

Bulletin PD-2.397 rev. G 07/04

International IOR Rectifier

10BQ040

SCHOTTKY RECTIFIER

1 Amp

$$I_{F(AV)} = 1 \text{ Amp}$$

$$V_R = 40V$$

Major Ratings and Characteristics

Characteristics	10BQ040	Units
$I_{F(AV)}$ Rectangular waveform	1.0	A
V_{RRM}	40	V
I_{FSM} @tp = 5 μ s sine	430	A
V_F @ 1.0 Apk, $T_J = 125^\circ\text{C}$	0.49	V
T_J range	-55 to 150	$^\circ\text{C}$

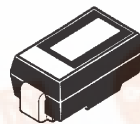
Description/ Features

The 10BQ040 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

10BQ040



SMB

Cathode  Anode

Voltage Ratings

Part number	10BQ040
V_R Max. DC Reverse Voltage (V)	40
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	10BQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	1.0	A	50% duty cycle @ $T_L = 112^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current	430	A	5 μs Sine or 3 μs Rect. pulse
	45		10ms Sine or 6ms Rect. pulse
E_{AS} Non- Repetitive Avalanche Energy	3.0	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1\text{A}$, $L = 6\text{mH}$
I_{AR} Repetitive Avalanche Current	1.0	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	10BQ	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1) * See Fig. 1	0.53	V	@ 1A
	0.70	V	@ 2A
	0.49	V	@ 1A
	0.64	V	@ 2A
I_{RM} Max. Reverse Leakage Current (1) * See Fig. 2	0.1	mA	$T_J = 25^\circ\text{C}$
	4	mA	$T_J = 125^\circ\text{C}$
C_T Typical Junction Capacitance	80	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 Charge (Rated V_R)	10000	V/ μs	

(1) Pulse Width < 300 μs , Duty Cycle < 2%

Thermal-Mechanical Specifications

Parameters	10BQ	Units	Conditions
T_J Max. Junction Temperature Range (*)	-55 to 150	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
R_{thJL} Max. Thermal Resistance Junction to Lead (**)	36	$^\circ\text{C}/\text{W}$	DC operation
R_{thJA} Max. Thermal Resistance Junction to Ambient	80	$^\circ\text{C}/\text{W}$	
wt Approximate Weight	0.10(0.003)	g(oz.)	
Case Style	SMB		Similar DO-214AA
Device Marking	IR1F		

