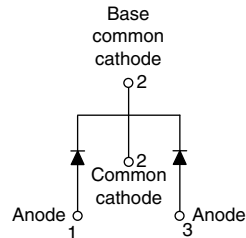


## Schottky Rectifier



TO-220



### FEATURES

- 150 °C  $T_J$  operation
- Center tap TO-220 package
- 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 (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level



### DESCRIPTION

The MBR15..CTPbF 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, freewheeling diodes, and reverse battery protection.

### PRODUCT SUMMARY

$I_{F(AV)}$	15 A
$V_R$	35 to 45 V

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	15	A
$V_{RRM}$		35 to 45	V
$I_{FSM}$	at $t_p = 5 \mu s$ sine	690	A
$V_F$	at 7.5 Apk, $T_J = 125^\circ C$	0.57	V
$T_J$		- 65 to 150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	MBR1535CTPbF	MBR1545CTPbF	UNITS
Maximum DC reverse voltage	$V_R$	35	45	V
Maximum working peak reverse voltage	$V_{RWM}$			

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per leg per device	$I_{F(AV)}$	at $T_C = 131^\circ C$ (rated $V_R$ )	7.5	A
			15	
Maximum peak one cycle non-repetitive surge	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	690	
		Surge applied at rated load condition halfwave single phase 60 Hz	150	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25^\circ C$ , $I_{AS} = 2 A$ , $L = 3.5 mH$	7	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	2	A

International Rectifier, IR, and the IR logo are registered trademarks of the International Rectifier Corporation



ELECTRICAL CHARACTERISTICS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	at 15 A	$T_J = 25\text{ }^\circ\text{C}$	0.84	V
		at 7.5 A	$T_J = 125\text{ }^\circ\text{C}$	0.57	
		at 15 A		0.72	
Maximum instantaneous reverse current	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	Rated DC voltage	0.1	mA
		$T_J = 125\text{ }^\circ\text{C}$		15	
Maximum junction capacitance	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		400	pF
Typical series inductance	$L_S$	Measured from top of terminal to mounting plane		8.0	nH
Maximum voltage rate of change	dv/dt	(Rated $V_R$ )		10 000	V/ $\mu$ s

**Note**

(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %

THERMAL - MECHANICAL CHARACTERISTICS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction temperature range	$T_J$			- 65 to 150	$^\circ\text{C}$
Maximum storage temperature range	$T_{Stg}$			- 65 to 175	
Maximum thermal resistance, junction to case per leg	$R_{thJC}$	DC operation		3.0	$^\circ\text{C/W}$
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased		0.50	
Maximum thermal resistance junction	$R_{thJA}$	DC operation		60	
Approximate weight				2	g
				0.07	(oz)
Mounting torque	minimum		Non-lubricated threads	6 (5)	kg-cm (lbf · in)
	maximum			12 (10)	
Marking device				MBR15..CT	

