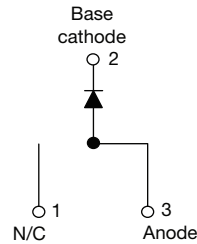


## High Performance Schottky Rectifier, 10 A


**D<sup>2</sup>PAK (TO-263AB)**


### FEATURES

- 150 °C T<sub>J</sub> operation
- TO-220 and D<sup>2</sup>PAK 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](http://www.vishay.com/doc?99912)


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**

| PRODUCT SUMMARY                  |                               |
|----------------------------------|-------------------------------|
| I <sub>F(AV)</sub>               | 10 A                          |
| V <sub>R</sub>                   | 35 V, 45 V                    |
| V <sub>F</sub> at I <sub>F</sub> | 0.57 V                        |
| I <sub>RM</sub>                  | 15 mA at 125 °C               |
| T <sub>J</sub> max.              | 150 °C                        |
| E <sub>AS</sub>                  | 8 mJ                          |
| Package                          | D <sup>2</sup> 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 <sub>F(AV)</sub>                | Rectangular waveform                         | 10          | A     |
| I <sub>FRM</sub>                  | T <sub>C</sub> = 135 °C                      | 20          |       |
| V <sub>RRM</sub>                  |  | 35/45       | V     |
| I <sub>FSM</sub>                  | t <sub>p</sub> = 5 μs sine                   | 1060        | A     |
| V <sub>F</sub>                    | 10 A <sub>pk</sub> , T <sub>J</sub> = 125 °C | 0.57        | V     |
| T <sub>J</sub>                    | Range  | -55 to +150 | °C    |

| VOLTAGE RATINGS                      |                  |                |                |       |
|--------------------------------------|------------------|----------------|----------------|-------|
| PARAMETER                            | SYMBOL           | VS-MBRB1035HM3 | VS-MBRB1045HM3 | UNITS |
| Maximum DC reverse voltage           | V <sub>R</sub>   | 35             | 45             | V     |
| Maximum working peak reverse voltage | V <sub>RWM</sub> |                |                |       |



| 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 $\mu\text{s}$ sine or 3 $\mu\text{s}$ 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 $\mu\text{s}$<br>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   |                                   | 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              | $r_f$          |  |                                   | 17.6   | m $\Omega$       |
| 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/ $\mu\text{s}$ |

**Note**

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

| THERMAL - MECHANICAL SPECIFICATIONS          |            |   |  |            |                        |
|--|------------|---|--|------------|------------------------|
| PARAMETER                                    | SYMBOL     | TEST CONDITIONS   |  | VALUES     | UNITS                  |
| Maximum junction temperature range           | $T_J$      |   |  | -55 to 150 | $^\circ\text{C}$       |
| Maximum storage temperature range            | $T_{Stg}$  |   |  | -55 to 175 |                        |
| Maximum thermal resistance, junction to case | $R_{thJC}$ | DC operation  |  | 2.0        | $^\circ\text{C/W}$     |
| Typical thermal resistance, case to heatsink | $R_{thCS}$ | Mounting surface, smooth and greased<br>(Only for TO-220) |  | 0.50       |                        |
| Approximate weight                           |            |   |  | 2          | g                      |
|  |            |   |  | 0.07       | oz.                    |
| Mounting torque                              | minimum    |   |  | 6 (5)      | kgf · cm<br>(lbf · in) |
|  | maximum    |   |  | 12 (10)    |                        |
| Marking device                               |            | Case style D <sup>2</sup> PAK (TO-263AB)                  |  | MBRB1035H  |                        |
|  |            |   |  | MBRB1045H  |                        |

