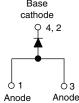


High Performance Schottky Rectifier, 3.5 A





| $D_{-}DNK$ | (TO-252AA) |
|------------|------------|
| J-FAIL (| 10-23244 |

| Bas | е | | | | | |
|-------|---------|--|--|--|--|--|
| catho | cathode | | | | | |
| | 4, 2 | | | | | |
| 01 03 | | | | | | |
| Anode | Anode | | | | | |

| PRODUCT SUMMARY | | | | | |
|----------------------------------|----------------------|--|--|--|--|
| Package | TO-252AA (D-PAK) | | | | |
| I _{F(AV)} | 3.5 A | | | | |
| V _R | 60 V | | | | |
| V _F at I _F | See Electrical table | | | | |
| I _{RM} | 30 mA at 125 °C | | | | |
| T _J max. | 150 °C | | | | |
| Diode variation | Single die | | | | |
| E _{AS} | 6 mJ | | | | |

FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long RoHS term reliability



FREE

- Popular D-PAK outline
- · Small foot print, surface mountable
- High frequency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION

The VS-30WQ06FN-M3 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 | А | | | |
| V _{RRM} | | 60 | V | | | |
| I _{FSM} | t _p = 5 μs sine | 490 | Α | | | |
| V _F | 3 A _{pk} , T _J = 125 °C | 0.53 | V | | | |
| TJ | | -40 to +150 | °C | | | |

| VOLTAGE RATINGS | | | | | | |
|--------------------------------------|-----------|----------------|-------|--|--|--|
| PARAMETER | SYMBOL | VS-30WQ06FN-M3 | UNITS | | | |
| Maximum DC reverse voltage | V_{R} | 60 | V | | | |
| Maximum working peak reverse voltage | V_{RWM} | 60 | V | | | |

| ABSOLUTE MAXIMUM RATINGS | | | | | | |
|---|--------------------|---|--------|--------|-------|--|
| PARAMETER | SYMBOL | TEST COND | ITIONS | VALUES | UNITS | |
| Maximum average forward current See fig. 5 | I _{F(AV)} | 50 % duty cycle at T _C = 133 °C | 3.5 | | | |
| Maximum peak one cycle non-repetitive surge current | I | 5 µs sine or 3 µs rect. pulse Following any rated load condition and with rated V _{RRM} applied | | 490 | Α | |
| See fig. 7 | I _{FSM} | | | 70 | | |
| Non-repetitive avalanche energy | E _{AS} | T _J = 25 °C, I _{AS} = 1 A, L = 12 mH | | 6.0 | mJ | |
| Repetitive avalanche current | I _{AR} | Current decaying linearly to zero in 1 μ s Frequency limited by T _J maximum V _A = 1.5 x V _R typical | | 1.0 | Α | |



| ELECTRICAL SPECIFICATIONS | | | | | | |
|---------------------------------|--------------------------------|-------------------------------------|---------------------------------------|--------|------|--|
| PARAMETER | SYMBOL | TEST COND | VALUES | UNITS | | |
| | | 3 A | T _{.1} = 25 °C | 0.61 | V | |
| Maximum forward voltage drop | V _{FM} ⁽¹⁾ | 6 A | 1J=23 0 | 0.76 | | |
| See fig. 1 | VFM (*) | 3 A | T _{.1} = 125 °C | 0.53 | | |
| | | 6 A | 1j = 125 C | 0.65 | | |
| Maximum reverse leakage current | I _{RM} ⁽¹⁾ | T _J = 25 °C | V Datad V | 2 | - mA | |
| See fig. 2 | IRM (** | T _J = 125 °C | V _R = Rated V _R | 30 | | |
| Threshold voltage | V _{F(TO)} | T - T movimum | | 0.38 | V | |
| Forward slope resistance | r _t | ij = ij maximum | $T_J = T_J$ maximum | | mΩ | |
| Typical junction capacitance | C _T | $V_R = 5 V_{DC}$ (test signal range | 100 kHz to 1 MHz), 25 °C | 145 | 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 µs, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | | |
|--|--|--|-------------|-------|--|--|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS | | |
| Maximum junction and storage temperature range | T _J ⁽¹⁾ , T _{Stg} | | -40 to +150 | °C | | |
| Maximum thermal resistance, junction to case | R _{thJC} | DC operation See fig. 4 | 4.7 | °C/W | | |
| Approximate weight | | | 0.3 | g | | |
| Approximate weight | | | 0.01 | oz. | | |
| Marking device | | Case style D-PAK (similar to TO-252AA) | 30WQ | D6FN | | |

