

International  
**IR** Rectifier

**50WQ03FN**

**SCHOTTKY RECTIFIER**

**5.5 Amp**



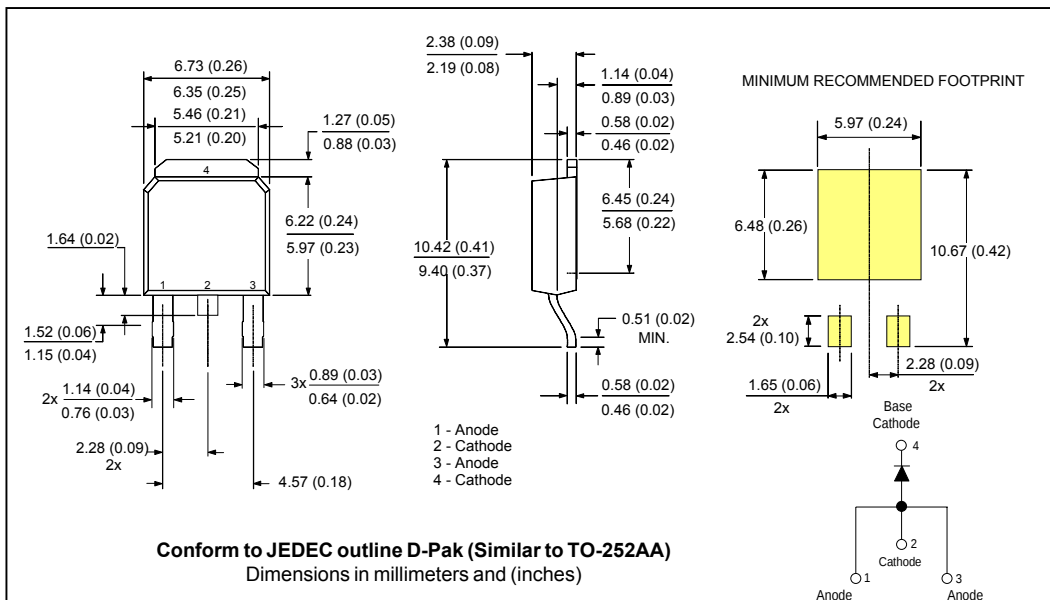
#### Major Ratings and Characteristics

| Characteristics                  | 50WQ03FN   | Units      |
|----------------------------------|------------|------------|
| $I_{F(AV)}$ Rectangular waveform | 5.5        | A          |
| $V_{RRM}$                        | 30         | V          |
| $I_{FSM}$ @ $t_p=5\mu s$ sine    | 320        | A          |
| $V_F$ @5Apk, $T_J=125^\circ C$   | 0.35       | V          |
| $T_J$ range                      | -40 to 150 | $^\circ C$ |

#### Description/ Features

The 50WQ03FN 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 mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



## Voltage Ratings

| Part number                                     | 50WQ03FN |
|-------------------------------------------------|----------|
| $V_R$ Max. DC Reverse Voltage (V)               | 30       |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |          |

## Absolute Maximum Ratings

| Parameters                                                              | 50WQ... | Units | Conditions                                                                                                               |
|-------------------------------------------------------------------------|---------|-------|--------------------------------------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward Current<br>* See Fig. 5                | 5.5     | A     | 50% duty cycle @ $T_C = 136^\circ\text{C}$ , rectangular waveform                                                        |
| $I_{FSM}$ 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                                                                      |
|                                                                         | 130     |       | 10ms Sine or 6ms Rect. pulse                                                                                             |
| $E_{AS}$ Non-Repetitive Avalanche Energy                                | 10      | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 2.0$ Amps, $L = 10$ mH                                                              |
| $I_{AR}$ Repetitive Avalanche Current                                   | 2.0     | A     | Current decaying linearly to zero in 1 $\mu\text{sec}$<br>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<br>* See Fig. 1 (1)    | 0.46    | V          | @ 5A<br>$T_J = 25^\circ\text{C}$                                        |
|                                                           | 0.53    | V          | @ 10A<br>$T_J = 25^\circ\text{C}$                                       |
|                                                           | 0.35    | V          | @ 5A<br>$T_J = 125^\circ\text{C}$                                       |
|                                                           | 0.46    | V          | @ 10A<br>$T_J = 125^\circ\text{C}$                                      |
| $I_{RM}$ Max. Reverse Leakage Current<br>* See Fig. 2 (1) | 3       | mA         | $T_J = 25^\circ\text{C}$                                                |
|                                                           | 58      | mA         | $T_J = 125^\circ\text{C}$                                               |
| $V_{F(TO)}$ Threshold Voltage                             | 0.19    | V          | $T_J = T_J$ max.                                                        |
| $r_t$ Forward Slope Resistance                            | 22.22   | m $\Omega$ |                                                                         |
| $C_T$ Typical Junction Capacitance                        | 590     | 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                             |

