

International
IR Rectifier

MBRB4045CTPbF
MBR4045CT-1PbF

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} @ $T_C = 118^{\circ}\text{C}$ (Per Leg)	40	A
V_{RRM}	45	V
I_{FSM} @ $t_p = 5\mu\text{s}$ sine	900	A
V_F @ 20 Apk, $T_J = 125^{\circ}\text{C}$	0.58	V
T_J range	-65 to 150	$^{\circ}\text{C}$

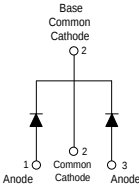
Description/Features

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, D²Pak 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)

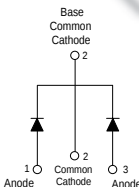
Case Styles

MBRB4045CTPbF



D²PAK

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TO-262

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Voltage Ratings

Parameters	MBRB4045CTPbF, MBR4045CT-1PbF
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	A	@ $T_C = 118^\circ\text{C}$, (Rated V_R)
	40		
I_{FRM} Peak Repetitive Forward Current (Per Leg)	40	A	Rated V_R , square wave, 20kHz $T_C = 118^\circ\text{C}$
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg)	900	A	5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V_{RWM} applied
	210		
E_{AS} Non-Repetitive Avalanche Energy (Per Leg)	20	A	$T_J = 25^\circ\text{C}$, $I_{AS} = 3\text{Amps}$, $L = 4.40\text{mH}$
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)	0.60	V	@ 20A $T_J = 25^\circ\text{C}$
	0.78	V	@ 40A $T_J = 25^\circ\text{C}$
	0.58	V	@ 20A $T_J = 125^\circ\text{C}$
	0.75	V	@ 40A $T_J = 125^\circ\text{C}$
I_{RM} Max. Instantaneous Reverse Current (1)	1	mA	$T_J = 25^\circ\text{C}$ Rated DC voltage
	50	mA	$T_J = 100^\circ\text{C}$
	95	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°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 < 300 μs , Duty Cycle < 2%

Thermal-Mechanical Specifications

Parameters		Values	Units	Conditions	
T _J	Max. Junction Temperature Range	-65to 150	°C		
T _{stg}	Max. Storage Temperature Range	-65to 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 ² Pak and TO-262	
wt	Approximate Weight	2 (0.07)	g(oz.)		
T	Mounting Torque	Min.	6 (5)	Non-lubricated threads	
		Max.	12 (10)		
Device Marking		MBRB4045CT			Case style D ² Pak
		MBR4045CT-1			Case style TO-262

