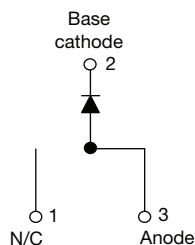


High Performance Schottky Rectifier, 10 A


D²PAK (TO-263AB)


FEATURES

- 150 °C T_J operation
- TO-220 and D²PAK packages
- Low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Designed and qualified according to JEDEC®-JESD 47
- AEC-Q101 qualified
- Meets JESD 201 class 1 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

PRODUCT SUMMARY

| | |
|----------------------------------|-------------------------------|
| I _{F(AV)} | 10 A |
| V _R | 35 V, 45 V |
| V _F at I _F | 0.57 V |
| I _{RM} | 15 mA at 125 °C |
| T _J max. | 150 °C |
| E _{AS} | 8 mJ |
| Package | D ² PAK (TO-263AB) |
| Diode variation | Single |

DESCRIPTION

This Schottky rectifier has been optimized for low reverse leakage at high temperature. 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 | CHARACTERISTICS | VALUES | UNITS |
|--------------------|--|-------------|-------|
| I _{F(AV)} | Rectangular waveform | 10 | A |
| I _{FRM} | T _C = 135 °C | 20 | |
| V _{RRM} | | 35/45 | V |
| I _{FSM} | t _p = 5 μs sine | 1060 | A |
| V _F | 10 A _{pk} , T _J = 125 °C | 0.57 | V |
| T _J | Range | -55 to +150 | °C |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | VS-MBRB1035HM3 | VS-MBRB1045HM3 | UNITS |
|--------------------------------------|------------------|----------------|----------------|-------|
| Maximum DC reverse voltage | V _R | 35 | 45 | V |
| Maximum working peak reverse voltage | V _{RWM} | | | |

**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---------------------------------|-------------|--|--------|-------|
| Maximum average forward current | $I_{F(AV)}$ | $T_C = 135\text{ }^{\circ}\text{C}$, rated V_R | 10 | A |
| Peak repetitive forward current | I_{FRM} | Rated V_R , square wave, 20 kHz, $T_C = 135\text{ }^{\circ}\text{C}$ | 20 | |
| Non-repetitive surge current | I_{FSM} | 5 μs sine or 3 μs rect. pulse Following any rated load condition and with rated V_{RRM} applied | 1060 | |
| | | Surge applied at rated load conditions half wave, single phase, 60 Hz | 150 | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25\text{ }^{\circ}\text{C}$, $I_{AS} = 2\text{ A}$, $L = 4\text{ mH}$ | 8 | mJ |
| Repetitive avalanche current | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | 2 | A |

ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---------------------------------------|----------------|--|--------|------------------|
| Maximum forward voltage drop | $V_{FM}^{(1)}$ | 20 A $T_J = 25\text{ }^{\circ}\text{C}$ | 0.84 | V |
| | | 10 A $T_J = 125\text{ }^{\circ}\text{C}$ | 0.57 | |
| | | 20 A $T_J = 125\text{ }^{\circ}\text{C}$ | 0.72 | |
| Maximum instantaneous reverse current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$ Rated DC voltage | 0.1 | mA |
| | | $T_J = 125\text{ }^{\circ}\text{C}$ | 15 | |
| Threshold voltage | $V_{F(TO)}$ | $T_J = T_J$ maximum | 0.354 | V |
| Forward slope resistance | r_t | | 17.6 | m Ω |
| Maximum junction capacitance | C_T | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$ | 600 | pF |
| Typical series inductance | L_S | Measured from top of terminal to mounting plane | 8.0 | 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 temperature range | T _J | | -55 to 150 | °C |
| Maximum storage temperature range | T _{Stg} | | -55 to 175 | |
| Maximum thermal resistance, junction to case | R _{thJC} | DC operation | 2.0 | °C/W |
| Typical thermal resistance, case to heatsink | R _{thCS} | Mounting surface, smooth and greased (Only for TO-220) | 0.50 | |
| Approximate weight | | | 2 | g |
| | | | 0.07 | oz. |
| Mounting torque | minimum | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style D ² PAK (TO-263AB) | MBRB1035H | |
| | | | MBRB1045H | |