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

## Thermal-Mechanical Specifications

| Parameters                                          | 50W...     | 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       |

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

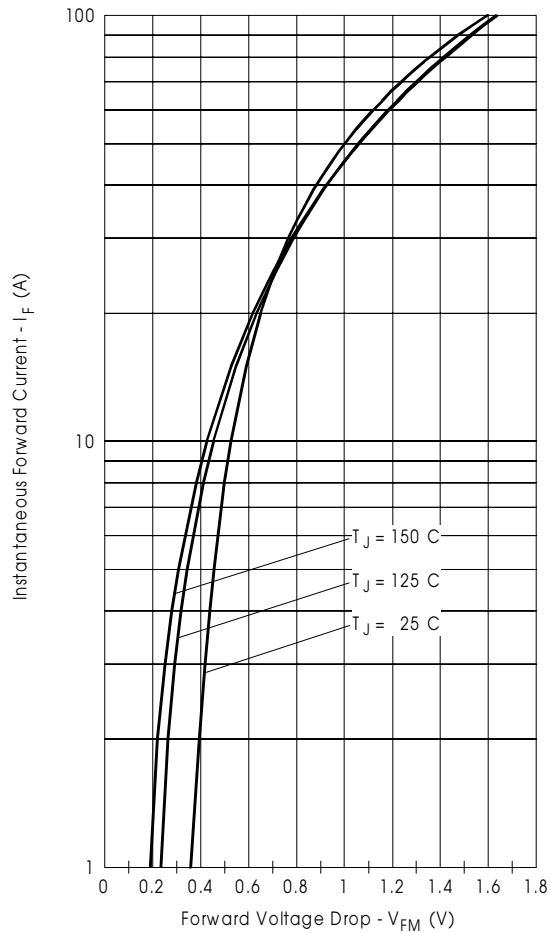


Fig. 1 - Maximum Forward Voltage Drop Characteristics

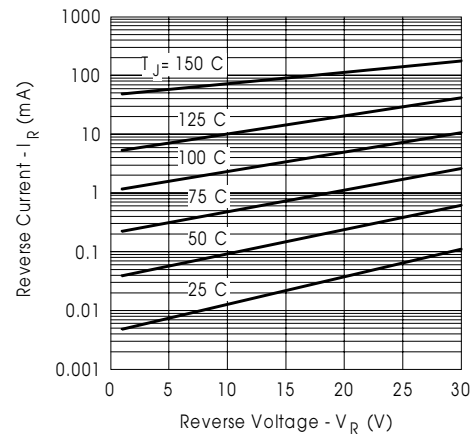


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

