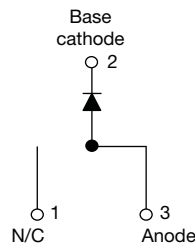


High Performance Schottky Rectifier, 7.5 A



FEATURES

- 150 °C T_J operation
- High frequency operation
- Low forward voltage drop
- 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

| PRIMARY CHARACTERISTICS | |
|-------------------------|-------------------------------|
| $I_{F(AV)}$ | 7.5 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} | 7 mJ |
| Package | D ² PAK (TO-263AB) |
| Circuit configuration | Single |

DESCRIPTION

The VS-MBRB7... Schottky rectifier series 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 | 7.5 | A | |
| V_{RRM} | | 35, 45 | V | |
| I_{FSM} | $t_p = 5 \mu s$ sine | 690 | A | |
| V_F | $7.5 A_{pk}$, $T_J = 125 \text{ °C}$ | 0.57 | V | |
| T_J | Range | -65 to +150 | °C | |

| VOLTAGE RATINGS | | | | |
|--------------------------------------|-----------|---------------|---------------|-------|
| PARAMETER | SYMBOL | VS-MBRB735-M3 | VS-MBRB745-M3 | 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 | $I_{F(AV)}$ | $T_C = 131 \text{ °C}$, rated V_R | | 7.5 | A |
| Non-repetitive peak surge current | I_{FSM} | 5 μs sine or 3 μs rect. pulse | Following any rated load condition and with rated V_{RRM} applied | 690 | |
| | | Surge applied at rated load condition halfwave single phase 60 Hz | | 150 | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25 \text{ °C}$, $I_{AS} = 2 \text{ A}$, $L = 3.5 \text{ mH}$ | | 7 | 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⁾ | 15 A | T _J = 25 °C | 0.84 | V |
| | | 7.5 A | T _J = 125 °C | 0.57 | |
| | | 15 A | | 0.72 | |
| Maximum instantaneous reverse current | I _{RM} ⁽¹⁾ | T _J = 25 °C | Rated DC voltage | 0.1 | mA |
| | | T _J = 125 °C | | 15 | |
| Maximum junction capacitance | C _T | V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °C | | 400 | 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 | | | -65 to 150 | °C |
| Maximum storage temperature range | T _{Stg} | | | -65 to 175 | |
| Maximum thermal resistance, junction to case | R _{thJC} | DC operation | | 3.0 | °C/W |
| Typical thermal resistance, case to heatsink | R _{thCS} | Mounting surface, smooth and greased | | 0.50 | |
| Approximate weight | | | | 2 | g |
| | | | | 0.07 | oz. |
| Mounting torque | | | | 6 (5) | kgf · cm (lbf · in) |
| | | | | 12 (10) | |
| Marking device | | | Case style D ² PAK (TO-263AB) | MBRB735 | |
| | | | | MBRB745 | |

