

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

$$V_R = 40\text{V}$$

Major Ratings and Characteristics

| Characteristics | Values | Units |
|---|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform | 5.5 | A |
| V_{RRM} | 40 | V |
| I_{FSM} @tp = 5 μ s sine | 340 | A |
| V_F @5 Apk, $T_J = 125^\circ\text{C}$ | 0.44 | V |
| T_J range | -40 to 150 | $^\circ\text{C}$ |

Description/ Features

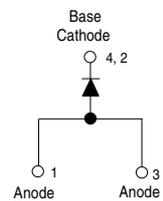
The 50WQ04FN surface mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- 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

Case Styles



D-PAK (TO-252AA)



50WQ04FN

Bulletin PD-20524 rev. H 05/06



Voltage Ratings

| Part number | 50WQ04FN |
|---|----------|
| V_R Max. DC Reverse Voltage (V) | 40 |
| 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 @ $T_C = 135^\circ\text{C}$, rectangular wave form |
| I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7 | 550 | A | 5 μs Sine or 3 μs Rect. pulse |
| | 90 | | 10ms Sine or 6ms Rect. pulse |
| E_{AS} Non-Repetitive Avalanche Energy | 9 | mJ | $T_J = 25^\circ\text{C}$, $I_{AS} = 1.5$ Amps, $L = 8$ mH |
| I_{AR} Repetitive Avalanche Current | 1.2 | 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 | 50WQ... | Units | Conditions |
|---|---------|------------|---|
| V_{FM} Max. Forward Voltage Drop * See Fig. 1 (1) | 0.51 | V | @ 5A |
| | 0.63 | V | @ 10A |
| | 0.44 | V | @ 5A |
| | 0.59 | V | @ 10A |
| I_{RM} Max. Reverse Leakage Current * See Fig. 2 (1) | 3 | mA | $T_J = 25^\circ\text{C}$ |
| | 40 | mA | $T_J = 125^\circ\text{C}$ |
| $V_{F(TO)}$ Threshold Voltage | 0.27 | V | $T_J = T_J$ max. |
| r_t Forward Slope Resistance | 26.77 | m Ω | |
| C_T Typical Junction Capacitance | 405 | pF | $V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) 25°C |
| L_S Typical Series Inductance | 5.0 | nH | Measured lead to lead 5mm from package body |

(1) Pulse Width < 300 μs , 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 | 50WQ04FN | | |

