

# International IOR Rectifier

## 50WQ06FN

SCHOTTKY RECTIFIER

5.5 Amp

$$I_{F(AV)} = 5.5\text{Amp}$$

$$V_R = 60\text{V}$$

### Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	5.5	A
$V_{RRM}$	60	V
$I_{FSM}$ @tp = 5 $\mu$ s sine	320	A
$V_F$ @5 Apk, $T_J = 125^\circ\text{C}$	0.54	V
$T_J$ range	-40 to 150	$^\circ\text{C}$

### Description/ Features

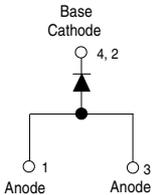
The 50WQ06FN surface mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Popular D-PAK outline
- Small foot print, surface moutable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

### Case Styles



**D-PAK (TO-252AA)**



## Voltage Ratings

Part number	50WQ06FN
$V_R$ Max. DC Reverse Voltage (V)	60
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)	

## Absolute Maximum Ratings

Parameters	50WQ...	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	5.5	A	50% duty cycle @ $T_C = 132^\circ\text{C}$ , rectangular wave form
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	320	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse
	105		10ms Sine or 6ms Rect. pulse
$E_{AS}$ Non-Repetitive Avalanche Energy	7	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 1.2$ Amps, $L = 10$ mH
$I_{AR}$ Repetitive Avalanche Current	0.8	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical

## Electrical Specifications

Parameters	50WQ...	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop * See Fig. 1 (1)	0.57	V	@ 5A
	0.74	V	@ 10A
	0.54	V	@ 5A
	0.68	V	@ 10A
$I_{RM}$ Max. Reverse Leakage Current * See Fig. 2 (1)	3	mA	$T_J = 25^\circ\text{C}$
	35	mA	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold Voltage	0.35	V	$T_J = T_J$ max.
$r_t$ Forward Slope Resistance	25.5	m $\Omega$	
$C_T$ Typical Junction Capacitance	360	pF	$V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ Typical Series Inductance	5.0	nH	Measured lead to lead 5mm from package body
dv/dt Max. Voltage Rate of Change	10000	V/ $\mu\text{s}$	(Rated $V_R$ )

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal-Mechanical Specifications

Parameters	50WQ...	Units	Conditions
$T_J$ Max. Junction Temperature Range(*)	-40 to 150	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-40 to 150	$^\circ\text{C}$	
$R_{thJC}$ Max. Thermal Resistance Junction to Case	3.0	$^\circ\text{C/W}$	DC operation * See Fig. 4
wt Approximate Weight	0.3(0.01)	g(oz.)	
Case Style	D - PAK		Similar to TO-252AA
Device Marking	50WQ06FN		

