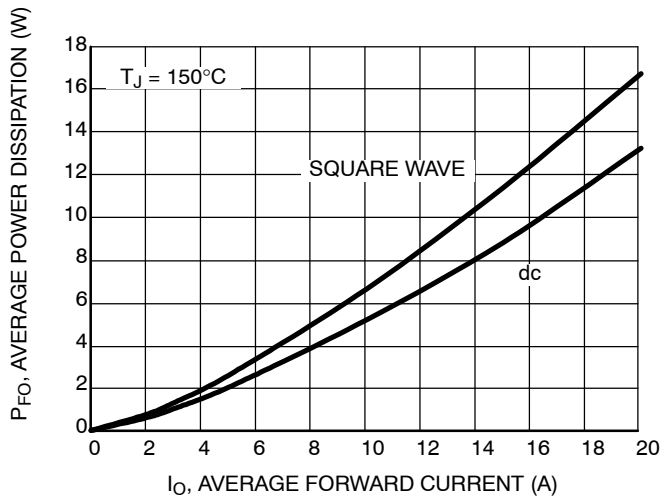
# MBR20L60CT MBRF20L60CT



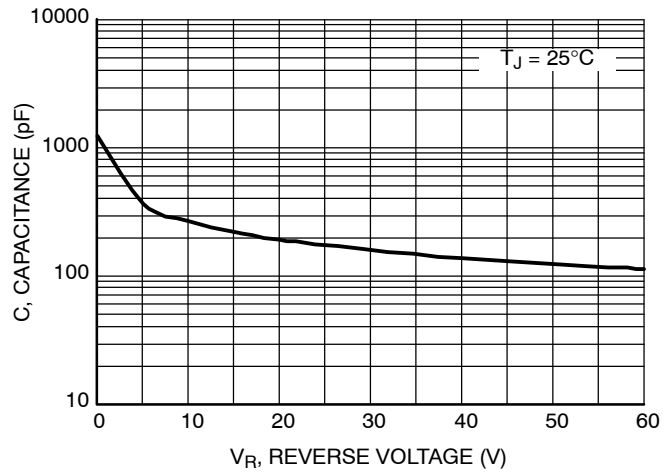
**Figure 7. Current Derating, Case per Leg  
MBRF20L60CT**



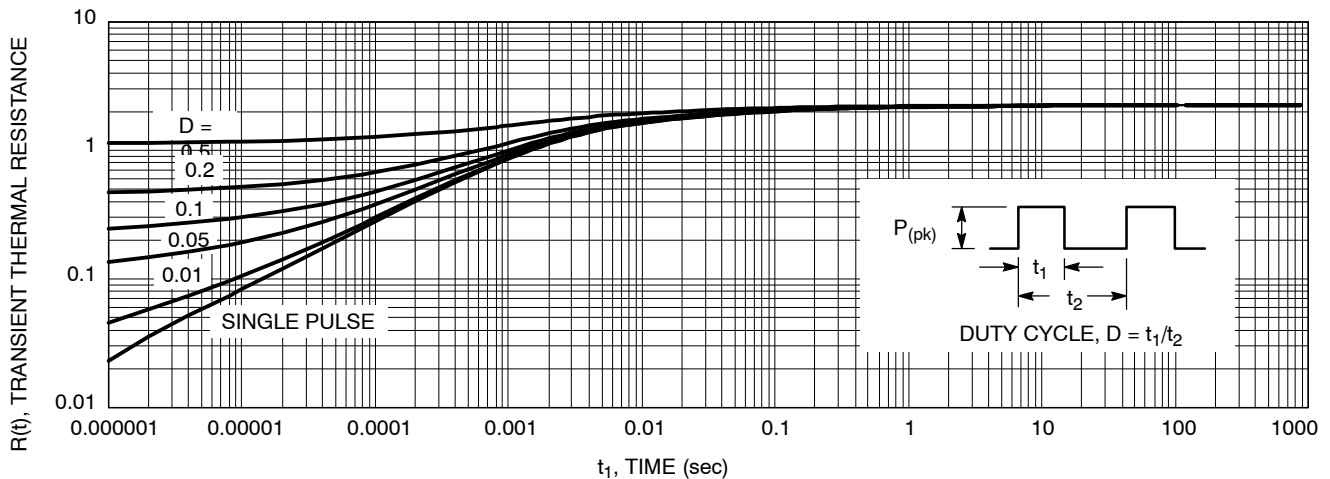
**Figure 8. Current Derating, Ambient per Leg  
MBRF20L60CT**



