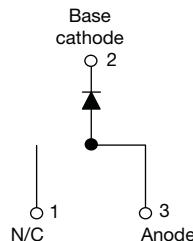


High Performance Schottky Rectifier, 10 A


TO-263AB (D²PAK)

RoHS
COMPLIANT
HALOGEN
FREE

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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

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.

| 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 |

| 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 or 3 µs rect. pulse | | 1060 | |
| | | Surge applied at rated load conditions halfwave, 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 × 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 | $V_{F(TO)}$ | $T_J = T_J \text{ maximum}$ | | 0.354 | V | |
| Forward slope resistance | r_t | | | 17.6 | $\text{m}\Omega$ | |
| 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 | $\text{V}/\mu\text{s}$ | |

Note

(1) Pulse width < 300 μs , 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 | $^\circ\text{C}/\text{W}$ | |
| 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) | $\text{kgf} \cdot \text{cm}$ (lbf · in) | |
| | maximum | | | 12 (10) | | |
| Marking device | | Case style D ² PAK | | MBRB1035 | | |
| | | | | MBRB1045 | | |

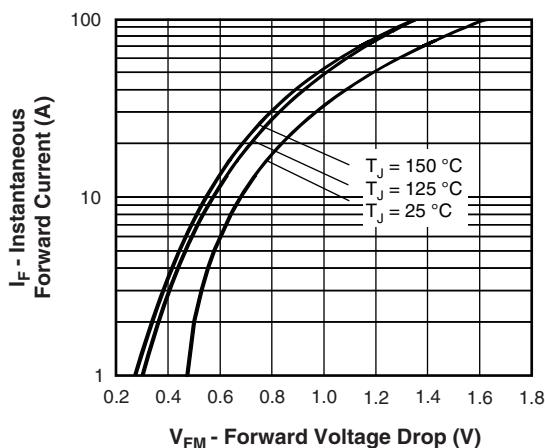


Fig. 1 - Maximum Forward Voltage Drop Characteristics

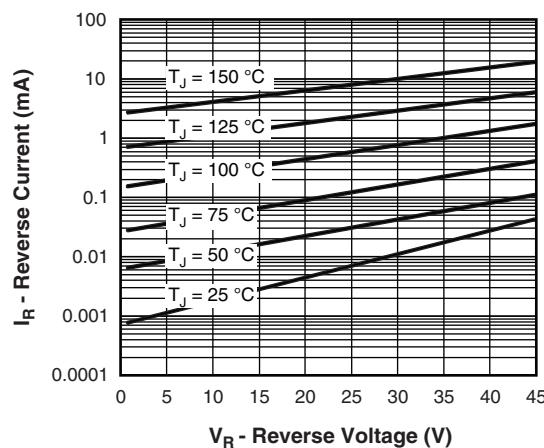


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

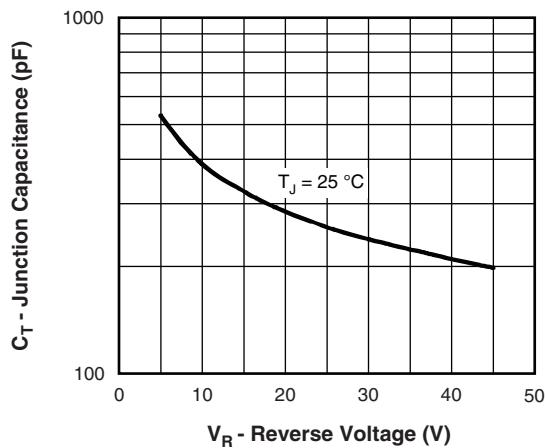


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

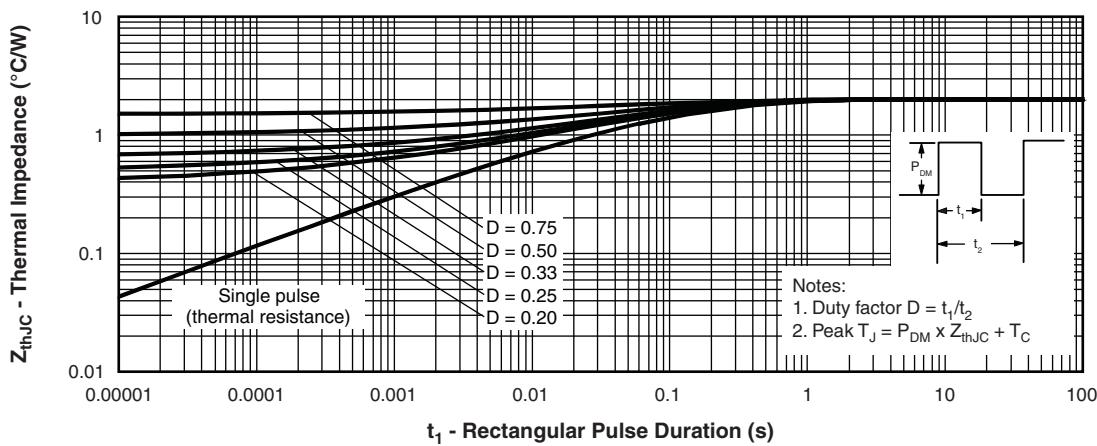


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

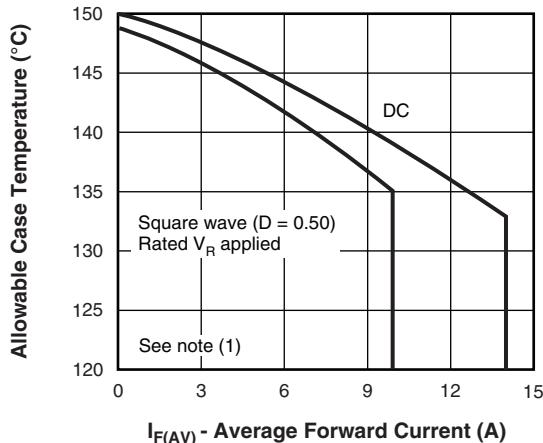


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

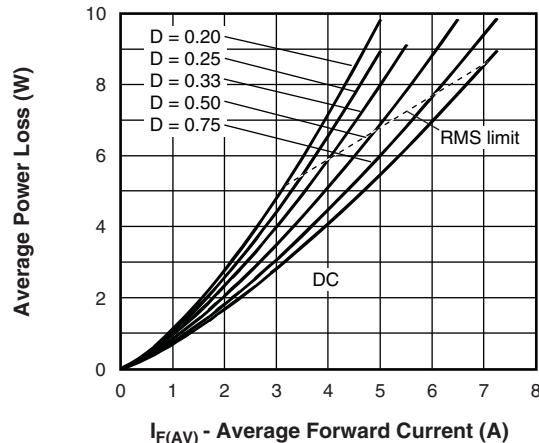


Fig. 6 - Forward Power Loss Characteristics

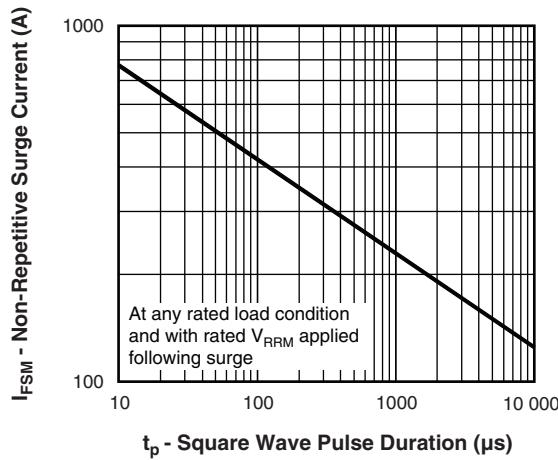
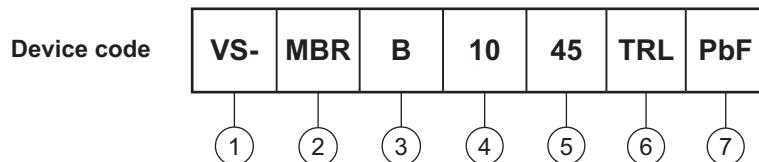


