Bulletin PD-21019 rev. C 01/07

International
IOR Rectifier

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

SCHOTTKY RECTIFIER

20 Amp

$I_{F(AV)}$ = 20Amp
V_R = 80/ 100V

Major Ratings and Characteristics

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

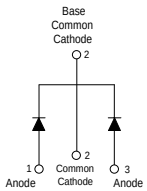
Description/ Features

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^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

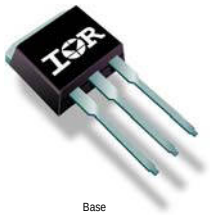
Case Styles

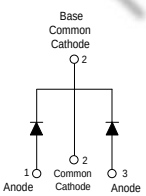
MBRB20...CTPbF



D^2PAK

MBR20...CT-1PbF





TO-262

Voltage Ratings

Parameters		MBRB2080CTPbF MBR2080CT-1PbF	MBRB2090CTPbF MBR2090CT-1PbF	MBRB20100CTPbF MBR20100CT-1PbF
V_R	Max. DC Reverse Voltage (V)	80	90	100
V_{RWM}	Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

	Parameters	Values	Units	Conditions
$I_{F(AV)}$	Max. Average Forward (Per Leg)	10	A	@ T_C = 133° C, (Rated V_R)
	Current (Per Device)	20		
I_{FRM}	Peak Repetitive Forward Current (Per Leg)	20	A	Rated V_R, square wave, 20kHz T_C = 133° C
I_{FSM}	Non Repetitive Peak Surge Current	850	A	5µs Sine or 3µs Rect. pulse — Following any rated load condition and with rated V_{RRM} applied
		150		Surge applied at rated load conditions halfwave, single phase, 60Hz
I_{RRM}	Peak Repetitive Reverse Surge Current	0.5	A	2.0 µsec 1.0 KHz
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	24	mJ	T_J = 25 °C, I_{AS} = 2 Amps, L = 12 mH

Electrical Specifications

	Parameters	Values	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1)	0.80	V	@ 10A	T_J = 25 °C
		0.95	V	@ 20A	
		0.70	V	@ 10A	T_J = 125 °C
		0.85	V	@ 20A	
I_{RM}	Max. Instantaneus Reverse Current (1)	0.10	mA	T_J = 25 °C	Rated DC voltage
		6	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.433	V	T_J = T_J max.	
r_t	Forward Slope Resistance	15.8	mΩ		
C_T	Max. Junction Capacitance	400	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)		2.0	°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		MBRB20...CT		Case style D^2Pak
			MBR20...CT-1		Case style TO-262

