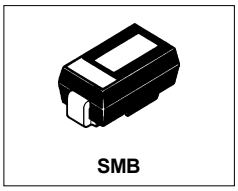
Bulletin PD-20591 rev. A 02/02

International
IOR Rectifier

MBRS140TR

SCHOTTKY RECTIFIER 1 Amp



SMB

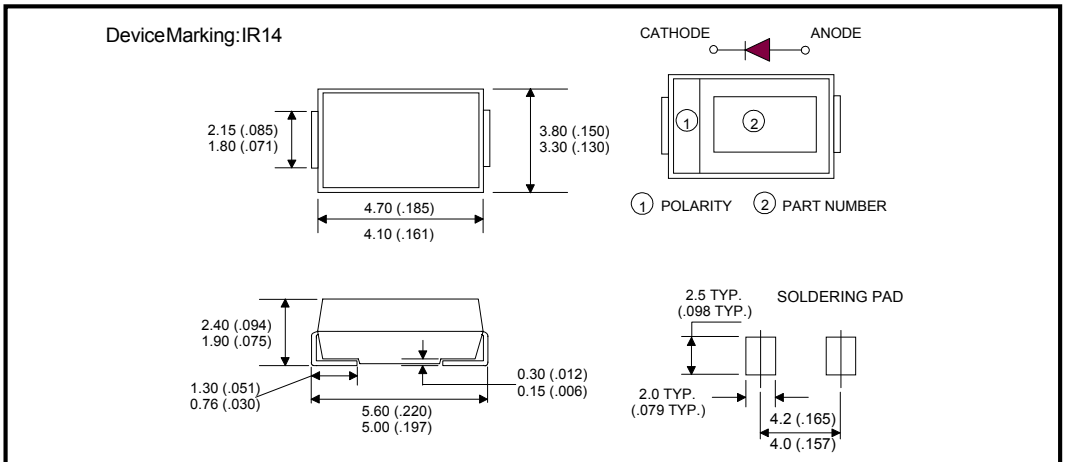
Major Ratings and Characteristics

Characteristics	MBRS140TR	Units
$I_{F(AV)}$ Rectangular waveform	1.0	A
V_{RRM}	40	V
I_{FSM} @ tp = 5 µs sine	380	A
V_F @1.0Apk, T_J=125°C	0.53	V
T_J range	-55 to 150	°C

Description/Features

The MBRS140TR surface-mount Schottky rectifier has been designed for applications requiring low forward drop and very 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
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



Outline SMB
Dimensions in millimeters and (inches)
For recommended footprint and soldering techniques refer to application note #AN-994

Voltage Ratings

	Part number	MBRS140TR
V_R	Max. DC Reverse Voltage (V)	40
V_{RWM}	Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

	Parameters	Value	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current	1.0	A	50% duty cycle @ T_L = 119 °C, rectangular waveform	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current	380	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		40		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	4	mJ	T_J = 25 °C, I_{AS} = 1.0A, L = 5.0mH	
I_{AR}	Repetitive Avalanche Current	0.6	A	Current decaying linearly to zero in 1 µsec Frequency limited by T_J max. Va = 1.5 x Vr typical	

Electrical Specifications

	Parameters	Typ.	Max	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1)	0.52	0.6	V	@ 1A	T_J = 25 °C
		0.70	0.77	V	@ 2A	
		0.48	0.53	V	@ 1A	T_J = 125 °C
		0.63	0.71	V	@ 2A	
I_{RM}	Max. Reverse Leakage Current (1)	-	0.1	mA	T_J = 25°C	V_R = rated V_R
		-	4.0	mA	T_J = 125°C	
C_T	Max. Junction Capacitance	-	80	pF	V_R = 5V_{DC} (test signal range 100KHz to 1Mhz) 25°C	
L_S	Typical Series Inductance	-	2.0	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Voltage Rate of Change (Rated V_R)	-	10000	V/µs		

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

Thermal-Mechanical Specifications

	Parameters	Value	Units	Conditions
T_J	Max. Junction Temperature Range (*)	-55 to 150	°C	
T_{stg}	Max. Storage Temperature Range	-55 to 150	°C	
R_{thJL}	Max. Thermal Resistance Junction to Lead (**)	36	°C/W	DC operation (See Fig. 4)
R_{thJA}	Max. Thermal Resistance Junction to Ambient	80	°C/W	DC operation
wt	Approximate Weight	0.10(0.003)	g (oz.)	
	Case Style	SMB		Similar to DO-214AA
	Device Marking	IR14		

