Bulletin PD-20773 06/04

International
IOR Rectifier

# 10MQ060NPbF

## SCHOTTKY RECTIFIER

## 2.1 Amp

$I_{F(AV)}$ = 2.1Amp
$V_R$ = 60V

### Major Ratings and Characteristics

| Characteristics | | Value | Units |
|---|---|---|---|
| $I_F$ | DC | 2.1 | A |
| $V_{RRM}$ | | 60 | V |
| $I_{FSM}$ | @tp = 5 µs sine | 40 | A |
| $V_F$ | @1.5Apk, $T_J$=125°C | 0.63 | V |
| $T_J$ | range | - 55 to 150 | °C |

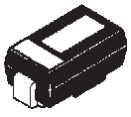
### Description/ Features

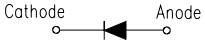
The 10MQ060NPbF surface mount Schottky rectifier has been designed for applications requiring low forward drop and very small foot prints on PC boards. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free ("PbF" suffix)

### Case Styles

10MQ060NPbF






SMA

## Voltage Ratings

| | Part number | 10MQ060NPbF |
|---|---|---|
| $V_R$ | Max. DC Reverse Voltage (V) | 60 |
| $V_{RWM}$ | Max. Working Peak Reverse Voltage (V) | |

## Absolute Maximum Ratings

| | Parameters | 10MQ | Units | Conditions | |
|---|---|---|---|---|---|
| $I_{F(AV)}$ | Max. Average Forward Current * See Fig. 4 | 1.5 | A | 50% duty cycle @ $T_L$ = 120 °C, rectangular wave form. On PC board 9mm$^2$ island(.013mm thick copper pad area) | |
| $I_{FSM}$ | Max. Peak One Cycle Non-Repetitive | 40 | A | 5µs Sine or 3µs Rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied |
| | Surge Current * See Fig. 6 | 10 | | 10ms Sine or 6ms Rect. pulse | |
| $E_{AS}$ | Non-Repetitive Avalanche Energy | 2.0 | mJ | $T_J$ = 25 °C, $I_{AS}$ = 1A, L = 4mH | |
| $I_{AR}$ | Repetitive Avalanche Current | 1.0 | A | | |

## Electrical Specifications

| | Parameters | 10MQ | Units | Conditions | |
|---|---|---|---|---|---|
| $V_{FM}$ | Max. Forward Voltage Drop (1) | 0.63 | V | @ 1A | $T_J$ = 25 °C |
| | * See Fig. 1 | 0.71 | V | @ 1.5A | |
| | | 0.57 | V | @ 1A | $T_J$ = 125 °C |
| | | 0.63 | V | @ 1.5A | |
| $I_{RM}$ | Max. Reverse Leakage Current (1) | 0.5 | mA | $T_J$ = 25 °C | $V_R$ = rated $V_R$ |
| | * See Fig. 2 | 7.5 | mA | $T_J$ = 125 °C | |
| $V_{F(TO)}$ | Threshold Voltage | 0.45 | V | $T_J$ = $T_J$ max. | |
| $r_t$ | Forward Slope Resistance | 86.8 | mΩ | | |
| $C_T$ | Typical Junction Capacitance | 31 | pF | $V_R$ = 10$V_{DC}$, $T_J$ = 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 | 10MQ | Units | Conditions |
|---|---|---|---|---|
| $T_J$ | Max. Junction Temperature Range (*) | -55 to 150 | °C | |
| $T_{stg}$ | Max. Storage Temperature Range | -55 to 150 | °C | |
| $R_{thJA}$ | 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 | IR1H | | |

