

### SCHOTTKY RECTIFIER

### 40 Amp

$$I_{F(AV)} = 40\text{Amp}$$

$$V_R = 60\text{V}$$

#### Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	40	A
$V_{RRM}$	60	V
$I_{FSM}$ @tp = 5 $\mu$ s sine	3200	A
$V_F$ @20 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.49	V
$T_J$	-55 to 150	$^\circ\text{C}$

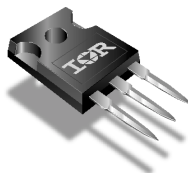
#### Description/Features

The MBR... center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150° C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150° C  $T_J$  operation
- Center tap TO-247 package
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

#### Case Styles

MBR4060WT



TO-247

Voltage Ratings

Part number	MBR4060WT
$V_R$ Max. DC Reverse Voltage (V)	60
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	40	A	@ $T_C = 120^\circ\text{C}$ , 50% duty cycle, rectangular waveform
$I_{FRM}$ Peak Repetitive Forward Current (Per Leg)	40	A	Rated $V_R$ , square wave, 20kHz $T_C = 125^\circ\text{C}$
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) See fig.7	3200	A	Following any rated load condition and with rated $V_{RRM}$ applied
	320		
$E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)	18	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 3$ Amps, $L = 4.40$ mH
$I_{AR}$ Repetitive Avalanche Current (Per Leg)	2	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	Values	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop  (1)	0.53	V	@ 20A $T_J = 25^\circ\text{C}$
	0.68	V	@ 40A
	0.49	V	@ 20A $T_J = 125^\circ\text{C}$
	0.64	V	@ 40A
$I_{RM}$ Max. Instantaneous Reverse Current	1.7	mA	$T_J = 25^\circ\text{C}$ Rated DC voltage
	96	mA	$T_J = 125^\circ\text{C}$
$C_T$ Max. Junction Capacitance	900	pF	$V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ Typical Series Inductance	7.5	nH	Measured from top of terminal to mounting plane
$dv/dt$ Max. Voltage Rate of Change (Rated $V_R$ )	10000	V/ $\mu\text{s}$	

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle <2%

Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
$T_J$ Max. Junction Temperature Range	-55 to 150	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)	1.25	$^\circ\text{C/W}$	DC operation
$R_{thCS}$ Typical Thermal Resistance Case to Heatsink	0.63	$^\circ\text{C/W}$	Mounting surface, smooth and greased
wt Approximate Weight	6(0.21)	g(oz.)	
T Mounting Torque	Min. 6(5)	Kg-cm (lbf-in)	
	Max. 12(10)		
Case Style	TO-247AC (TO-3P)	JEDEC	