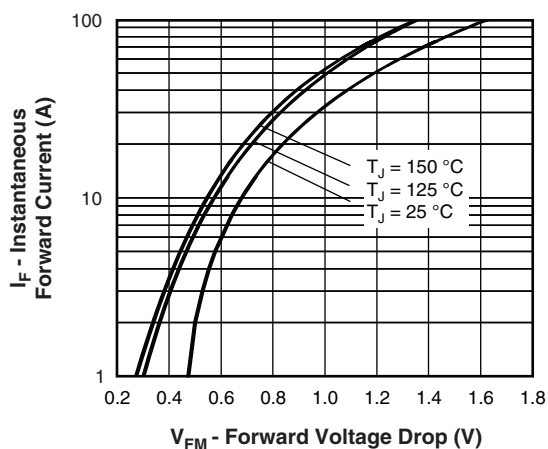


Fig. 1 - Maximum Forward Voltage Drop Characteristics

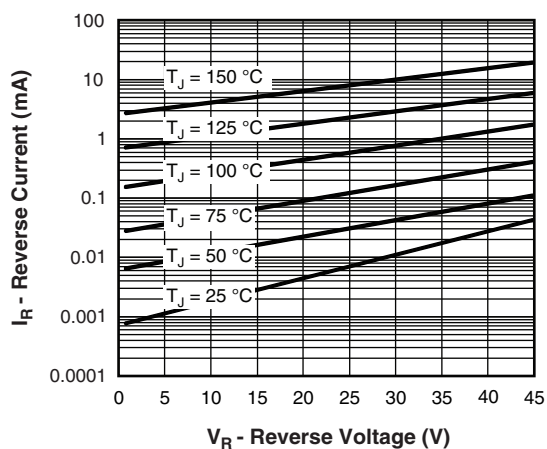


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

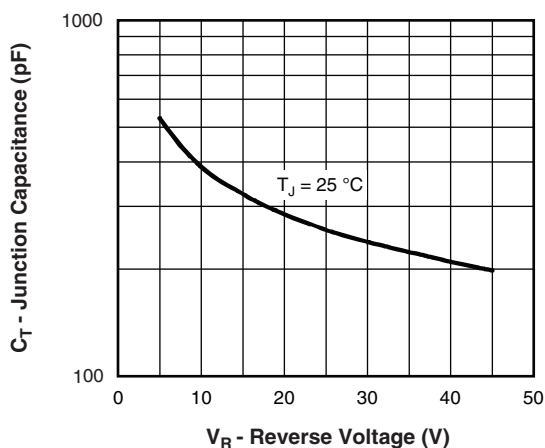
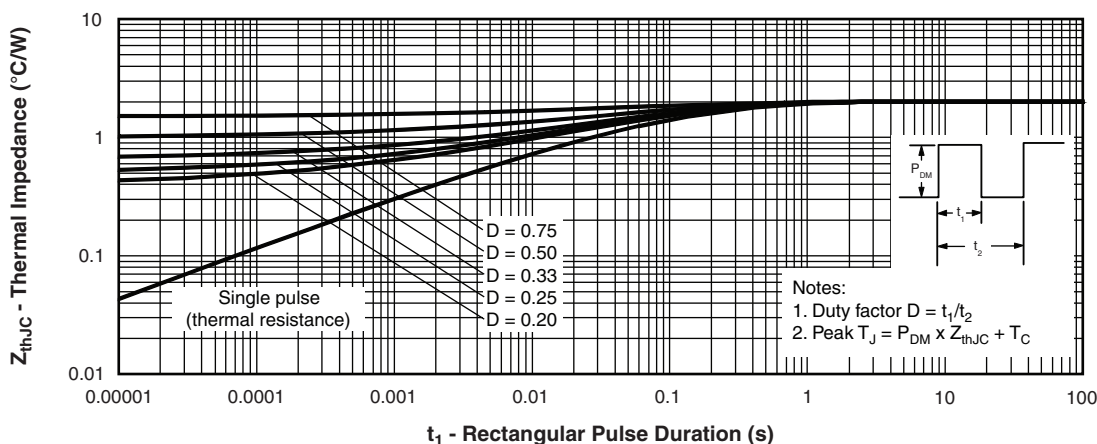


