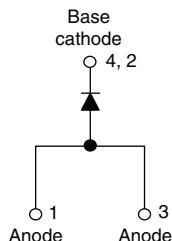


## Schottky Rectifier, 3.5 A


**D-PAK**


### FEATURES

- 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
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for AEC Q101 level



Available  
**RoHS\***  
COMPLIANT

### PRODUCT SUMMARY

|             |       |
|-------------|-------|
| $I_{F(AV)}$ | 3.5 A |
| $V_R$       | 40 V  |

### DESCRIPTION

The 30WQ04FNPbF 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, freewheeling diodes, battery charging, and reverse battery protection.

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS            | VALUES      | UNITS      |
|-------------|----------------------------|-------------|------------|
| $I_{F(AV)}$ | Rectangular waveform       | 3.5         | A          |
| $V_{RRM}$   |                            | 40          | V          |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine       | 500         | A          |
| $V_F$       | 3 Apk, $T_J = 125^\circ C$ | 0.49        | V          |
| $T_J$       |                            | - 40 to 150 | $^\circ C$ |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 30WQ04FNPbF | UNITS |
|--------------------------------------|-----------|-------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 40          | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |             |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                            | SYMBOL      | TEST CONDITIONS                                                                                                     | VALUES | UNITS |
|----------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------|--------|-------|
| Maximum average forward current<br>See fig. 5                        | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 135^\circ C$ , rectangular waveform                                                       | 3.5    | A     |
| Maximum peak one cycle<br>non-repetitive surge current<br>See fig. 7 | $I_{FSM}$   | 5 $\mu s$ sine or 3 $\mu s$ rect. pulse                                                                             | 500    |       |
|                                                                      |             | 10 ms sine or 6 ms rect. pulse                                                                                      | 80     |       |
| Non-repetitive avalanche energy                                      | $E_{AS}$    | $T_J = 25^\circ C$ , $I_{AS} = 1 A$ , $L = 16 mH$                                                                   | 8.0    | mJ    |
| Repetitive avalanche current                                         | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu s$<br>Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical | 1.0    | A     |

\* Pb containing terminations are not RoHS compliant, exemptions may apply

| ELECTRICAL SPECIFICATIONS                     |                |                                                                                           |                                     |        |       |  |
|-----------------------------------------------|----------------|-------------------------------------------------------------------------------------------|-------------------------------------|--------|-------|--|
| PARAMETER                                     | SYMBOL         | TEST CONDITIONS                                                                           |                                     | VALUES | UNITS |  |
| Maximum forward voltage drop<br>See fig. 1    | $V_{FM}^{(1)}$ | 3 A                                                                                       | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.53   | V     |  |
|                                               |                | 6 A                                                                                       |                                     | 0.67   |       |  |
|                                               |                | 3 A                                                                                       | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.49   |       |  |
|                                               |                | 6 A                                                                                       |                                     | 0.62   |       |  |
| Maximum reverse leakage current<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                        | $V_R = \text{Rated } V_R$           | 2      | mA    |  |
|                                               |                | $T_J = 125\text{ }^{\circ}\text{C}$                                                       |                                     | 24     |       |  |
| Threshold voltage                             | $V_{F(TO)}$    | $T_J = T_J \text{ maximum}$                                                               |                                     | 0.34   | V     |  |
| Forward slope resistance                      | $r_t$          |                                                                                           |                                     | 37.33  | mΩ    |  |
| Typical junction capacitance                  | $C_T$          | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$ |                                     | 189    | pF    |  |
| Typical series inductance                     | $L_S$          | Measured lead to lead 5 mm from package body                                              |                                     | 5.0    | nH    |  |
| Maximum voltage rate of change                | dV/dt          | Rated $V_R$                                                                               |                                     | 10 000 | V/μs  |  |

**Note**(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS            |                                                  |                                        |             |       |
|------------------------------------------------|--------------------------------------------------|----------------------------------------|-------------|-------|
| PARAMETER                                      | SYMBOL                                           | TEST CONDITIONS                        | VALUES      | UNITS |
| Maximum junction and storage temperature range | T <sub>J</sub> <sup>(1)</sup> , T <sub>Stg</sub> |                                        | - 40 to 150 | °C    |
| Maximum thermal resistance, junction to case   | R <sub>thJC</sub>                                | DC operation<br>See fig. 4             | 4.7         | °C/W  |
| Approximate weight                             |                                                  |                                        | 0.3         | g     |
|                                                |                                                  |                                        | 0.01        | oz.   |
| Marking device                                 |                                                  | Case style D-PAK (similar to TO-252AA) | 30WQ04FN    |       |

