

MBR20L60CTG MBRF20L60CTG

Switch-mode 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 Devices are Pb-Free and are RoHS Compliant*

Applications

- Power Supply – Output Rectification
- Power Management
- Instrumentation

Mechanical Characteristics:

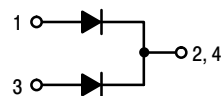
- Case: Epoxy, Molded
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Shipped 50 Units Per Plastic Tube



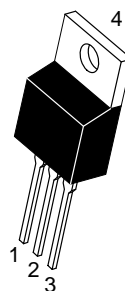
ON Semiconductor®

www.onsemi.com

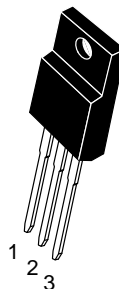
SCHOTTKY BARRIER RECTIFIER 20 AMPERES 60 VOLTS



MARKING DIAGRAM



TO-220
CASE 221A
STYLE 6



TO-220 FULLPAK™
CASE 221AH



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-220 (Pb-Free)	50 Units / Rail
MBRF20L60CTG	TO-220FP (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.

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MAXIMUM RATINGS (Per Diode 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 MBR20L60CT (Rated V_R) $T_C = 138^\circ\text{C}$ Per Diode MBRF20L60CT (Rated V_R) $T_C = 123^\circ\text{C}$ Per Device	$I_{F(AV)}$	10 20	A
Nonrepetitive Peak Surge Current (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: Machine Model = C Human Body Model = 3B		> 400 > 8000	V
Maximum Repetitive Peak Avalanche Voltage ($t_p < 1 \mu\text{s}$, $T_J < 150^\circ\text{C}$, $I_{AR} < 51 \text{ A}$)	V_{ARM}	85	V
Maximum Single-Pulse Peak Avalanche Voltage ($t_p < 1 \mu\text{s}$, $T_J < 150^\circ\text{C}$, $I_{AR} < 51 \text{ A}$)	V_{ASM}	85	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

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance MBR20L60CTG - Junction-to-Case - Junction-to-Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.3 70	$^\circ\text{C/W}$
MBRF20L60CTG - Junction-to-Case - Junction-to-Ambient	$R_{\theta JC}$ $R_{\theta JA}$	5.2 75	

ELECTRICAL CHARACTERISTICS (Per Diode Leg)

Characteristic	Symbol	Typ	Max	Unit
Maximum Instantaneous Forward Voltage (Note 2) ($I_F = 10 \text{ A}$, $T_C = 25^\circ\text{C}$) ($I_F = 10 \text{ A}$, $T_C = 125^\circ\text{C}$) ($I_F = 20 \text{ A}$, $T_C = 25^\circ\text{C}$) ($I_F = 20 \text{ A}$, $T_C = 125^\circ\text{C}$)	V_F	0.53 0.49 0.68 0.64	0.57 0.54 0.73 0.69	V
Maximum Instantaneous Reverse Current (Note 2) (Rated DC Voltage, $T_C = 25^\circ\text{C}$) (Rated DC Voltage, $T_C = 125^\circ\text{C}$)	i_R	118 52	380 96	μA 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 $\leq 2.0\%$.

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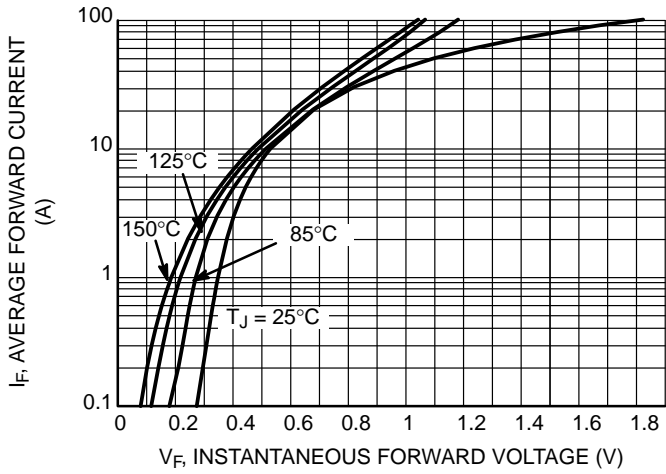