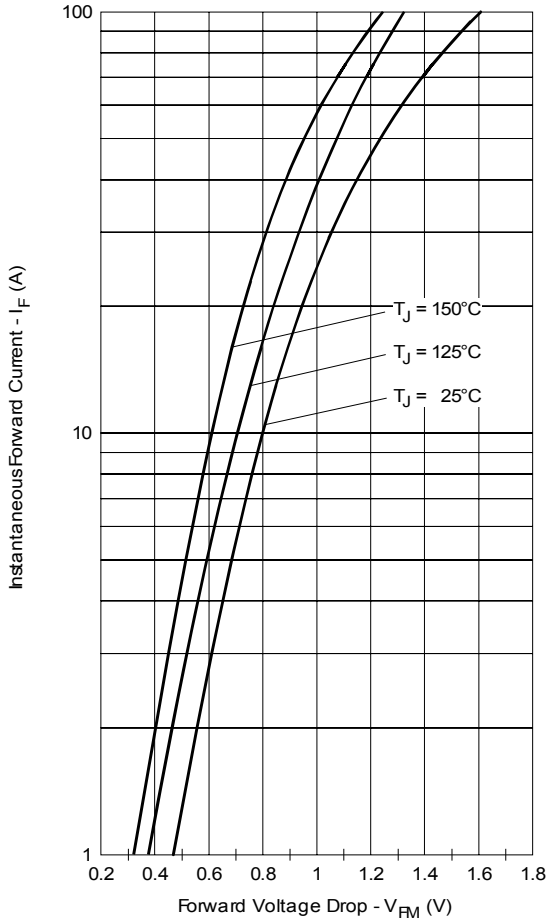


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

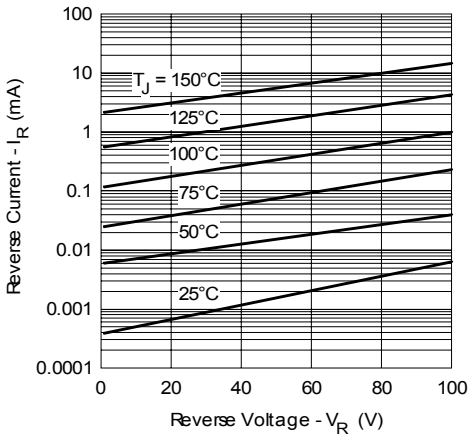


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

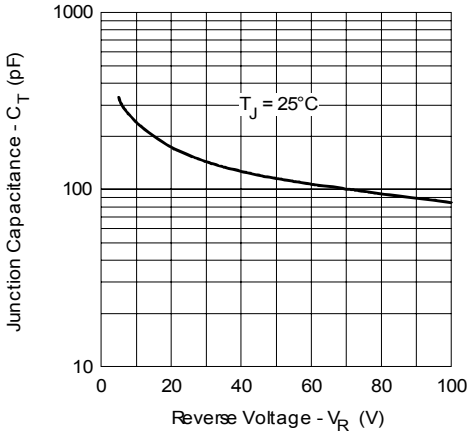


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

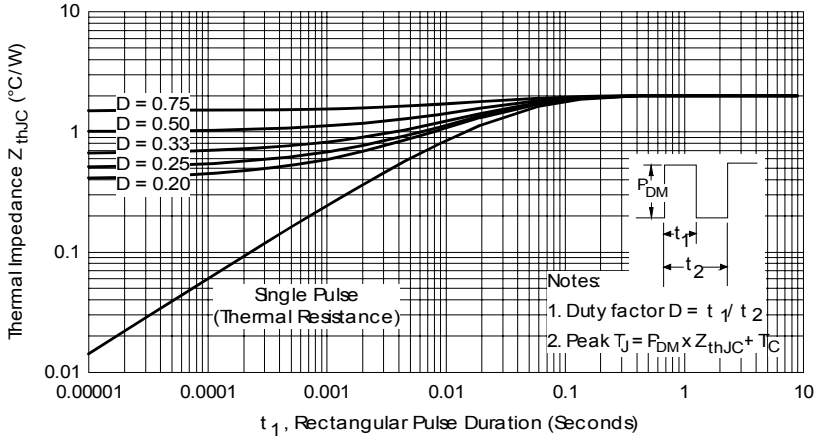


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

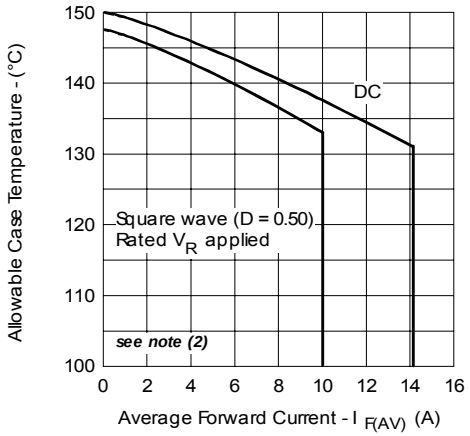


Fig. 5 - Max. Allowable Case Temperature
Vs. Average Forward Current (Per Leg)

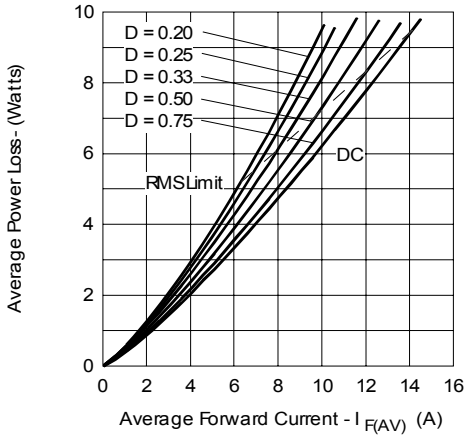


Fig. 6 - Forward Power Loss Characteristics
(Per Leg)

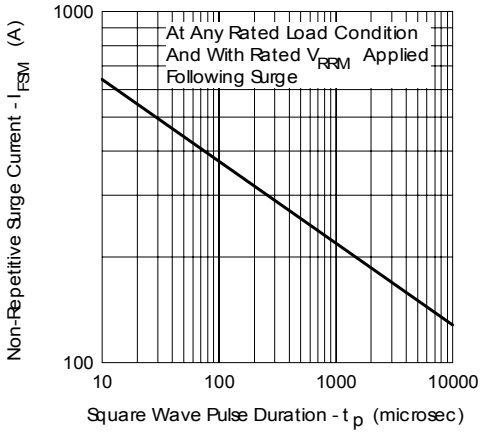
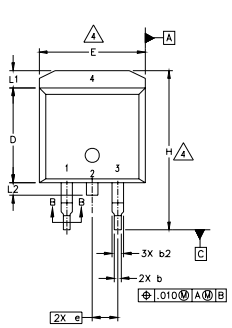


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

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

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	
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	4
b2	1.14	1.78	.045	.070	
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		
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	
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	
m	17.78		.700		
m1	8.89		.350		
n	11.43		.450		
o	2.08		.082		
p	3.81		.150		
R	0.51	0.71	.020	.028	
θ	90°	93°	90°	93°	

