Bulletin PD-20872 rev. A 02/07

International
IOR Rectifier

MBR4045CTPbF

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 = 118°C (Per Leg)	40	A
V_{RRM}		45	V
I_{FSM}	@ tp = 5 µs sine	900	A
V_F	@ 20 Apk, T_J = 125°C	0.58	V
T_J	range	- 65 to 150	°C

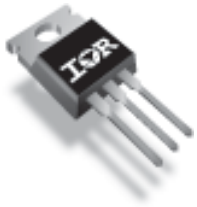
www.DataSheet4U.com

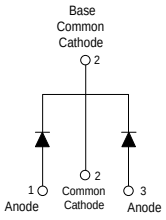
Description/ Features

This center tap Schottky rectifier has been optimized for low reverse leakage at high temperature. 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-220, D^2Pak and TO-262 packages
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free ("PbF" suffix)

Case Styles





TO-220

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Voltage Ratings

Parameters		MBR4045CTPbF
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 (Per Leg)	20	A	@ T_C = 118° C, (Rated V_R)	
	Current (Per Device)	40			
I_{FRM}	Peak Repetitive Forward Current (Per Leg)	40	A	Rated V_R, square wave, 20kHz T_C = 118° C	
I_{FSM}	Max. Peak One Cycle Non-Repetitive	900	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current (Per Leg)	210		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	20	A	T_J = 25°C, I_{AS} = 3Amps, L = 4.40mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	3	A	Current decaying linearty 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	0.60	V	@ 20A	T_J = 25 °C
		0.78	V	@ 40A	
	(1)	0.58	V	@ 20A	T_J = 125 °C
		0.75	V	@ 40A	
I_{RM}	Max. Instantaneus Reverse Current	1	mA	T_J = 25 °C	Rated DC voltage
	(1)	50	mA	T_J = 100 °C	
		95	mA	T_J = 125 °C	
C_T	Max. Junction Capacitance	900	pF	V_R = 5V_{DC}, (test signal range 100Khz to 1Mhz) 25°C	
L_S	Typical Series Inductance	8.0	nH	Measured from top of terminal to mounting plane	
dv/dt	Max. Voltage Rate of Change	10000	V/ µs	(Rated V_R)	

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

Thermal-Mechanical Specifications

Parameters			Values	Units	Conditions
T_J	Max. Junction Temperature Range		-65 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-65 to 175	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Leg)		1.5	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance Case to Heatsink		0.50	°C/W	Mounting surface, smooth and greased Only for TO-220
R_{thJA}	Max. Thermal Resistance Junction to Ambient		50	°C/W	DC operation For D^2Pak and TO-262
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	Non-lubricated threads
		Max.	12 (10)		
	Marking Device		MBR4045CT		

