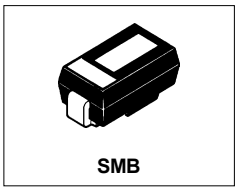
Bulletin PD-20592 04/01

International
IOR Rectifier

# MBRS190TR
# MBRS1100TR

## SCHOTTKY RECTIFIER

## 1 Amp



**SMB**

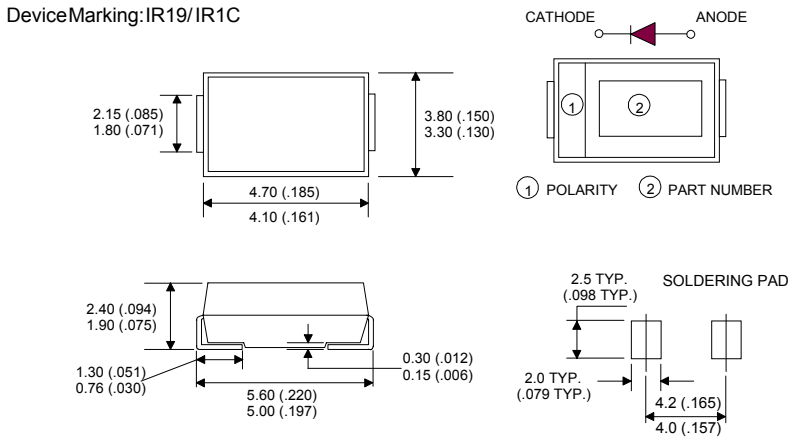
### Major Ratings and Characteristics

| Characteristics | MBR190TR MBR1100TR | Units |
|---|---|---|
| $I_{F(AV)}$ Rectangular waveform | 1.0 | A |
| $V_{RRM}$ | 100 | V |
| $I_{FSM}$ @tp = 5 µs sine | 870 | A |
| $V_F$ @1.0Apk, $T_J$=125°C | 0.62 | V |
| $T_J$ range | -55 to 175 | °C |

### Description/Features

The MBRS190TR, MBRS1100TR 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 | MBRS190TR | MBRS1100TR |
|---|---|---|---|
| $V_R$ | Max. DC Reverse Voltage (V) | 90 | 100 |
| $V_{RWM}$ | 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 @ $T_L$ = 147 °C, rectangular waveform | |
| $I_{FSM}$ | Max. Peak One Cycle Non-Repetitive | 870 | A | 5µs Sine or 3µs Rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied |
| | Surge Current | 50 | | 10ms Sine or 6ms Rect. pulse | |
| $E_{AS}$ | Non-Repetitive Avalanche Energy | 6.0 | mJ | $T_J$ = 25 °C, $I_{AS}$ = 0.5A, L = 11mH | |
| $I_{AR}$ | Repetitive Avalanche Current | 0.5 | A | Current decaying linearly to zero in 1 µsec<br>Frequency limited by $T_J$ max. Va = 1.5 x Vr typical | |

## Electrical Specifications

| | Parameters | Value | Units | Conditions | |
|---|---|---|---|---|---|
| $V_{FM}$ | Max. Forward Voltage Drop (1) | 0.78 | V | @ 1A | $T_J$ = 25 °C |
| | * See Fig. 1 | 0.87 | V | @ 2A | |
| | | 0.62 | V | @ 1A | $T_J$ = 125 °C |
| | | 0.70 | V | @ 2A | |
| $I_{RM}$ | Max. Reverse Leakage Current (1) | 0.5 | mA | $T_J$ = 25 °C | $V_R$ = rated $V_R$ |
| | * See Fig. 2 | 1 | mA | $T_J$ = 125 °C | |
| $C_T$ | Typical Junction Capacitance | 42 | pF | $V_R$ = 5$V_{DC}$, (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. Volatge Rate of Charge (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 | -55to175 | °C | |
| $T_{stg}$ | Max. Storage Temperature Range | -55to175 | °C | |
| $R_{thJL}$ | Max. Thermal Resistance, Junction to Lead (2) | 36 | °C/W | DC operation |
| wt | Approximate Weight | 0.10 | | g (oz.) |
| | Case Style | SMB | | Similar DO-214AA |

