

International  
**IR** Rectifier

**MBRB20...CTPbF**  
**MBR20...CT-1PbF**

SCHOTTKY RECTIFIER

20 Amp

$$I_{F(AV)} = 20\text{Amp}$$

$$V_R = 80/100\text{V}$$

**Major Ratings and Characteristics**

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform (Per Device)	20	A
$I_{FRM}$ @ $T_C = 133^\circ\text{C}$ (PerLeg)	20	A
$V_{RRM}$	80/90/100	V
$I_{FSM}$ @ $t_p = 5\ \mu\text{s}$ sine	850	A
$V_F$ @ 10Apk, $T_J = 125^\circ\text{C}$	0.70	V
$T_J$ range	-65 to 150	$^\circ\text{C}$

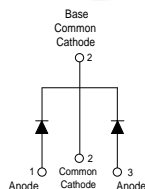
**Description/ Features**

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, D<sup>2</sup>Pak 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

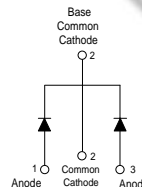
**Case Styles**

MBRB20...CTPbF



**D<sup>2</sup>PAK**

MBR20...CT-1PbF



**TO-262**

MBRB20...CTPbF, MBR20...CT-1PbF Series

Bulletin PD-21019 rev. C 01/07



Voltage Ratings

Parameters	MBRB2080CTPbF MBR2080CT-1PbF	MBRB2090CTPbF MBR2090CT-1PbF	MBRB20100CTPbF MBR20100CT-1PbF
V <sub>R</sub> Max. DC Reverse Voltage (V)	80	90	100
V <sub>RWM</sub> Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
I <sub>F(AV)</sub> Max. Average Forward Current (PerLeg) (PerDevice)	10	A	@ T <sub>C</sub> = 133°C, (Rated V <sub>R</sub> )
	20		
I <sub>FRM</sub> Peak Repetitive Forward Current (Per Leg)	20	A	Rated V <sub>R</sub> , squarewave, 20kHz T <sub>C</sub> = 133°C
I <sub>FSM</sub> Non Repetitive Peak Surge Current	850	A	5µs. Sine or 3µs Rect. pulse Following any rated load condition and with rated V <sub>RRM</sub> applied Surge applied at rated load conditions halfwave, single phase, 60Hz
	150		
I <sub>RRM</sub> Peak Repetitive Reverse Surge Current	0.5	A	2.0 µsec 1.0KHz
E <sub>AS</sub> Non-Repetitive Avalanche Energy (PerLeg)	24	mJ	T <sub>J</sub> = 25°C, I <sub>AS</sub> = 2 Amps, L = 12 mH

Electrical Specifications

Parameters	Values	Units	Conditions
V <sub>FM</sub> Max. Forward Voltage Drop (1)	0.80	V	@ 10A T <sub>J</sub> = 25°C
	0.95	V	@ 20A
	0.70	V	@ 10A T <sub>J</sub> = 125°C
	0.85	V	@ 20A
I <sub>RM</sub> Max. Instantaneous Reverse Current (1)	0.10	mA	T <sub>J</sub> = 25°C
	6	mA	T <sub>J</sub> = 125°C Rated DC voltage
V <sub>F(TO)</sub> Threshold Voltage	0.433	V	T <sub>J</sub> = T <sub>J</sub> max.
r <sub>t</sub> Forward Slope Resistance	15.8	mΩ	
C <sub>T</sub> Max. Junction Capacitance	400	pF	V <sub>R</sub> = 5V <sub>DC</sub> (test signal range 100Khz to 1Mhz) 25°C
L <sub>S</sub> 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 <sub>R</sub> )

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

Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
T <sub>J</sub> Max. Junction Temperature Range	-65 to 150	°C	
T <sub>stg</sub> Max. Storage Temperature Range	-65 to 175	°C	
R <sub>thJC</sub> Max. Thermal Resistance Junction to Case (Per Leg)	2.0	°C/W	DC operation
R <sub>thCS</sub> Typical Thermal Resistance Case to Heatsink	0.50	°C/W	Mounting surface, smooth and greased Only for TO-220
R <sub>thJA</sub> Max. Thermal Resistance Junction to Ambient	50	°C/W	DC operation For D <sup>2</sup> Pak 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	MBRB20...CT	Case style D <sup>2</sup> Pak	
	MBR20...CT-1	Case style TO-262	

