Bulletin PD-20582 rev. D 07/04

International
IOR Rectifier

MBRA140TR

SCHOTTKY RECTIFIER

1.0 Amp

$I_{F(AV)}$ = 1 Amp
V_R = 40V

Major Ratings and Characteristics

Characteristics		Value	Units
I_{FAV}	Rect. Waveform	1.0	A
V_{RRM}		40	V
I_{FSM}	@ tp = 5 μs sine	120	A
V_F	@ 1.0Apk, T_J=125°C	0.49	V
T_J	range	- 55 to 150	°C

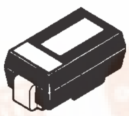
Description/ Features

The MBRA140TR 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

Case Styles

MBRA140TR



SMA

Voltage Ratings

	Part number	MBRA140TR
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 * See Fig. 4	1.0	A	50% duty cycle @ T_L = 118 °C, rectangular wave form. On PC board 9mm[2] island (.013mm thick copper pad area)	
I_{FSM}	Max. Peak One Cycle Non-Repetitive	120	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current * See Fig. 6	30		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	3.0	mJ	T_J = 25 °C, I_{AS} = 1A, L = 6mH	
I_{AR}	Repetitive Avalanche Current	1.0	A		

Electrical Specifications

	Parameters	Value	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1) * See Fig. 1	0.55	V	@ 1A	T_J = 25 °C
		0.71	V	@ 2A	
		0.5	V	@ 1A	T_J = 100 °C
		0.65	V	@ 2A	
		0.49	V	@ 1A	T_J = 125 °C
		0.63	V	@ 2A	
I_{RM}	Max. Reverse Leakage Current (1) * See Fig. 2	0.5	mA	T_J = 25 °C	V_R = rated V_R
		10	mA	T_J = 100 °C	
		26	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.36	V	$T_J = T_J$ max.	
r_t	Forward Slope Resistance	104	m Ω		
C_T	Typical Junction Capacitance	38	pF	$V_R = 10V_{DC}$, T_J = 25°C, test signal = 1Mhz	
L_S	Typical Series Inductance	2.0	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Voltage Rate of Change	10000	V/ µs	(Rated V_R)	

(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 (**)	35	°C/W	DC operation (* See Fig. 4)
R_{thJA}	Max. Thermal Resistance Junction to Ambient	80	°C/W	DC operation
wt	Approximate Weight	0.07(0.002)	g (oz.)	
	Case Style	SMA		Similar D-64
	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, Thermal Probe connected to lead 2mm from Package