(2) Mounted 1 inch square PCB, thermal probe connected to lead 2mm from package

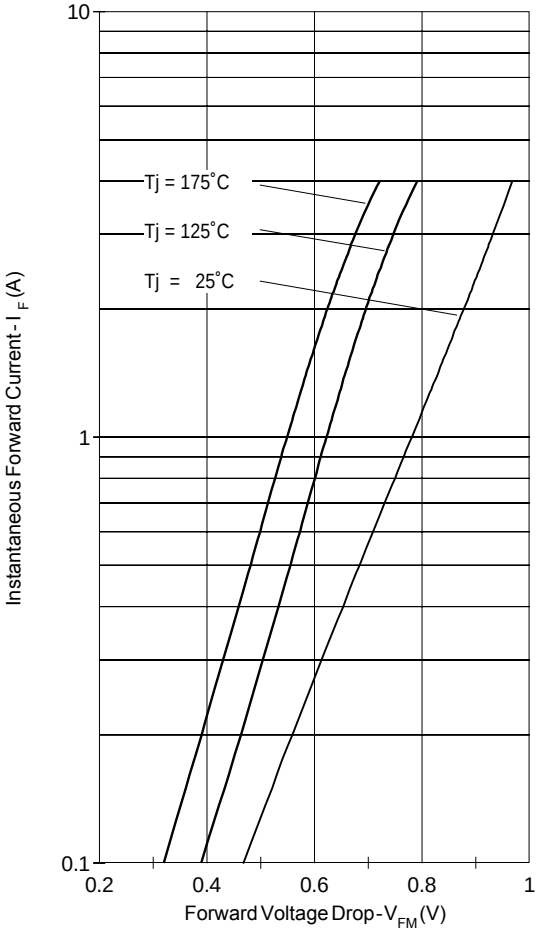



Fig. 1 - Maximum Forward Voltage Drop Characteristics

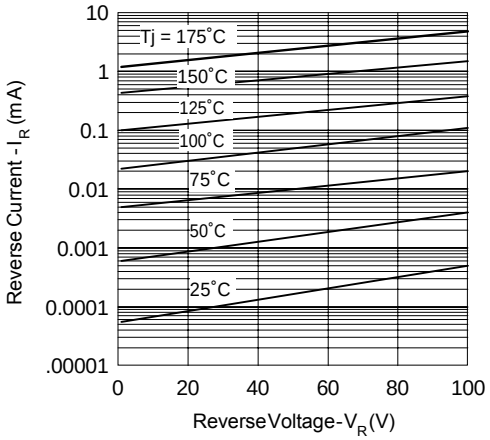



Fig. 2 - Typical Peak Reverse Current
Vs. Reverse Voltage

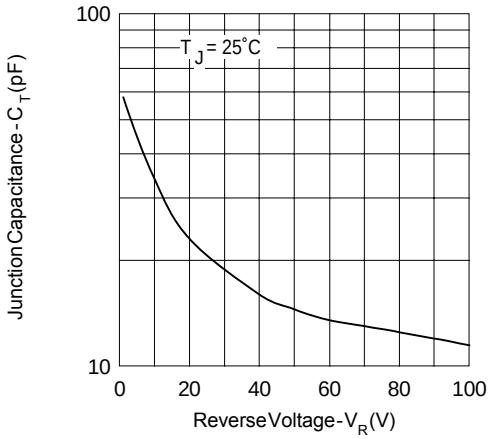



Fig. 3 - Typical Junction Capacitance
Vs. Reverse Voltage

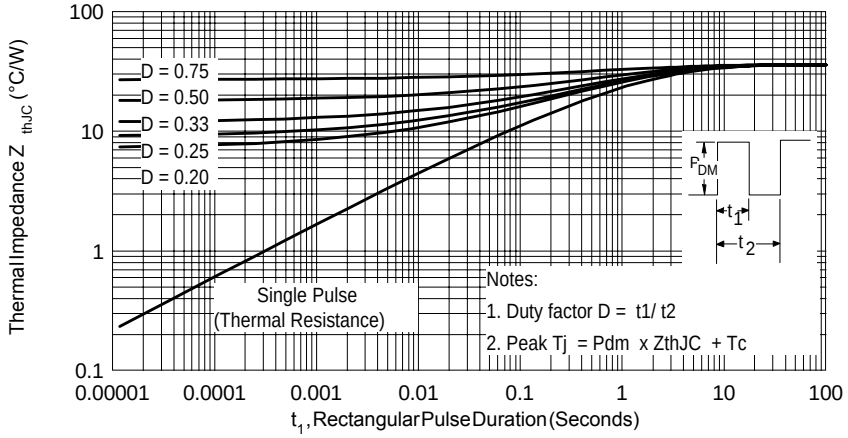



Fig. 4 - Max. Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)

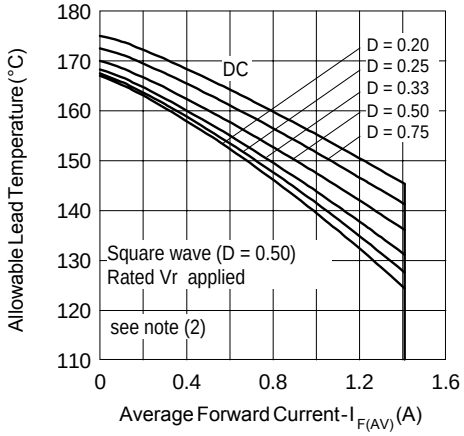



Fig. 4 - Maximum Average Forward Current
Vs. Allowable Lead Temperature