Figure 1. Typical Forward Voltage

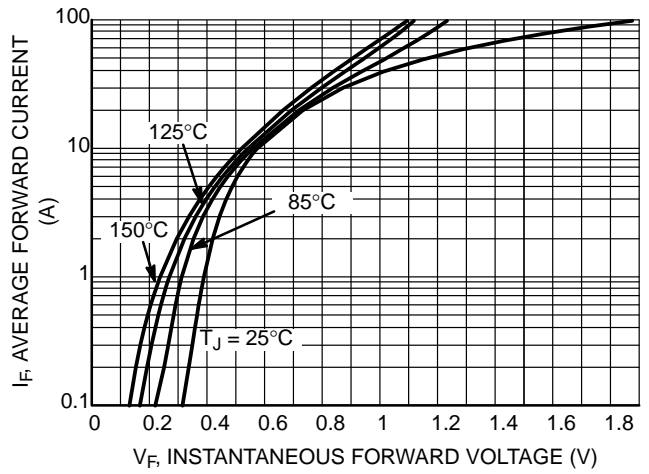


Figure 2. Maximum Forward Voltage

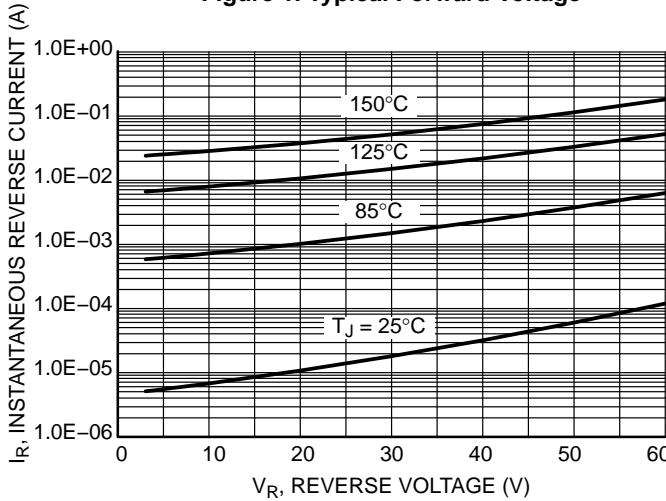


Figure 3. Typical Reverse Current

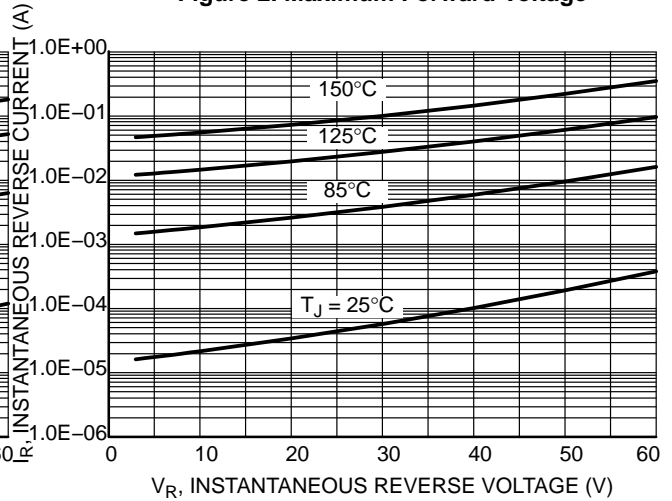


