

Bulletin PD-20645 rev. A 02/02

# International IOR Rectifier

## MBRS320TR

SCHOTTKY RECTIFIER

3 Amp



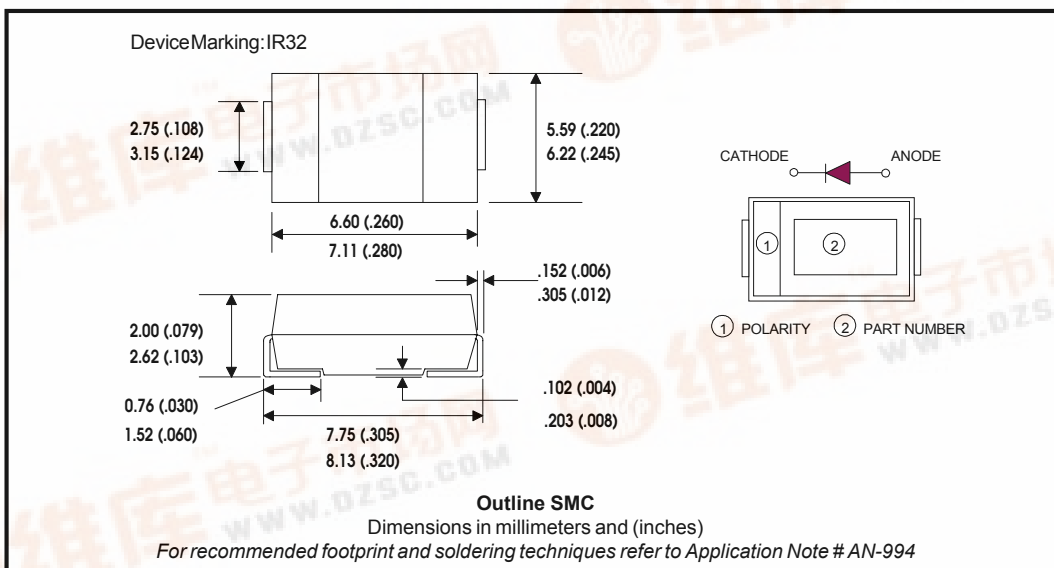
### Major Ratings and Characteristics

Characteristics	MBRS320TR	Units
$I_{F(AV)}$ Rectangular waveform	3.0	A
$V_{RRM}$	20	V
$I_{FSM}$ @ $t_p=5\mu s$ sine	820	A
$V_F$ @3.0Apk, $T_J=125^\circ C$	0.36	V
$T_J$ range	- 65 to 150	$^\circ C$

### Description/Features

The MBRS320TR surface-mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC boards. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Small foot print, surface mountable
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



## Voltage Ratings

Part number	MBRS320TR
$V_R$ Max. DC Reverse Voltage (V)	20
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)	

## Absolute Maximum Ratings

Parameters	Value	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	3.0	A	50% duty cycle @ $T_L = 136^\circ\text{C}$ , rectangular waveform
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current	820	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse
	80		10ms Sine or 6ms Rect. pulse
$E_{AS}$ Non Repetitive Avalanche Energy	6	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 1.5\text{A}$ , $L = 5\text{mH}$
$I_{AR}$ Repetitive Avalanche Current	1.0	A	

## Electrical Specifications

Parameters	Typ.	Max.	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (1)	0.41	0.45	V	@ 3A
	0.45	0.53	V	@ 6A
	0.29	0.36	V	@ 3A
	0.35	0.46	V	@ 6A
$I_{RM}$ Max. Reverse Leakage Current (1)	0.04	0.5	mA	$T_J = 25^\circ\text{C}$
	8.0	20	mA	$T_J = 100^\circ\text{C}$
	23	35	mA	$T_J = 125^\circ\text{C}$
$C_T$ Typical Junction Capacitance	360	-	pF	$V_R = 5V_{DC}$ (test signal range 100kHz to 1Mhz), @ $25^\circ\text{C}$
$L_S$ Typical Series Inductance	3.0	-	nH	Measured lead to lead 5mm from package body
$dv/dt$ Max. Voltage Rate of Change	-	10000	V/ $\mu\text{s}$	(Rated $V_R$ )

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal-Mechanical Specifications

Parameters	Value	Units	Conditions
$T_J$ Max. Junction Temperature Range (*)	-65 to 150	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-65 to 150	$^\circ\text{C}$	
$R_{thJL}$ Max. Thermal Resistance Junction to Lead (**)	12	$^\circ\text{C}/\text{W}$	DC operation
$R_{thJA}$ Max. Thermal Resistance Junction to Ambient	46	$^\circ\text{C}/\text{W}$	
Wt Approximate Weight	0.24(0.008)	gr(oz)	
Case Style	SMC		Similar DO-214AB
Device Marking	IR32		