**Figure 9. Forward Power Dissipation**



**Figure 10. Capacitance**



**Figure 11. Thermal Response Junction-to-Case, per Leg for MBR20L60CT**

## MBR20L60CT MBRF20L60CT

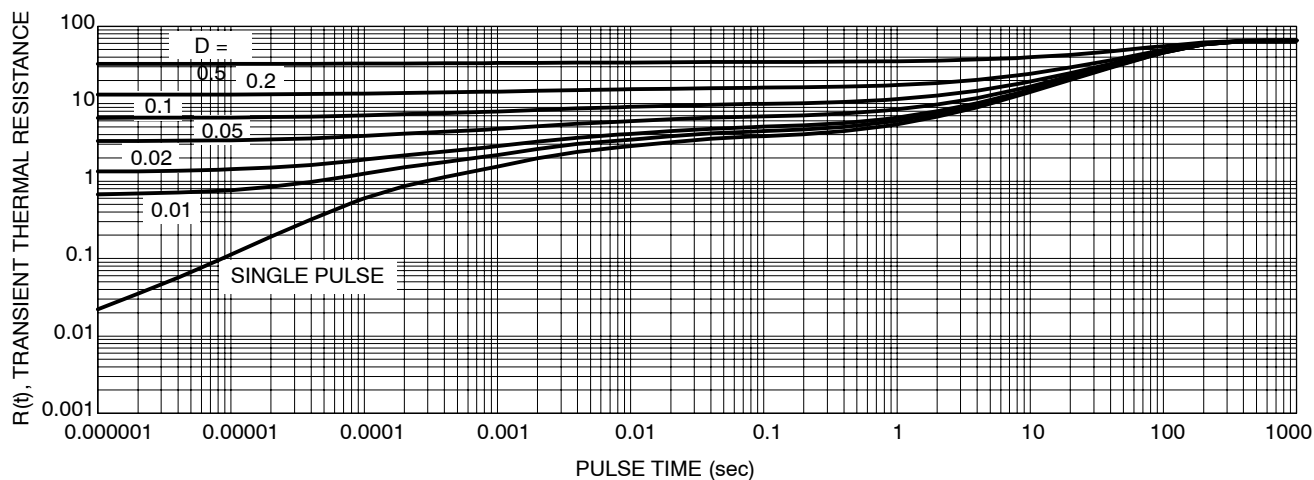


Figure 12. Thermal Response Junction-to-Ambient, per Leg for MBR20L60CT

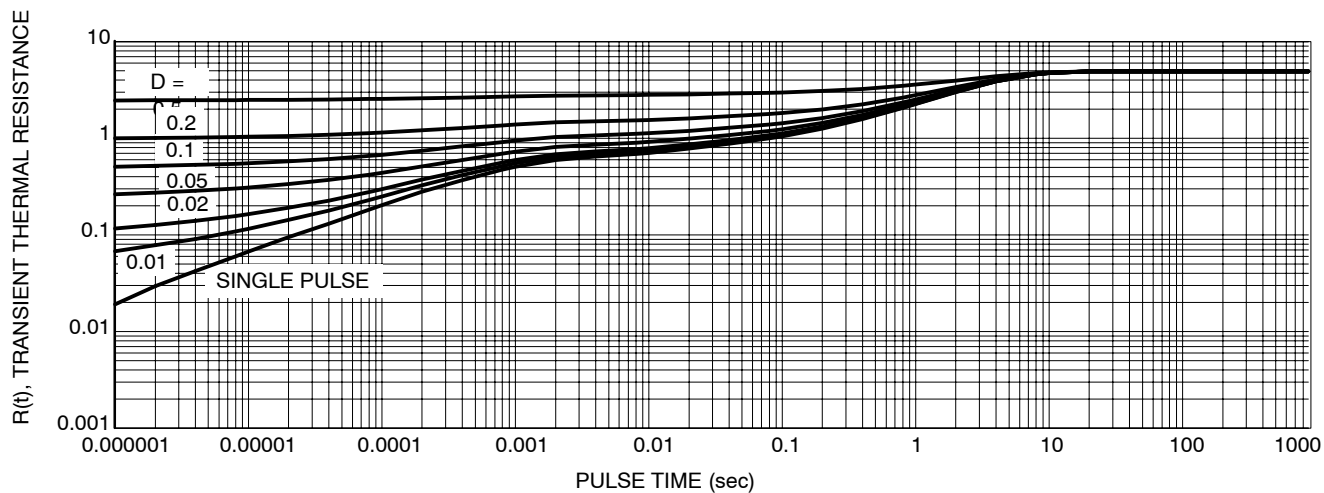


Figure 13. Thermal Response Junction-to-Case, per Leg for MBRF20L60CT

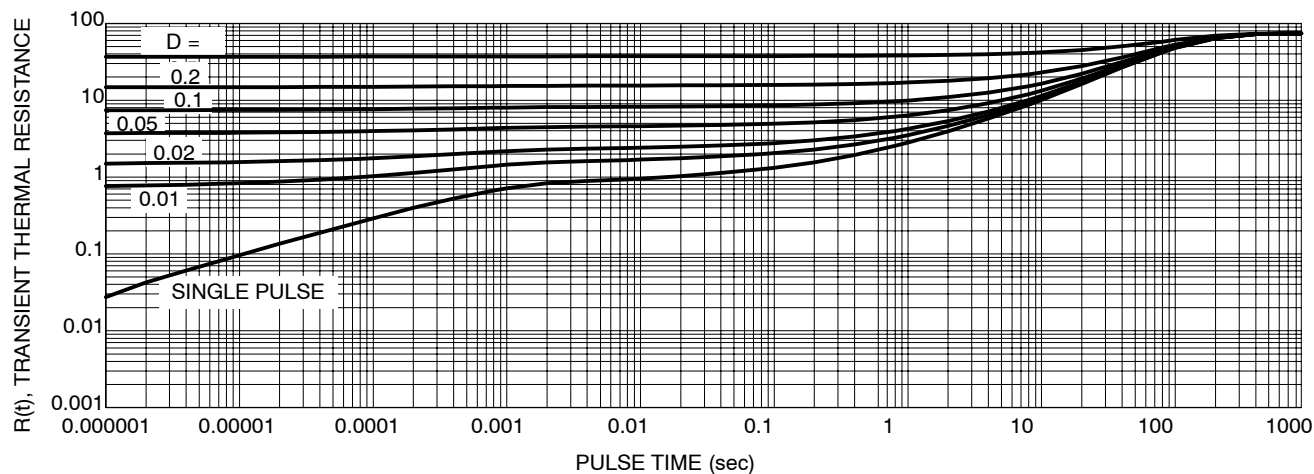
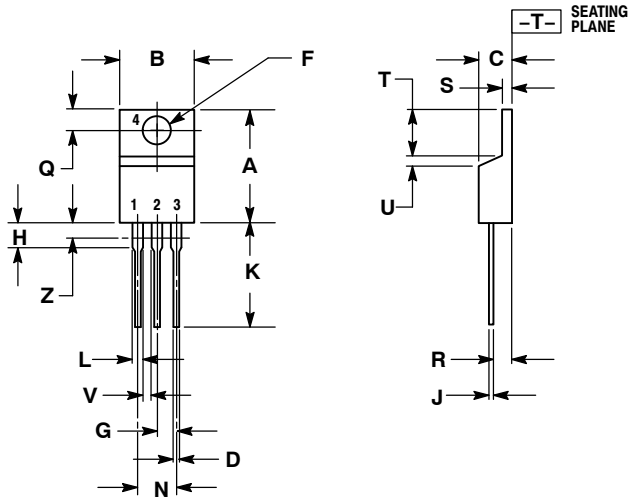


Figure 14. Thermal Response Junction-to-Ambient, per Leg for MBRF20L60CT

# MBR20L60CT MBRF20L60CT

## PACKAGE DIMENSIONS

TO-220  
CASE 221A-09  
ISSUE AF



