Bulletin PD-20715 rev. B 12/01

International
IOR Rectifier

MBR4045WT

SCHOTTKY RECTIFIER

40 Amp

$I_{F(AV)}$ = 40Amp
V_R = 45V

Major Ratings and Characteristics

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

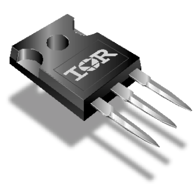
Description/Features

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.

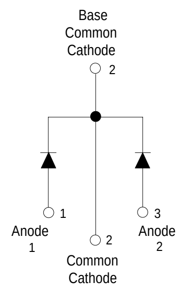
- 150° C T_J operation
- Center tap TO-247 package
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

Case Styles

MBR4045WT



TO-247AC



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)	20	A	@ T_C = 125°C, 50% duty cycle, rectangular waveform	
		(Per Device)	40			
I_{FRM}	Peak Repetitive Forward Current	(Per Leg)	40	A	Rated V_R, square wave, 20kHz T_C = 125° C	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg)	See fig.7	1020	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
			265		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	(Per Leg)	20	mJ	T_J = 25 °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 x V_R typical	

Electrical Specifications

	Parameters	Values	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1)	0.59	V	@ 20A	T_J = 25 °C
		0.78	V	@ 40A	
		0.56	V	@ 20A	T_J = 125 °C
		0.72	V	@ 40A	
I_{RM}	Max. Instantaneus Reverse Current (1)	1.75	mA	T_J = 25 °C	Rated DC voltage
		50	mA	T_J = 100 °C	
		85	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.29	V	T_J = T_J max.	
r_t	Forward Slope Resistance	10.3	mΩ		
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		

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

Thermal-Mechanical Specifications

	Parameters		Values	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 175	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Package)		1.4	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance Case to Heatsink		0.7	°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