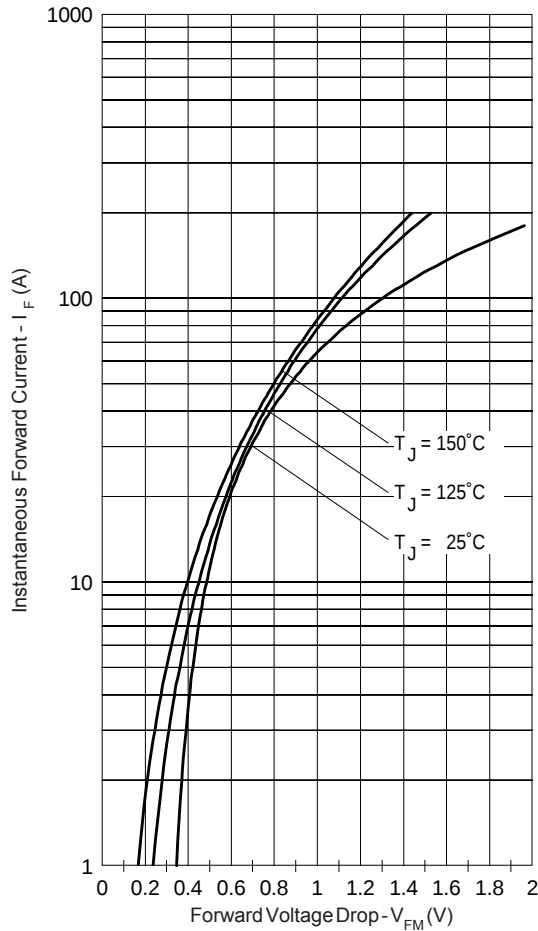


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

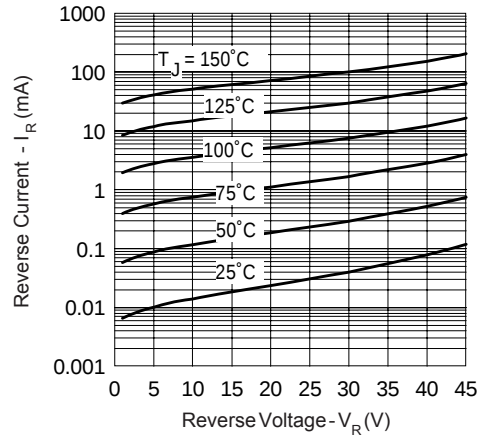


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

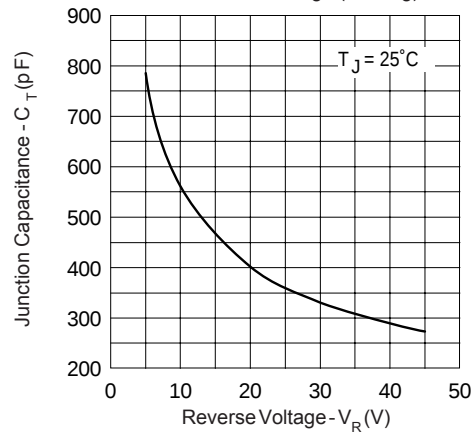


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

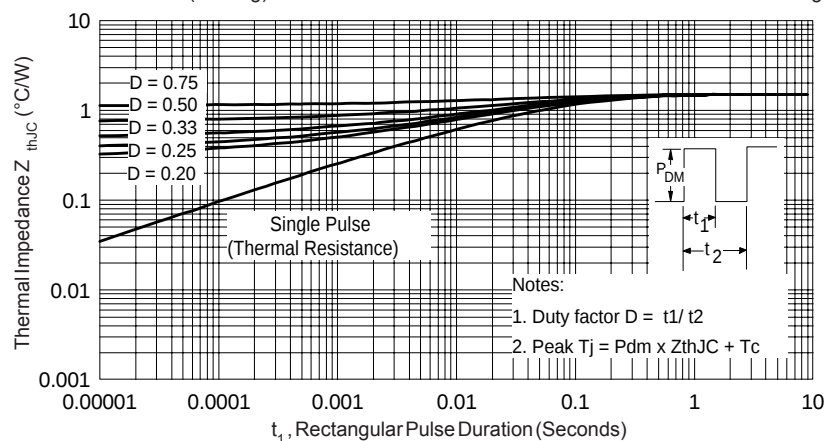


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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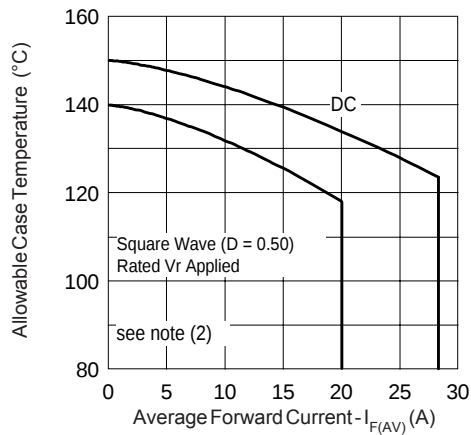