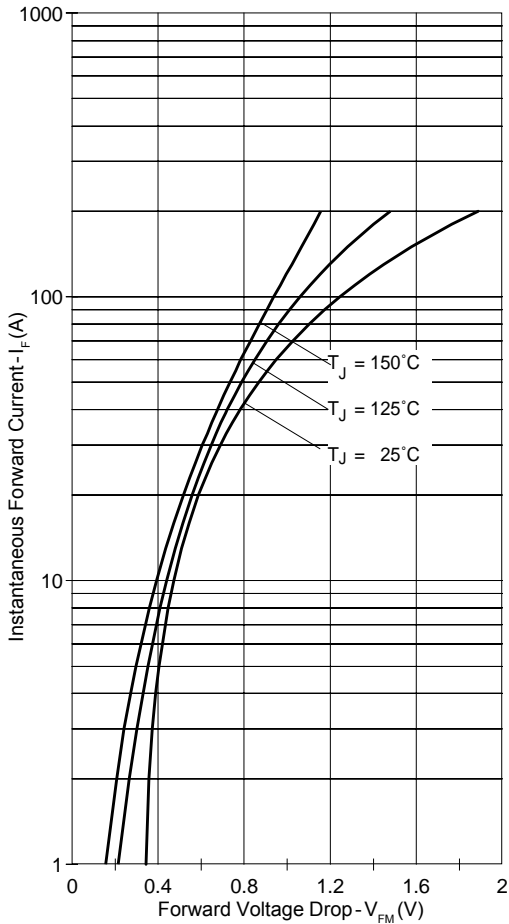


Fig. 1 - Max. Forward Voltage Drop Characteristics

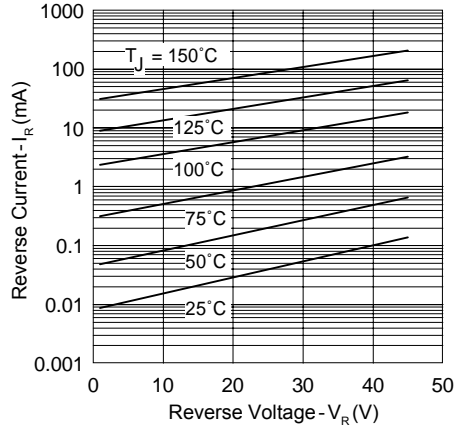


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

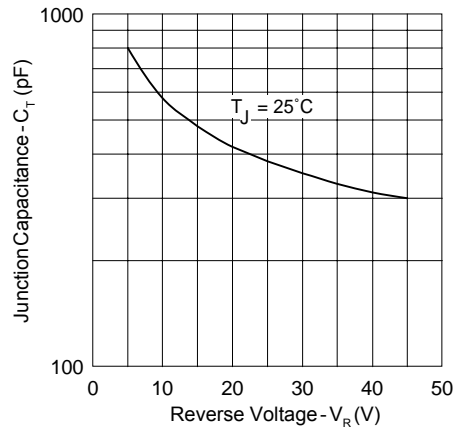


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

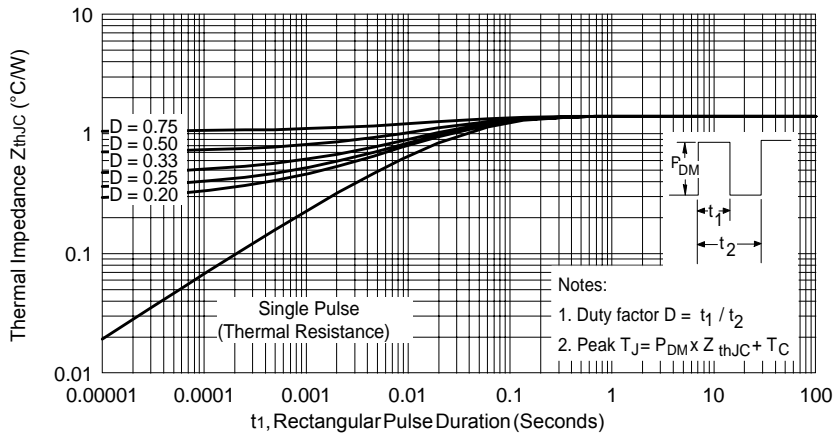


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics

