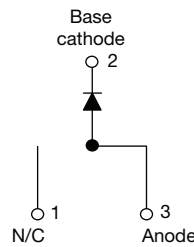


High Performance Schottky Rectifier, 10 A


TO-263AB (D²PAK)


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 260 °C
- AEC-Q101 qualified, meets JESD 201, class 1A whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
 COMPLIANT
 HALOGEN
FREE

PRODUCT SUMMARY

| | |
|----------------------------------|-------------------------------|
| Package | TO-263AB (D ² PAK) |
| I _{F(AV)} | 10 A |
| V _R | 35 V, 45 V |
| V _F at I _F | 0.57 V |
| I _{RM} max. | 15 mA at 125 °C |
| T _J max. | 150 °C |
| Diode variation | Single die |
| E _{AS} | 8.0 mJ |

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 | -65 to +150 | °C |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | VS-MBRB1035PbF | VS-MBRB1045PbF | 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 °C, rated V _R | 10 | A |
| Peak repetitive forward current | I _{FRM} | Rated V _R , square wave, 20 kHz, T _C = 135 °C | 20 | |
| Non-repetitive surge current | I _{FSM} | 5 μs sine | 1060 | |
| | | Surge applied at rated load conditions half wave, single phase, 60 Hz | 150 | |
| Non-repetitive avalanche energy | E _{AS} | T _J = 25 °C, I _{AS} = 2 A, L = 4 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 x 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_t | | | 17.6 | m Ω |
| Maximum junction capacitance | C_T | $V_R = 5 V_{DC}$ (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/ μ s |

Note(1) Pulse width < 300 μ s, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | |
|--|------------|--|--|-------------|------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum junction temperature range | T_J | | | -65 to +150 | $^\circ\text{C}$ |
| Maximum storage temperature range | T_{Stg} | | | -65 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 (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 | | MBRB1035 | |
| | | | | MBRB1045 | |

