RoHS

COMPLIANT

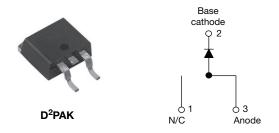
HALOGEN

FREE



Vishay Semiconductors

High Performance Schottky Rectifier, 15 A

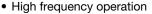


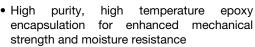
| PRODUCT SUMMARY | | | | | | | |
|----------------------------------|-------------------------------|--|--|--|--|--|--|
| I _{F(AV)} | 15 A | | | | | | |
| V_{R} | 60 V | | | | | | |
| V _F at I _F | 0.56 V | | | | | | |
| I _{RM} max. | 45 mA at 125 °C | | | | | | |
| T _J max. | 150 °C | | | | | | |
| E _{AS} | 6 mJ | | | | | | |
| Package | TO-263AB (D ² PAK) | | | | | | |
| Diode variation | Single die | | | | | | |

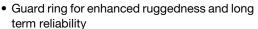
FEATURES



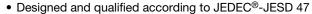












 Material categorization: For definitions of compliance please see <u>www.vishay.com/doc?99912</u>



The VS-15TQ060S-M3 Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

| MAJOR RATINGS AND CHARACTERISTICS | | | | | | | | | | |
|-----------------------------------|--|------------|----|--|--|--|--|--|--|--|
| SYMBOL | YMBOL CHARACTERISTICS VALUES UNITS | | | | | | | | | |
| I _{F(AV)} | Rectangular waveform | 15 | А | | | | | | | |
| V_{RRM} | | 60 | V | | | | | | | |
| I _{FSM} | t _p = 5 μs sine | 1000 | Α | | | | | | | |
| V _F | 15 A _{pk} , T _J = 125 °C | 0.56 | V | | | | | | | |
| T _J | Range | -55 to 150 | °C | | | | | | | |

| VOLTAGE RATINGS | | | | | | | | |
|--------------------------------------|----------------|----------------|-------|--|--|--|--|--|
| PARAMETER | SYMBOL | VS-15TQ060S-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 CONDI | VALUES | UNITS | | | | |
| Maximum average forward current See fig. 5 | I _{F(AV)} | 50 % duty cycle at T _C = 104 °C | 15 | А | | | | |
| Maximum peak one cycle non-repetitive surge current | I _{FSM} | 5 μs sine or 3 μs rect. pulse | Following any rated | 1000 | Α | | | |
| See fig. 7 | | 10 ms sine or 6 ms rect. pulse | rated V _{RRM} applied | 260 | | | | |
| Non-repetitive avalanche energy | E _{AS} | T _J = 25 °C, I _{AS} = 1.5 A, L = 11.5 mH | | 6 | mJ | | | |
| Repetitive avalanche current | I _{AR} | Current decaying linearly to zero Frequency limited by T _J maximu | 1.50 | А | | | | |



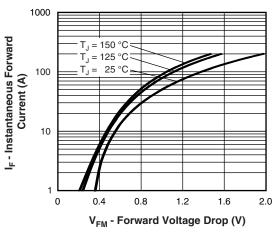
| ELECTRICAL SPECIFICATIONS | | | | | | | | |
|--|--------------------------------|---|---------------------------------------|-------|------|--|--|--|
| PARAMETER | SYMBOL | TEST CO | VALUES | UNITS | | | | |
| Maximum forward voltage drop See fig. 1 | | 15 A | - T _{.1} = 25 °C | 0.62 | | | | |
| | V (1) | 30 A | - IJ=25 C | 0.82 | V | | | |
| | V _{FM} ⁽¹⁾ | 15 A | - T _{.1} = 125 °C | 0.56 | V | | | |
| | | 30 A | - IJ= 125 C | 0.71 | | | | |
| Maximum reverse leakage current | I _{RM} ⁽¹⁾ | T _J = 25 °C | V_{R} = Rated V_{R} | 0.80 | - mA | | | |
| See fig. 2 | | T _J = 125 °C | v _R = nateu v _R | 45 | | | | |
| Maximum junction capacitance | C _T | V _R = 5 V _{DC} (test signal rar | 720 | pF | | | | |
| Typical series inductance | L _S | Measured lead to lead 5 | 8.0 | nH | | | | |
| Maximum voltage rate of change | dV/dt | Rated V _R | 10 000 | V/µs | | | | |