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

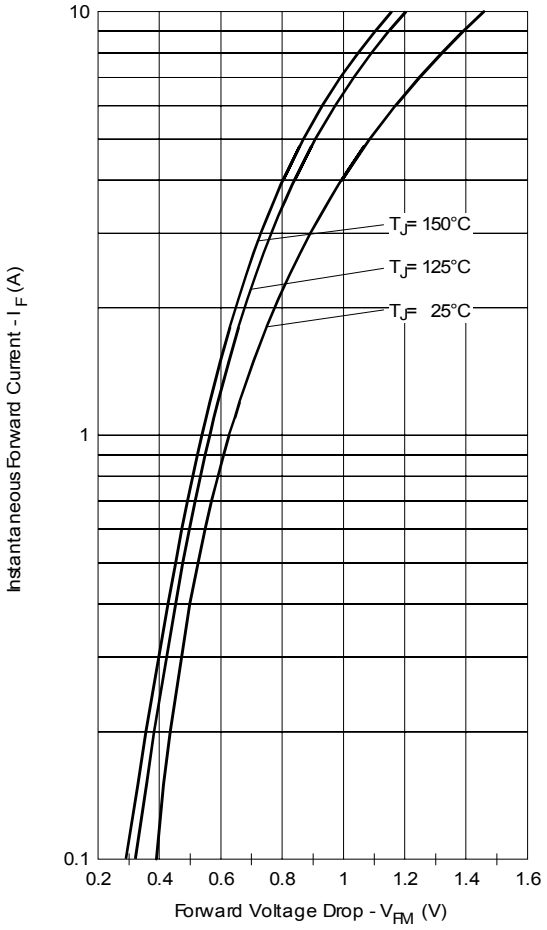



Fig. 1 - Maximum Forward Voltage Drop Characteristics

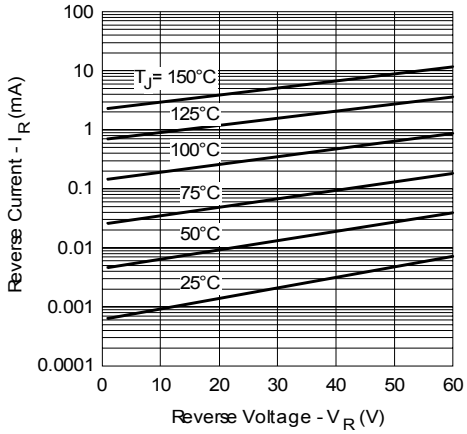



Fig. 2 - Typical Peak Reverse Current
Vs. Reverse Voltage

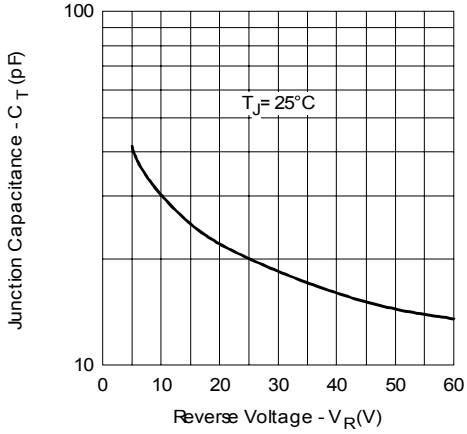



Fig. 3 - Typical Junction Capacitance
Vs. Reverse Voltage

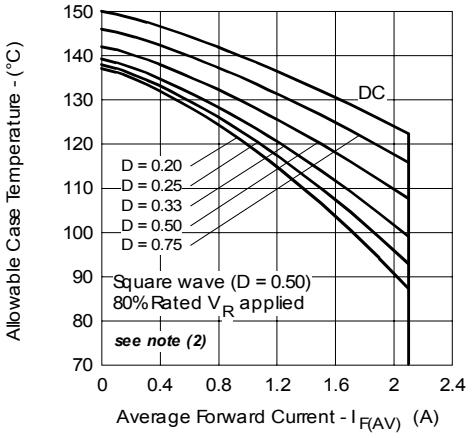



Fig. 4 - Maximum Average Forward Current Vs. Allowable Lead Temperature

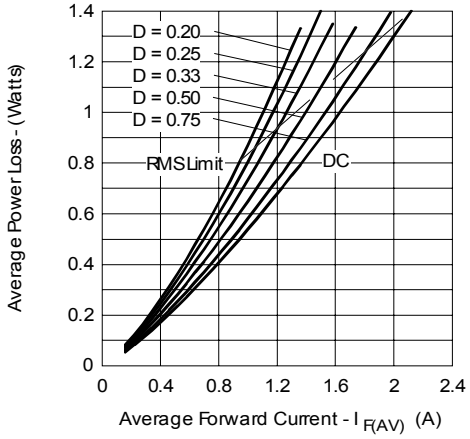



Fig. 5 - Maximum Average Forward Dissipation Vs. Average Forward Current

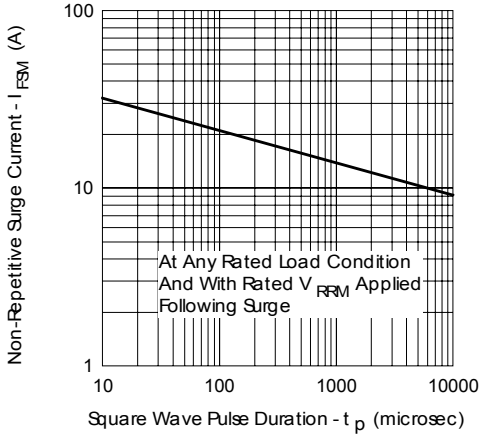
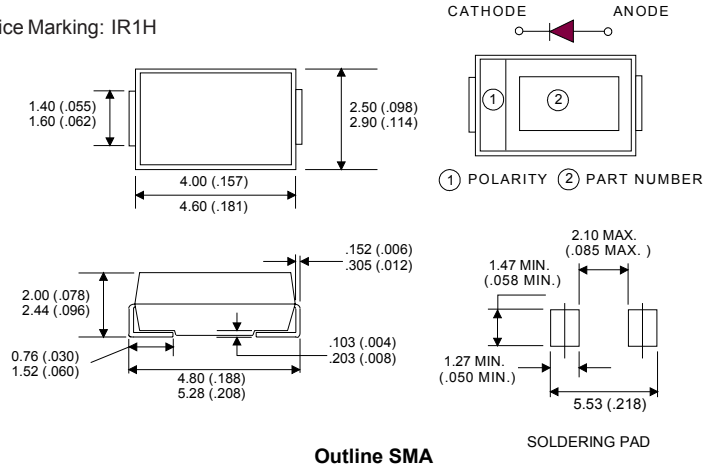



Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

**(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: IR1H




**Outline SMA**

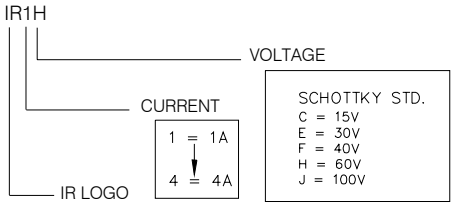
Dimensions in millimeters and (inches)

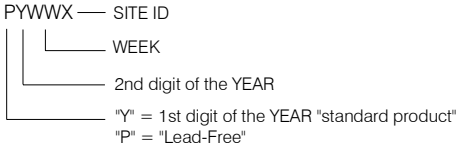
For recommended footprint and soldering techniques refer to application note #AN-994

## Marking & Identification

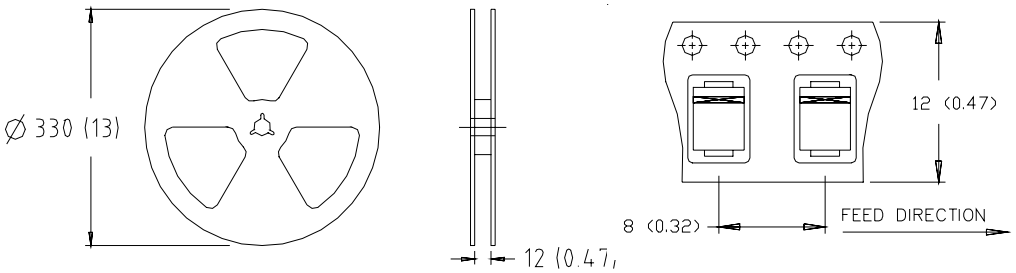
Each device has 2 rows for identification. The first row designates the device as manufactured by International Rectifier, indicated by the letters "IR", and the Part Number (indicates the current, the voltage rating and Schottky Generation). The second row indicates the year, the week of manufacturing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



## Tape & Reel Information




Dimensions in millimetres and (inches)

## Ordering Information Table

**Device Code**

| 10 | M | Q | 060 | N | TR | PbF |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | |
|---|---|---|
| **1** | - | Current Rating |
| **2** | - | M = SMA |
| **3** | - | Q = Schottky Q Series |
| **4** | - | Voltage Rating (060 = 60V) |
| **5** | - | N = New SMA |
| **6** | - | • none = Box (1000 pieces)<br>• TR = Tape & Reel (7500 pieces) |
| **7** | - | • none = Standard Production<br>• PbF = Lead-Free |

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

International
IOR Rectifier

**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
06/04

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*Тел: +7 (812) 336 43 04 (многоканальный)*
*Email: org@lifeelectronics.ru*

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