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

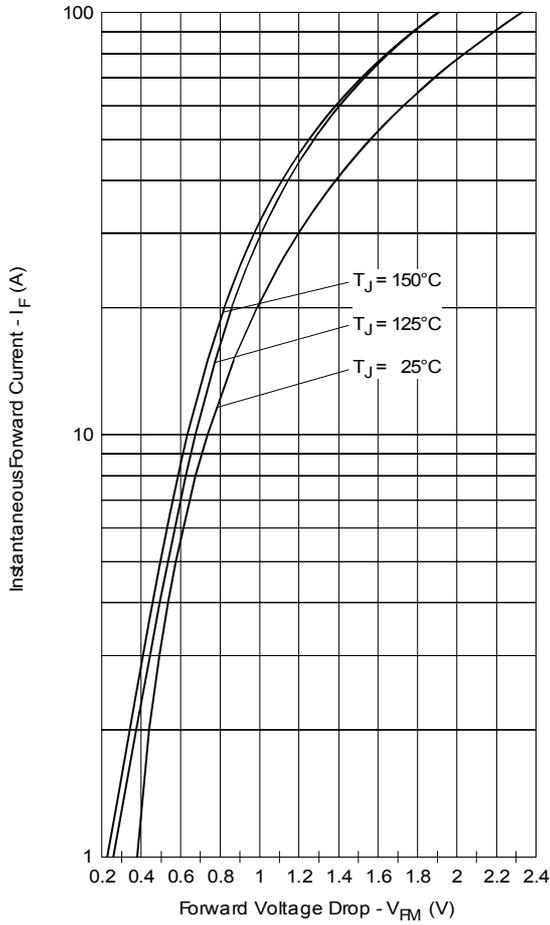


Fig. 1 - Maximum Forward Voltage Drop Characteristics

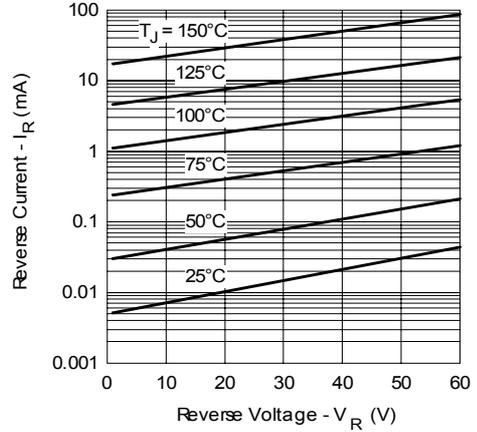


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

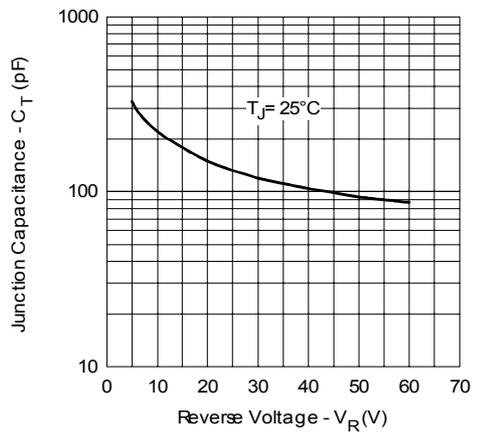


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

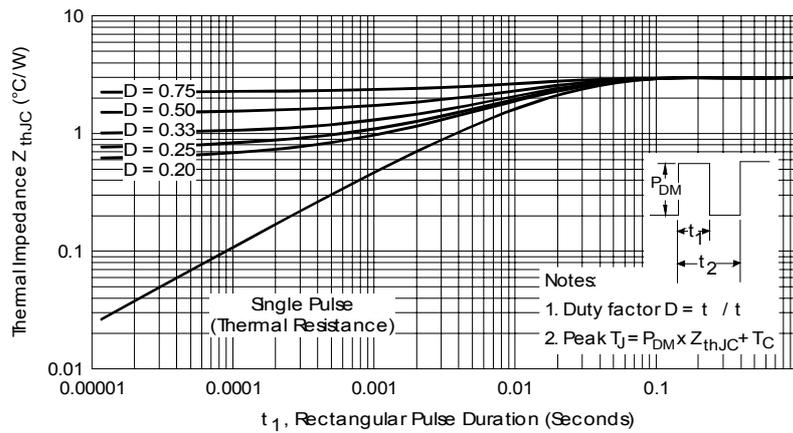


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

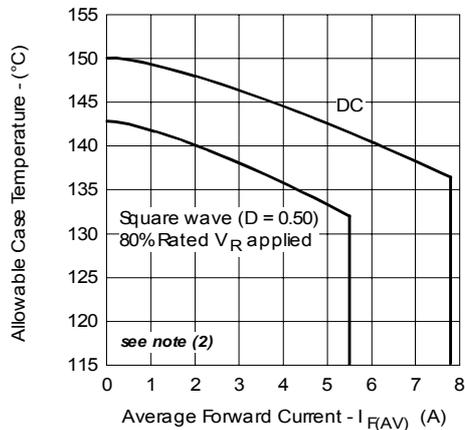


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

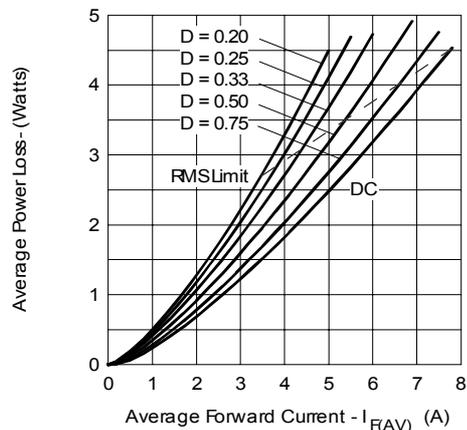


Fig. 6 - Forward Power Loss Characteristics

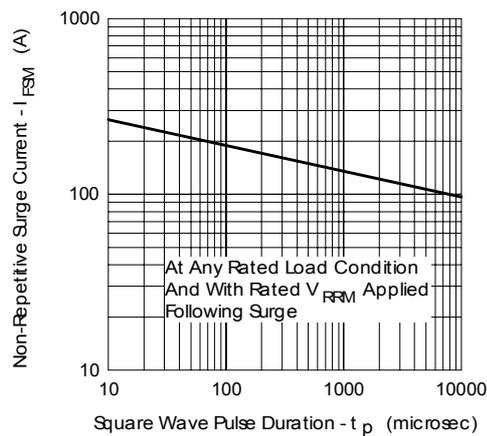


Fig. 7 - Maximum Non-Repetitive Surge Current

- (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);  
 $Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 80\% \text{ rated } V_R$