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

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

ORDERING INFORMATION TABLE


| | |
|---|--|
| 1 | - Vishay Semiconductors product |
| 2 | - Essential part number |
| 3 | - B = surface mount |
| 4 | - Current rating (10 = 10 A) |
| 5 | - Voltage ratings |
| 6 | <ul style="list-style-type: none"> • None = tube (50 pieces) • TRL = tape and reel (left oriented) • TRR = tape and reel (right oriented) |
| 7 | - PbF = lead (Pb)-free |

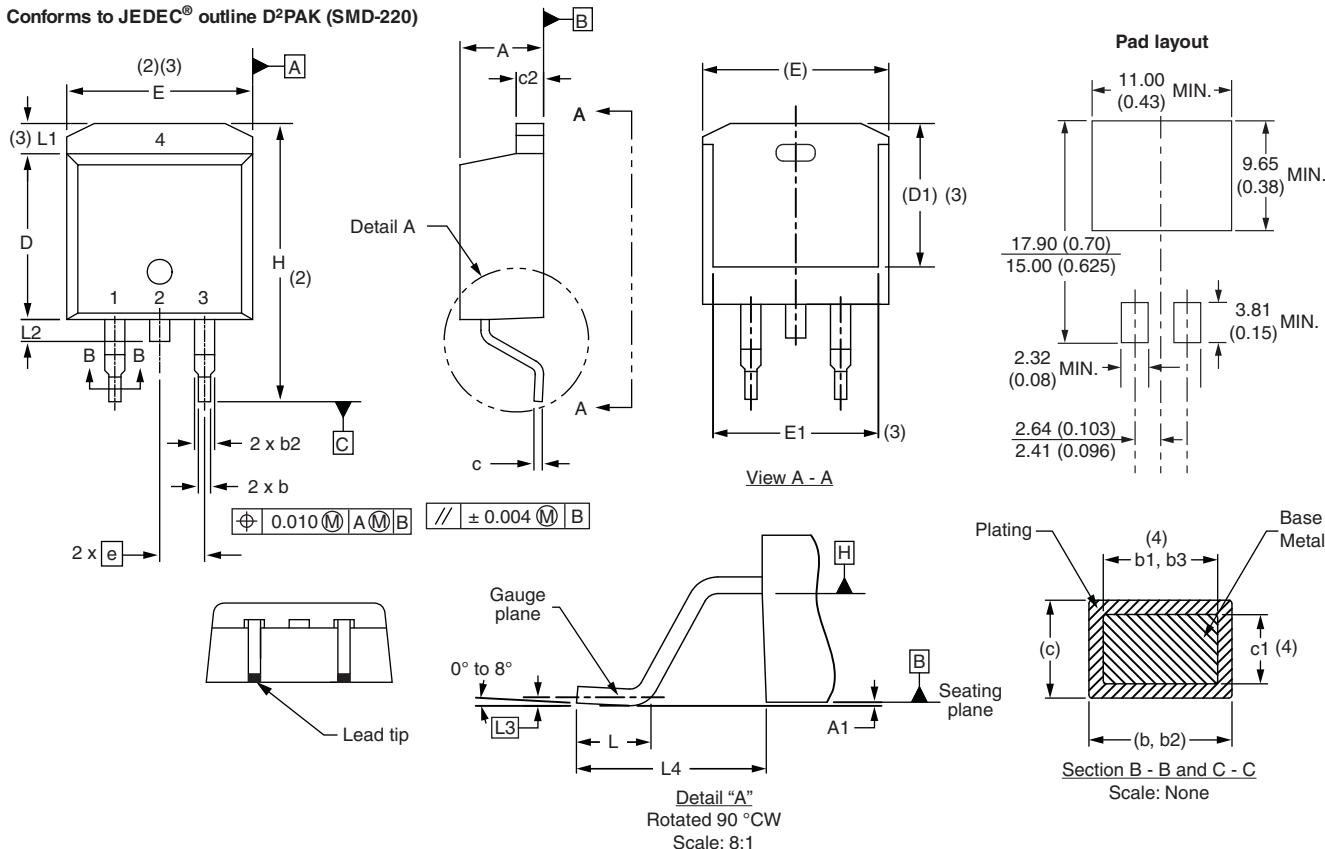
LINKS TO RELATED DOCUMENTS

| | |
|--------------------------|--|
| 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

- (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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