Figure 4. Maximum Reverse Current

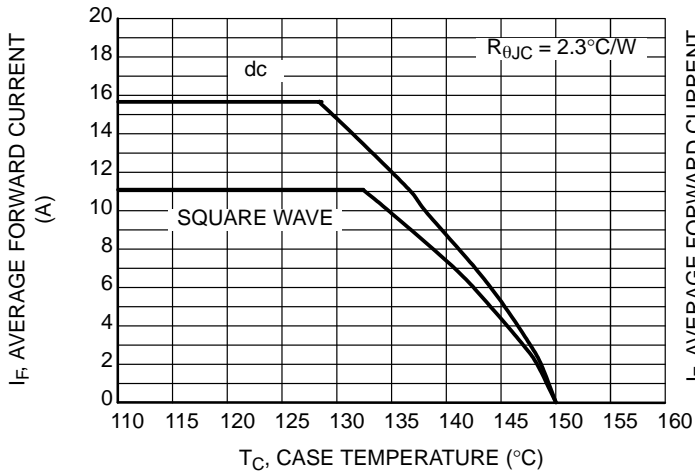


Figure 5. Current Derating, Case per Leg
MBR20L60CT

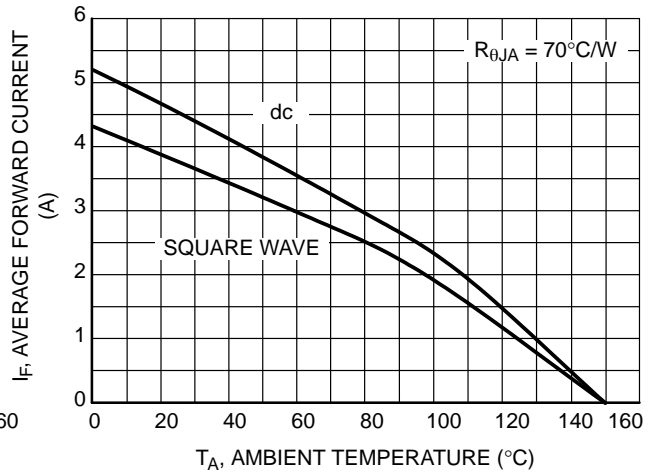
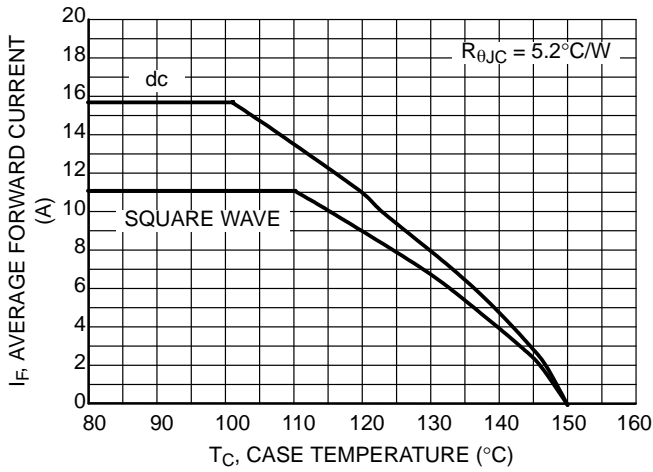
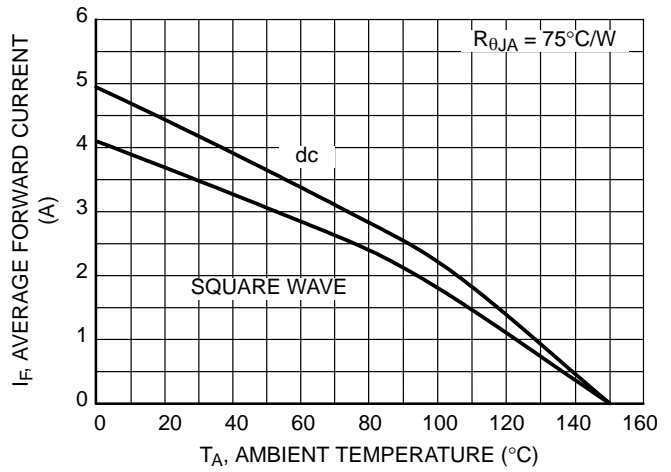