### 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  | 0.035 | 0.64        | 0.88  |
| F   | 0.142  | 0.161 | 3.61        | 4.09  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.155 | 2.80        | 3.93  |
| J   | 0.014  | 0.025 | 0.36        | 0.64  |
| 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  |

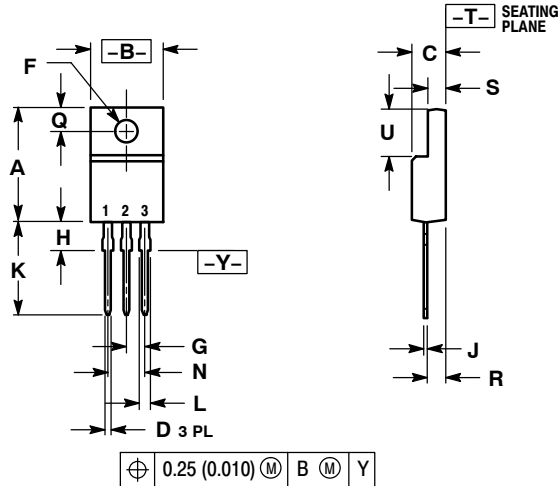
### STYLE 6:

- PIN 1. ANODE
- CATHODE
- ANODE
- CATHODE

# MBR20L60CT MBRF20L60CT

## PACKAGE DIMENSIONS

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



#### 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  |

#### STYLE 3:

- PIN 1. ANODE
- CATHODE
- ANODE

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**Телефон:** +7 812 627 14 35

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