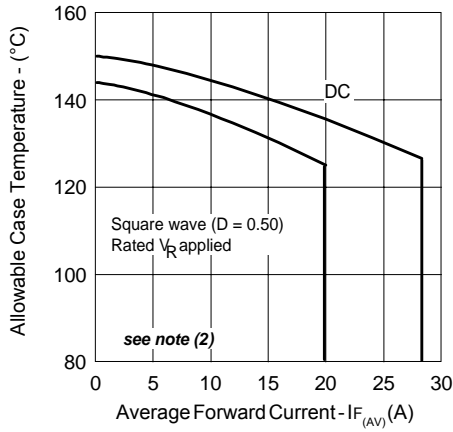


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

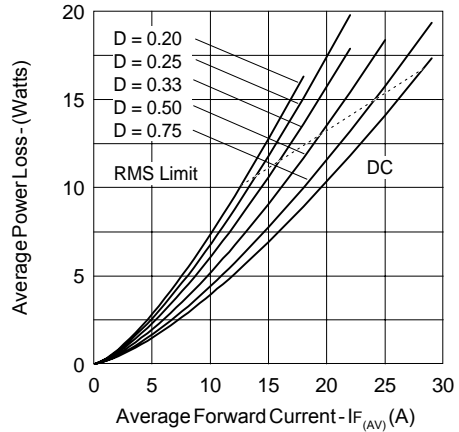


Fig. 6 - Forward Power Loss Characteristics

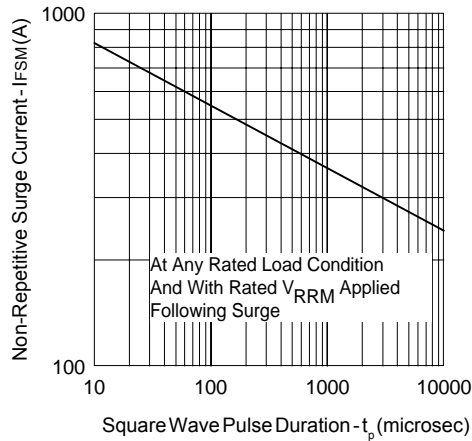


Fig. 7 - Max. Non-Repetitive Surge Current

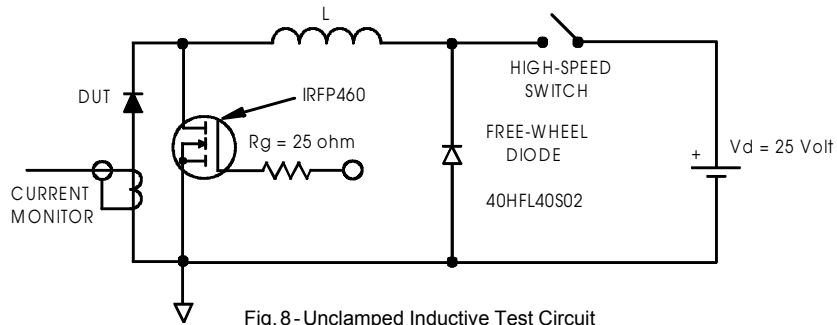
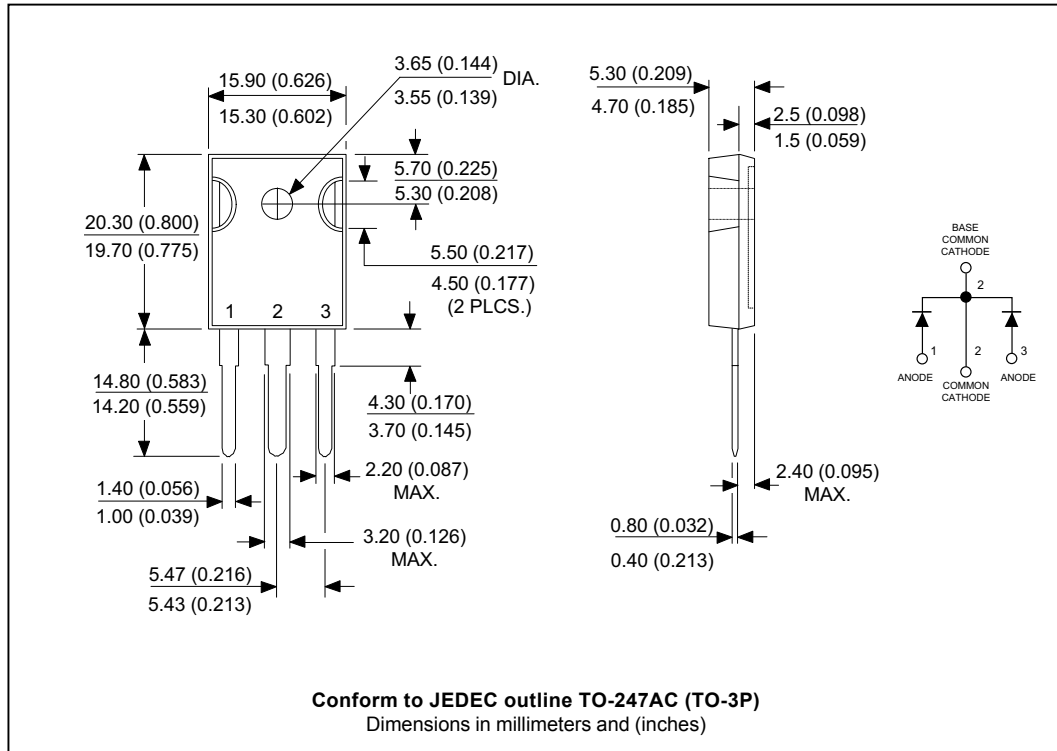