Figure 6. Current Derating, Ambient per Leg
MBR20L60CT

MBR20L60CTG MBRF20L60CTG



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



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

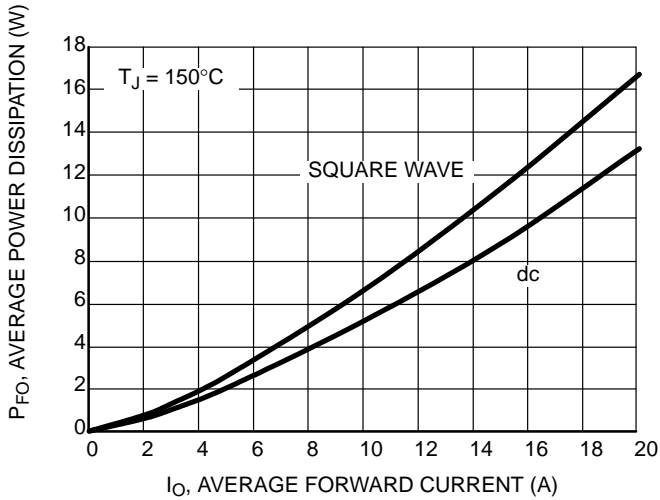


Figure 9. Forward Power Dissipation

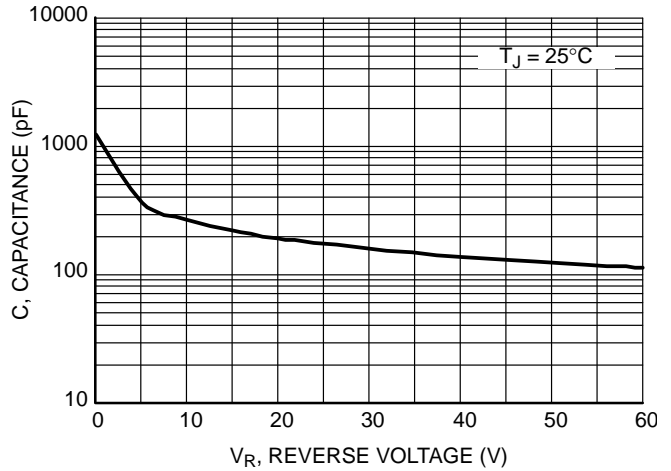


Figure 10. Capacitance

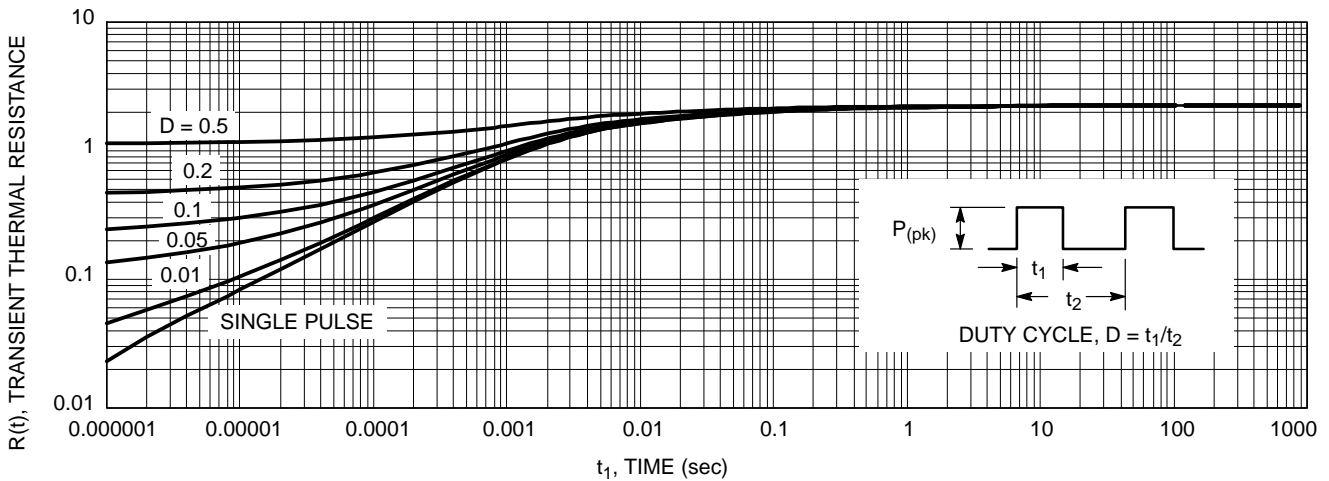


Figure 11. Thermal Response Junction-to-Case, per Leg for MBR20L60CT

MBR20L60CTG MBRF20L60CTG

