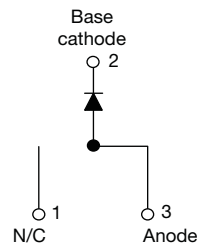


High Performance Schottky Rectifier, 20 A


 TO-263AB (D²PAK)


FEATURES

- 125 °C T_J operation (V_R < 5 V)
- Center tap module
- Optimized for OR-ing applications
- Ultralow forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
 COMPLIANT
 HALOGEN
FREE

| PRODUCT SUMMARY | |
|----------------------------------|-------------------------------|
| I _{F(AV)} | 20 A |
| V _R | 15 V |
| V _F at I _F | 0.33 V |
| I _{RM} max. | 600 mA at 100 °C |
| T _J max. | 125 °C |
| E _{AS} | 10 mJ |
| Package | TO-263AB (D ² PAK) |
| Diode variation | Single die |

DESCRIPTION

The Schottky rectifier module has been optimized for ultralow forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|--|-------------|-------|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| I _{F(AV)} | Rectangular waveform | 20 | A |
| V _{RRM} | | 15 | V |
| I _{FSM} | t _p = 5 μs sine | 700 | A |
| V _F | 19 A _{pk} , T _J = 125 °C (typical) | 0.25 | V |
| T _J | Range | -55 to +125 | °C |

| VOLTAGE RATINGS | | | | |
|--------------------------------------|------------------|-------------------------|------------------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VS-STPS20L15GPbF | UNITS |
| Maximum DC reverse voltage | V _R | T _J = 100 °C | 15 | V |
| Maximum working peak reverse voltage | V _{RWM} | | | |

| ABSOLUTE MAXIMUM RATINGS | | | | |
|--|--------------------|--|--------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum average forward current See fig. 5 | I _{F(AV)} | 50 % duty cycle at T _C = 85 °C, rectangular waveform | 20 | A |
| Maximum peak one cycle non-repetitive surge current See fig. 7 | I _{FSM} | 5 μs sine or 3 μs rect. pulse | 700 | |
| | | 10 ms sine or 6 ms rect. pulse | 330 | |
| Non-repetitive avalanche energy | E _{AS} | T _J = 25 °C, I _{AS} = 2 A, L = 6 mH | 10 | mJ |
| Repetitive avalanche current | I _{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T _J maximum V _A = 1.5 x V _R typical | 2 | A |



| ELECTRICAL SPECIFICATIONS | | | | | | |
|---------------------------------------|----------------|---|-----------------------------------|--------|------|------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | TYP. | MAX. | UNITS |
| Forward voltage drop See fig. 1 | $V_{FM}^{(1)}$ | 19 A | $T_J = 25\text{ }^\circ\text{C}$ | - | 0.41 | V |
| | | 40 A | | - | 0.52 | |
| | | 19 A | $T_J = 125\text{ }^\circ\text{C}$ | 0.25 | 0.33 | |
| | | 40 A | | 0.37 | 0.50 | |
| Reverse leakage current See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | - | 10 | mA |
| | | $T_J = 100\text{ }^\circ\text{C}$ | | - | 600 | |
| Threshold voltage | $V_{F(TO)}$ | $T_J = T_J \text{ maximum}$ | | 0.182 | | V |
| Forward slope resistance | r_t | | | 7.6 | | mW |
| Maximum junction capacitance | C_T | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$ | | - | 2000 | pF |
| Typical series inductance | L_S | Measured lead to lead 5 mm from package body | | 8 | - | 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 temperature range | T_J | | -55 to +125 | $^\circ\text{C}$ |
| Maximum storage temperature range | T_{Stg} | | -55 to +150 | |
| Maximum thermal resistance, junction to case | R_{thJC} | DC operation See fig. 4 | 1.5 | $^\circ\text{C}/\text{W}$ |
| Typical thermal resistance, case to heatsink | R_{thCS} | Mounting surface, smooth and greased (for TO-220) | 0.50 | |
| Maximum thermal resistance, junction to ambient | R_{thJA} | DC operation (for D ² PAK) | 40 | |
| Approximate weight | | | 2 | g |
| | | | 0.07 | oz. |
| Mounting torque | minimum | Non-lubricated threads | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style D ² PAK | STPS20L15G | |