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

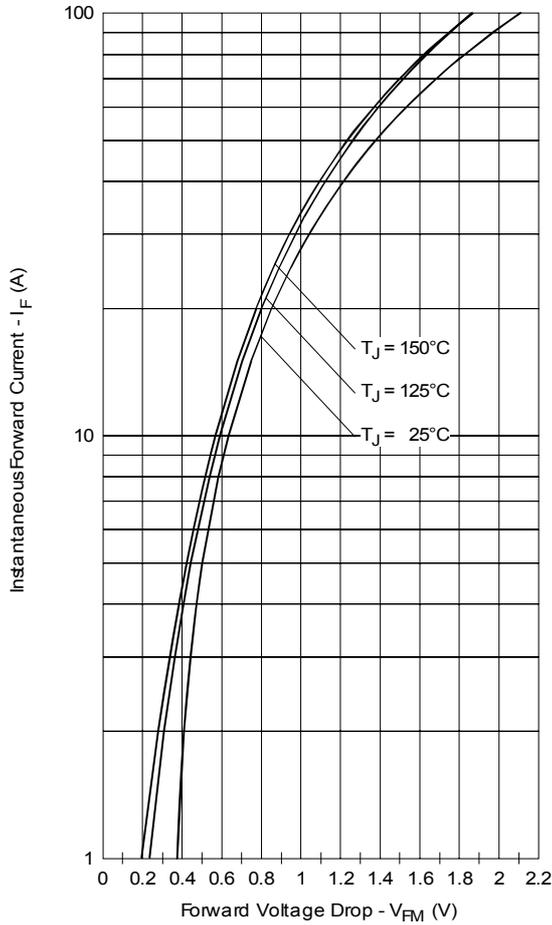


Fig. 1 - Maximum Forward Voltage Drop Characteristics

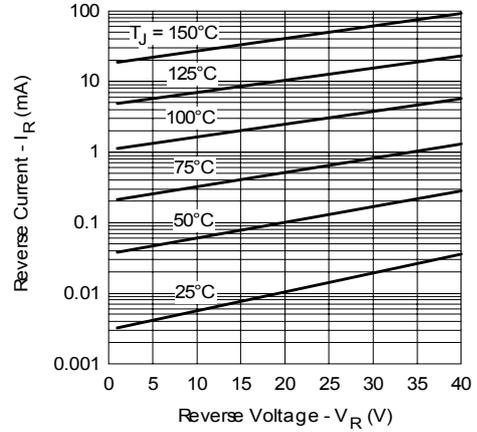


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

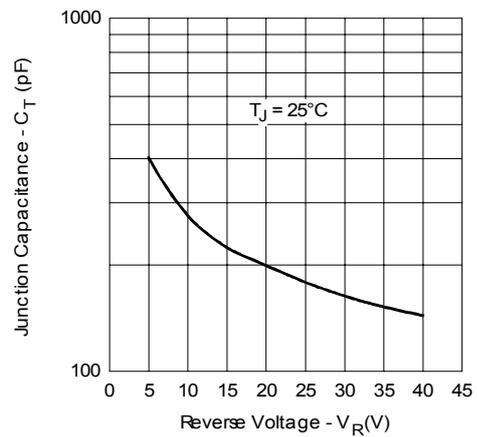


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

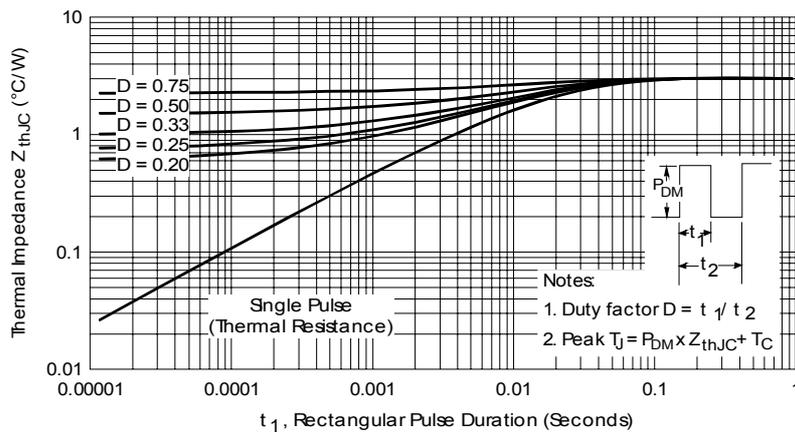


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

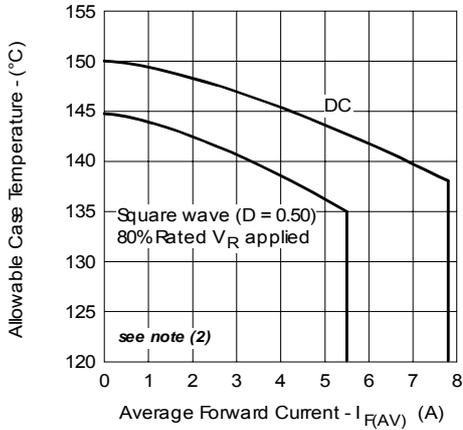


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

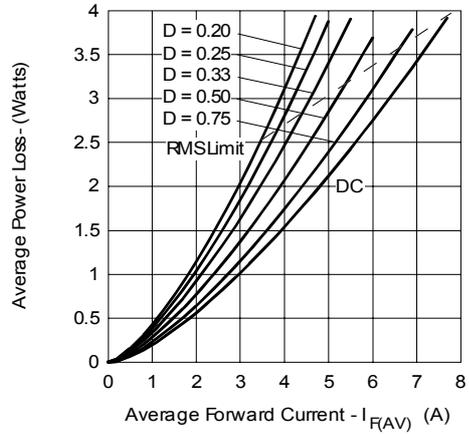


Fig. 6 - Forward Power Loss Characteristics

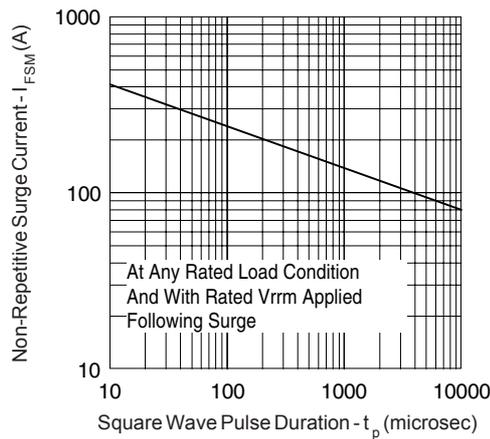


Fig. 7 - Maximum Non-Repetitive Surge Current

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

Outline Table

NOTES:
 1.- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
 2.- DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS]
 3.- LEAD DIMENSION UNCONTROLLED IN U.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.

| DIMENSIONS | DIMENSIONS | | | | N O T E S |