LEAD ASSIGNMENTS

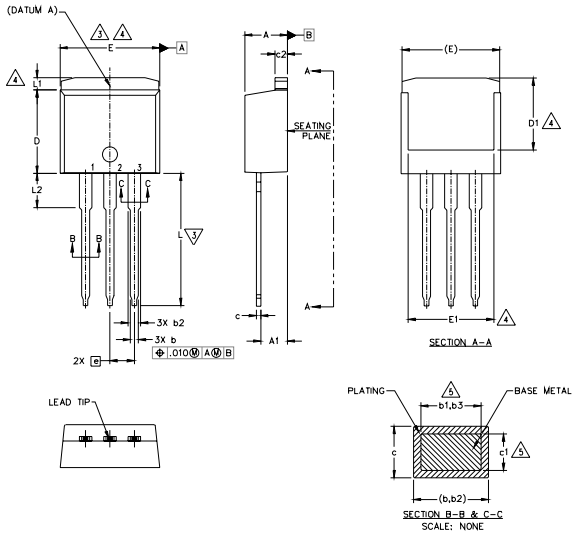
HEXFET
1.– GATE
2, 4.– DRAIN
3.– SOURCE

IGBTs, CoPACK
1.– GATE
2, 4.– COLLECTOR
3.– EMITTER

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

* PART DEPENDENT.

Conform to JEDEC outline D^2Pak (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	
A1	2.03	3.02	.080	.119	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
D1	6.86	–	.270	–	4
E	9.65	10.67	.380	.420	3,4
E1	6.22	–	.245		4
e	2.54 BSC		.100 BSC		
L	13.46	14.10	.530	.555	
L1	–	1.65	–	.065	4
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

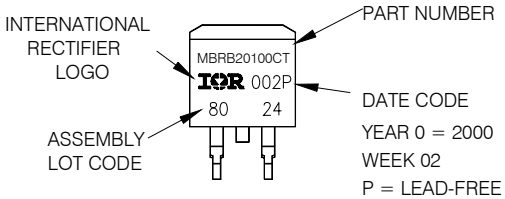
Modified JEDEC outline TO-262
Dimensions in millimeters and (inches)

Part Marking Information

D²PAK

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

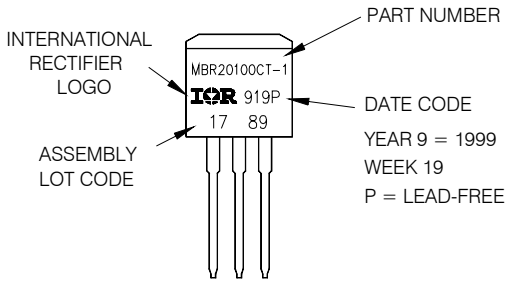
Note: "P" in assembly line position indicates "Lead-Free"



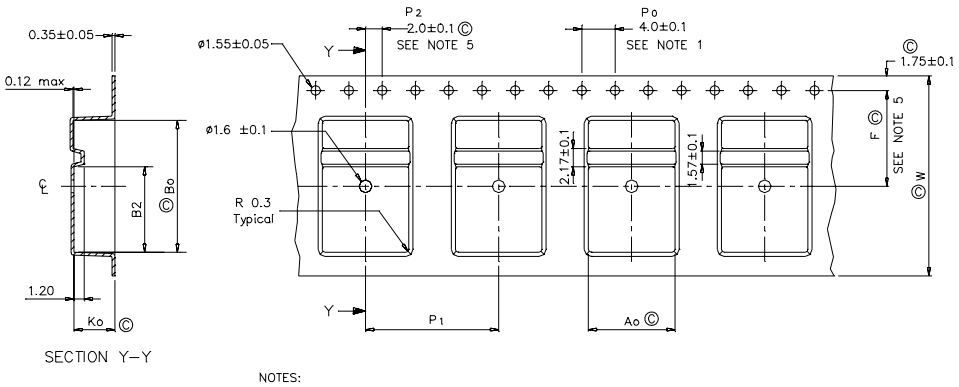
TO-262

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

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



Tape & Reel Information



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 10^6 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

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code

MBR	B	20	100	CT	-1	TRL	P
1	2	3	4	5	6	7	8

1 - Essential Part Number

2 - • B = D^2Pak **6** none
• none = TO-262 **6** = -1

3 - Current Rating (20 = 20A)

4 - Voltage Ratings

80	= 80V
90	= 90V
100	= 100V

5 - CT = Essential Part Number

6 • none = D^2Pak **2** = B
• -1 = TO-262 **2** none

7 - • none = Tube (50 pieces)
• TRL = Tape & Reel (Left Oriented - for D^2Pak only)
• TRR = Tape & Reel (Right Oriented - for D^2Pak only)

8 - • none = Standard Production
• PbF = Lead-Free (for TO-262 and D^2Pak tube)
• P = Lead-Free (for D^2Pak TRR and TRL)

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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01/07

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