

SCHOTTKY RECTIFIER

40 Amp

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

$$V_R = 45\text{V}$$

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform (Per Device)	40	A
I_{FRM} @ $T_C = 125^\circ\text{C}$ (Per Leg)	40	A
V_{RRM}	45	V
I_{FSM} @ tp = 5 μs sine	1020	A
V_F @ 20 Apk, $T_J = 125^\circ\text{C}$	0.56	V
T_J range	-55 to 150	$^\circ\text{C}$

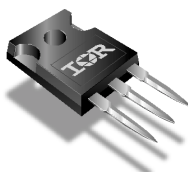
Description/Features

The MBR4045WT 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

MBR4045WT



TO-247AC

MBR4045WT

Bulletin PD-20715 rev. A 09/00

International
IOR Rectifier

Voltage Ratings

Part number	MBR4045WT
V_R Max. DC Reverse Voltage (V)	45
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current (Per Leg) (Per Device)	20 40	A	@ $T_C = 125^\circ\text{C}$, 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	1020 265	A	5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V_{RRM} applied
E_{AS} Non-Repetitive Avalanche Energy (Per Leg)	20	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 3$ Amps, $L = 4.40$ mH
I_{AR} Repetitive Avalanche Current (Per Leg)	3	A	Current decaying linearly to zero in 1 μsec 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)	0.59 0.78 0.56 0.72	V	@ 20A @ 40A @ 20A @ 40A $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
I_{RM} Max. Instantaneous Reverse Current (1)	1.75 50 85	mA	$T_J = 25^\circ\text{C}$ $T_J = 100^\circ\text{C}$ $T_J = 125^\circ\text{C}$ Rated DC voltage
$V_{F(TO)}$ Threshold Voltage	0.29	V	$T_J = T_J$ max.
r_t Forward Slope Resistance	10.3	m Ω	
C_T Max. Junction Capacitance	900	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) 25°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/ μs	

Thermal-Mechanical Specifications

(1) Pulse Width < 300 μs , Duty Cycle < 2%

Parameters	Values	Units	Conditions
T_J Max. Junction Temperature Range	-55 to 150	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 175	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Junction to Case (Per Package)	1.4	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance Case to Heatsink	0.7	$^\circ\text{C/W}$	Mounting surface, smooth and greased
wt Approximate Weight	6(0.21)	g(oz.)	
T Mounting Torque Min. Max.	6(5) 12(10)	Kg-cm (lbf-in)	
Case Style	TO-247AC(TO-3P)	JEDEC	