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

(**) Mounted 1 inch square PCB

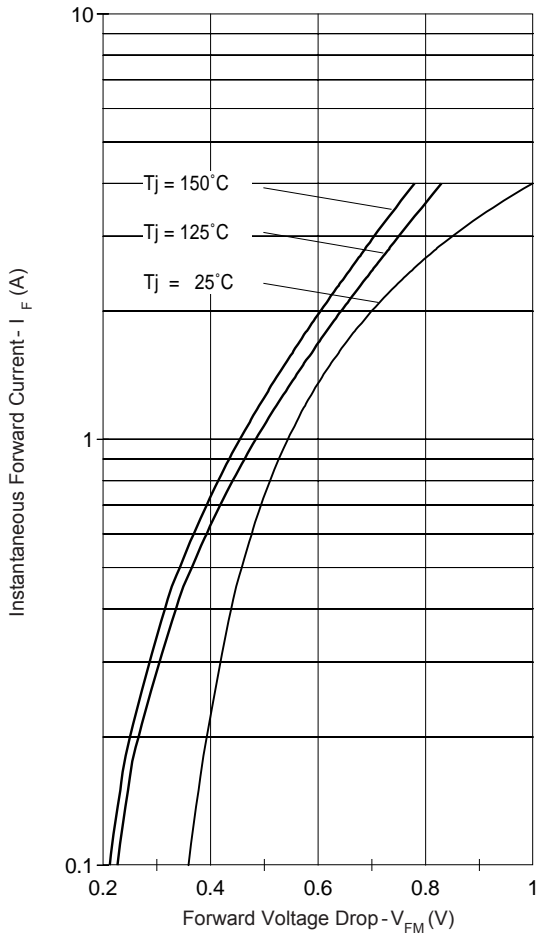


Fig. 1 - Maximum Forward Voltage Drop Characteristics

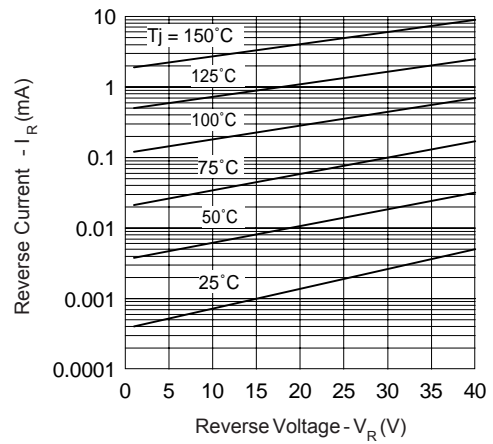


Fig. 2 - Typical Peak Reverse Current Vs. Reverse Voltage

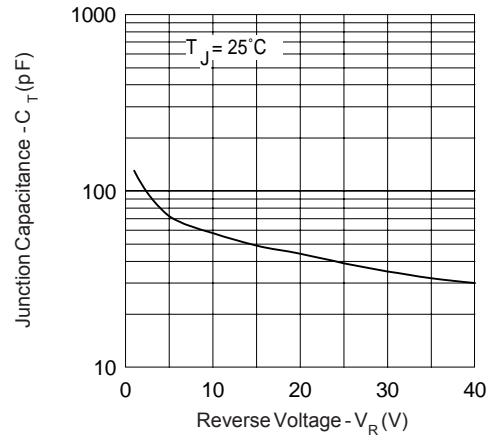


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