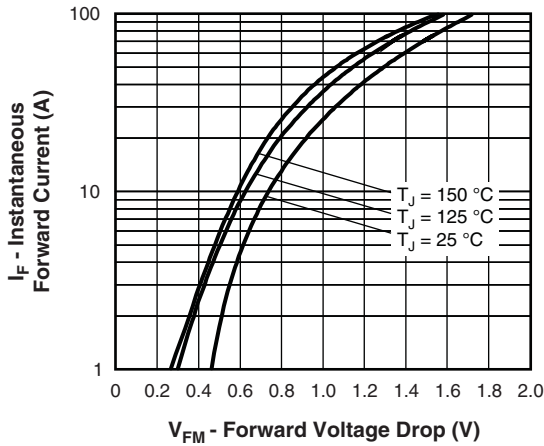


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

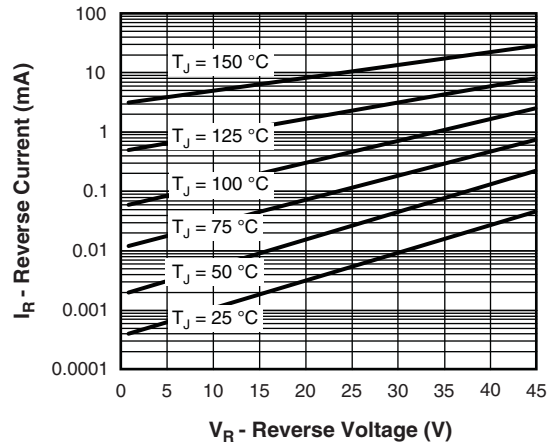


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

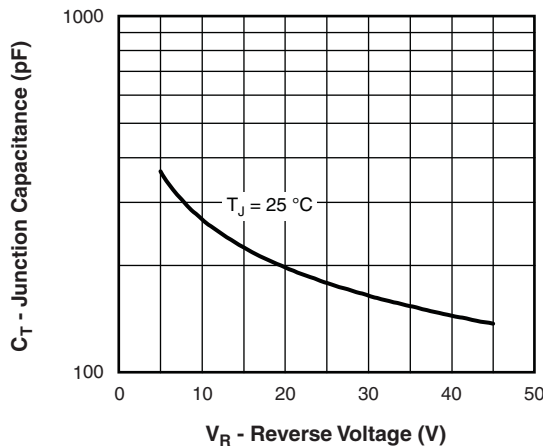


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

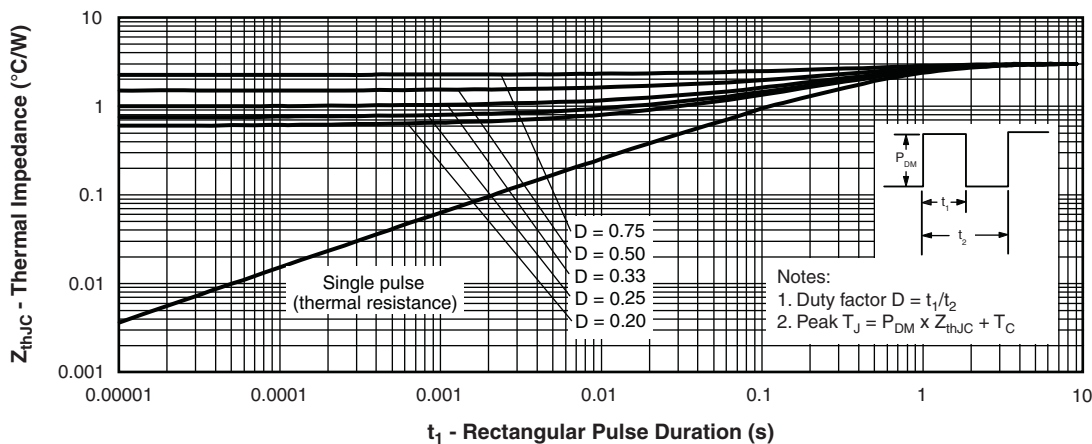


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

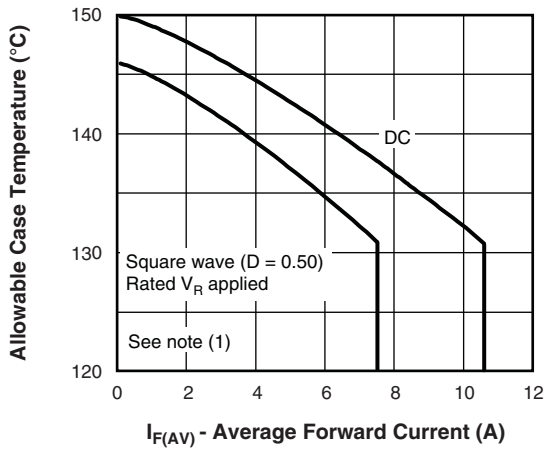


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

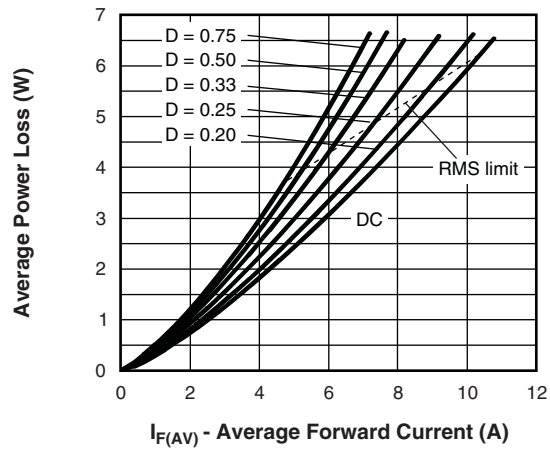


Fig. 6 - Forward Power Loss Characteristics

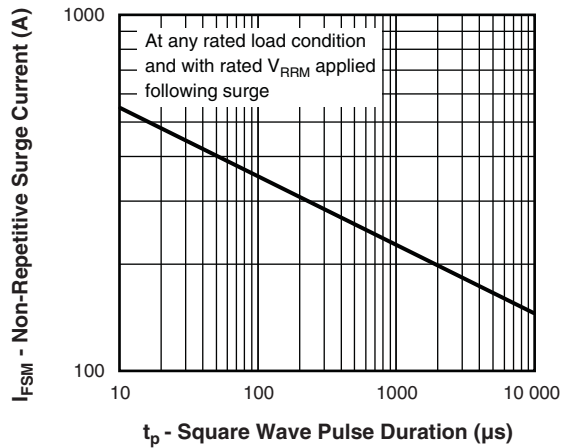


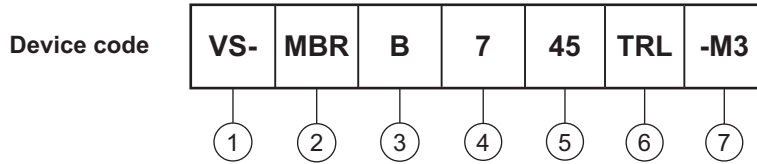
Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