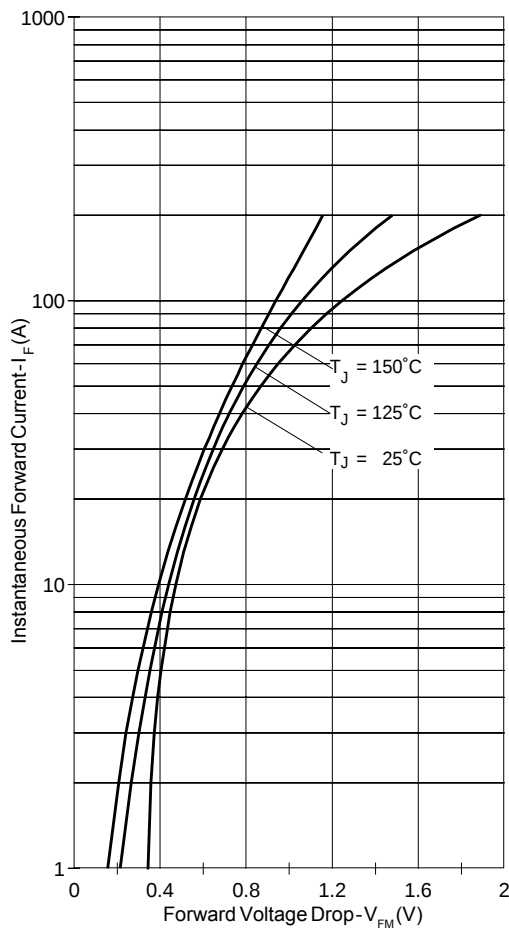


Fig. 1 - Max. Forward Voltage Drop Characteristics

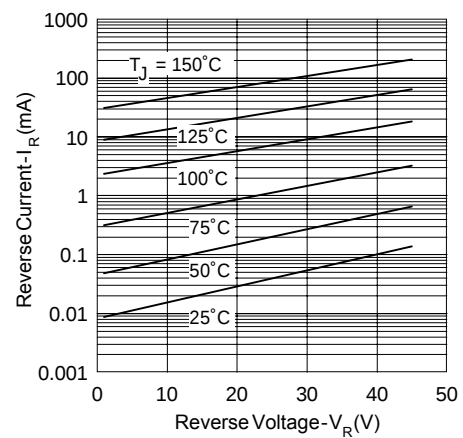


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

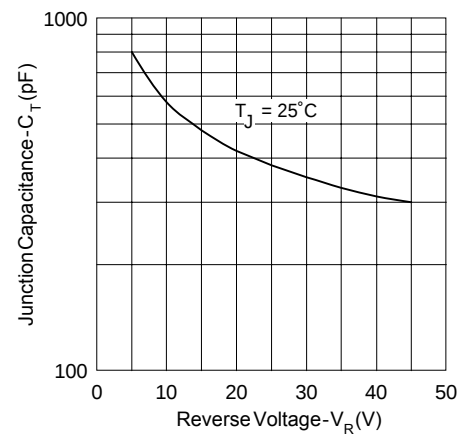


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

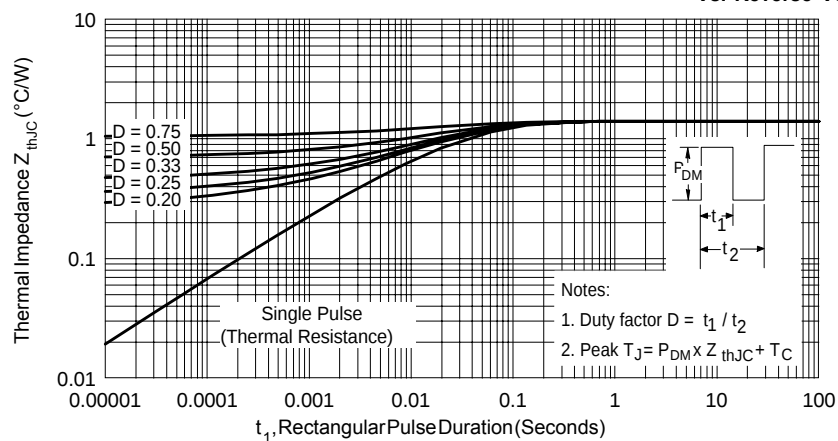


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

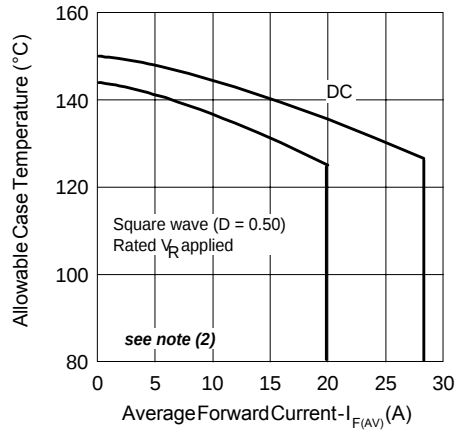


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

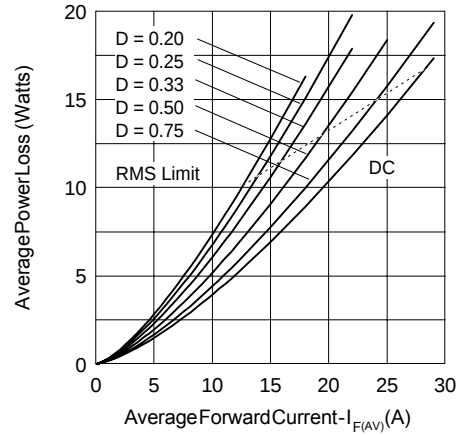


Fig. 6 - Forward Power Loss Characteristics

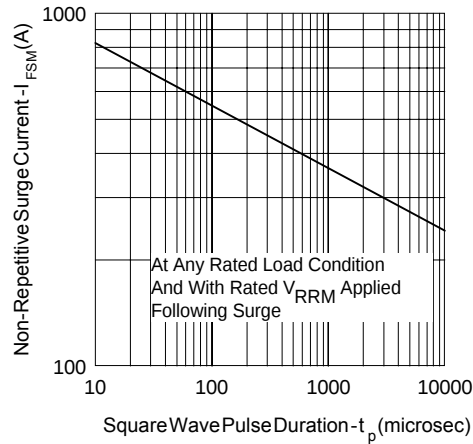


Fig. 7 - Max. Non-Repetitive Surge Current

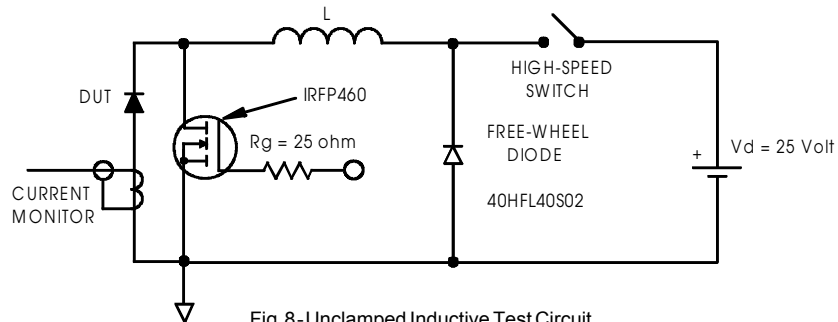


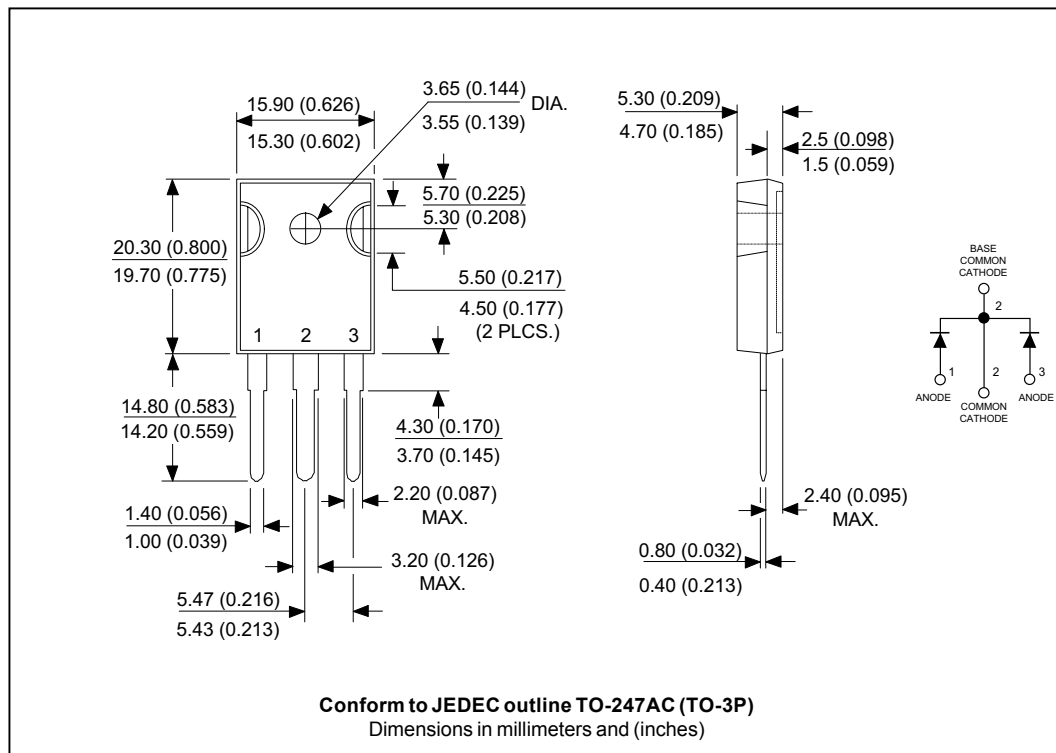
Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = rated V_R

Outline Table



Ordering Information Table

Device Code			
MBR	40	45	WT
1	2	3	4
1	-	Schottky MBR Series	
2	-	Current Rating	: 40 = 40A
3	-	Voltage Rating	: 45 = 45V
4	-	Circuit Configuration	: Center Tap (Dual) TO-247

MBR4045WT

Bulletin PD-20715 rev. A 09/00