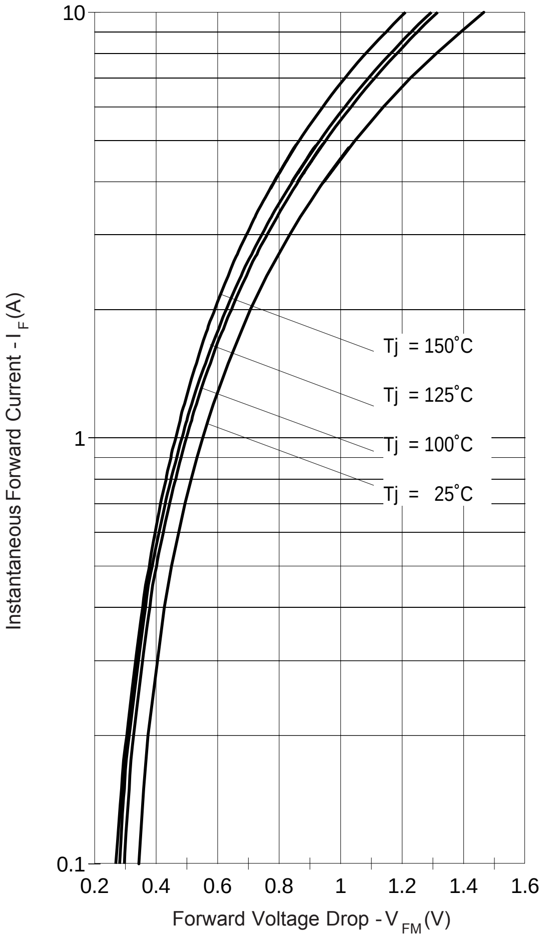


Fig. 1 - Maximum Forward Voltage Drop Characteristics

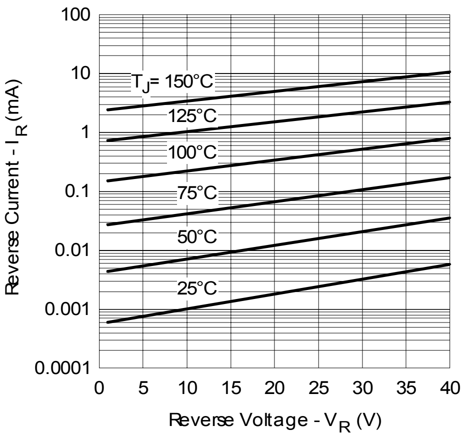


Fig. 2 - Typical Peak Reverse Current Vs. Reverse Voltage

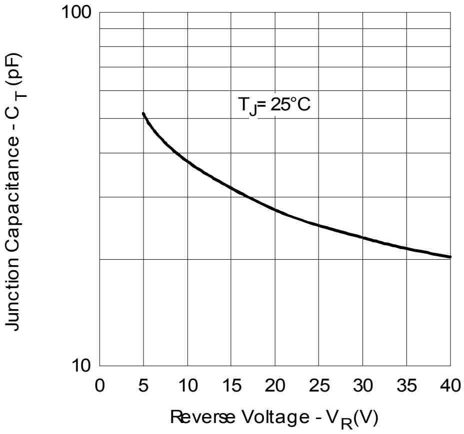


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

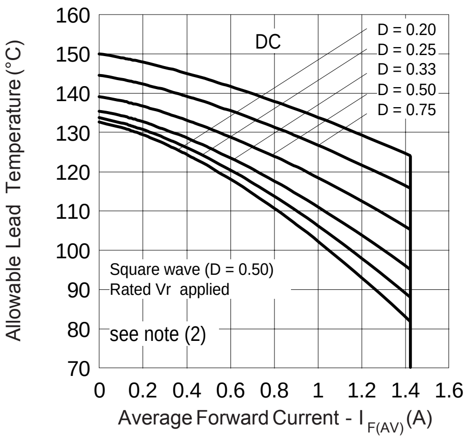


Fig. 4 - Maximum Average Forward Current Vs. Allowable Lead Temperature

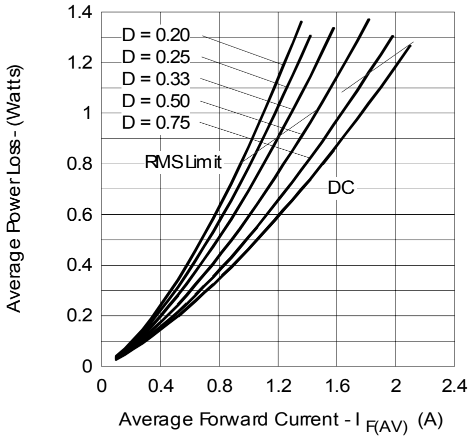


Fig. 5 - Maximum Average Forward Dissipation Vs. Average Forward Current

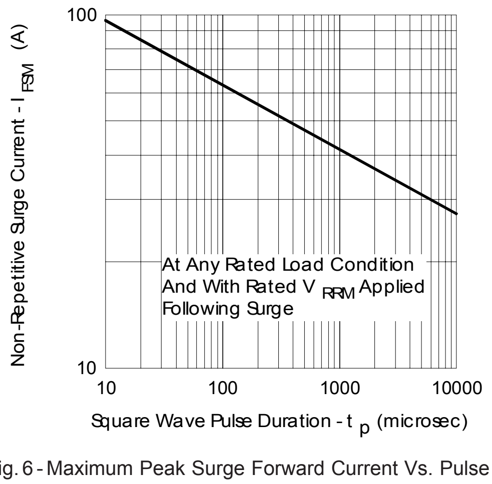
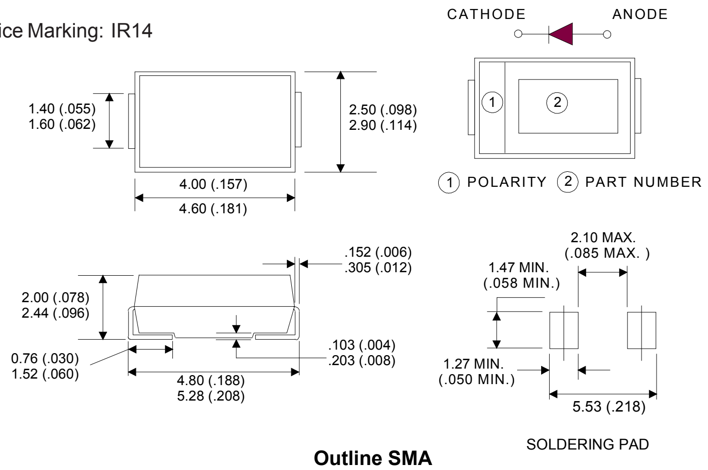


Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

(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

Outline Table

Device Marking: IR14



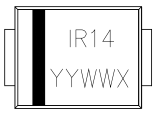
Outline SMA

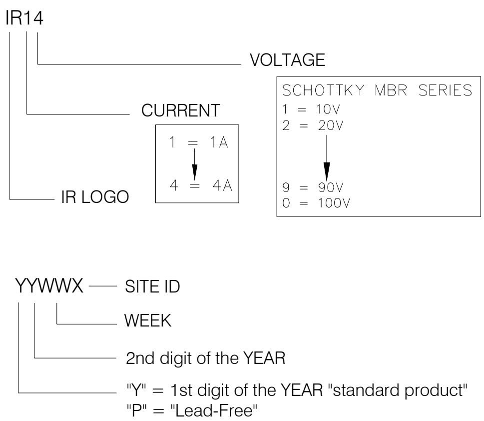
Dimensions in millimeters and (inches)