(\*)  $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink

(\*\*) Mounted 1 inch square PCB

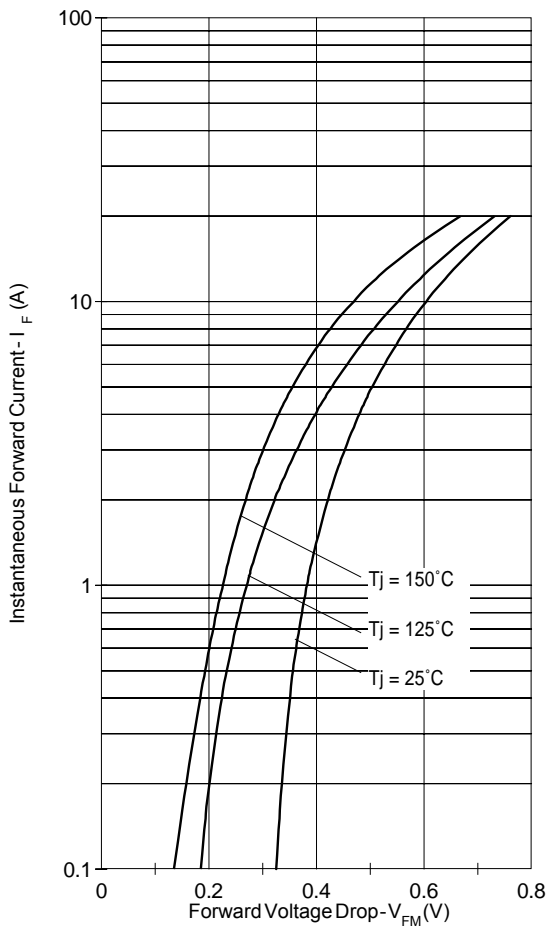


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

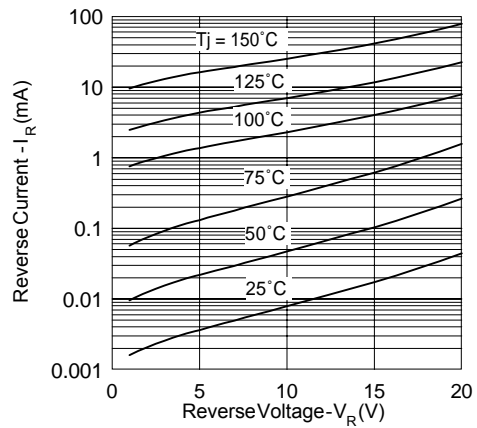


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

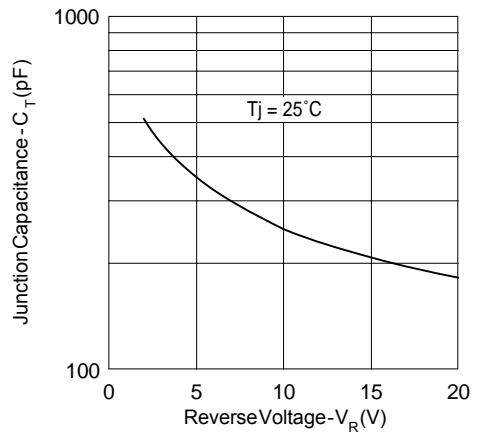


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

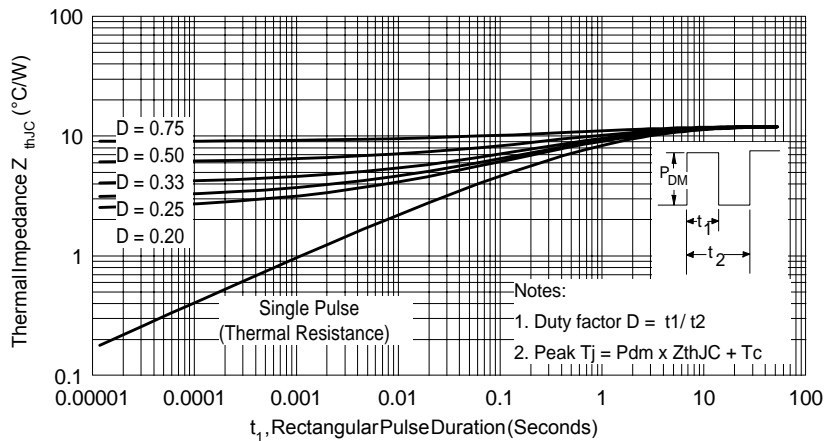


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

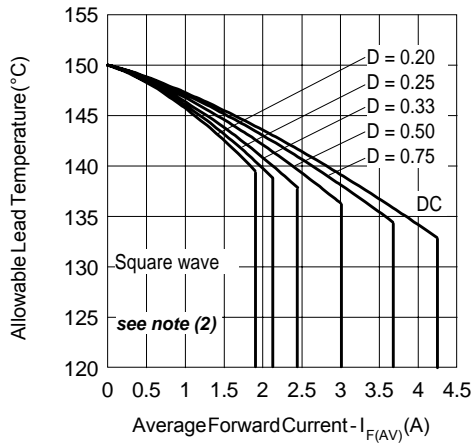


Fig. 5- Maximum Average Forward Current Vs. Allowable Lead Temperature

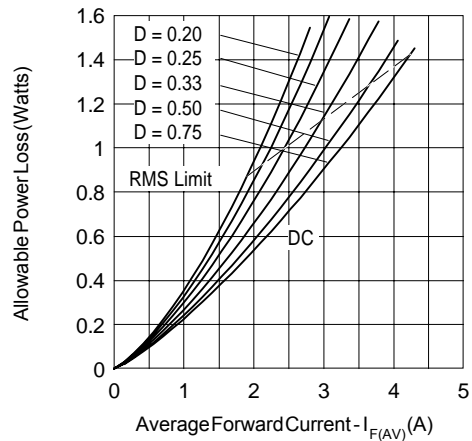


Fig. 6- Maximum Average Forward Dissipation Vs. Average Forward Current

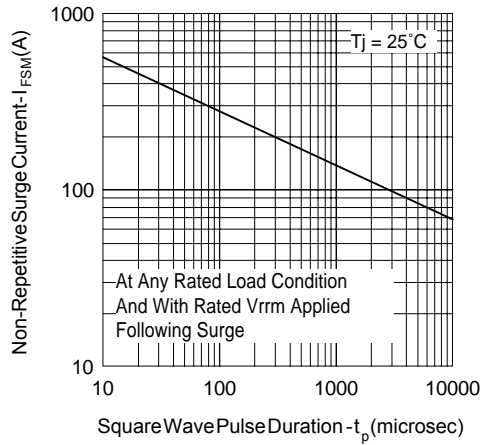