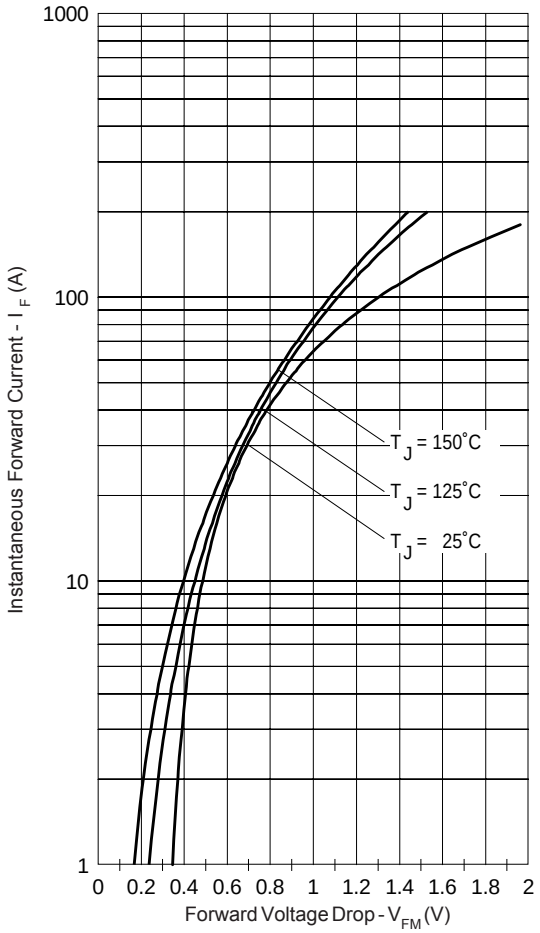


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

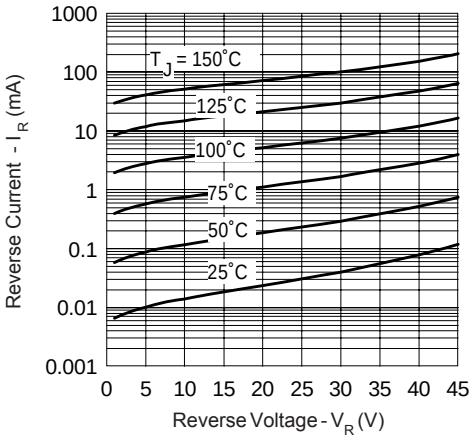


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

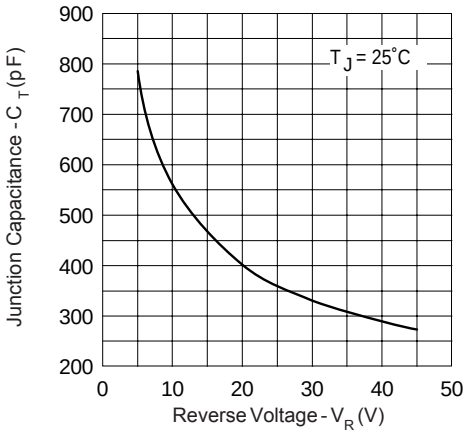


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

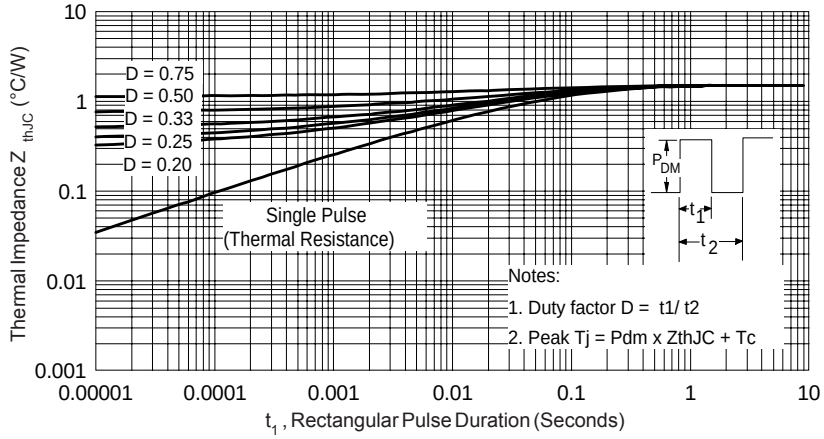


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

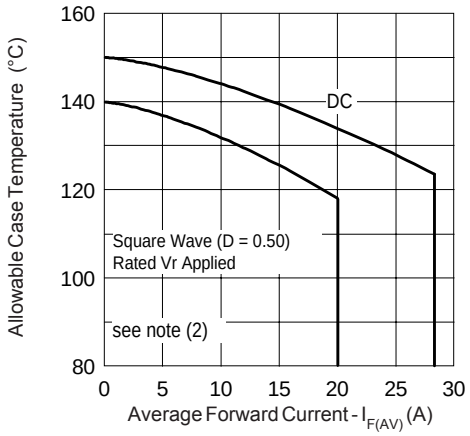


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

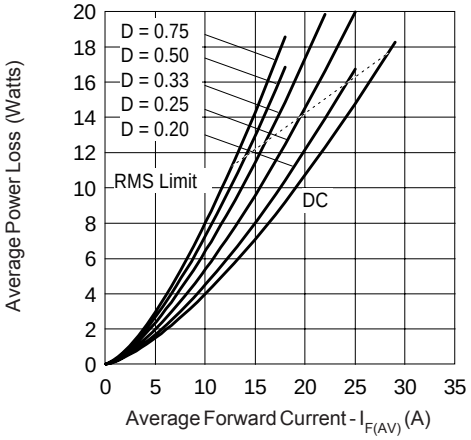


Fig. 6 - Forward Power Loss Characteristics

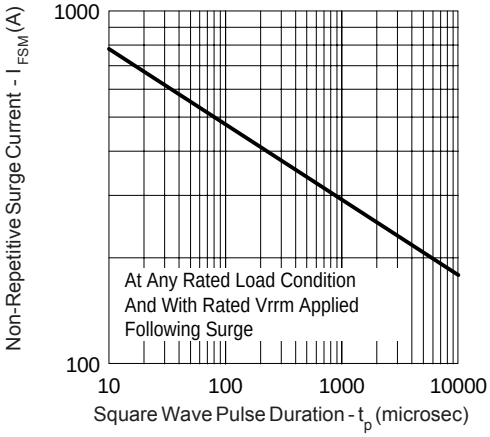
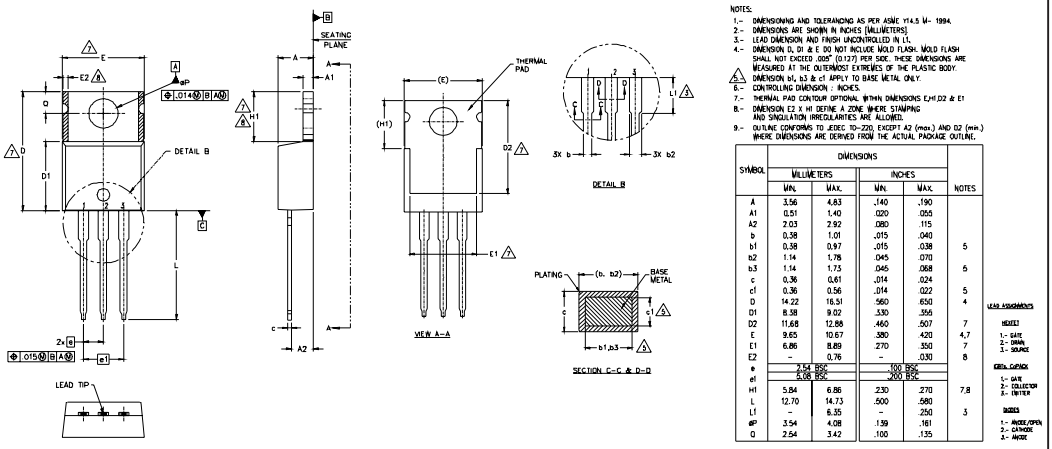