Note

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

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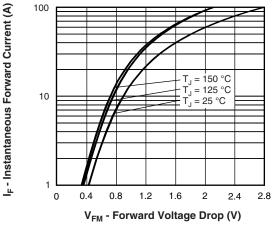


Fig. 1 - Maximum Forward Voltage Drop Characteristics

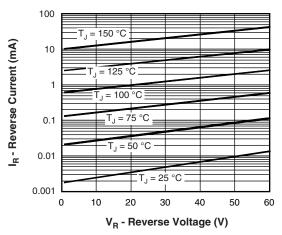


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

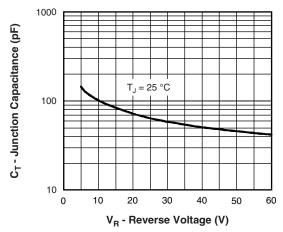


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

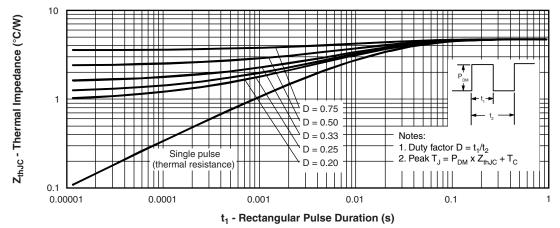


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics



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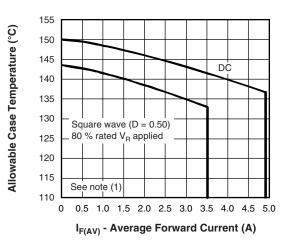


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

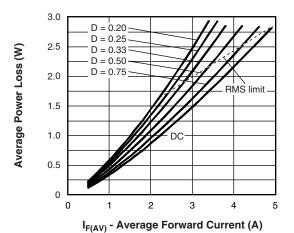


Fig. 6 - Forward Power Loss Characteristics

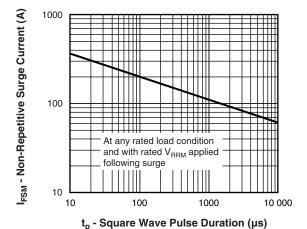


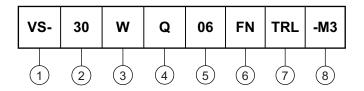
Fig. 7 - Maximum Non-Repetitive Surge Current

Note



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (3.5 A)

Package identifier:

W = D-PAK

4 - Schottky "Q" series

- Voltage rating (06 = 60 V)

6 - FN = TO-252AA (D-PAK)

7 - • None = tube

• TR = tape and reel

• TRL = tape and reel (left oriented)

• TRR = tape and reel (right oriented)

8 - Environmental digit:

-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

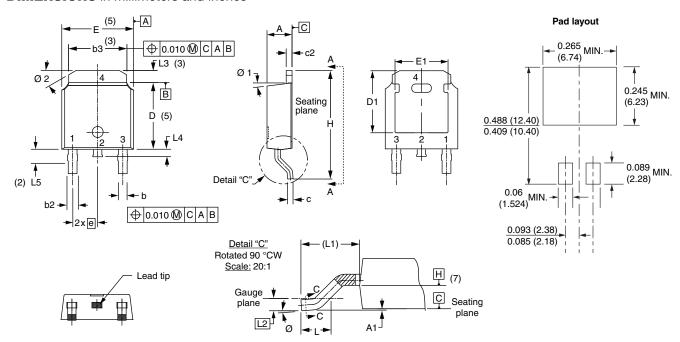
| ORDERING INFORMATION (Example) | | | | | | |
|--------------------------------|------------------|------------------------|-------------------------|--|--|--|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION | | | |
| VS-30WQ06FN-M3 | 75 | 3000 | Antistatic plastic tube | | | |
| VS-30WQ06FNTR-M3 | 2000 | 2000 | 13" diameter reel | | | |
| VS-30WQ06FNTRL-M3 | 3000 | 3000 | 13" diameter reel | | | |
| VS-30WQ06FNTRR-M3 | 3000 | 3000 | 13" diameter reel | | | |

| LINKS TO RELATED DOCUMENTS | | | | | |
|--|--------------------------|--|--|--|--|
| Dimensions <u>www.vishay.com/doc?95627</u> | | | | | |
| Part marking information | www.vishay.com/doc?95176 | | | | |
| Packaging information | www.vishay.com/doc?95033 | | | | |
| SPICE model | www.vishay.com/doc?95687 | | | | |



D-PAK (TO-252AA) "M"

DIMENSIONS in millimeters and inches



| SYMBOL | MILLIN | IETERS | INC | INCHES | |
|--------|--------|--------|-------|--------|-------|
| STMBOL | MIN. | MAX. | MIN. | MAX. | NOTES |
| Α | 2.18 | 2.39 | 0.086 | 0.094 | |
| A1 | - | 0.13 | - | 0.005 | |
| b | 0.64 | 0.89 | 0.025 | 0.035 | |
| b2 | 0.76 | 1.14 | 0.030 | 0.045 | |
| b3 | 4.95 | 5.46 | 0.195 | 0.215 | 3 |
| С | 0.46 | 0.61 | 0.018 | 0.024 | |
| c2 | 0.46 | 0.89 | 0.018 | 0.035 | |
| D | 5.97 | 6.22 | 0.235 | 0.245 | 5 |
| D1 | 5.21 | - | 0.205 | 1 | 3 |
| Е | 6.35 | 6.73 | 0.250 | 0.265 | 5 |
| E1 | 4.32 | - | 0.170 | - | 3 |

| SYMBOL | MILLIN | IETERS | ERS INCHES | | NOTES |
|----------|----------|--------|------------|-------|-------|
| STINIBOL | MIN. | MAX. | MIN. | MAX. | NOTES |
| е | 2.29 | BSC | 0.090 | BSC | |
| Н | 9.40 | 10.41 | 0.370 | 0.410 | |
| L | 1.40 | 1.78 | 0.055 | 0.070 | |
| L1 | 2.74 BSC | | 0.108 | REF. | |
| L2 | 0.51 | BSC | 0.020 BSC | | |
| L3 | 0.89 | 1.27 | 0.035 | 0.050 | 3 |
| L4 | - | 1.02 | - | 0.040 | |
| L5 | 1.14 | 1.52 | 0.045 | 0.060 | 2 |
| Ø | 0° | 10° | 0° | 10° | |
| Ø1 | 0° | 15° | 0° | 15° | |
| Ø2 | 25° | 35° | 25° | 35° | |

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension uncontrolled in L5
- (3) Dimension D1, E1, L3 and b3 establish a minimum mounting surface for thermal pad
- (4) Section C C dimension apply to the flat section of the lead between 0.13 and 0.25 mm (0.005 and 0.10") from the lead tip
- (5) Dimension D, and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (6) Dimension b1 and c1 applied to base metal only
- (7) Datum A and B to be determined at datum plane H
- (8) Outline conforms to JEDEC® outline TO-252AA



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