|------------|-------------|-------|--------|------|-----------|
| | MILLIMETERS | | INCHES | | |
| A | 2.18 | 2.39 | .086 | .094 | |
| A1 | - | 0.15 | - | .005 | |
| b | 0.64 | 0.89 | .025 | .035 | |
| b1 | 0.65 | 0.79 | .025 | .031 | 7 |
| b2 | 0.76 | 1.14 | .030 | .045 | |
| b3 | 4.95 | 6.46 | .195 | .255 | |
| c | 0.46 | 0.61 | .018 | .024 | |
| c1 | 0.41 | 0.56 | .016 | .022 | 7 |
| c2 | 0.46 | 0.89 | .018 | .035 | |
| D | 5.97 | 6.22 | .235 | .245 | 6 |
| D1 | 5.21 | - | .205 | - | 4 |
| E | 6.35 | 6.73 | .250 | .265 | 6 |
| E1 | 4.32 | - | .170 | - | 4 |
| φ | 2.29 | BSC | .090 | BSC | |
| H | 9.40 | 10.41 | .370 | .410 | |
| L | 1.40 | 1.78 | .055 | .070 | |
| L1 | 2.74 | BSC | .108 | BSC | |
| L3 | 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 |
| φ | 0" | 10" | 0" | 10" | |
| φ1 | 0" | 15" | 0" | 15" | |
| φ2 | 25" | 35" | 25" | 35" | |

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

HEXFET
 1.- GATE
 2.- COLLECTOR
 3.- EMITTER
 4.- COLLECTOR

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 50WQ04FN
 LOT CODE 8024
 ASSEMBLED ON WW 02, 2000