(*) $\frac{dPtot}{dTj} < \frac{1}{Rth(j\text{-}a)}$ thermal runaway condition for a diode on its own heatsink

(**) Mounted 1 inch square PCB

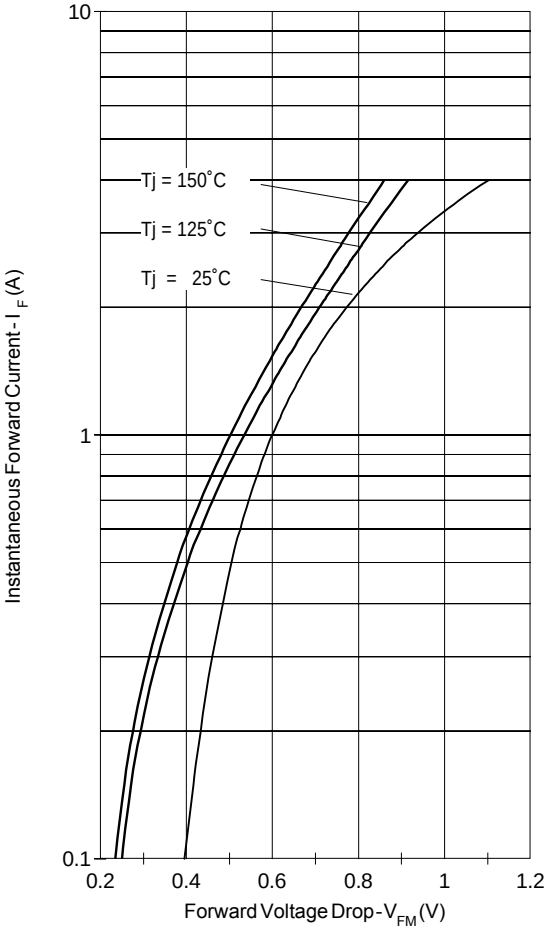


Fig. 1 - Maximum Forward Voltage Drop Characteristics

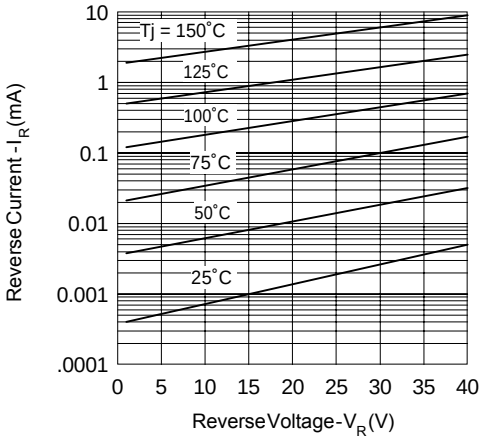


Fig. 2 - Typical Peak Reverse Current
Vs. Reverse Voltage

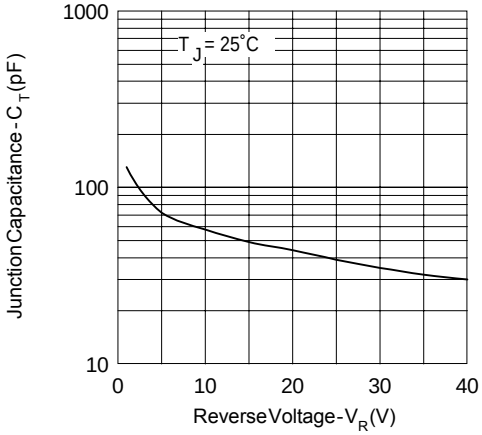


Fig. 3 - Typical Junction Capacitance
Vs. Reverse Voltage

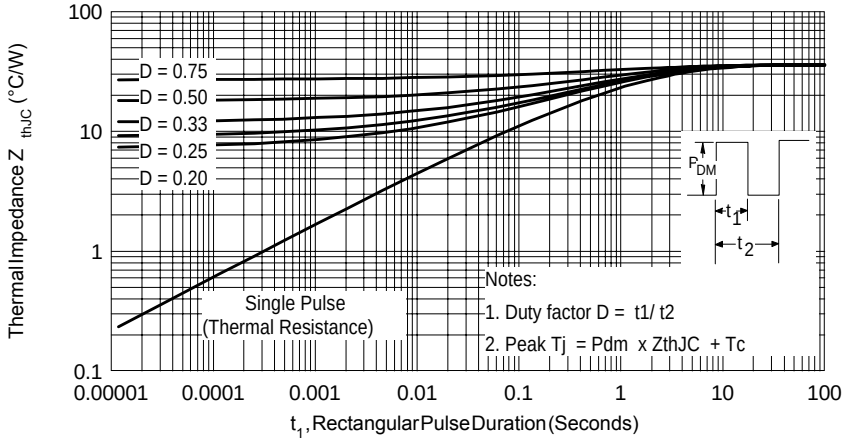


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

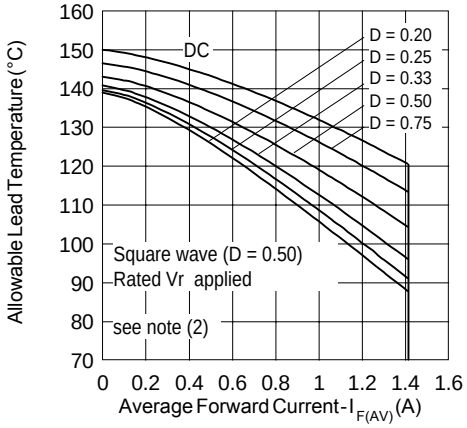


Fig. 4 - Maximum Average Forward Current
Vs. Allowable Lead Temperature

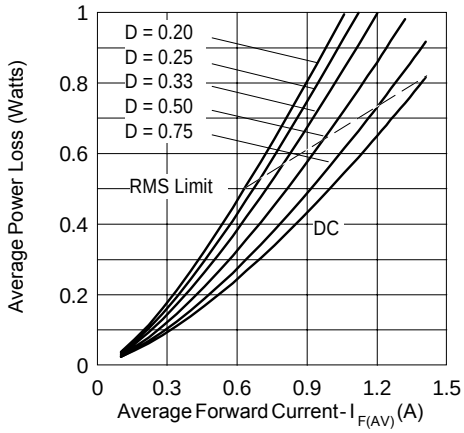


Fig. 5 - Maximum Average Forward Dissipation
