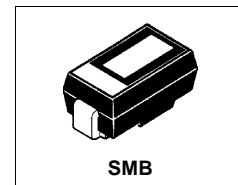


International IOR Rectifier

MBRS120

SCHOTTKY RECTIFIER

1 Amp



Major Ratings and Characteristics

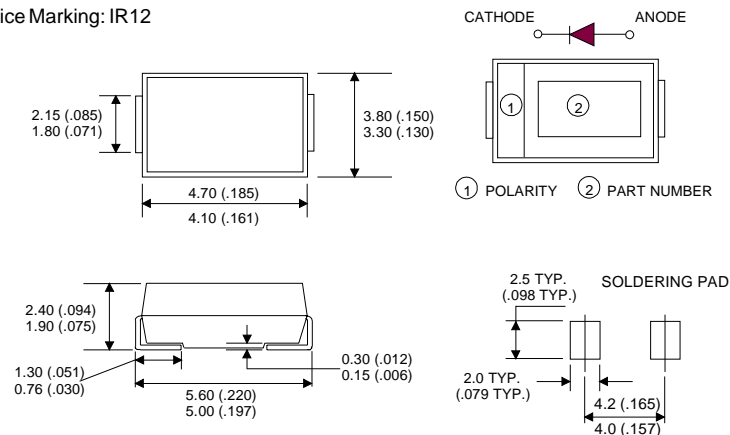
| Characteristics | MBRS120 | Units |
|--------------------------------------|-------------|------------|
| $I_{F(AV)}$ Rectangular waveform | 1.0 | A |
| V_{RRM} | 20 | V |
| I_{FSM} @ $t_p=5\mu s$ sine | 310 | A |
| V_F @ $1.0A_{pk}, T_J=125^\circ C$ | 0.35 | V |
| T_J range | - 65 to 150 | $^\circ C$ |

Description/Features

The MBRS120 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

Device Marking: IR12



Outline SMB

Dimensions in millimeters and (inches)

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

Voltage Ratings

| Part number | MBRS120 |
|---|---------|
| 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 | 1.0 | A | 50% duty cycle @ $T_L = 138^\circ\text{C}$, rectangular wave form |
| I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current | 310 | | 5 μs Sine or 3 μs Rect. pulse |
| | 40 | | 10ms Sine or 6ms Rect. pulse |
| E_{AS} Non Repetitive Avalanche Energy | 2.0 | mJ | $T_J = 25^\circ\text{C}$, $I_{AS} = 1\text{A}$, $L = 4\text{mH}$ |
| I_{AR} Repetitive Avalanche Current | 0.8 | A | Current decaying linearly to zero in 1 μsec Frequency limited by T_J max. $V_a = 1.5 \times V_R$ typical |

Electrical Specifications

| Parameters | Typ. | Max. | Units | Conditions |
|---|-------|-------|------------------|--|
| V_{FM} Max. Forward Voltage Drop (1) | 0.42 | 0.45 | V | @ 1A |
| | 0.46 | 0.52 | V | @ 2A |
| | 0.33 | 0.37 | V | @ 1A |
| | 0.39 | 0.45 | V | @ 2A |
| | 0.30 | 0.35 | V | @ 1A |
| | 0.36 | 0.43 | V | @ 2A |
| I_{RM} Max. Reverse Leakage Current (1) | 0.015 | 0.2 | mA | $T_J = 25^\circ\text{C}$ |
| | 2.0 | 6.0 | mA | $T_J = 100^\circ\text{C}$ |
| | 7.0 | 20 | mA | $T_J = 125^\circ\text{C}$ |
| C_T Typical Junction Capacitance | 110 | - | 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 | - | 10000 | V/ μs | (Rated V_R) |

(1) Pulse Width < 300 μs , 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 (**) | 30 | $^\circ\text{C/W}$ | DC operation |
| R_{thJA} Max. Thermal Resistance Junction to Ambient | | 80 | $^\circ\text{C/W}$ |
| Wt Approximate Weight | 0.10(0.003) | gr (oz) | |
| Case Style | SMB | | Similar DO-214AA |
| Device Marking | IR12 | | |