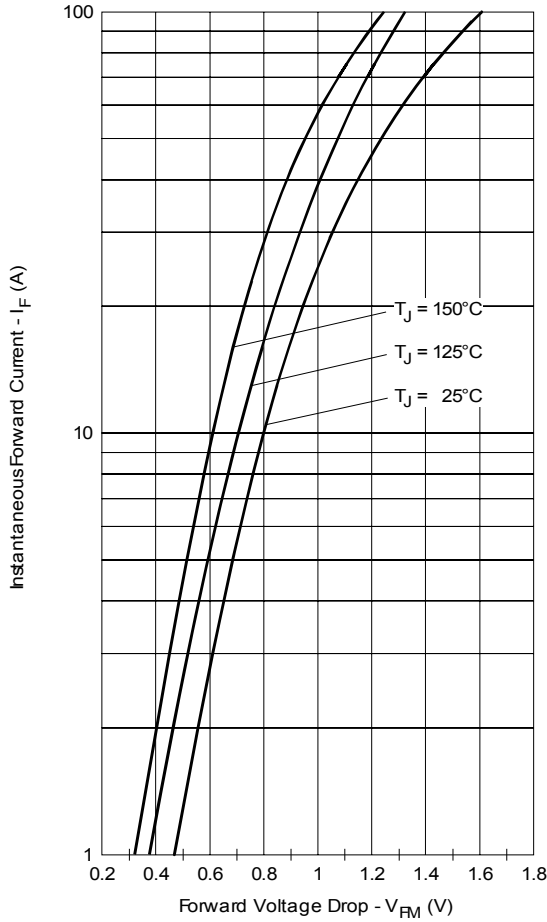


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

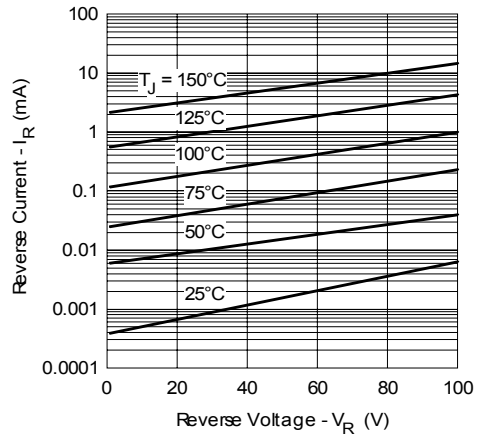


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

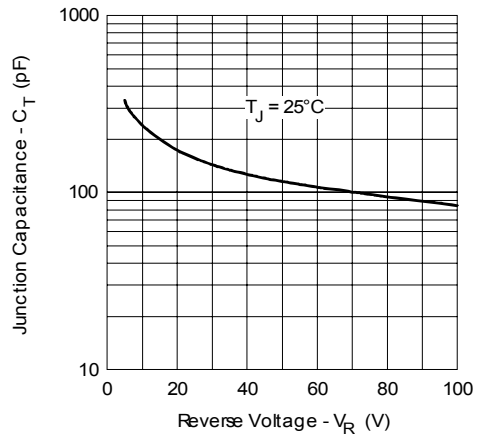


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

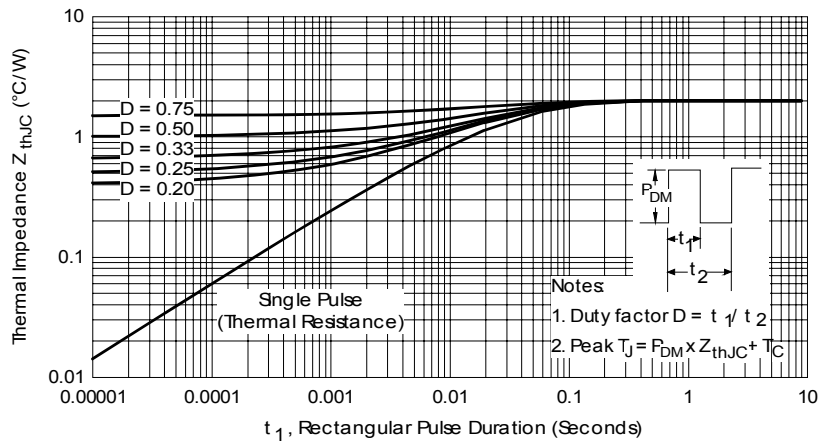


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

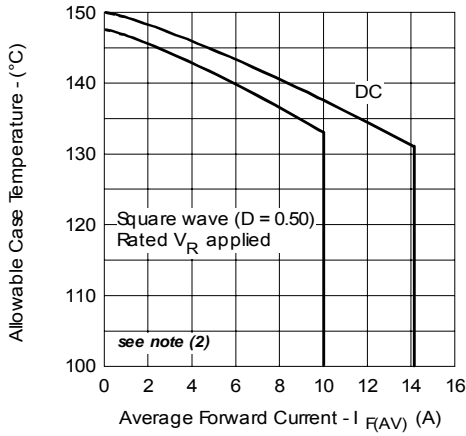


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

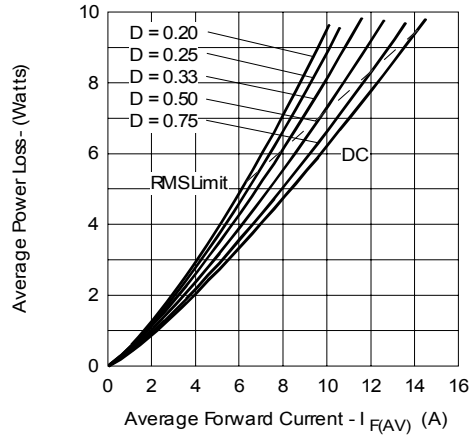


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

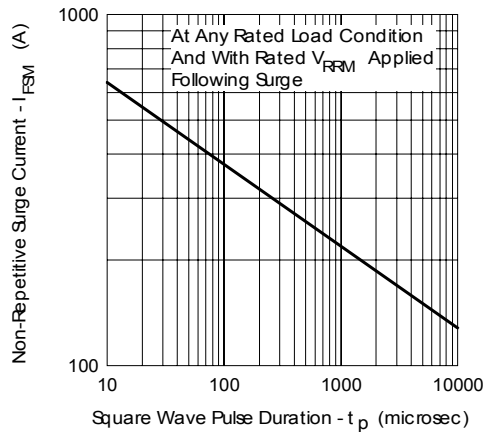


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

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

Outlines Table

NOTES:  
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994  
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES]  
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.  
4. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.  
5. CONTROLLING DIMENSION: INCH.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	4
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	
b2	1.14	1.78	.045	.070	4
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	4
c2	1.14	1.65	.045	.065	
D	8.51	9.65	.335	.380	3
D1	6.86	-	.270	-	
E	9.65	10.67	.380	.420	3
E1	6.22	-	.245	-	
e	2.54 BSC		.100 BSC		3
H	14.61	15.88	.575	.625	
L	1.78	2.79	.070	.110	
L1	-	1.65	-	.065	
L2	1.27	1.78	.050	.070	3
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	3
m	17.78	-	.700	-	
m1	8.89	-	.350	-	
n	11.43	-	.450	-	
o	2.08	-	.082	-	3
p	3.81	-	.150	-	
R	0.51	0.71	.020	.028	
θ	90°	93°	90°	93°	

**LEAD ASSIGNMENTS**

**HEXFET**  
1.- GATE  
2, 4.- DRAIN  
3.- SOURCE

**IGBTs, CoPACK**  
1.- GATE  
2, 4.- COLLECTOR  
3.- EMITTER

**DIODES**  
1.- ANODE  
2, 4.- CATHODE  
3.- ANODE

\* PART DEPENDENT.