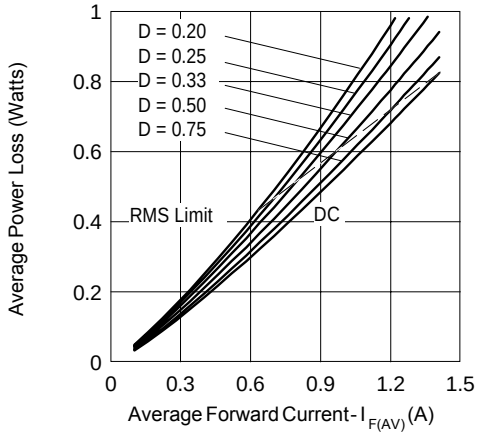



Fig. 5 - Maximum Average Forward Dissipation
Vs. Average Forward Current

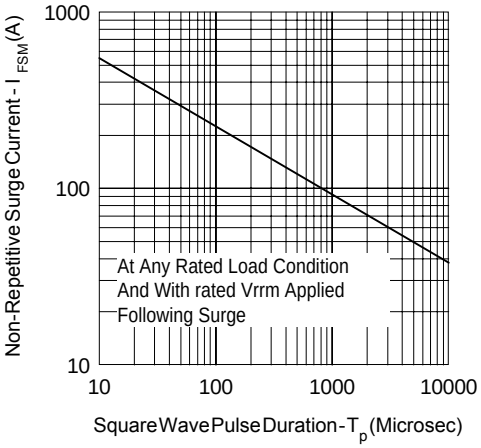
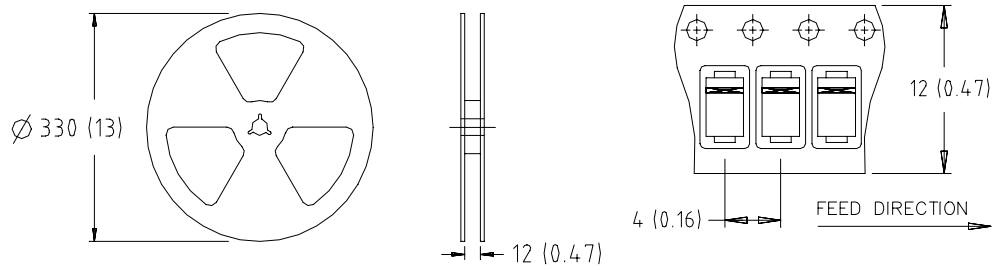



Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

**(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 B 1 C

**SECOND ROW**
Date Code
YY WW

## Ordering Information

**MBRS1100TR - TAPE AND REEL**

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

EXAMPLE: MBRS1100TR - 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.

International
IOR Rectifier

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