Bulletin PD-20775 06/04

International
IOR Rectifier

15MQ040NPbF

SCHOTTKY RECTIFIER

3 Amp

$I_{F(AV)}$ = 3Amp
V_R = 40V

Major Ratings and Characteristics

Characteristics		Value	Units
I_F	DC	3	A
V_{RRM}		40	V
I_{FSM}	@ tp = 5 µs sine	330	A
V_F	@ 2Apk, T_J=125°C	0.43	V
T_J	range	- 40 to 150	°C

Description/ Features

The 15MQ040NPbF Schottky rectifier is designed to be used for low-power applications where a reverse voltage of 40 volts is encountered and surface mountable is required.

Applications

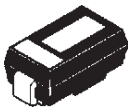
- Switching power supplies
- Meter protection
- Reverse protection for power input to PC board circuits
- Battery isolation and charging
- Low threshold voltage diode
- Free-wheeling or by-pass diode
- Low voltage clamp

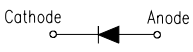
Features

- Surface mountable
- Extremely low forward voltage
- Improved reverse blocking voltage capability relative to other similar size Schottky
- Compact size
- Lead-Free ("PbF" suffix)

Case Styles

15MQ040NPbF





SMA

Voltage Ratings

	Part number	15MQ040NPbF
V_R	Max. DC Reverse Voltage (V)	40
V_{RWM}	Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

	Parameters	15MQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 4	2.1	A	50% duty cycle @ T_L = 105 °C, rectangular wave form. On PC board 9mm² island(.013mm thick copper pad area)	
I_{FSM}	Max. Peak One Cycle Non-Repetitive	330	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current * See Fig. 6	140		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	6.0	mJ	T_J = 25 °C, I_{AS} = 1A, L = 12mH	
I_{AR}	Repetitive Avalanche Current	1.0	A		

Electrical Specifications

	Parameters	15MQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1) * See Fig. 1	0.42	V	@ 1A	T_J = 25 °C
		0.49	V	@ 2A	
		0.34	V	@ 1A	T_J = 125 °C
		0.43	V	@ 2A	
I_{RM}	Max. Reverse Leakage Current (1) * See Fig. 2	0.5	mA	T_J = 25 °C	V_R = rated V_R
		20	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.26	V	T_J = T_J max.	
r_t	Forward Slope Resistance	64.6	mΩ		
C_T	Typical Junction Capacitance	134	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	15MQ	Units	Conditions
T_J	Max. Junction Temperature Range (*)	-40 to 150	°C	
T_{stg}	Max. Storage Temperature Range	-40 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	IR3F		