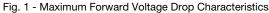
Note

 $^{^{(1)}\,}$ Pulse width < 300 $\mu s,$ duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | | | | |
|--|--------------------|-----------------------------------|--------------------------------------|-------------|------------|--|--|--|
| PARAMETER | | SYMBOL | TEST CONDITIONS | VALUES | UNITS | | | |
| Maximum junction and storage temperature range | | T _J , T _{Stg} | | - 55 to 150 | °C | | | |
| Maximum thermal resistance, junction to case | | R _{thJC} | DC operation See fig. 4 | 3.25 | °C/W | | | |
| Typical thermal resistance, case to heatsink | | R _{thCS} | Mounting surface, smooth and greased | 0.50 | | | | |
| Annyayimata waight | | | | 2 | g | | | |
| Approximate weight | Approximate weight | | | 0.07 | OZ. | | | |
| Mounting torque | minimum | | | 6 (5) | kgf · cm | | | |
| Mounting torque | maximum | | | 12 (10) | (lbf · in) | | | |
| Marking device | | | Case style D ² PAK | 15TQ060S | | | | |







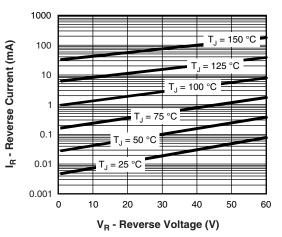


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

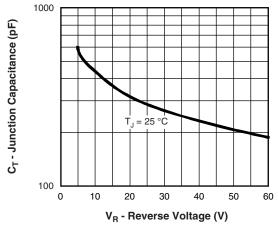


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

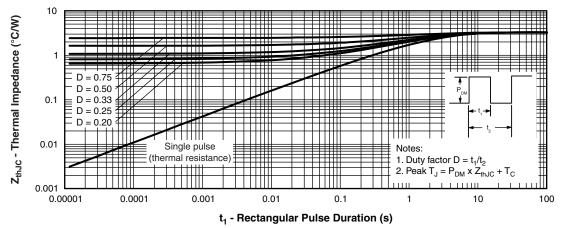


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics



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Vishay Semiconductors

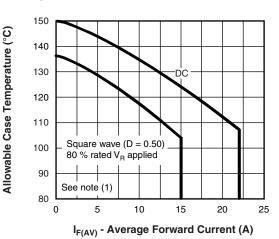


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

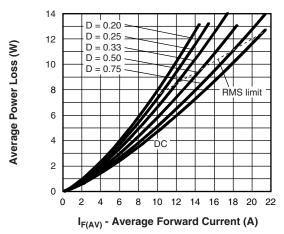


Fig. 6 - Forward Power Loss Characteristics

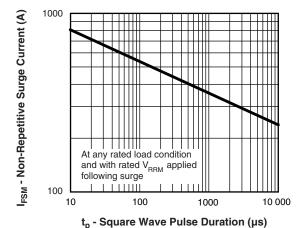


Fig. 7 - Maximum Non-Repetitive Surge Current

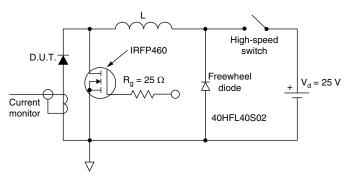


Fig. 8 - Unclamped Inductive Test Circuit

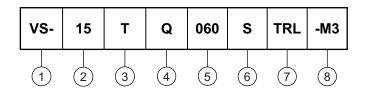
Note

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



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (15 A)

Circuit configuration: T = TO-220

Schottky "Q" series

Voltage rating (060 = 60 V)

- S = D²PAK

7 - • None = Tube

• TRL = Tape and reel (left oriented)

• TRR = Tape and reel (right oriented)