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
 - None = TO-220
- 4** - Current rating (7 = 7.5 A)
- 5** - Voltage ratings

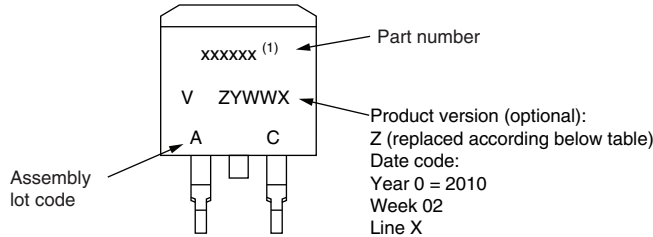
| |
|-----------|
| 35 = 35 V |
| 45 = 45 V |
- 6** -
 - None = Tube
 - TRL = Tape and reel (left oriented - for D²PAK only)
 - TRR = Tape and reel (right oriented - for D²PAK only)
- 7** - -M3 = Halogen-free, RoHS-compliant and termination lead (Pb)-free

| ORDERING INFORMATION (Example) | | | |
|--------------------------------|------------------|------------------------|-------------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-MBRB735-M3 | 50 | 1000 | Antistatic plastic tube |
| VS-MBRB735TRR-M3 | 800 | 800 | 13" diameter reel |
| VS-MBRB735TRL-M3 | 800 | 800 | 13" diameter reel |
| VS-MBRB745-M3 | 50 | 1000 | Antistatic plastic tube |
| VS-MBRB745TRR-M3 | 800 | 800 | 13" diameter reel |
| VS-MBRB745TRL-M3 | 800 | 800 | 13" diameter reel |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?96164 |
| Part marking information | www.vishay.com/doc?95444 |
| Packaging information | www.vishay.com/doc?96424 |
| SPICE model | www.vishay.com/doc?95298 |



D²PAK



Example: This is a xxxxxx ⁽¹⁾ with assembly lot code AC, assembled on WW 02, 2010

Note

⁽¹⁾ If part number contain "H" as last digit, product is AEC-Q101 qualified

| ENVIRONMENTAL NAMING CODE (Z) | PRODUCT DEFINITION |
|-------------------------------|--|
| A | Termination lead (Pb)-free |
| B | Totally lead (Pb)-free |
| E | RoHS-compliant and termination lead (Pb)-free |
| F | RoHS-compliant and totally lead (Pb)-free |
| M | Halogen-free, RoHS-compliant, and termination lead (Pb)-free |
| N | Halogen-free, RoHS-compliant, and totally lead (Pb)-free |
| G | Green |

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: inches
- (7) Outline conforms to JEDEC[®] outline TO-263AB



D²PAK (TO-263AB)

CARRIER TAPE FOR TAPE AND REEL LEFT in millimeters



Note

(1) For dimensions, see next pages

CARRIER TAPE FOR TAPE AND REEL RIGHT in millimeters



Note

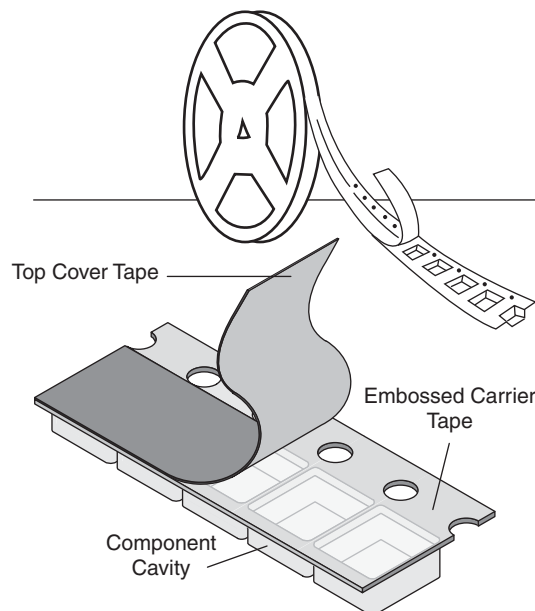
(1) For dimensions, see next pages



REEL FOR CARRIER TAPE in millimeters



CARRIER TAPE AND REEL PACKAGING D²PAK (TO-263AB)





COVER TAPE FOR CARRIER TAPE in millimeters



| APPLICATION | COVER TAPE WIDTH W | COVER TAPE THICKNESS T | CARRIER TAPE WIDTH | MATERIAL |
|----------------------------------|-----------------------|---------------------------|--------------------|--|
| D ² PAK (TO-263AB) | 21.3 ± 0.1 | 0.060 ± 0.01 | 24 | Antistatic/treated/transparent/polyester |



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