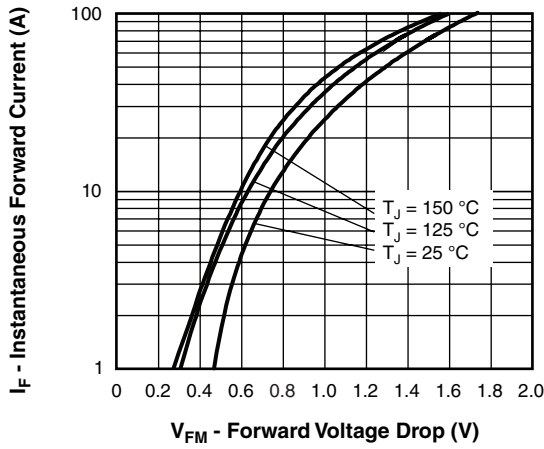


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

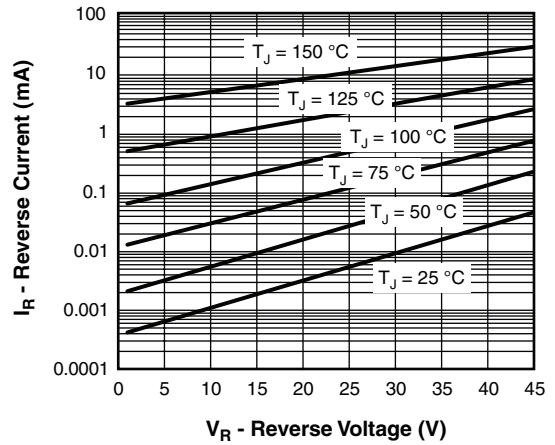


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

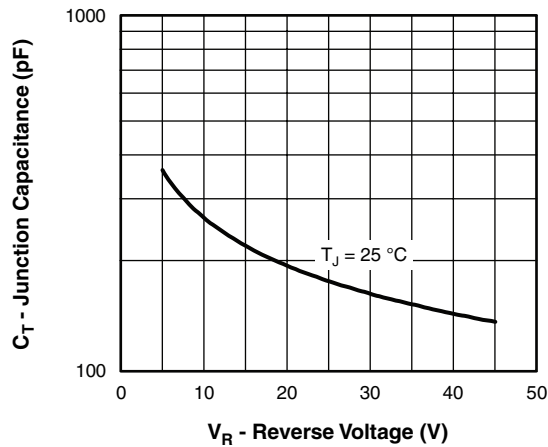


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

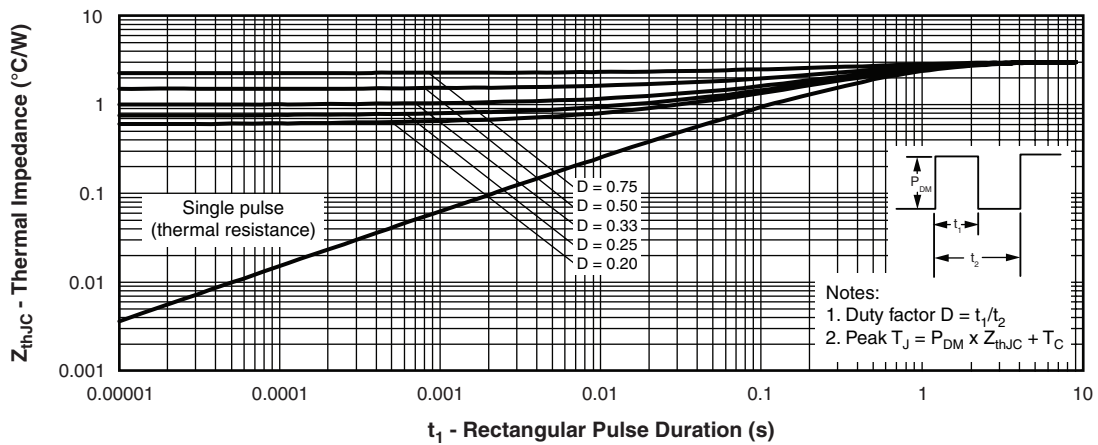