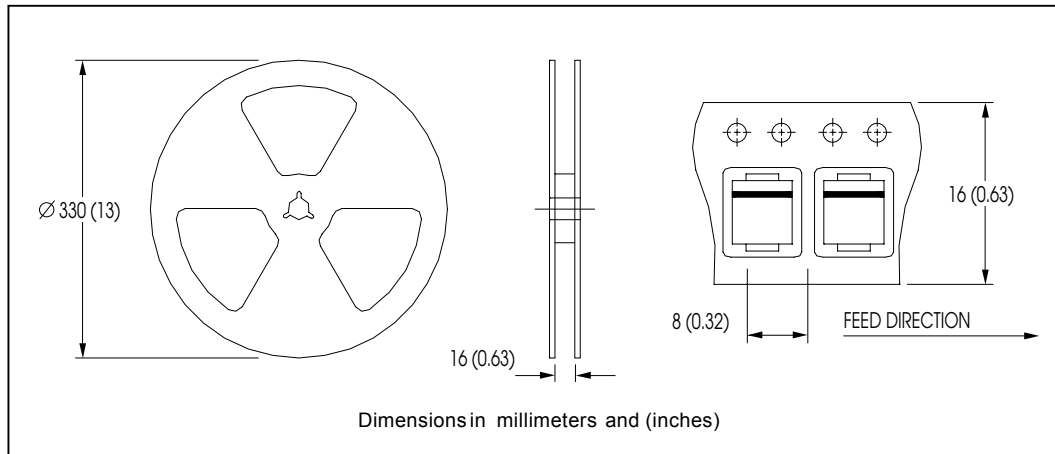


Fig. 7- Maximum Peak Surge Forward Current Vs. Pulse Duration

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

**Tape & Reel Information**



**Marking & Identification**

Each device has marking and identification on two rows.  
 - The first row designates the device as manufactured by International Rectifier as indicated by the letters "IR", then Current and Voltage.  
 - The second row shows the data code: Year and Week.

See below marking diagram.

**FIRST ROW**

IR 32

**SECOND ROW**

Date Code

YY WW

**Ordering Information**

**MBRS320TR - TAPE AND REEL**

WHEN ORDERING, INDICATE THE PART NUMBER AND THE QUANTITY ( IN MULTIPLES OF 3000 PIECES).

EXAMPLE: MBRS320TR - 6000 PIECES

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