8 - -M3 = Halogen-free, RoHS-compliant and termination lead (Pb)-free

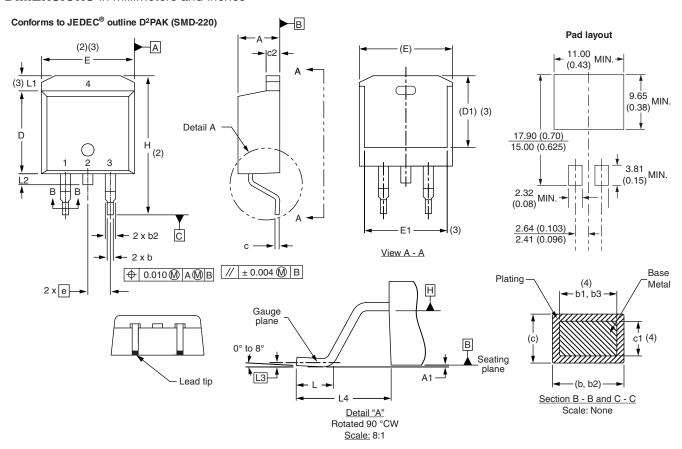
| ORDERING INFORMATION | | | | | | | | | |
|----------------------|------------------------|-----------------------|--------------------------|--|--|--|--|--|--|
| PREFERRED P/N | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION | | | | | | | |
| VS-15TQ060S-M3 | 50 | 1000 | Antistatic plastic tubes | | | | | | |
| VS-15TQ060STRR-M3 | 800 | 800 | 13" diameter reel | | | | | | |
| VS-15TQ060STRL-M3 | 800 | 800 | 13" diameter reel | | | | | | |

| LINKS TO RELATED DOCUMENTS | | | | | | |
|--|--------------------------|--|--|--|--|--|
| Dimensions <u>www.vishay.com/doc?95046</u> | | | | | | |
| Part marking information | www.vishay.com/doc?95444 | | | | | |
| Packaging information | www.vishay.com/doc?95032 | | | | | |
| SPICE model | www.vishay.com/doc?95600 | | | | | |



D²PAK

DIMENSIONS in millimeters and inches



| SYMBOL | MILLIMETERS | | INCHES | | NOTES | NOTES | SYMBOL | MILLIM | ETERS | INC | HES | NOTES |
|----------|-------------|-------|--------|-------|-------|-------|----------|--------|-------|-------|-------|-------|
| STIVIBUL | MIN. | MAX. | MIN. | MAX. | NOTES | | STIVIBUL | MIN. | MAX. | MIN. | MAX. | NOTES |
| Α | 4.06 | 4.83 | 0.160 | 0.190 | | | D1 | 6.86 | 8.00 | 0.270 | 0.315 | 3 |
| A1 | 0.00 | 0.254 | 0.000 | 0.010 | | | Е | 9.65 | 10.67 | 0.380 | 0.420 | 2, 3 |
| b | 0.51 | 0.99 | 0.020 | 0.039 | | | E1 | 7.90 | 8.80 | 0.311 | 0.346 | 3 |
| b1 | 0.51 | 0.89 | 0.020 | 0.035 | 4 | | е | 2.54 | BSC | 0.100 | BSC | |
| b2 | 1.14 | 1.78 | 0.045 | 0.070 | | | Н | 14.61 | 15.88 | 0.575 | 0.625 | |
| b3 | 1.14 | 1.73 | 0.045 | 0.068 | 4 | | L | 1.78 | 2.79 | 0.070 | 0.110 | |
| С | 0.38 | 0.74 | 0.015 | 0.029 | | | L1 | - | 1.65 | - | 0.066 | 3 |
| c1 | 0.38 | 0.58 | 0.015 | 0.023 | 4 | | L2 | 1.27 | 1.78 | 0.050 | 0.070 | |
| c2 | 1.14 | 1.65 | 0.045 | 0.065 | | | L3 | 0.25 | BSC | 0.010 | BSC | |
| D | 8.51 | 9.65 | 0.335 | 0.380 | 2 | | L4 | 4.78 | 5.28 | 0.188 | 0.208 | |

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) 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 outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inch
- (7) Outline conforms to JEDEC® outline TO-263AB



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Vishay

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