Fig. 8 - Unclamped Inductive Test Circuit

- (2) Formula used:  $T_c = T_j - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);  
 $P_{d_{REV}} = \text{Inverse Power Loss} = V_{R1} \times I_{R1} (1 - D)$ ;  $I_{R1} @ V_{R1} = \text{rated } V_R$

Outline Table



Ordering Information Table

Device Code			
<b>MBR</b>	<b>40</b>	<b>60</b>	<b>WT</b>
①	②	③	④
<b>1</b>	-	Schottky MBR Series	
<b>2</b>	-	Current Rating	: 40 = 40A
<b>3</b>	-	Voltage Rating	: 60 = 60V
<b>4</b>	-	Circuit Configuration	: Center Tap (Dual) TO-247

```

MBR4060WT
*****
This model has been developed by
Wizard SPICE MODEL GENERATOR (1999)
(International Rectifier Corporation)
contains Proprietary Information
*****
* SPICE Model Diode is composed by a      *
* simple diode plus paraladed VCG2T      *
*****
.SUBCKT MBR4060WT ANO CAT
D1 ANO 1 DMOD (0.15431)
*Define diode model
.MODEL DMOD D(IS=1.24122088285142E-04A,N=1.118139845134,BV=68V,
+IBV=0.326321361043483A,RS=0.001033877,CJO=1.77866386701626E-08,
+VJ=1.31756418398729,XTI=2,EG=0.750533880678658)
*****
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=16.0583931154828)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP(((((-2.583306E-03/16.05839)*((V(2,CAT)*1E6)/(I(VX)+1E-
6)-1))+1)*4.198821E-02*ABS(V(ANO,CAT)))-1)}}
*****
.ENDS MBR4060WT

Thermal Model Subcircuit
.SUBCKT MBR4060WT 5 1

CTHERM1    5    4    1.25E+00
CTHERM2    4    3    4.94E+00
CTHERM3    3    2    1.45E+01
CTHERM4    2    1    7.99E+01

RTHERM1    5    4    6.22E-01
RTHERM2    4    3    4.63E-01
RTHERM1    3    2    1.36E-01
RTHERM1    2    1    2.41E-02

.ENDS MBR4060WT
    
```

**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245 U.S.A. Tel: (310) 322 3331. Fax: (310) 322 3332.  
**EUROPEAN HEADQUARTERS:** Hurst Green, Oxted, Surrey RH8 9BB, U.K. Tel: ++ 44 1883 732020. Fax: ++ 44 1883 733408.  
**IR CANADA:** 15 Lincoln Court, Brampton, Markham, Ontario L6T3Z2. Tel: (905) 453 2200. Fax: (905) 475 8801.  
**IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg. Tel: ++ 49 6172 96590. Fax: ++ 49 6172 965933.  
**IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino. Tel: ++ 39 11 4510111. Fax: ++ 39 11 4510220.  
**IR FAR EAST:** K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171. Tel: 81 3 3983 0086.  
**IR SOUTHEAST ASIA:** 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994. Tel: ++ 65 838 4630.  
**IR TAIWAN:** 16 Fl. Suite D.207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan. Tel: 886 2 2377 9936.