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

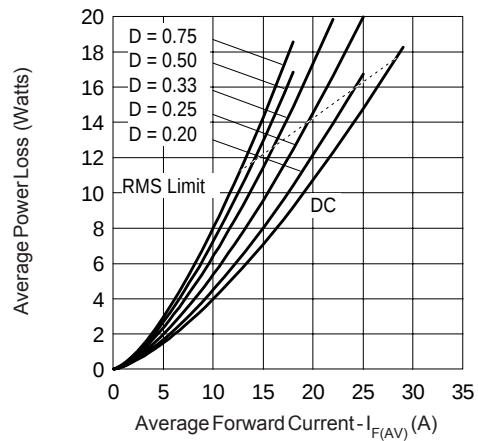


Fig. 6 - Forward Power Loss Characteristics

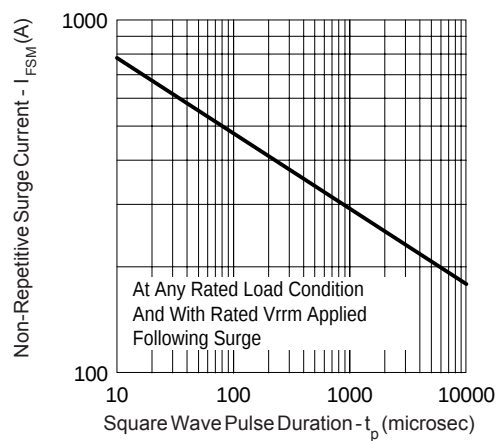


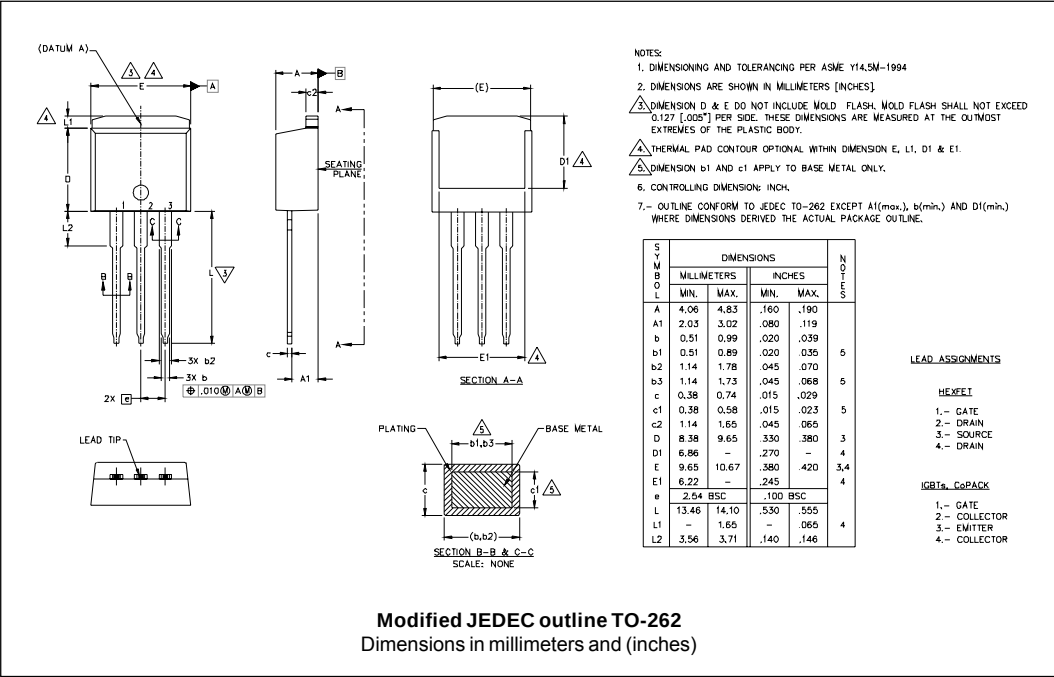
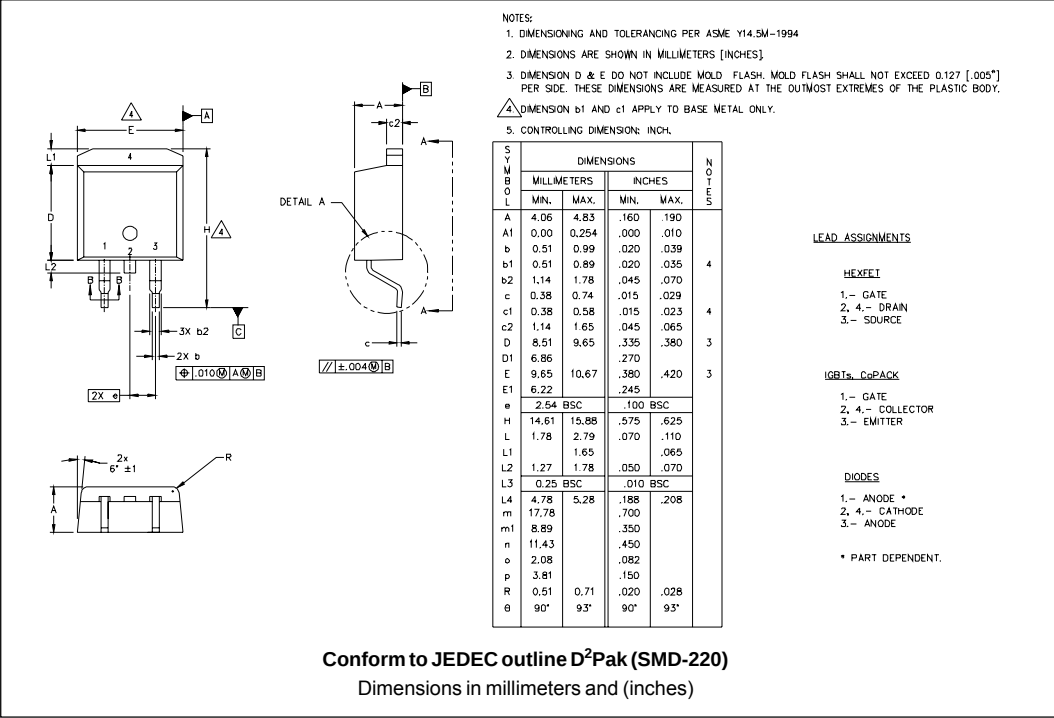
Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