International
IOR Rectifier

MBR4045WT

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 paralld VCG2T

.SUBCKT MBR4045WT ANO CAT

D1 ANO 1 DMOD (0.07089)

*Define diode model

.MODEL DMOD D(IS=1.87674447387184E-04A,N=1.0815129563336,BV=51V,
+IBV=0.370052071012812A,RS=0.000482052,CJO=1.77083341686508E-08,
+VJ=2.63120433908928,XTI=2,EG=0.680665296447736)

*Implementation of VCG2T

VX 1 2 DC 0V

R1 2 CAT TRES 1E-6

.MODEL TRES RES(R=1,TC1=30.266567848718)

GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP(((((-2.374754E-03/30.26657)*(V(2,CAT)*1E6)/(I(VX)+1E-6)-
1)))+1)*6.049001E-02*ABS(V(ANO,CAT))))-1}}

.ENDS MBR4045WT

Thermal Model Subcircuit

.SUBCKT MBR4045WT 5 1

CTHERM1 5 4 8.75E-01

CTHERM2 4 3 1.19E+01

CTHERM3 3 2 7.69E+01

CTHERM4 2 1 4.98E+02

RTHERM1 5 4 1.00E-04

RTHERM2 4 3 7.15E-01

RTHERM1 3 2 5.30E-01

RTHERM1 2 1 1.50E-01

.ENDS MBR4045WT

International
IOR Rectifier

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.

<http://www.irf.com>

Fax-On-Demand: +44 1883 733420

Data and specifications subject to change without notice.