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

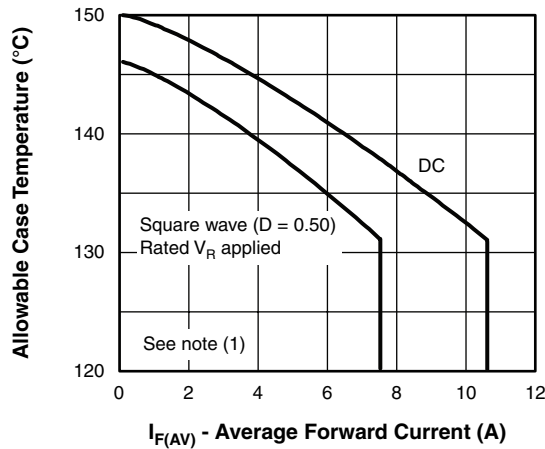


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

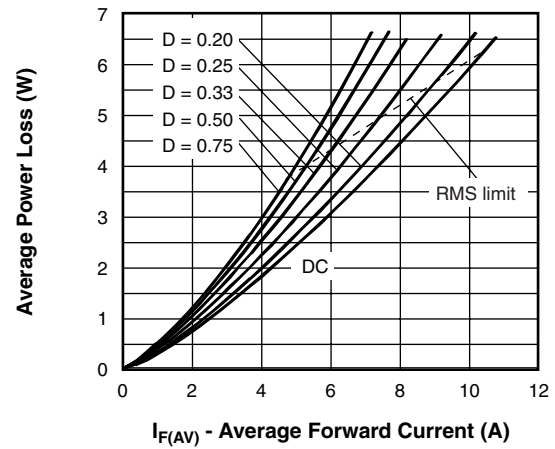


Fig. 6 - Forward Power Loss Characteristics

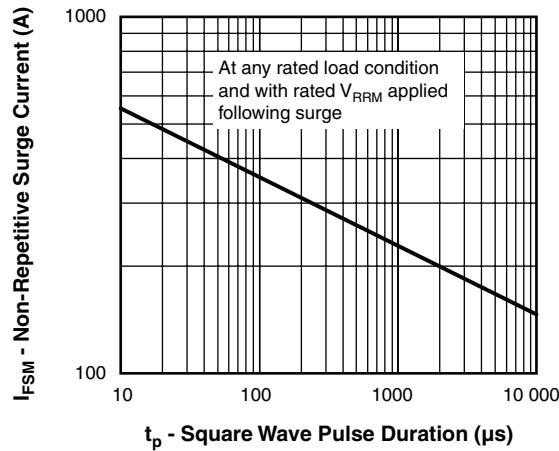
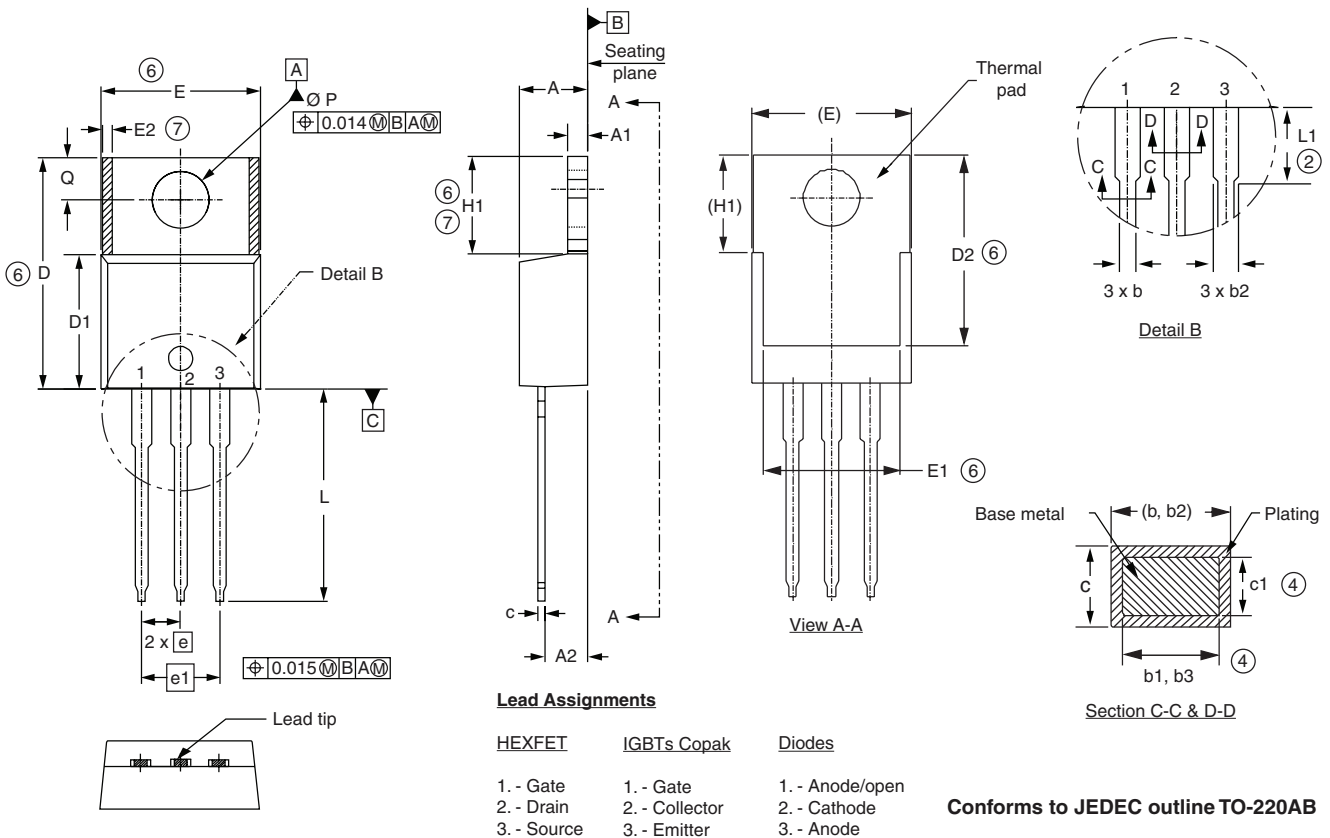