**Conform to JEDEC outline D<sup>2</sup>Pak (SMD-220)**  
Dimensions in millimeters and (inches)

NOTES:  
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994  
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES]  
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.  
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.  
5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.  
6. CONTROLLING DIMENSION: INCH.  
7. - OUTLINE CONFORM TO JEDEC TO-262 EXCEPT A1(max.), b(min.) AND D1(min.) WHERE DIMENSIONS DERIVED THE ACTUAL PACKAGE OUTLINE.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	5
A1	2.03	3.02	.080	.119	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	
b2	1.14	1.78	.045	.070	5
b3	1.14	1.73	.045	.068	
c	0.38	0.74	.015	.029	5
c1	0.38	0.58	.015	.023	
c2	1.14	1.65	.045	.065	4
D	8.38	9.65	.330	.380	
D1	6.86	-	.270	-	4
E	9.65	10.67	.380	.420	
E1	6.22	-	.245	-	4
e	2.54 BSC		.100 BSC		
L	13.46	14.10	.530	.555	4
L1	-	1.65	-	.065	
L2	3.56	3.71	.140	.146	

**LEAD ASSIGNMENTS**

**HEXFET**  
1.- GATE  
2.- DRAIN  
3.- SOURCE  
4.- DRAIN

**IGBTs, CoPACK**  
1.- GATE  
2.- COLLECTOR  
3.- EMITTER  
4.- COLLECTOR

**Modified JEDEC outline TO-262**  
Dimensions in millimeters and (inches)

MBRB20...CTPbF, MBR20...CT-1PbF Series  
 Bulletin PD-21019 rev. C 01/07

International  
**IRF** Rectifier

Part Marking Information

**D<sup>2</sup>PAK**

EXAMPLE: THIS IS A MBRB20100CTPbF  
 LOT CODE 8024  
 ASSEMBLED ON WW 02, 2000

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

INTERNATIONAL RECTIFIER LOGO

PART NUMBER

DATE CODE  
 YEAR 0 = 2000  
 WEEK 02  
 P = LEAD-FREE

**TO-262**

EXAMPLE: THIS IS A MBR20100CT-1PbF  
 LOT CODE 1789  
 ASSEMBLED ON WW 19, 1999

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

INTERNATIONAL RECTIFIER LOGO

PART NUMBER

DATE CODE  
 YEAR 9 = 1999  
 WEEK 19  
 P = LEAD-FREE

Tape & Reel Information

SECTION Y-Y

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

NOTES:

- 1.0 10 SPROCKET HOLE PITH CUMULATIVE TOLERANCE ±.02
- 2.0 CAMBER NOT TO EXCEED 1mm In 100mm
- 3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
- 4.0 Ko 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<sup>6</sup> 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

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code	
<b>MBR</b>	<b>B</b>
<b>20</b>	<b>100</b>
<b>CT</b>	<b>-1</b>
<b>TRL</b>	<b>P</b>
①	②
③	④
⑤	⑥
⑦	⑧

<p><b>1</b> - Essential Part Number</p> <p><b>2</b> -</p> <ul style="list-style-type: none"> <li>• B = D<sup>2</sup>Pak</li> <li>• none = TO-262</li> </ul> <p><b>3</b> - Current Rating (20 = 20A)</p> <p><b>4</b> - Voltage Ratings</p> <p><b>5</b> - CT = Essential Part Number</p> <p><b>6</b> -</p> <ul style="list-style-type: none"> <li>• none = D<sup>2</sup>Pak</li> <li>• -1 = TO-262</li> </ul> <p><b>7</b> -</p> <ul style="list-style-type: none"> <li>• none = Tube (50 pieces)</li> <li>• TRL = Tape &amp; Reel (Left Oriented - for D<sup>2</sup>Pak only)</li> <li>• TRR = Tape &amp; Reel (Right Oriented - for D<sup>2</sup>Pak only)</li> </ul> <p><b>8</b> -</p> <ul style="list-style-type: none"> <li>• none = Standard Production</li> <li>• PbF = Lead-Free (for TO-262 and D<sup>2</sup>Pak tube)</li> <li>• P = Lead-Free (for D<sup>2</sup>Pak TRR and TRL)</li> </ul>	<p><b>6</b> none</p> <p><b>6</b> = -1</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>80 = 80V</p> <p>90 = 90V</p> <p>100 = 100V</p> </div> <p><b>2</b> = B</p> <p><b>2</b> none</p>
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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.