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

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

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

Outlines Table



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Part Marking Information

D²PAK

EXAMPLE: THIS IS A MBRB3045CT
LOT CODE 8024
ASSEMBLED ON WW 02, 2000

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

INTERNATIONAL RECTIFIER LOGO

ASSEMBLY LOT CODE

PART NUMBER

DATE CODE

YEAR 0 = 2000
WEEK 02
P = LEAD-FREE

TO-262

EXAMPLE: THIS IS A MBR4045CT-1
LOT CODE 1789
ASSEMBLED ON WW 19, 2002

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

INTERNATIONAL RECTIFIER LOGO

ASSEMBLY LOT CODE

PART NUMBER

DATE CODE

YEAR 2 = 2002
WEEK 19
P = LEAD-FREE

Tape & Reel Information

SECTION Y-Y

NOTES:

- 1.0 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ± 0.02
- 2.0 CAMBER NOT TO EXCEED 1mm in 100mm
- 3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
- 4.0 K_o MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
- 5.0 MEASURED FROM CENTRELINE OF SPROCKET HOLE TO CENTRELINE OF POCKET
- 6.0 VENDOR: (OPTIONAL)
- 7.0 MUST ALSO MEET REQUIREMENTS OF EIA STANDAR #EIA-481A TAPING OF SURFACE MOUNT COMPONENTS FOR AUTOMATIC PLACEMENT
- 8.0 SURFACE RESISTIVITY OF MOLDED MATL. MUST MEASURE LESS OR EQUAL TO 10^6 OHMS PER SQUARE. MEASURED IN ACCORDANCE TO PROCEDURE GIVEN IN ASTM D-257 & ASTM D-991
- 9.0 TOTAL LENGTH PER REEL MUST BE 45 METERS
- 10.0 © CRITICAL

Ao	10.50	+/- 0.1
Bo	15.80	+/- 0.1
B2	10.25	+/- 0.1
Ko	4.90	+/- 0.1
F	11.50	+/- 0.1
P1	16.00	+/- 0.1
W	24.00	+/- 0.3

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code		MBR	B	40	45	CT	-1	TRL	PbF
		1	2	3	4	5	6	7	8
1	-	Essential Part Number							
2	-	B = Surface Mount							
3	-	Current Rating (40 = 40A)							
4	-	Voltage code (45 = 45V)							
5	-	CT = Essential Part Number							
6	-	"-1" = TO-262							
7	-	• none = Tube (50 pieces) • TRL = Tape & Reel (Left Oriented - for D²Pak only) • TRR = Tape & Reel (Right Oriented - for D²Pak only)							
8	-	• none = Standard Production • PbF = 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 paralalled 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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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.

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