Outline Table

**NOTES:**  
 1.- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994  
 2.- DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS]  
 3.- LEAD DIMENSION UNCONTROLLED IN L.S.  
 4.- DIMENSION D1, E1, L3 & b3 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.  
 5.- SECTION C-C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 AND 0.10 [0.13 AND 0.25] FROM THE LEAD TIP.  
 6.- DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005 [0.13] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.  
 7.- DIMENSION b1 & c1 APPLIED TO BASE METAL ONLY.  
 8.- DATUM A & B TO BE DETERMINED AT DATUM PLANE H.  
 9.- OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

SYMBOL	DIMENSIONS				UNITS
	MILLIMETERS		INCHES		
A	2.18	2.39	.086	.094	4
A1	-	0.15	-	.005	
b	0.64	0.89	.025	.035	7
b1	0.65	0.79	.025	.031	
b2	0.76	1.14	.030	.045	4
b3	4.95	5.46	.195	.215	
c	0.46	0.61	.018	.024	7
c1	0.41	0.56	.016	.022	
c2	0.46	0.89	.018	.035	6
D	5.97	6.22	.235	.245	
D1	5.21	-	.205	-	6
E	6.35	6.73	.250	.265	
E1	4.52	-	.170	-	4
h	2.29	BSC	.090	BSC	
H	9.40	10.41	.370	.410	3
L	1.40	1.78	.055	.070	
L1	2.74	BSC	.108	REF.	3
L2	0.51	BSC	.020	BSC	
L3	0.89	1.27	.035	.050	4
L4	-	1.02	-	.040	
L5	1.14	1.52	.045	.060	3
#	0°	10°	0°	10°	
#1	0°	15°	0°	15°	
#2	25°	35°	25°	35°	