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

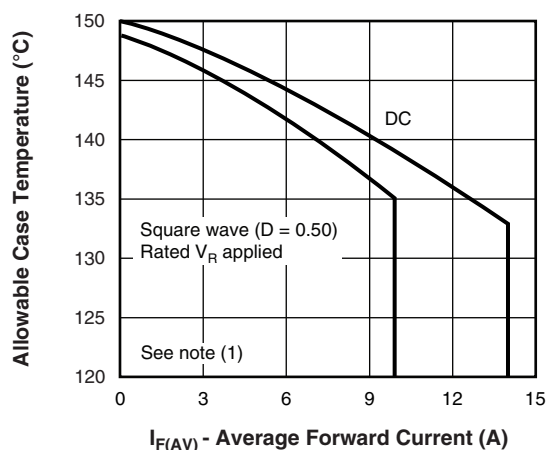


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

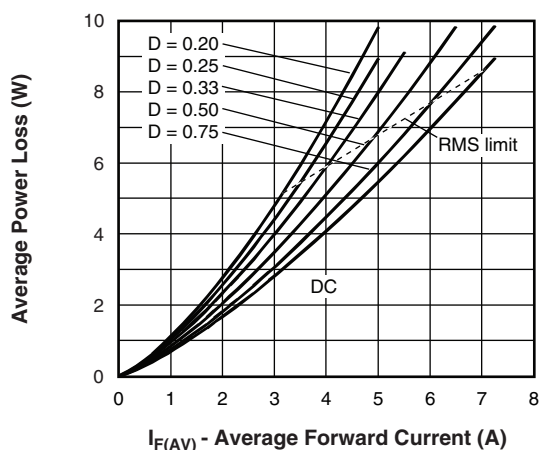


Fig. 6 - Forward Power Loss Characteristics

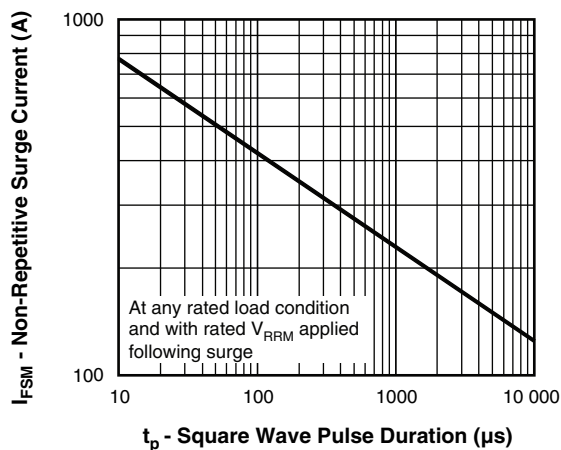


Fig. 7 - Maximum Non-Repetitive Surge Current

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} = rated V_R

**ORDERING INFORMATION TABLE**

| | | | | | | | | |
|-------------|------------|------------|----------|-----------|-----------|------------|----------|-----------|
| Device code | VS- | MBR | B | 10 | 45 | TRL | H | M3 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

- | | | |
|----------|---|--|
| 1 | - | Vishay Semiconductors product |
| 2 | - | Essential part number |
| 3 | - | B = surface mount |
| 4 | - | Current rating (10 = 10 A) |
| 5 | - | Voltage ratings |
| 6 | - | <ul style="list-style-type: none">• None = tube• TRL = tape and reel (left oriented)• TRR = tape and reel (right oriented) |
| 7 | - | H = AEC-Q101 qualified |
| 8 | - | M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free |
- 35 = 35 V

45 = 45 V

ORDERING INFORMATION

| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
|------------------|------------------|------------------------|--------------------------|
| VS-MBRB1035HM3 | 50 | 1000 | Antistatic plastic tubes |
| VS-MBRB1035TRRH3 | 800 | 800 | 13" diameter reel |
| VS-MBRB1035TRLH3 | 800 | 800 | 13" diameter reel |
| VS-MBRB1045HM3 | 50 | 1000 | Antistatic plastic tubes |
| VS-MBRB1045TRRH3 | 800 | 800 | 13" diameter reel |
| VS-MBRB1045TRLH3 | 800 | 800 | 13" diameter reel |

LINKS TO RELATED DOCUMENTS

| | |
|--------------------------|--|
| Dimensions | www.vishay.com/doc?95046 |
| Part marking information | www.vishay.com/doc?95444 |
| Packaging information | www.vishay.com/doc?95032 |
| SPIICE model | www.vishay.com/doc?95293 |

D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D²PAK (SMD-220)



| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| A | 4.06 | 4.83 | 0.160 | 0.190 | |
| A1 | 0.00 | 0.254 | 0.000 | 0.010 | |
| b | 0.51 | 0.99 | 0.020 | 0.039 | |
| b1 | 0.51 | 0.89 | 0.020 | 0.035 | 4 |
| b2 | 1.14 | 1.78 | 0.045 | 0.070 | |
| b3 | 1.14 | 1.73 | 0.045 | 0.068 | 4 |
| c | 0.38 | 0.74 | 0.015 | 0.029 | |
| c1 | 0.38 | 0.58 | 0.015 | 0.023 | 4 |
| c2 | 1.14 | 1.65 | 0.045 | 0.065 | |
| D | 8.51 | 9.65 | 0.335 | 0.380 | 2 |

| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| D1 | 6.86 | 8.00 | 0.270 | 0.315 | 3 |
| E | 9.65 | 10.67 | 0.380 | 0.420 | 2, 3 |
| E1 | 7.90 | 8.80 | 0.311 | 0.346 | 3 |
| e | 2.54 BSC | | 0.100 BSC | | |
| H | 14.61 | 15.88 | 0.575 | 0.625 | |
| L | 1.78 | 2.79 | 0.070 | 0.110 | |
| L1 | - | 1.65 | - | 0.066 | 3 |
| L2 | 1.27 | 1.78 | 0.050 | 0.070 | |
| L3 | 0.25 BSC | | 0.010 BSC | | |
| L4 | 4.78 | 5.28 | 0.188 | 0.208 | |

Notes

- Dimensioning and tolerancing per ASME Y14.5 M-1994
- 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
- Thermal pad contour optional within dimension E, L1, D1 and E1
- Dimension b1 and c1 apply to base metal only
- Datum A and B to be determined at datum plane H
- Controlling dimension: inch
- Outline conforms to JEDEC® outline TO-263AB



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