Vs. Average Forward Current

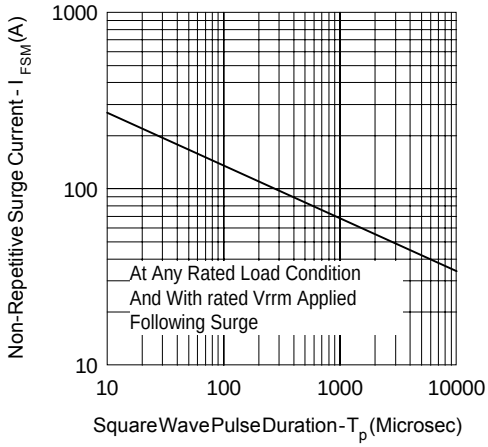
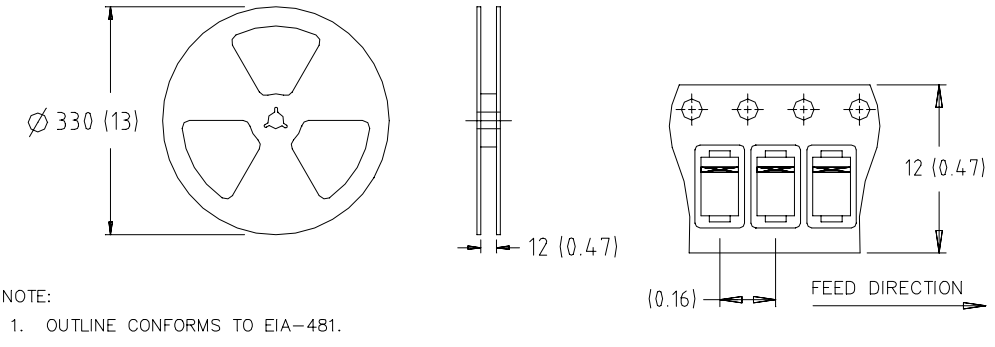


Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

(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 = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = 80% rated V_R

Tape & Reel Information



NOTE:
1. OUTLINE CONFORMS TO EIA-481.

Dimensions in millimeters and (inches)

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 1 4

SECOND ROW
Date Code
YY WW

Ordering Information

MBRS140TR - TAPE AND REEL

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

EXAMPLE: MBRS140TR - 6000 PIECES

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

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