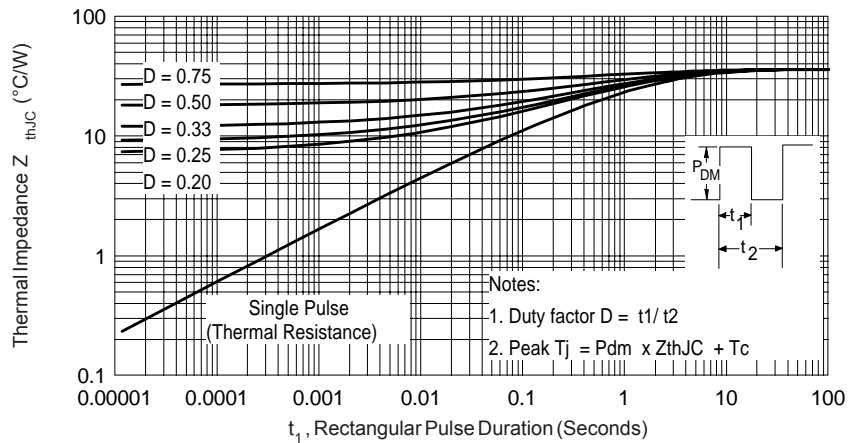


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

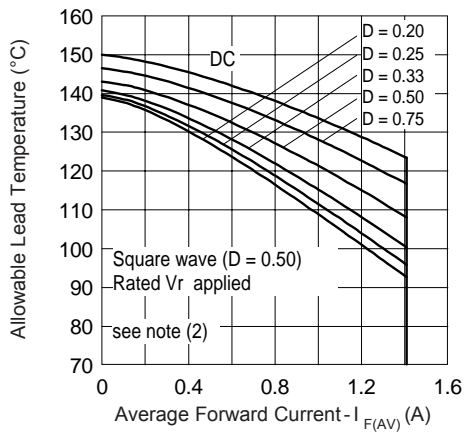


Fig. 4 - Maximum Average Forward Current Vs. Allowable Lead Temperature

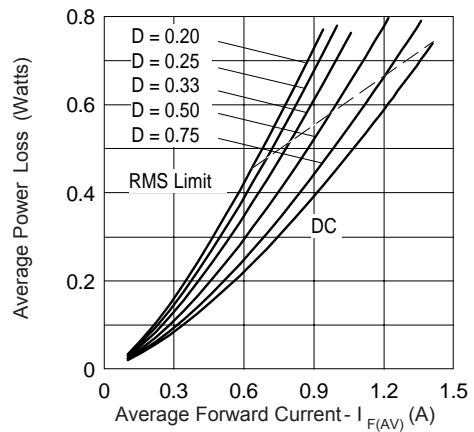


Fig. 5 - Maximum Average Forward Dissipation Vs. Average Forward Current

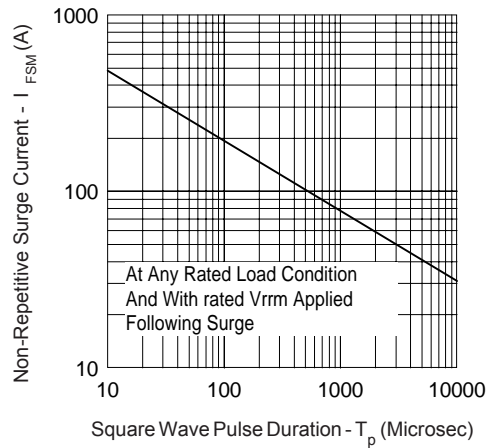
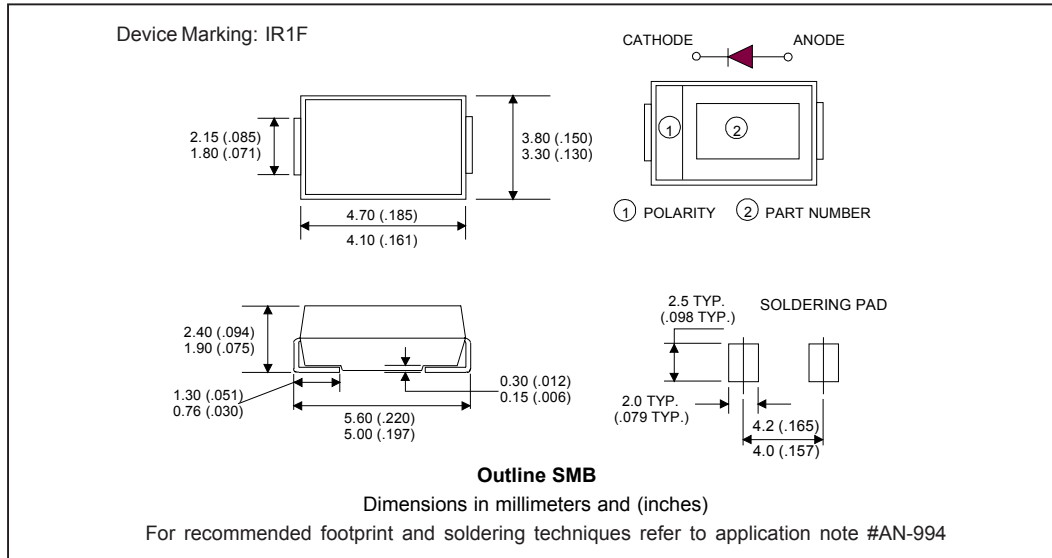