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = Rated  $V_R$

**OUTLINE DIMENSIONS** in millimeters (inches)



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	3.56	4.83	0.140	0.190	
A1	0.51	1.40	0.020	0.055	
A2	2.03	2.92	0.080	0.115	
b	0.38	1.01	0.015	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.22	16.51	0.560	0.650	3
D1	8.38	9.02	0.330	0.355	

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	11.68	12.88	0.460	0.507	6
E	9.65	10.67	0.380	0.420	3, 6
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e	2.54 BSC		0.100 BSC		
e1	5.08 BSC		0.200 BSC		
H1	5.84	6.86	0.230	0.270	6, 7
L	12.70	14.73	0.500	0.580	
L1	-	6.35	-	0.250	2
Ø P	3.54	4.08	0.139	0.161	
Q	2.54	3.42	0.100	0.135	

**Notes**

1. Dimensioning and tolerancing as per ASME Y 14.5 M - 1994
2. Lead dimension and finish uncontrolled in L1
3. Dimension D, D1 and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
4. Dimension b1, b3 and c1 apply to base metal only
5. Controlling dimensions: inches
6. Thermal pad contour optional within dimensions E, H1, D2 and E1
7. Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
8. Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline

# MBR15..CTPbF Series

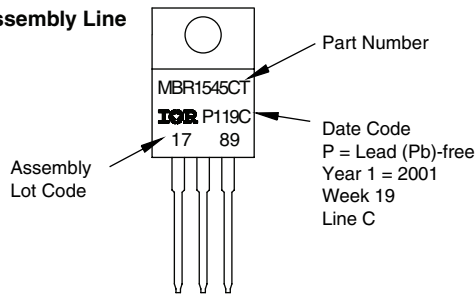
Vishay High Power Products

Schottky Rectifier



## PART MARKING INFORMATION

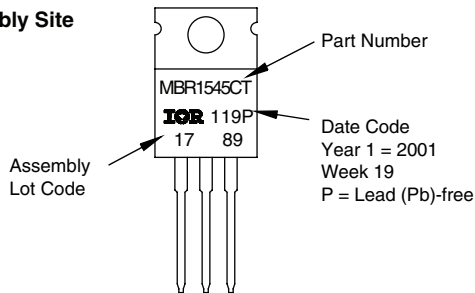
### MAIN - SubCon Assembly Line



Example: This is a MBR1545CT with Assembly Lot Code 1789, assembled on WW 19, 2001 in the assembly line "C"

Note: "P" in the beginning of Date Code indicates "lead (Pb)-free"

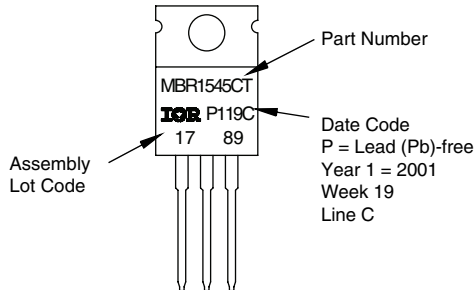
### Alternative Assembly Site



Example: This is a MBR1545CT with Assembly Lot Code 1789, assembled on WW 19, 2001

Note: "P" in assembly line position indicates "lead (Pb)-free"

or:



Example: This is a MBR1545CT with Assembly Lot Code 1789, assembled on WW 19, 2001 in the assembly line "C"

Note: "P" in the beginning of Date Code indicates "lead (Pb)-free"

## ORDERING INFORMATION TABLE

Device code	<b>MBR</b>	<b>15</b>	<b>45</b>	<b>CT</b>	<b>PbF</b>
	①	②	③	④	⑤

- 1** - Schottky MBR series
- 2** - Current rating (15 = 15 A)
- 3** - Voltage ratings 35 = 35 V
- 4** - CT = Essential part number 45 = 45 V
- 5** -
  - None = Standard production
  - PbF = Lead (Pb)-free



## Notice

The products described herein were acquired by Vishay Intertechnology, Inc., as part of its acquisition of International Rectifier's Power Control Systems (PCS) business, which closed in April 2007. Specifications of the products displayed herein are pending review by Vishay and are subject to the terms and conditions shown below.

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.

International Rectifier®, IR®, the IR logo, HEXFET®, HEXSense®, HEXDIP®, DOL®, INTERO®, and POWIRTRAIN® are registered trademarks of International Rectifier Corporation in the U.S. and other countries. All other product names noted herein may be trademarks of their respective owners.