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

(**) Mounted 1 inch square PCB

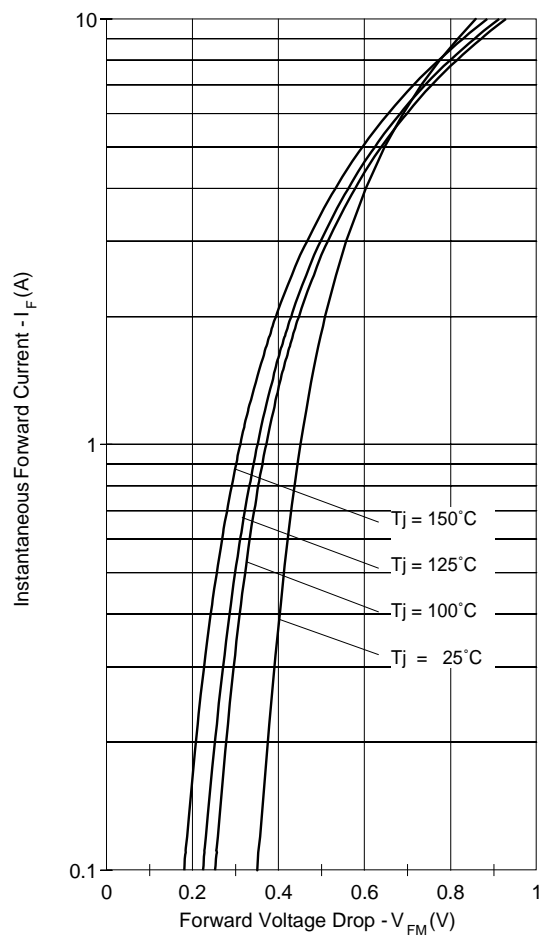


Fig. 1 - Maximum Forward Voltage Drop Characteristics

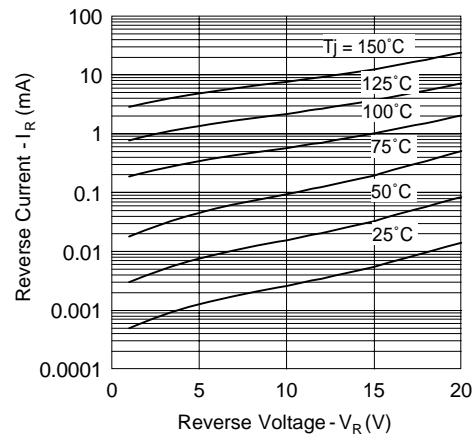


Fig. 2 - Typical Peak Reverse Current Vs. Reverse Voltage

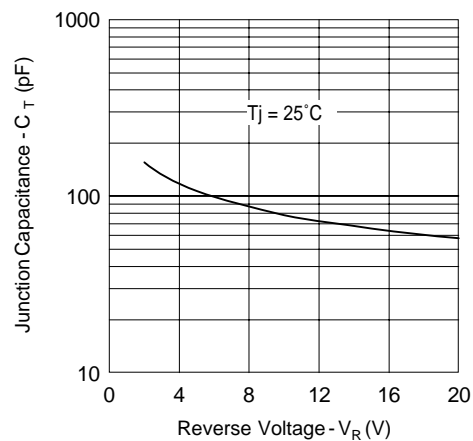


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

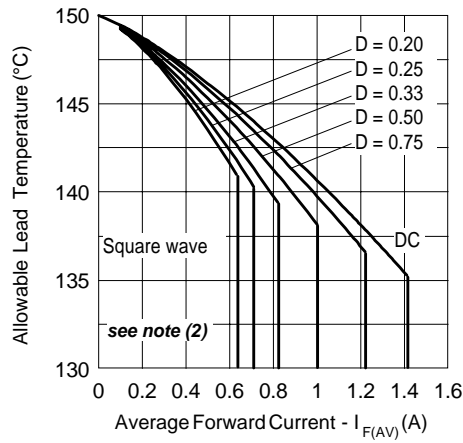


Fig. 4 - Maximum Average Forward Current
Vs. Allowable Lead Temperature

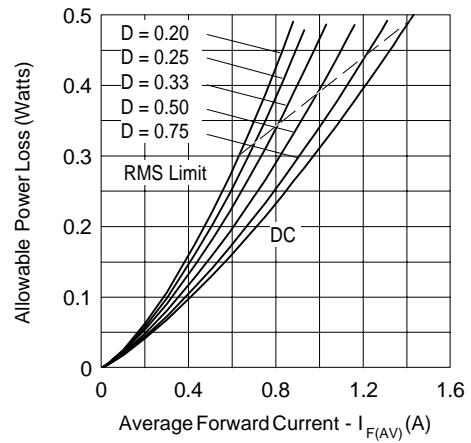


Fig. 5 - Maximum Average Forward Dissipation
Vs. Average Forward Current

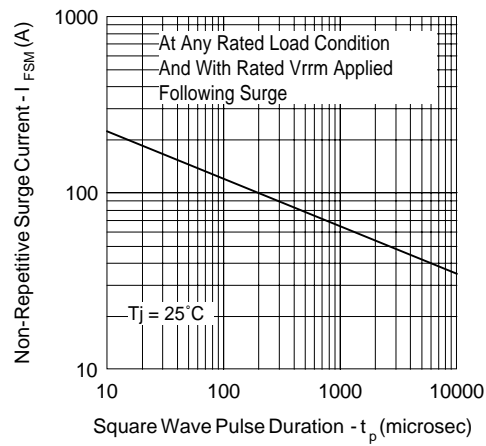


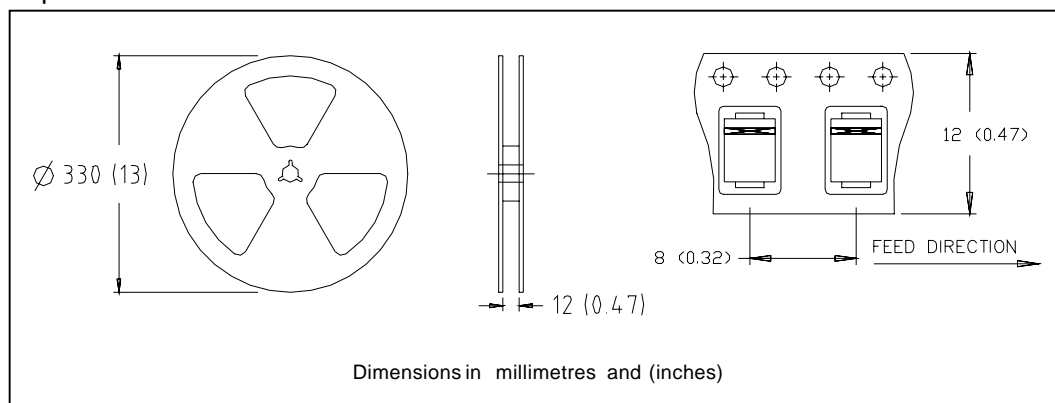
Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

(2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)}/D)$ (see Fig. 6);

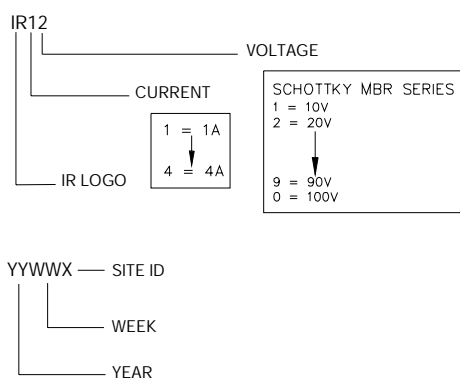
$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_{R1} (1 - D)$

Tape & Reel Information



Marking & Identification

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



Ordering Information

MBRS120TR - TAPE AND REEL

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

EXAMPLE: MBRS120TR - 6000 PIECES

MBRS120

Bulletin PD-20644 rev. D 03/03

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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.

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