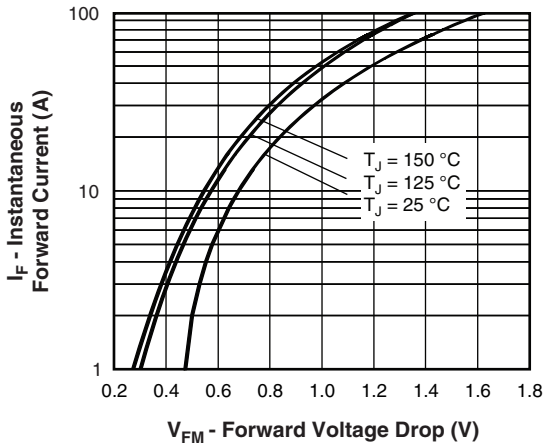


Fig. 1 - Maximum Forward Voltage Drop Characteristics

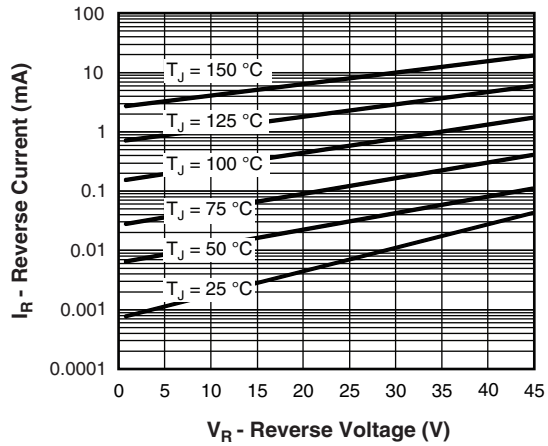


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

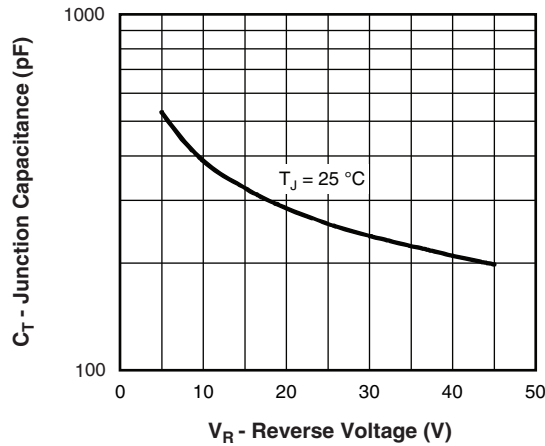


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

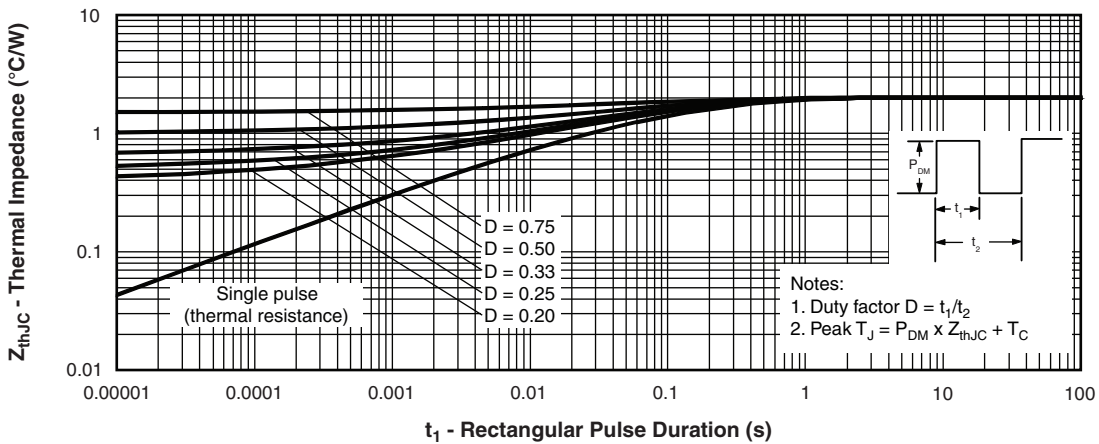


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

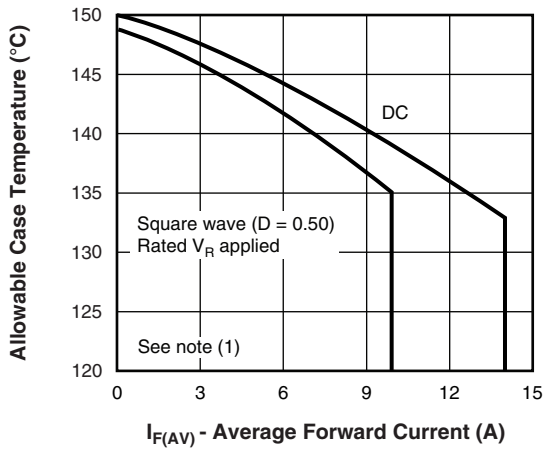


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

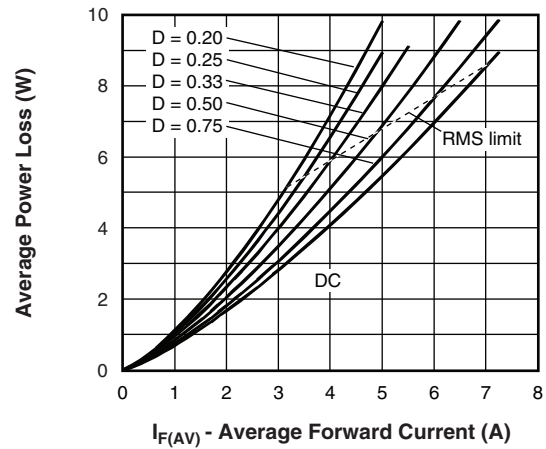


Fig. 6 - Forward Power Loss Characteristics

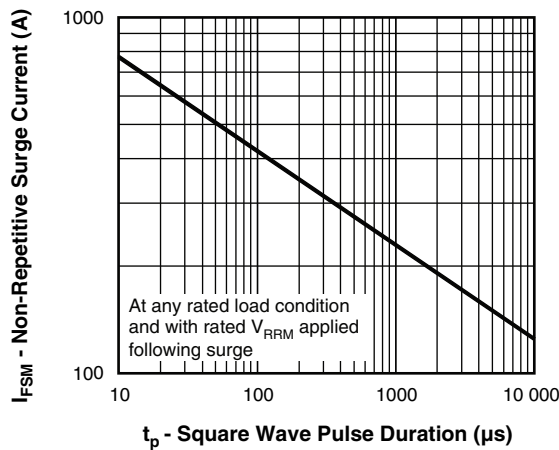


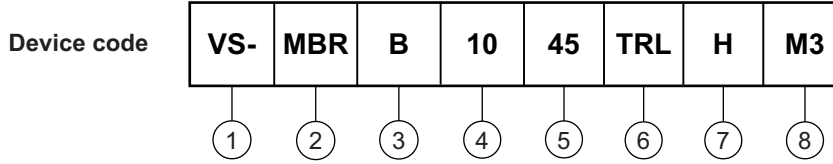
Fig. 7 - Maximum Non-Repetitive Surge Current

**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



- 1** - Vishay Semiconductors product
- 2** - Essential part number
- 3** - B = surface mount
- 4** - Current rating (10 = 10 A)
- 5** - Voltage ratings 35 = 35 V  
45 = 45 V
- 6** -
  - 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

| 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-MBRB1035TRLHM3    | 800              | 800                    | 13" diameter reel        |
| VS-MBRB1045HM3       | 50               | 1000                   | Antistatic plastic tubes |
| VS-MBRB1045TRRH3     | 800              | 800                    | 13" diameter reel        |
| VS-MBRB1045TRLHM3    | 800              | 800                    | 13" diameter reel        |

| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?95046">www.vishay.com/doc?95046</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95444">www.vishay.com/doc?95444</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a> |
| SPIICE model               | <a href="http://www.vishay.com/doc?95293">www.vishay.com/doc?95293</a> |

## D<sup>2</sup>PAK

### DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D<sup>2</sup>PAK (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

- 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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