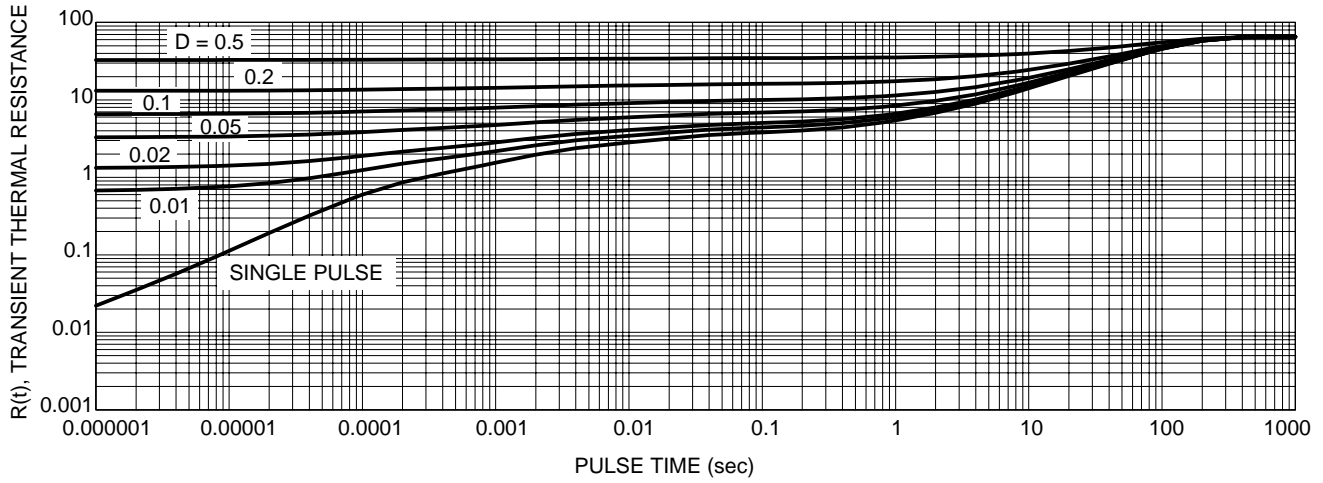


Figure 12. Thermal Response Junction-to-Ambient, per Leg for MBR20L60CT

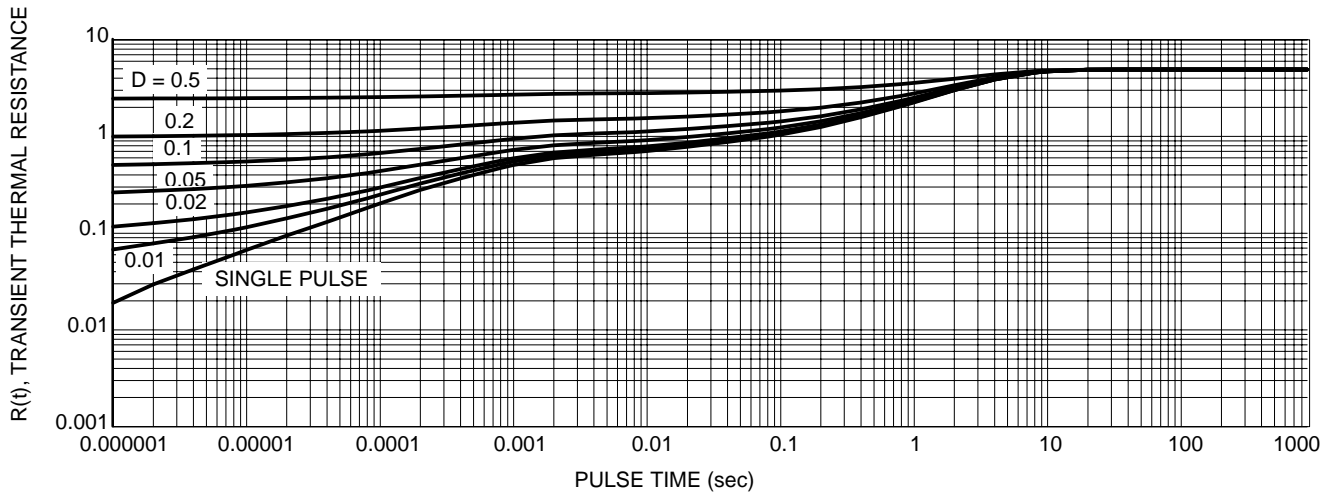


Figure 13. Thermal Response Junction-to-Case, per Leg for MBRF20L60CT

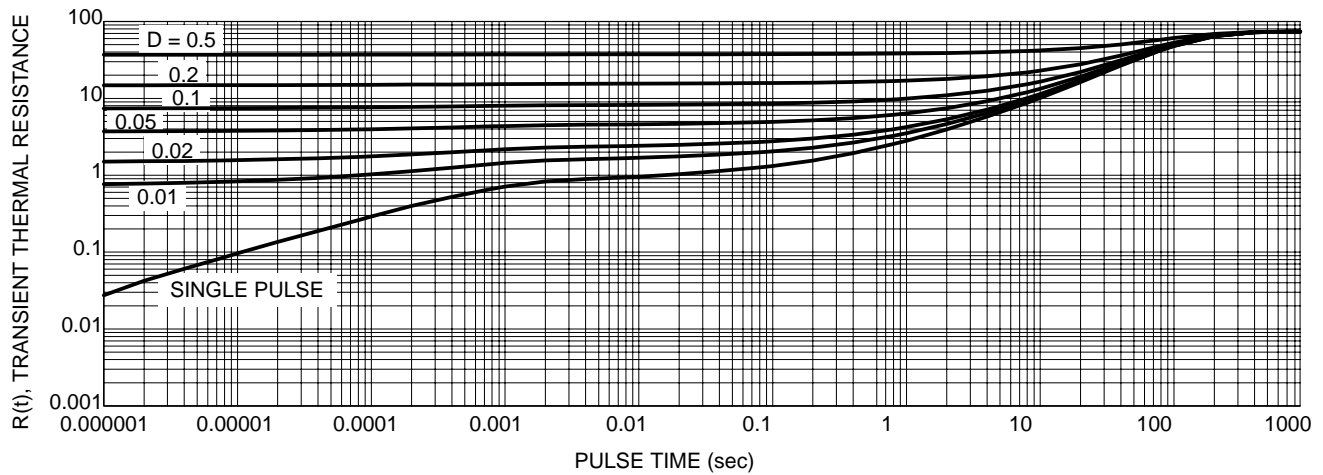
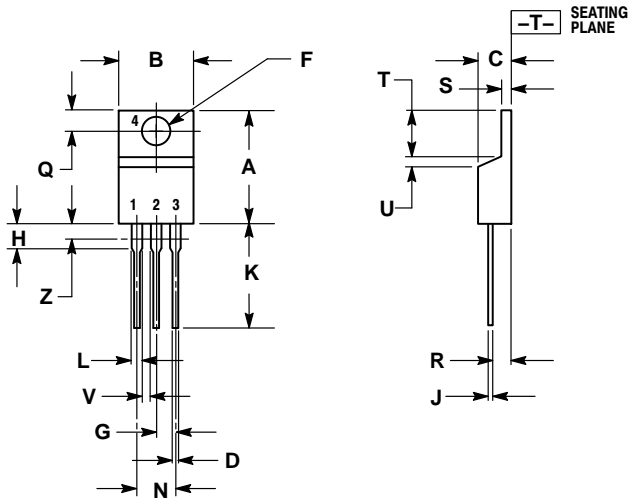


Figure 14. Thermal Response Junction-to-Ambient, per Leg for MBRF20L60CT

MBR20L60CTG MBRF20L60CTG

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.

DIM	INCHES		MILLIMETERS	