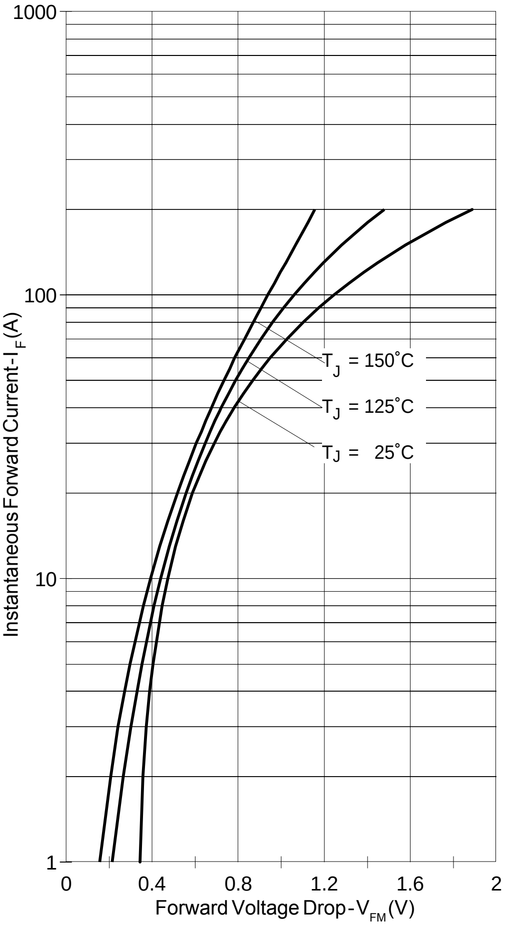


Fig. 1 - Max. Forward Voltage Drop Characteristics

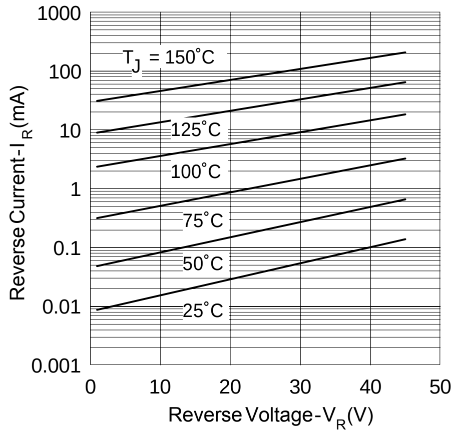


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

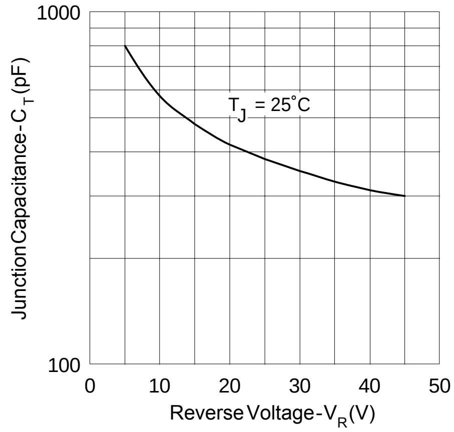


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

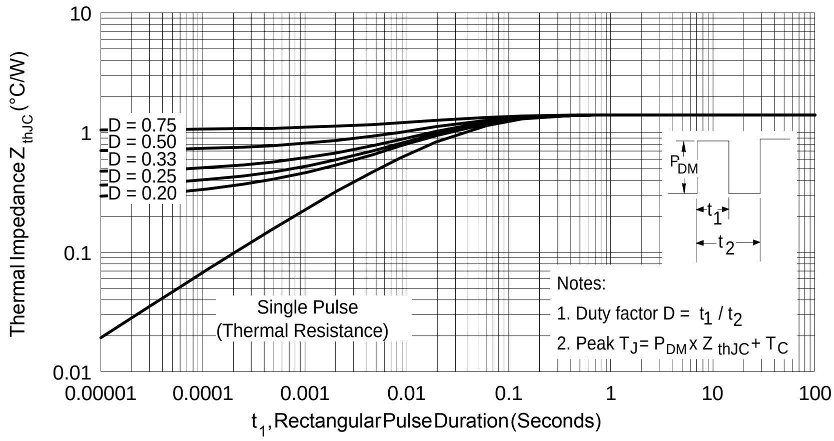


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

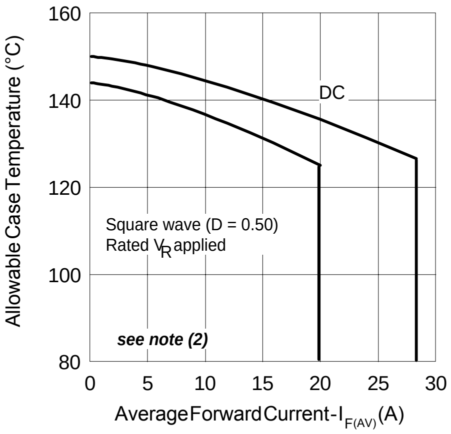


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

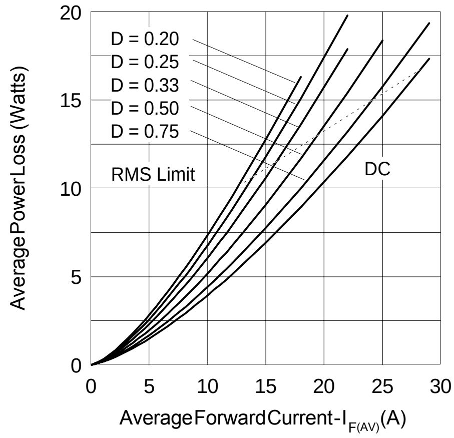


Fig. 6 - Forward Power Loss Characteristics

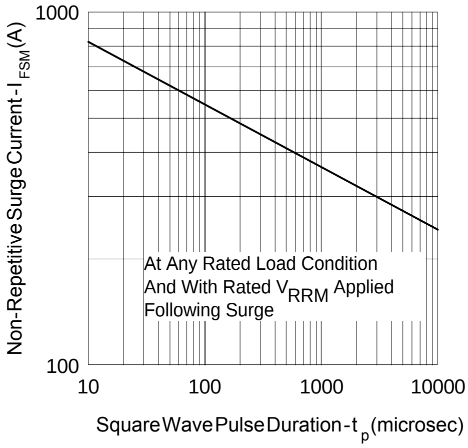


Fig. 7 - Max. Non-Repetitive Surge Current

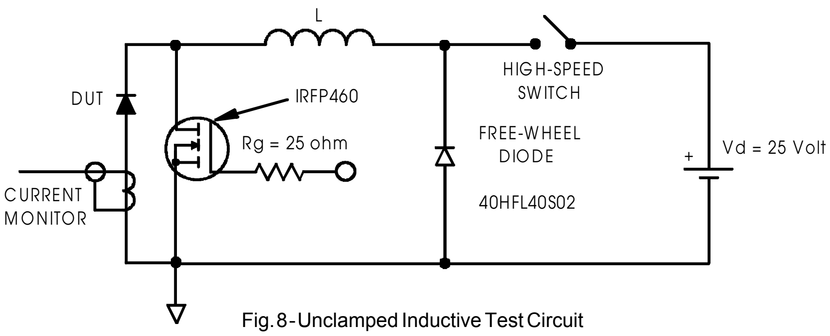
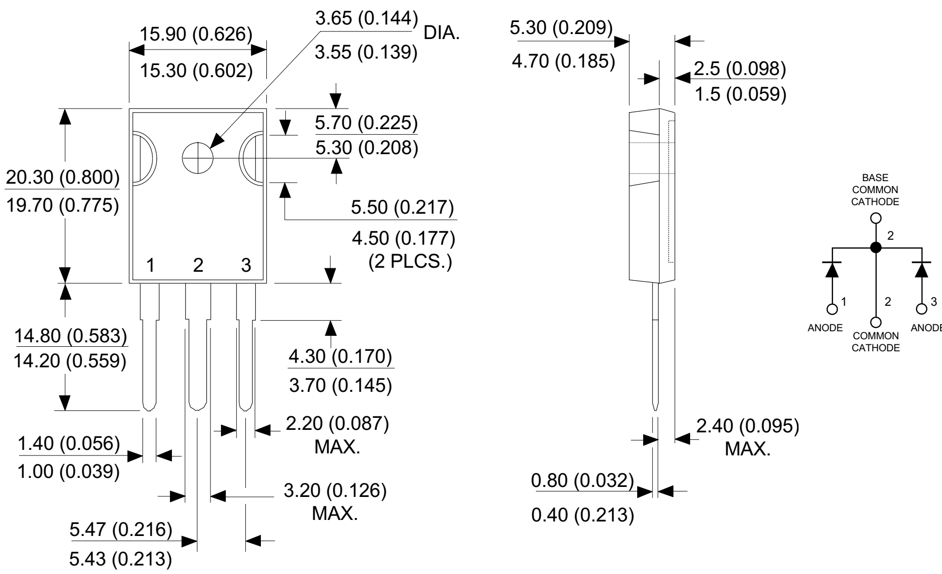


Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM}$ @ $(I_{F(AV)} / D)$ (see Fig. 6);
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; I_R @ V_{R1} = rated V_R

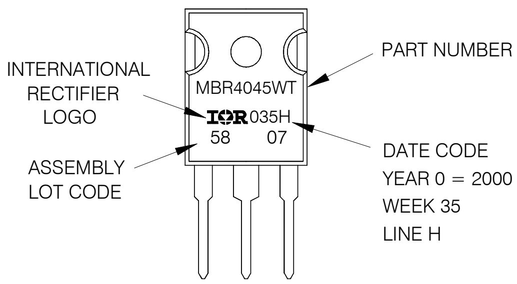
Outline Table



Conform to JEDEC outline TO-247AC (TO-3P)
Dimensions in millimeters and (inches)

Marking Information

EXAMPLE: THIS IS A MBR4045WT
WITH LOT CODE 58 07
ASSEMBLED ON WW 21, 2000
IN THE ASSEMBLY LINE "L"



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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 paralled 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
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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
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Ordering Information Table

Device Code

MBR	40	45	WT
1	2	3	4

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

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

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