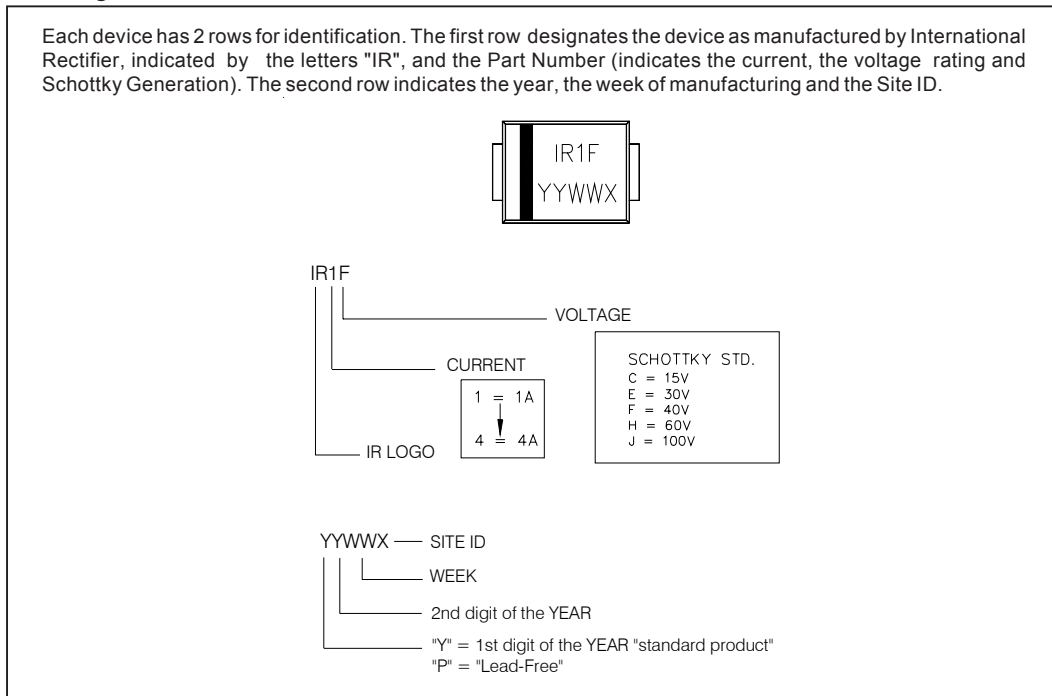
Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

- (2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
 $Pd = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
 $Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_{R1} (1 - D)$; $I_{R1} @ V_{R1} = 80\% \text{ rated } V_R$

Outline Table



Marking & Identification

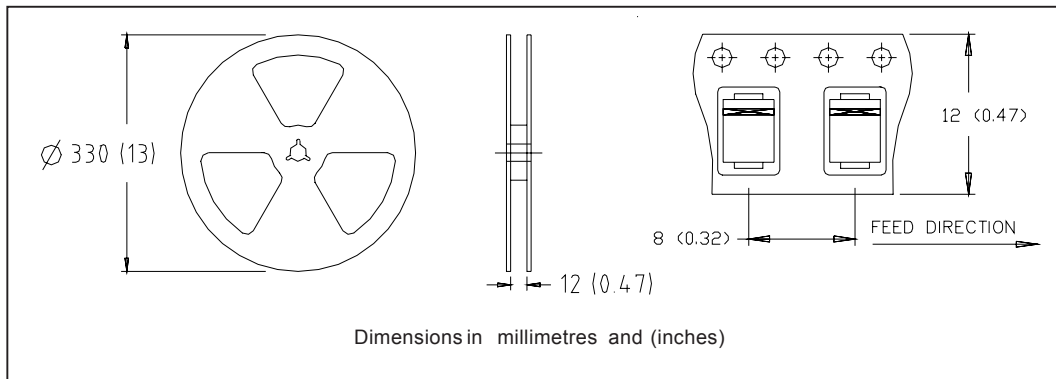


10BQ040

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International
IR Rectifier

Tape & Reel Information



Ordering Information Table

Device Code	10	B	Q	040	TR	-
	①	②	③	④	⑤	⑥
1	-	Current Rating				
2	-	B = Single Lead Diode				
3	-	Q = Schottky Q Series				
4	-	Voltage Rating (040 = 40V)				
5	-	• none = Box (1000 pieces)				
		• TR = Tape & Reel (3000 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
IR Rectifier

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