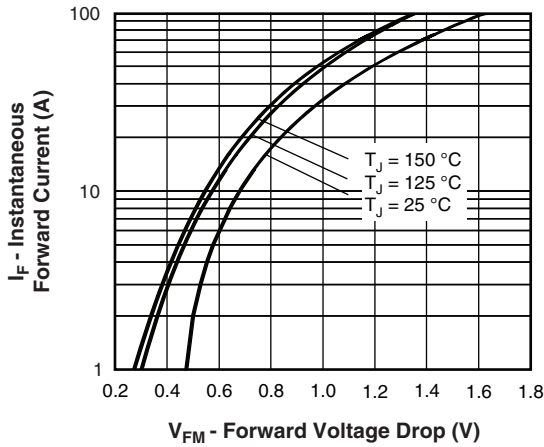


Fig. 1 - Maximum Forward Voltage Drop Characteristics

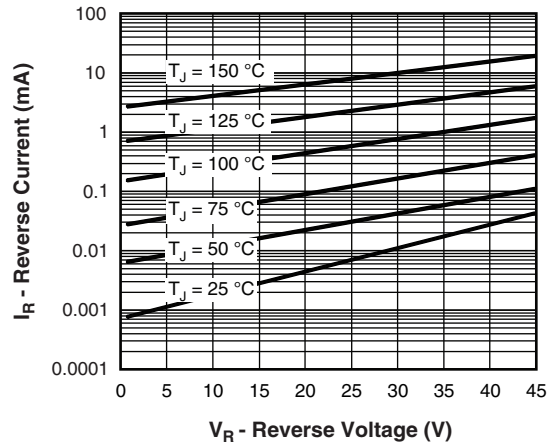


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

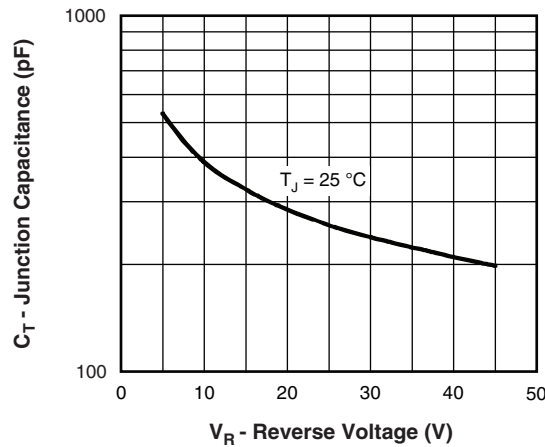


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

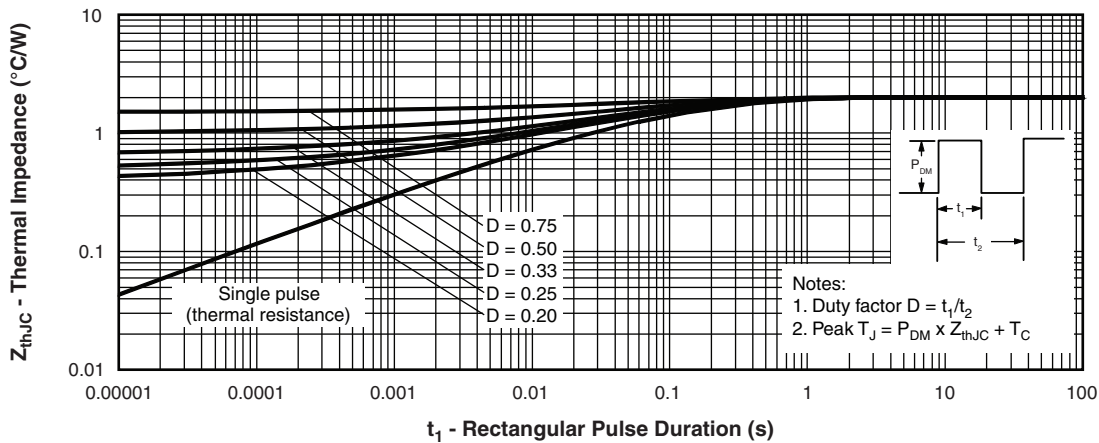


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

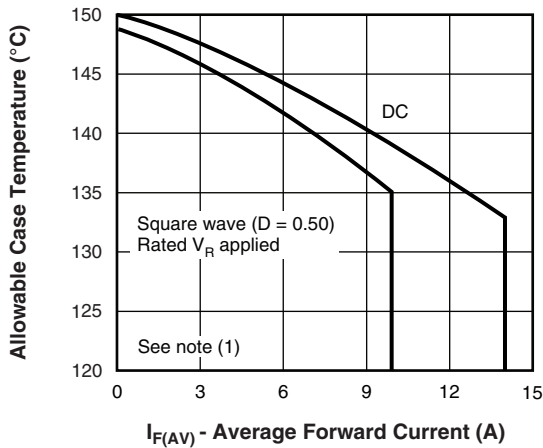


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

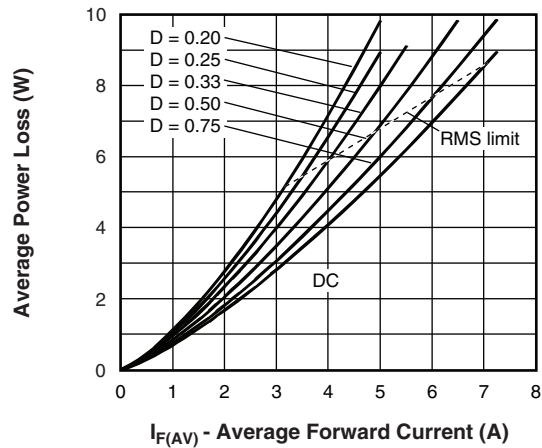


Fig. 6 - Forward Power Loss Characteristics

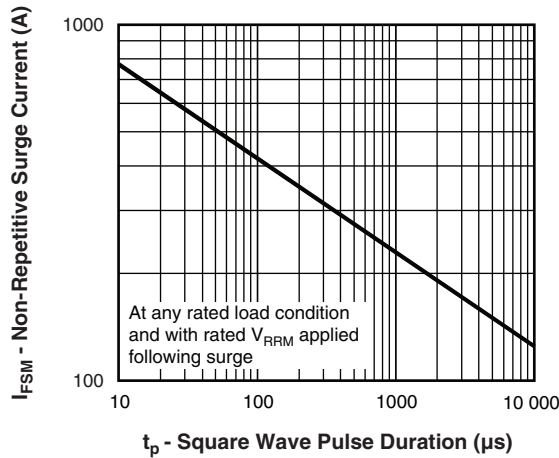


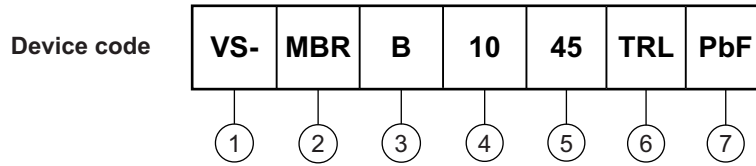
Fig. 7 - Maximum Non-Repetitive Surge Current

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 (50 pieces)
 - TRL = tape and reel (left oriented)
 - TRR = tape and reel (right oriented)
- 7** - PbF = lead (Pb)-free

| 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 |
| SPICE model | www.vishay.com/doc?95293 |

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

- 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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