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

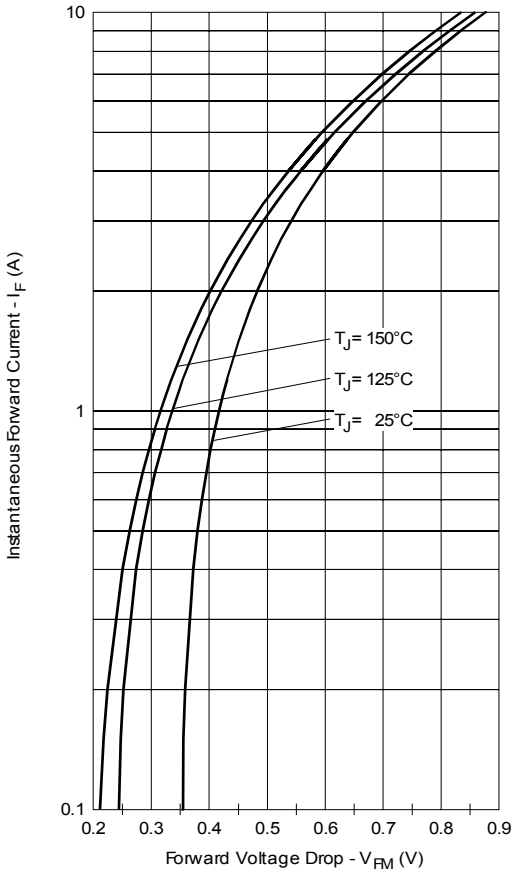


Fig. 1 - Maximum Forward Voltage Drop Characteristics

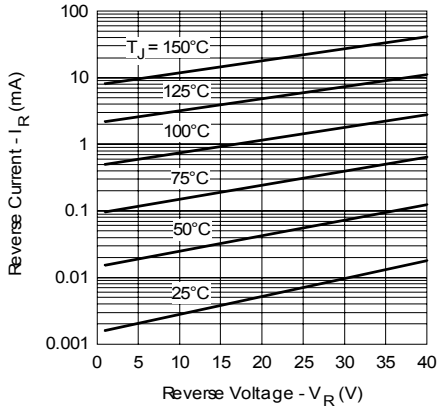


Fig. 2 - Typical Peak Reverse Current
Vs. Reverse Voltage

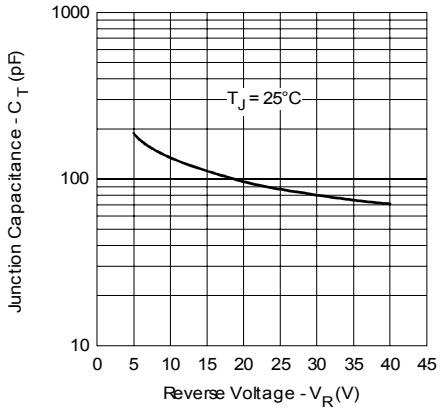


Fig. 3 - Typical Junction Capacitance
Vs. Reverse Voltage

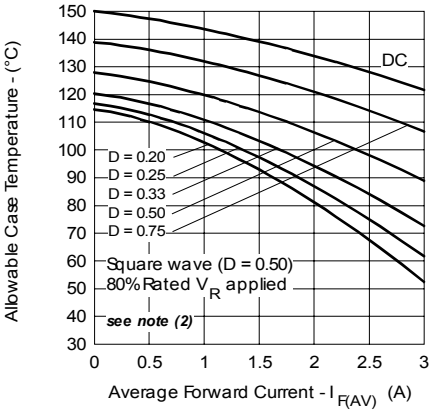


Fig. 4 - Maximum Average Forward Current
Vs. Allowable Lead Temperature

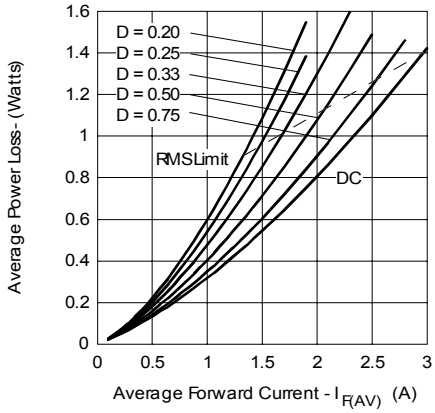


Fig. 5 - Maximum Average Forward Dissipation
Vs. Average Forward Current

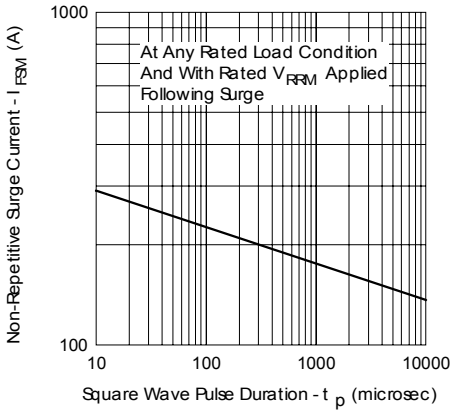
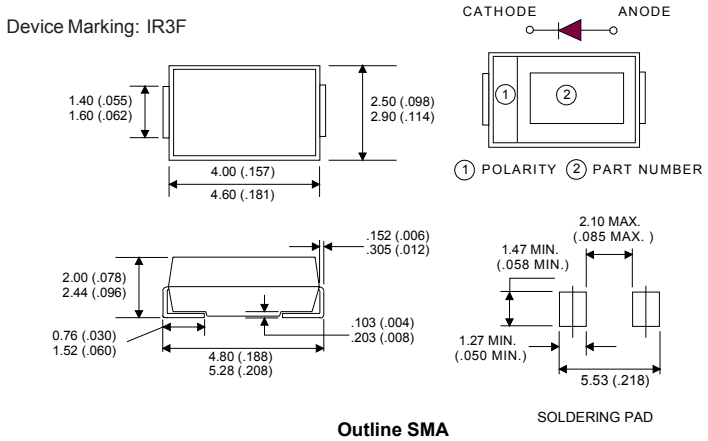


Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

(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



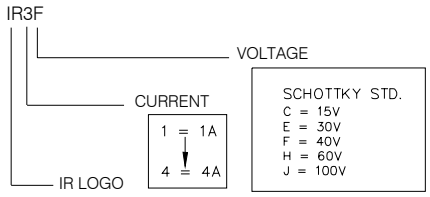
Outline SMA

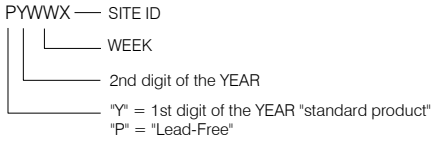
Dimensions in millimeters and (inches)

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

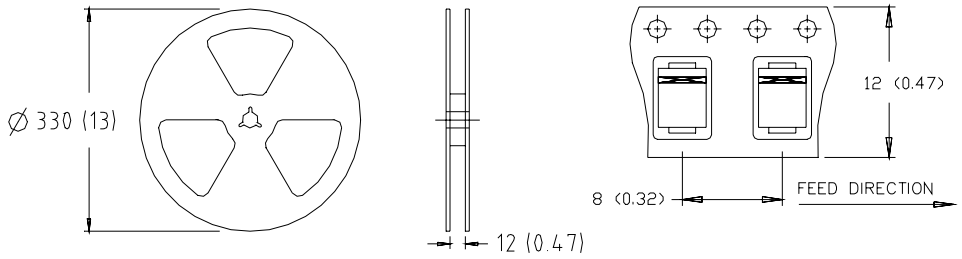
Marking & Identification

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

15	M	Q	040	N	TR	PbF
1	2	3	4	5	6	7

1	-	Current Rating
2	-	M = SMA
3	-	Q = Schottky Q Series
4	-	Voltage Rating (040 = 40V)
5	-	N = New SMA
6	-	• none = Box (1000 pieces)
		• TR = Tape & Reel (7500 pieces)
7	-	• none = Standard Production
		• 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.

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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