For recommended footprint and soldering techniques refer to application note #AN-994

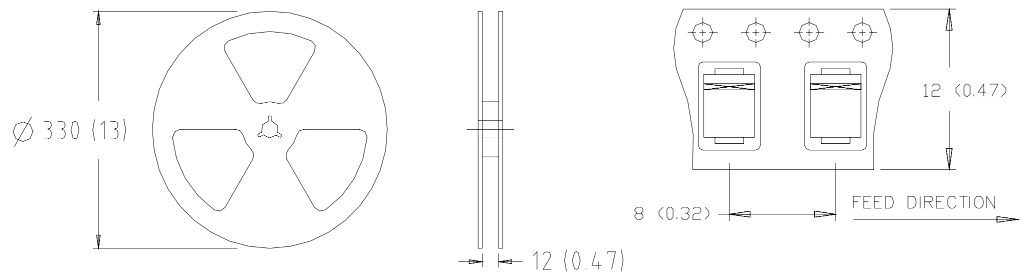
Marking & Identification

Each device has 2 rows for identification. The first row designates the device as manufactured by International Rectifier, indicated by the letters "IR", and the Part Number (indicates the current, the voltage rating and Schottky Generation). The second row indicates the year, the week of manufacturing and the Site ID.





Tape & Reel Information



Dimensions in millimetres and (inches)

Ordering Information Table

Device Code

MBR	A	1	40	TR	-
1	2	3	4	5	6

1 - Schottky MBR Series
2 - A = SMA
3 - Current Rating (1 = 1 A)
4 - Voltage Rating (40 = 40V)
5 - TR = Tape & Reel (7500 pieces)
6 • none = Standard Production
• PbF = Lead-Free

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.

International IOR Rectifier

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