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

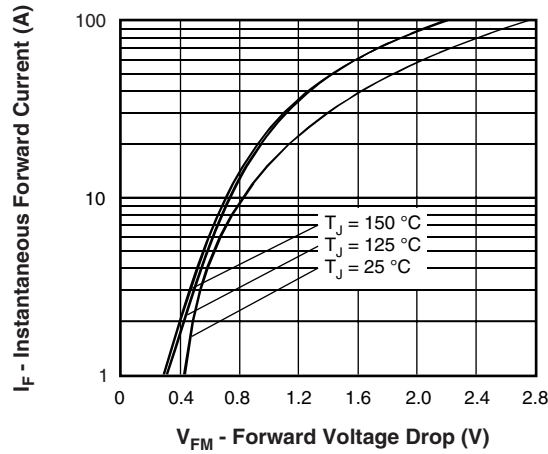


Fig. 1 - Maximum Forward Voltage Drop Characteristics

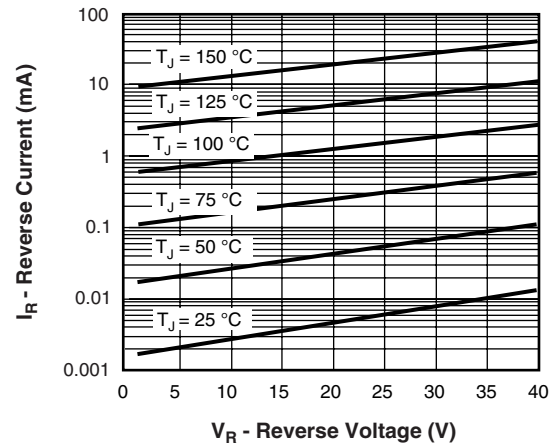


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

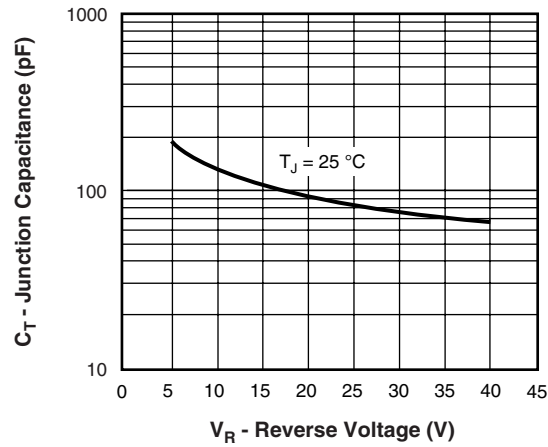


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

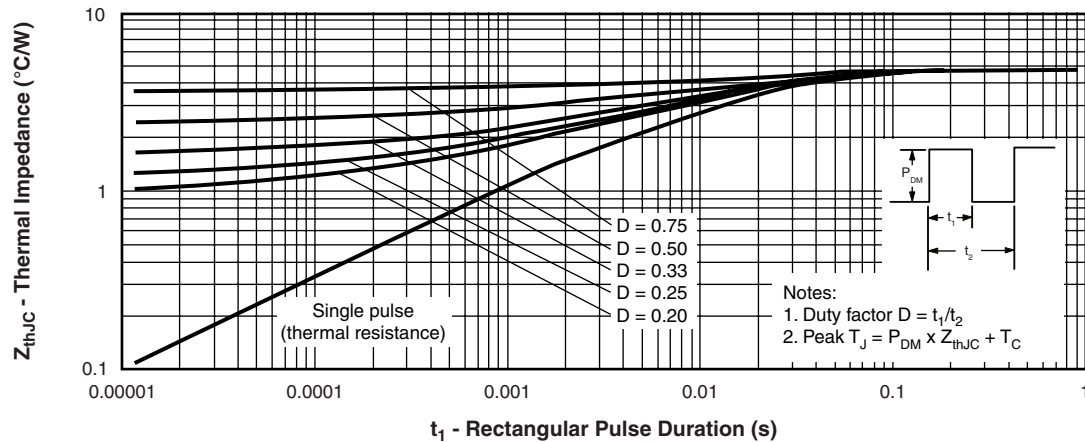


Fig. 4 Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

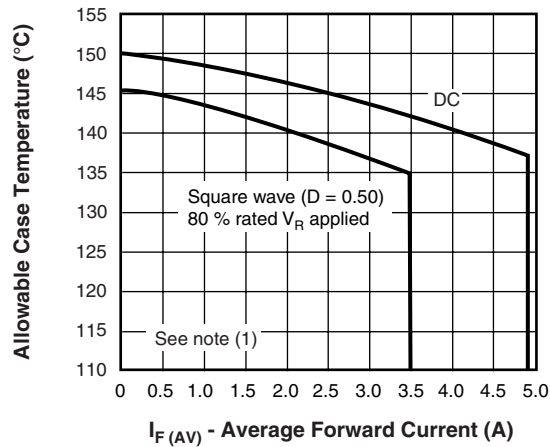


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

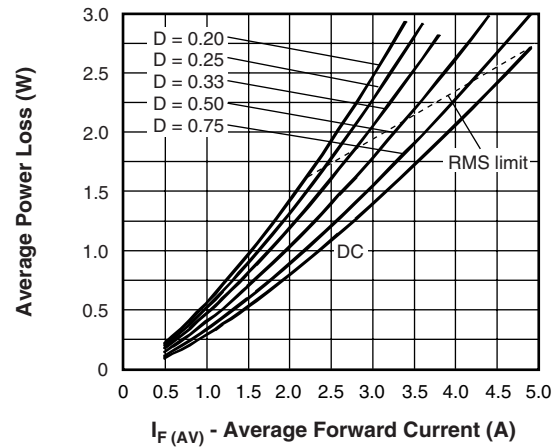


Fig. 6 - Forward Power Loss Characteristics

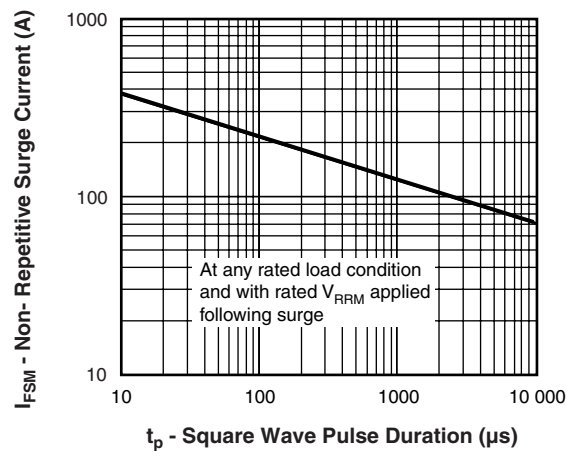


Fig. 7 - Maximum Non-Repetitive Surge Current

### Note

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

**ORDERING INFORMATION TABLE**

|             |           |          |          |           |           |            |            |
|-------------|-----------|----------|----------|-----------|-----------|------------|------------|
| Device code | <b>30</b> | <b>W</b> | <b>Q</b> | <b>04</b> | <b>FN</b> | <b>TRL</b> | <b>PbF</b> |
|             | ①         | ②        | ③        | ④         | ⑤         | ⑥          | ⑦          |

- |          |   |                                                                                                                                                                                                     |
|----------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | - | Current rating (3.5 A)                                                                                                                                                                              |
| <b>2</b> | - | Package identifier:<br>W = D-PAK                                                                                                                                                                    |
| <b>3</b> | - | Schottky "Q" series                                                                                                                                                                                 |
| <b>4</b> | - | Voltage rating (04 = 40 V)                                                                                                                                                                          |
| <b>5</b> | - | FN = TO-252AA (D-PAK)                                                                                                                                                                               |
| <b>6</b> | - | <ul style="list-style-type: none"><li>• None = Tube (50 pieces)</li><li>• TR = Tape and reel</li><li>• TRL = Tape and reel (left oriented)</li><li>• TRR = Tape and reel (right oriented)</li></ul> |
| <b>7</b> | - | <ul style="list-style-type: none"><li>• None = Standard production</li><li>• PbF = Lead (Pb)-free</li></ul>                                                                                         |

| LINKS TO RELATED DOCUMENTS |                                                                               |
|----------------------------|-------------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95016">http://www.vishay.com/doc?95016</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95059">http://www.vishay.com/doc?95059</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95033">http://www.vishay.com/doc?95033</a> |
| SPIICE model               | <a href="http://www.vishay.com/doc?95288">http://www.vishay.com/doc?95288</a> |



### Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.