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

(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



SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	3.56	4.83	.140	.190	
A1	0.51	1.40	.020	.055	
A2	2.03	2.92	.080	.115	
b	0.38	1.01	.015	.040	
b1	0.38	0.97	.015	.038	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.36	0.61	.014	.024	
c1	0.36	0.56	.014	.022	5
D	14.22	16.51	.560	.650	4
D1	8.38	9.02	.330	.356	
D2	11.68	12.88	.460	.507	7
E	9.65	10.67	.380	.420	4,7
E1	6.86	8.89	.270	.350	7
E2	–	0.76	–	.030	8
e	2.54 BSC		.100 BSC		
e1	5.08 BSC		.200 BSC		
H1	5.84	6.86	.230	.270	7,8
L	12.70	14.73	.500	.580	
L1	–	6.35	–	.250	3
øP	3.54	4.08	.139	.161	
Q	2.54	3.42	.100	.135	

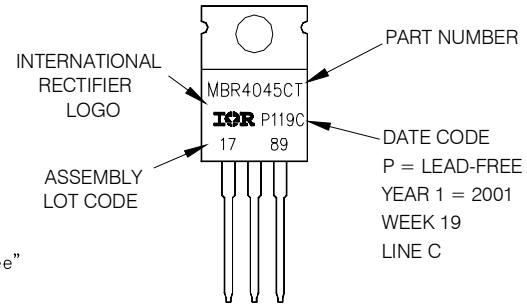
Conform to JEDEC outline TO-220AB

Part Marking Information

IRXC Assembly Line - SubCon Assembly Line

EXAMPLE: THIS IS A MBR4045CT
LOT CODE 1789
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"

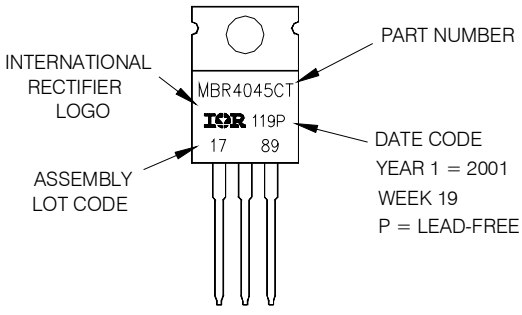
Note: "P" in the beginning of date code indicates "Lead-Free"



IRMX Assembly Line

EXAMPLE: THIS IS A MBR4045CT
LOT CODE 1789
ASSEMBLED ON WW 19, 2001

Note: "P" in assembly line position indicates "Lead-Free"



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MBR4045CT
*****************************************
*     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 MBR4045CT ANO CAT
D1 ANO 1 DMOD (0.07089)
*Define diode model
.MODEL DMOD D(IS=1.41031849705903E-04A,N=1.12223892649545,BV=49V,
+ IBV=0.267178064395486A,RS= 0.000581298,CJO=2.94926944579954E-08,
+ VJ=0.779269989906853,XTI=2, EG=0.730300626417364)
*****************************************
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=19.7716341798827)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((((-2.531689E-03/19.77164)*((V(2,CAT)*1E6)/
(I(VX)+1E-6)-1))+1)*6.454822E-02*ABS(V(ANO,CAT)))-1)}
*****************************************
.ENDS MBR4045CT


Thermal Model Subcircuit
.SUBCKT MBR4045CT 5 1

CTHERM1     5    4     1.84E+00
CTHERM2     4    3     1.74E+01
CTHERM3     3    2     9.36E+01
CTHERM4     2    1     1.30E+03

RTHERM1     5    4     4.55E-01
RTHERM2     4    3     5.76E-01
RTHERM1     3    2     3.12E-01
RTHERM1     2    1     1.49E-01


.ENDS MBR4045CT
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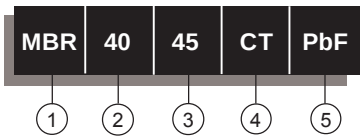
Ordering Information Table

Device Code



1	-	Schottky MBR Series
2	-	Current Rating (40 = 40A)
3	-	Voltage Rating (45 = 45V)
4	-	CT = Essential Part Number
5	-	• none = Standard Production • PbF = Lead-Free

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

International
IOR Rectifier

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