	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

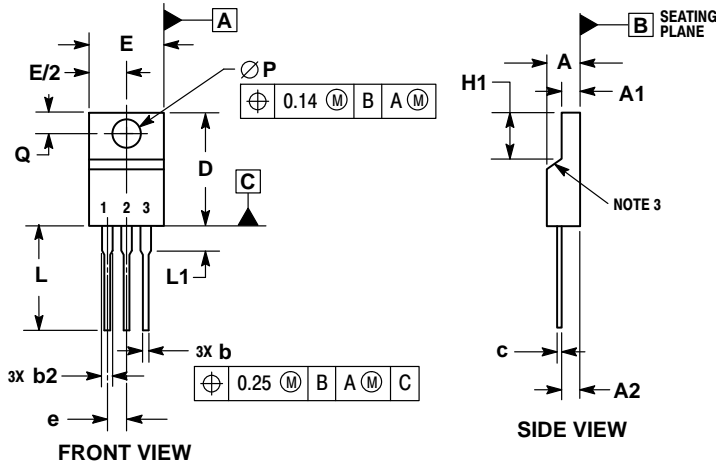
STYLE 6:

- PIN 1. ANODE
- CATHODE
- ANODE
- CATHODE

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PACKAGE DIMENSIONS

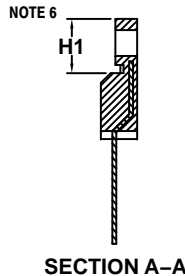
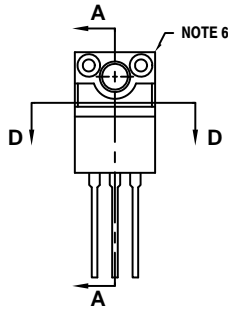
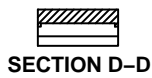
TO-220 FULLPACK, 3-LEAD
CASE 221AH
ISSUE F



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



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