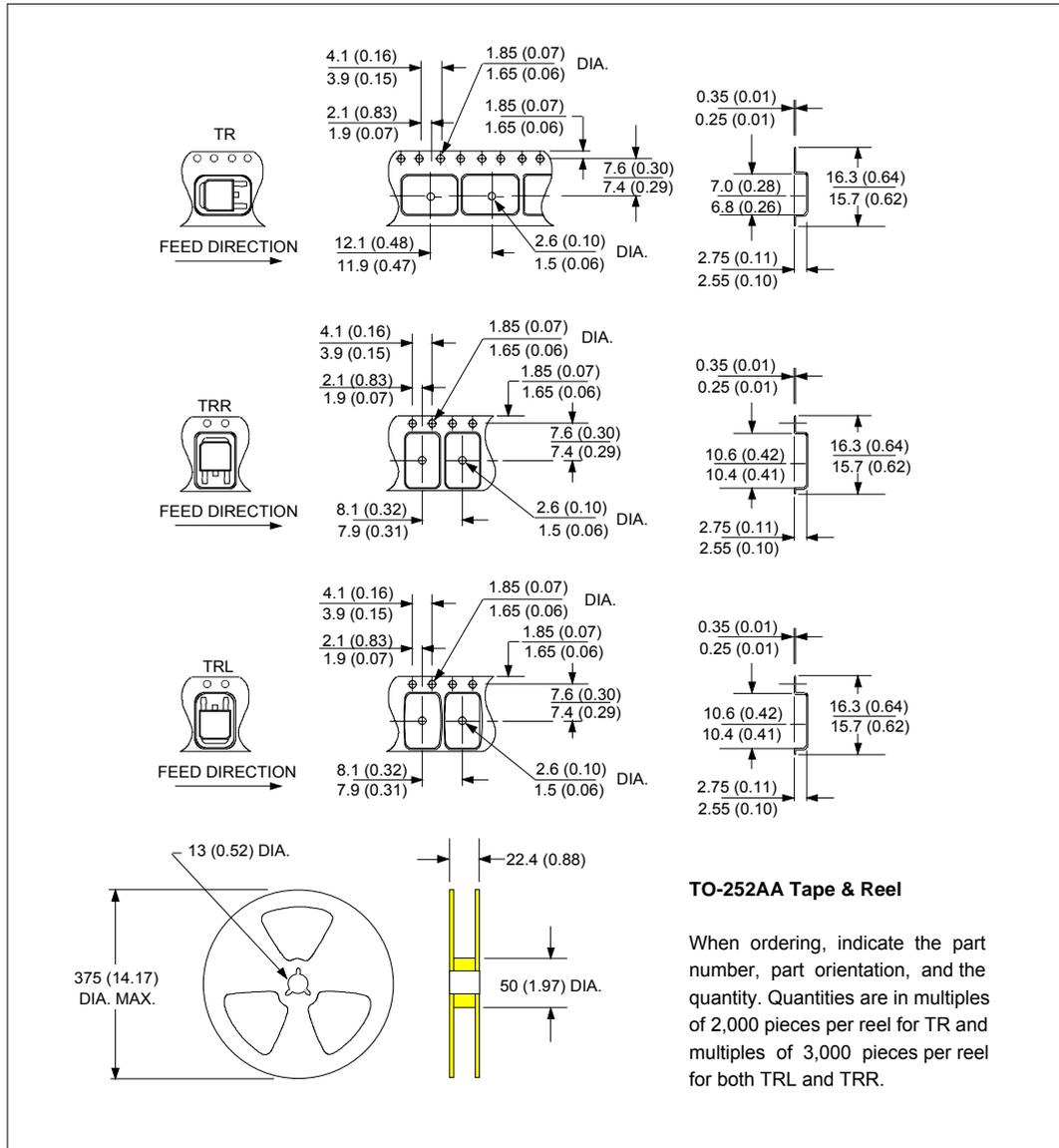
INTERNATIONAL
 RECTIFIER
 LOGO

ASSEMBLY
 LOT CODE

PART NUMBER

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

Tape & Reel Information



Ordering Information Table

| Device Code | | | | | | | | | | | | | | | |
|-------------|--|----|----|----|-----|----|-----|---|---|---|---|---|---|---|---|
| | <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">50</td> <td style="padding: 5px;">W</td> <td style="padding: 5px;">Q</td> <td style="padding: 5px;">04</td> <td style="padding: 5px;">FN</td> <td style="padding: 5px;">TRL</td> <td style="padding: 5px;">-</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> <td style="text-align: center;">⑦</td> </tr> </table> | 50 | W | Q | 04 | FN | TRL | - | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 50 | W | Q | 04 | FN | TRL | - | | | | | | | | | |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | | | | | | | | | |
| 1 | - Current Rating (5.5A) | | | | | | | | | | | | | | |
| 2 | - Package Identifier W = D-Pak | | | | | | | | | | | | | | |
| 3 | - Schottky "Q" Series | | | | | | | | | | | | | | |
| 4 | - Voltage Rating (04 = 40V) | | | | | | | | | | | | | | |
| 5 | - FN = TO-252AA | | | | | | | | | | | | | | |
| 6 | - <ul style="list-style-type: none"> • none = Tube (50 pieces) • TR = Tape & Reel • TRL = Tape & Reel (Left Oriented) • TRR = Tape & Reel (Right Oriented) | | | | | | | | | | | | | | |
| 7 | - <ul style="list-style-type: none"> • none = Standard Production • PbF = Lead-Free | | | | | | | | | | | | | | |

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.



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