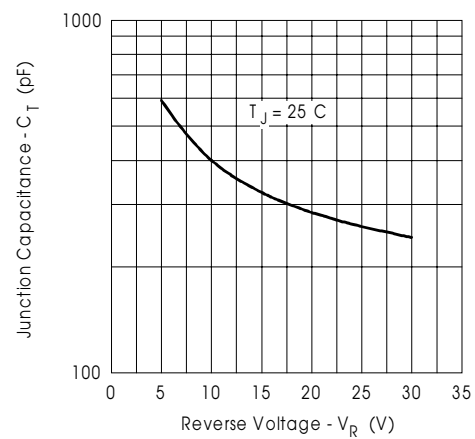


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

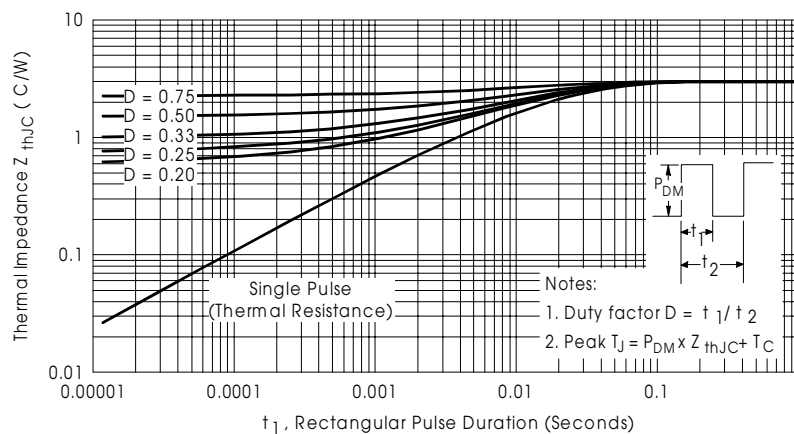


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

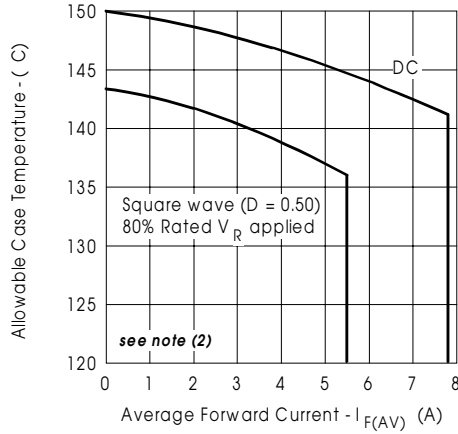


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

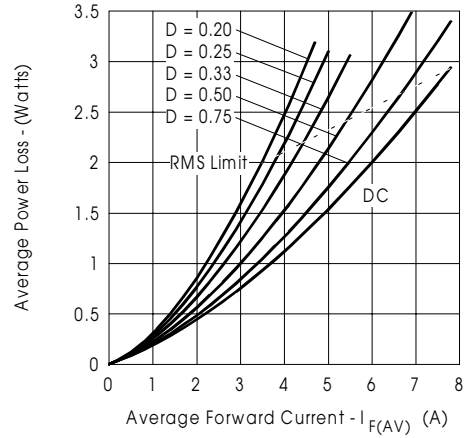


Fig. 6 - Forward Power Loss Characteristics

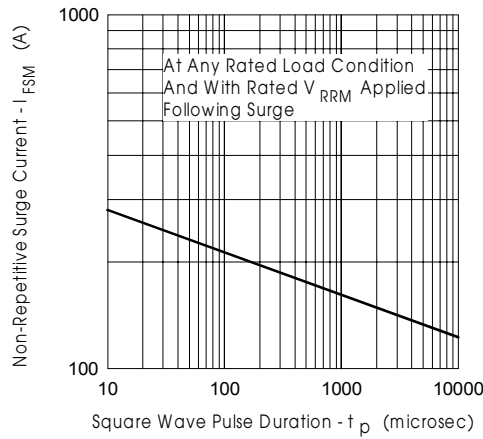


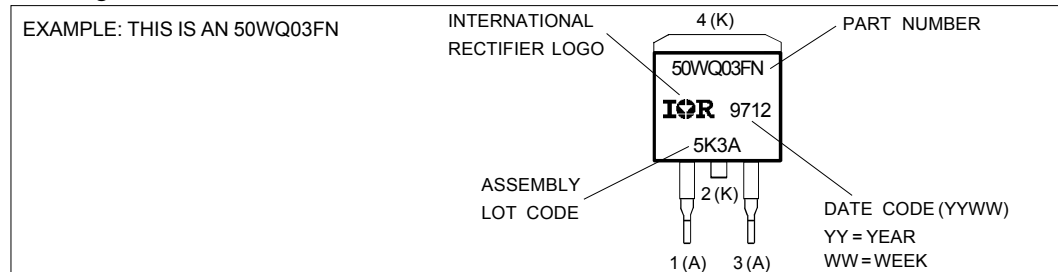
Fig. 7 - Maximum Non-Repetitive Surge Current