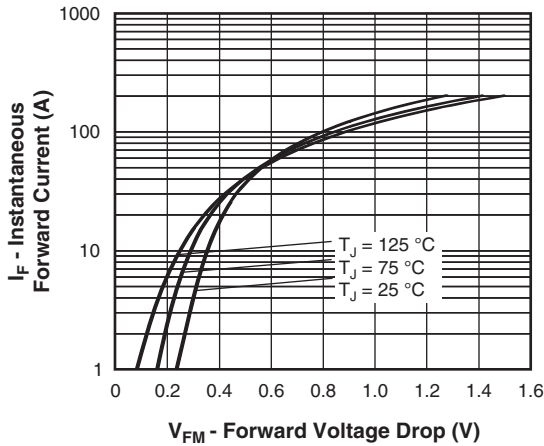


Fig. 1 - Maximum Forward Voltage Drop Characteristics

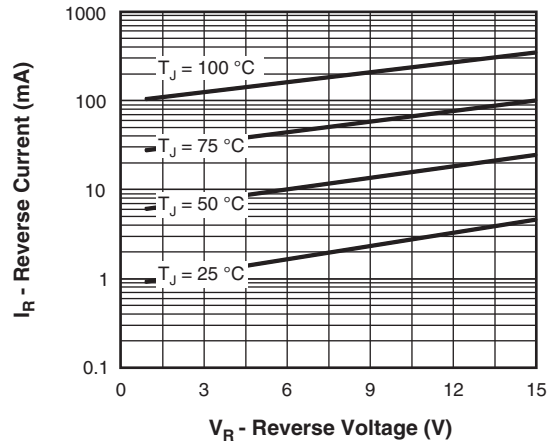


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

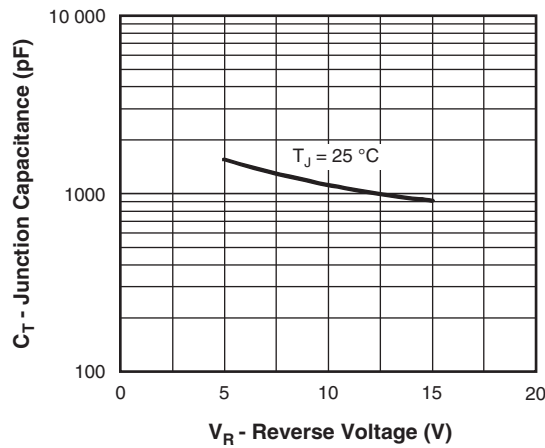


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

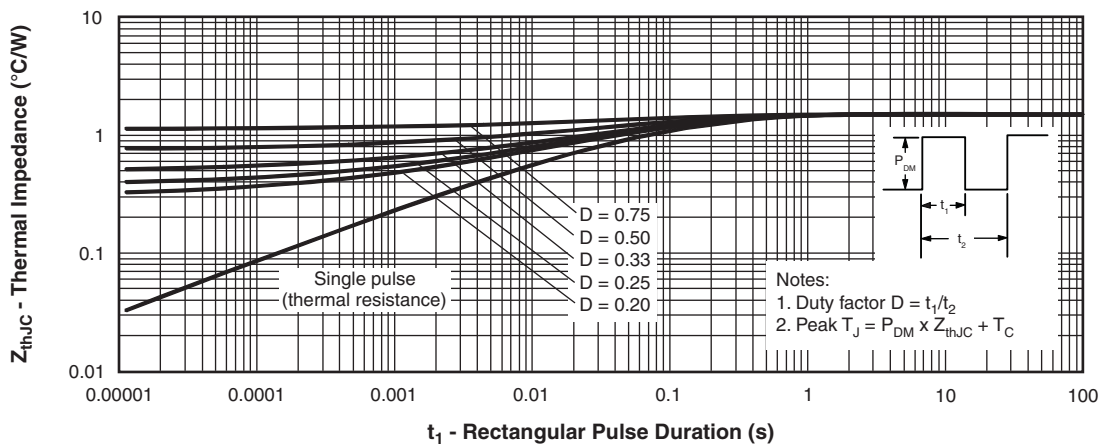


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

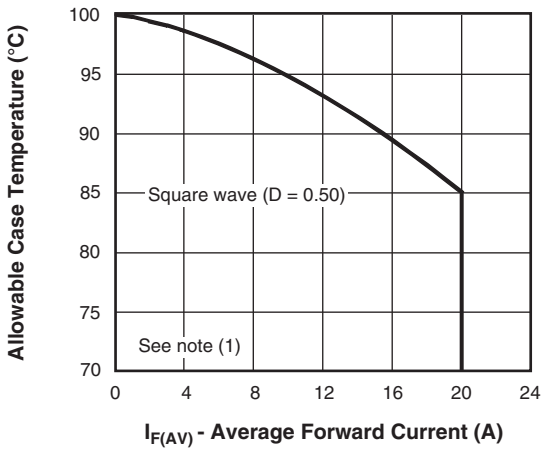


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

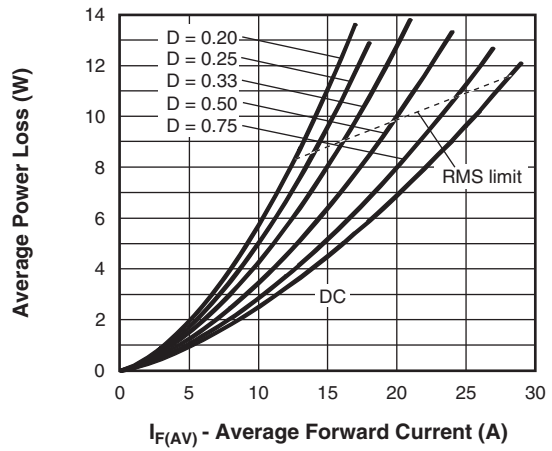


Fig. 6 - Forward Power Loss Characteristics

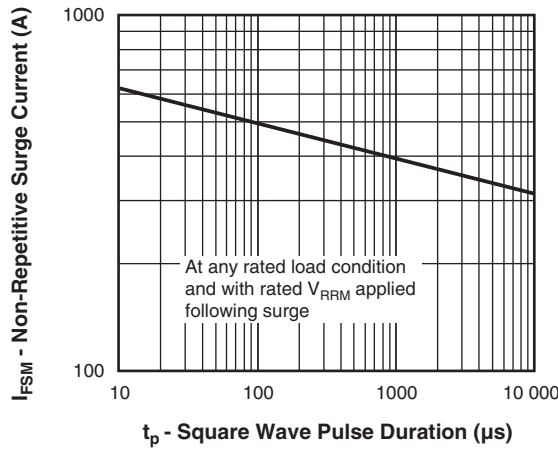


Fig. 7 - Maximum Non-Repetitive Surge Current

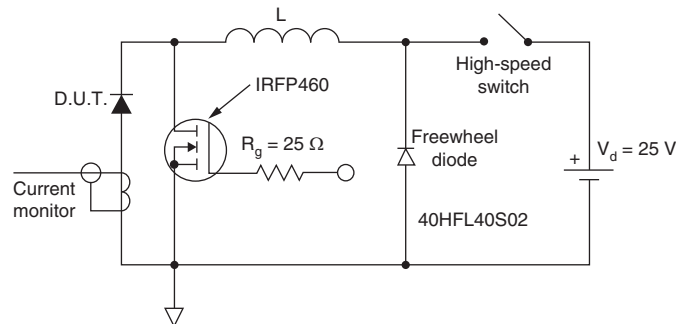


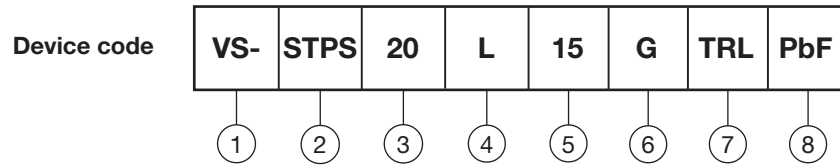
Fig. 8 - Unclamped Inductive Test Circuit

Note

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



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Essential part number
- 3** - Current rating (20 = 20 A)
- 4** - Low voltage
- 5** - Voltage rating (15 = 15 V)
- 6** - G = D²PAK package
- 7** -
 - None = tube
 - TRL = tape and reel (left oriented)
 - TRR = tape and reel (right oriented)
- 8** -
 - PbF = lead (Pb)-free (for D²PAK tube)
 - P = lead (Pb)-free (for D²PAK TRR and TRL)

| ORDERING INFORMATION (Example) | | | |
|---------------------------------------|------------------|------------------------|--------------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-STPS20L15GPbF | 50 | 1000 | Antistatic plastic tubes |
| VS-STPS20L15GTRLP | 800 | 800 | 13" diameter reel |
| VS-STPS20L15GTRRP | 800 | 800 | 13" diameter reel |

| LINKS TO RELATED DOCUMENTS | |
|-----------------------------------|--|
| Dimensions | www.vishay.com/doc?95046 |
| Part marking information | www.vishay.com/doc?95054 |
| Packaging information | www.vishay.com/doc?95032 |

D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D²PAK (SMD-220)



| SYMBOL | MILLIMETERS | | INCHES | | NOTES | SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|--------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | | | MIN. | MAX. | MIN. | MAX. | |
| A | 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 | | E | 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 | e | 2.54 BSC | | 0.100 BSC | | |
| b2 | 1.14 | 1.78 | 0.045 | 0.070 | | H | 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 | |
| c | 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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