**LEAD ASSIGNMENTS**  
 1- GATE  
 2- DRAIN  
 3- SOURCE  
 4- DRAIN

**HEXFET**  
 1- GATE  
 2- DRAIN  
 3- SOURCE  
 4- DRAIN

**IGBT & CoPAK**  
 1- GATE  
 2- COLLECTOR  
 3- EMITTER  
 4- COLLECTOR

**Modified JEDEC outline TO-252AA**  
 Dimensions in millimeters and (inches)

Part Marking Information

EXAMPLE: THIS IS A 50WQ06FN  
 LOT CODE 8024  
 ASSEMBLED ON WW 02, 2000

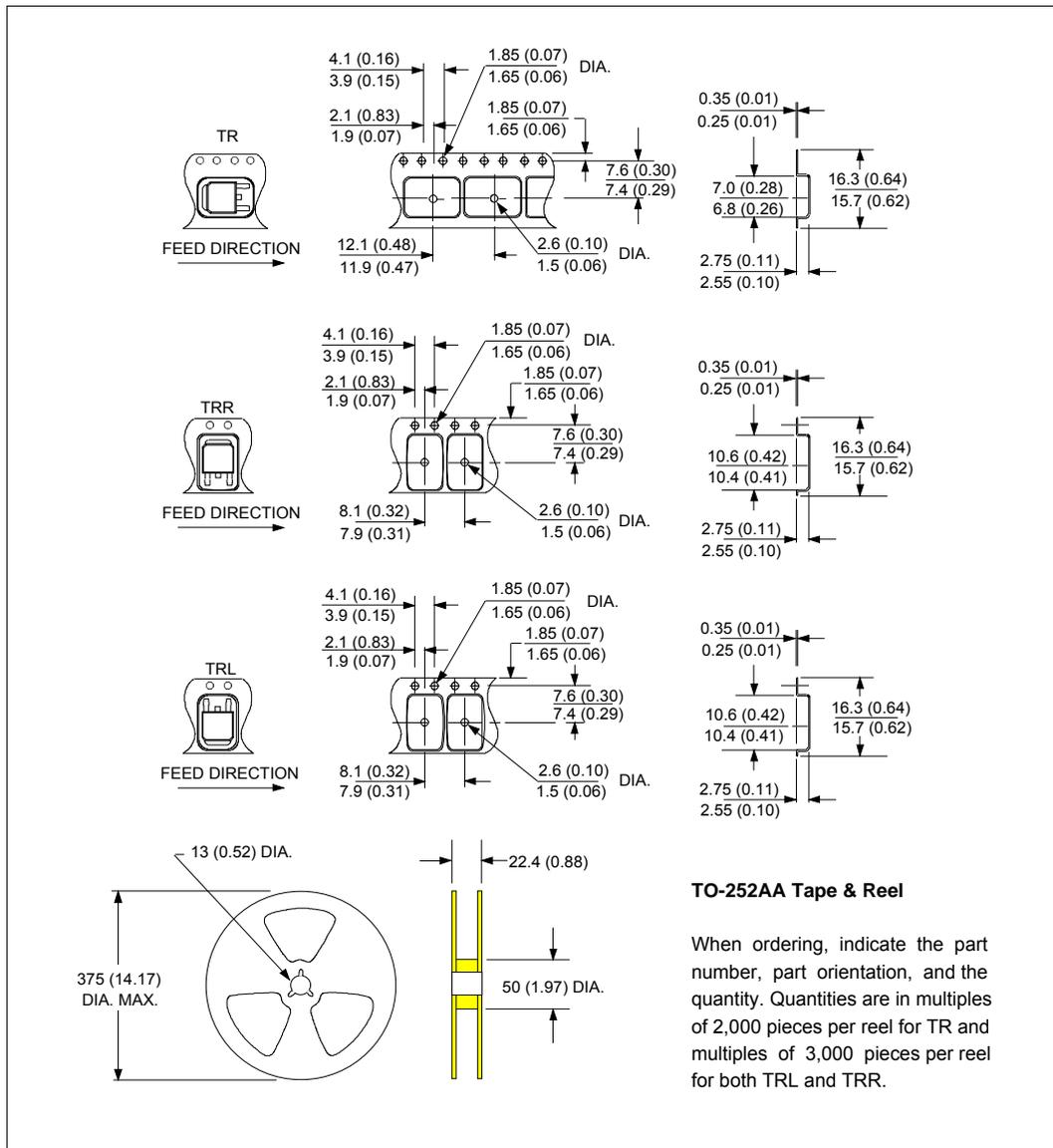
INTERNATIONAL  
 RECTIFIER  
 LOGO

ASSEMBLY  
 LOT CODE

PART NUMBER

DATE CODE  
 YEAR 0 = 2000  
 WEEK 02  
 X = SITE ID

Tape & Reel Information



Ordering Information Table

Device Code	
50	W
Q	06
FN	TRL
-	
①	②
③	④
⑤	⑥
⑦	

<b>1</b>	-	Current Rating (5.5A)
<b>2</b>	-	Package Identifier W = D-Pak
<b>3</b>	-	Schottky "Q" Series
<b>4</b>	-	Voltage Rating (06 = 60V)
<b>5</b>	-	FN = TO-252AA
<b>6</b>	-	<ul style="list-style-type: none"> <li>• none = Tube (50 pieces)</li> <li>• TR = Tape &amp; Reel</li> <li>• TRL = Tape &amp; Reel (Left Oriented)</li> <li>• TRR = Tape &amp; Reel (Right Oriented)</li> </ul>
<b>7</b>	-	<ul style="list-style-type: none"> <li>• none = Standard Production</li> <li>• PbF = Lead-Free</li> </ul>

Data and specifications subject to change without notice.  
 This product has been designed and qualified for AEC Q101 Level.  
 Qualification Standards can be found on IR's Web site.



## Notice

The products described herein were acquired by Vishay Intertechnology, Inc., as part of its acquisition of International Rectifier's Power Control Systems (PCS) business, which closed in April 2007. Specifications of the products displayed herein are pending review by Vishay and are subject to the terms and conditions shown below.

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.

International Rectifier®, IR®, the IR logo, HEXFET®, HEXSense®, HEXDIP®, DOL®, INTERO®, and POWIRTRAIN® are registered trademarks of International Rectifier Corporation in the U.S. and other countries. All other product names noted herein may be trademarks of their respective owners.