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

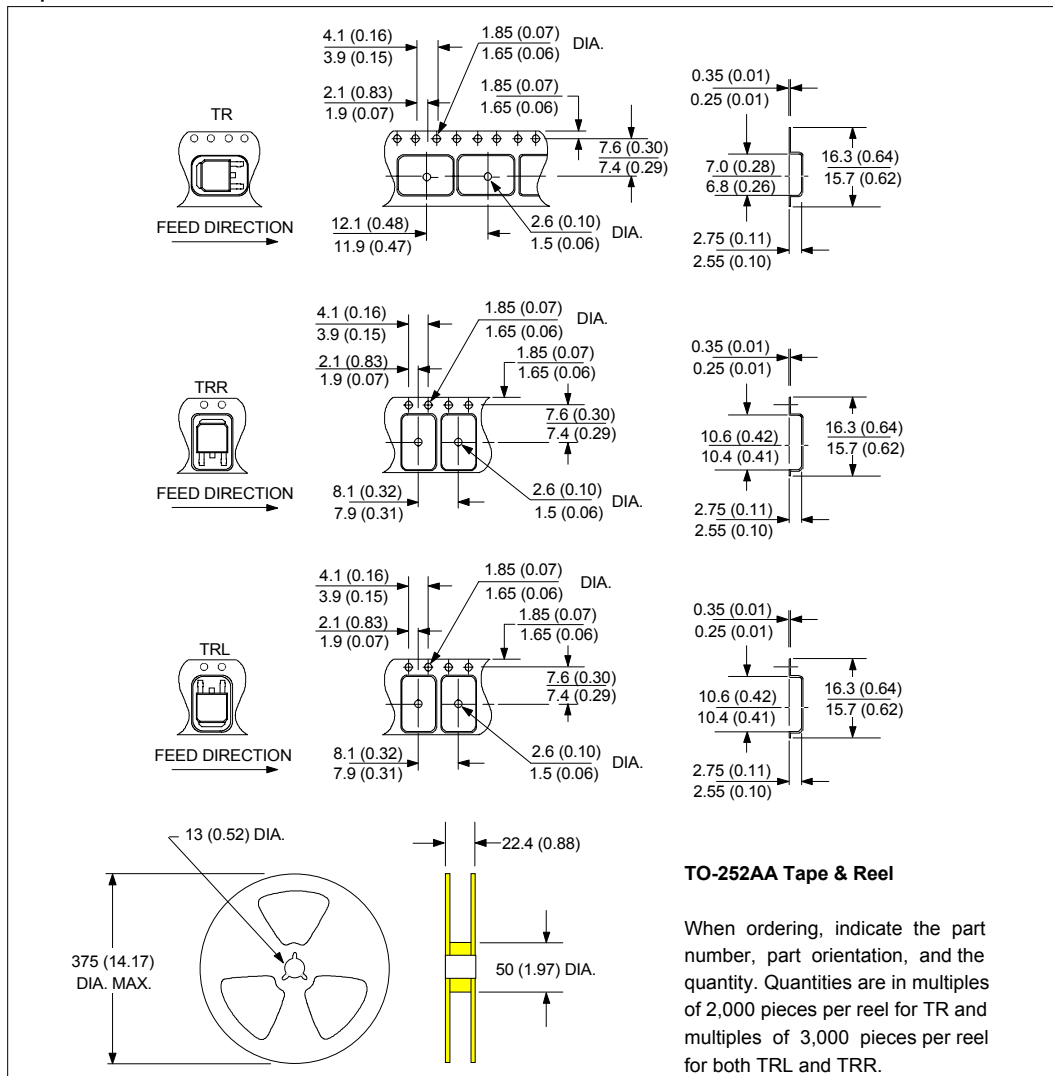
$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

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

## Marking Information



## Tape & Reel Information



50WQ03FN

Bulletin PD-20551 rev. C 02/02

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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.

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