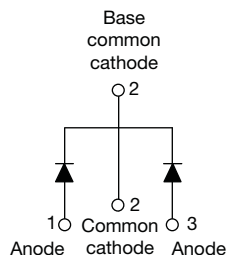
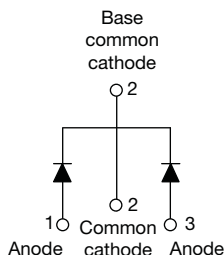


## High Performance Schottky Rectifier, 2 x 7.5 A

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

**VS-MBRB15..CT-M3**

TO-262AA


**VS-MBR15..CT-1-M3**

### FEATURES

- 150 °C T<sub>J</sub> operation
- Center tap TO-220 package
- 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
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see [www.vishay.com/doc299912](http://www.vishay.com/doc299912)



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

### PRODUCT SUMMARY

|                                  |                                         |
|----------------------------------|-----------------------------------------|
| I <sub>F(AV)</sub>               | 2 x 7.5 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> max.             | 15 mA at 125 °C                         |
| T <sub>J</sub> max.              | 150 °C                                  |
| E <sub>AS</sub>                  | 7 mJ                                    |
| Package                          | TO-263AB (D <sup>2</sup> PAK), TO-262AA |
| Diode variation                  | Common cathode                          |

### DESCRIPTION

The VS-MBR(B)15... center tap 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                          | 15          | A     |
| V <sub>R</sub>     |                                               | 35/45       | V     |
| I <sub>FSM</sub>   | t <sub>p</sub> = 5 μs sine                    | 690         | A     |
| V <sub>F</sub>     | 7.5 A <sub>pk</sub> , T <sub>J</sub> = 125 °C | 0.57        | V     |
| T <sub>J</sub>     |                                               | -65 to +150 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL           | VS-MBRB1535CT-M3<br>VS-MBR1535CT-1-M3 | VS-MBRB1545CT-M3<br>VS-MBR1545CT-1-M3 | 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             | per leg    | I <sub>F(AV)</sub> | T <sub>C</sub> = 131 °C, rated V <sub>R</sub>                                                                                          |                                                                            | 7.5    | A     |
|                                             | per device |                    |                                                                                                                                        |                                                                            | 15     |       |
| Maximum peak one cycle non-repetitive surge |            | I <sub>FSM</sub>   | 5 μs sine or 3 μs rect. pulse                                                                                                          | Following any rated load condition and with rated V <sub>RRM</sub> applied | 690    |       |
|                                             |            |                    | Surge applied at rated load conditions halfwave, single phase, 60 Hz                                                                   |                                                                            | 150    |       |
| Non-repetitive avalanche energy per leg     |            | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2 A, L = 3.5 mH                                                                              |                                                                            | 7      | mJ    |
| Repetitive avalanche current per leg        |            | I <sub>AR</sub>    | Current decaying linearly to zero in 1 μs<br>Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical |                                                                            | 2      | A     |

| ELECTRICAL SPECIFICATIONS             |                       |                                                                                                   |                                     |        |       |
|---------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------|-------------------------------------|--------|-------|
| PARAMETER                             | SYMBOL                | TEST CONDITIONS                                                                                   |                                     | VALUES | UNITS |
| Maximum forward voltage drop          | $V_{\text{FM}}^{(1)}$ | 15 A                                                                                              | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.84   | V     |
|                                       |                       | 7.5 A                                                                                             | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.57   |       |
|                                       |                       | 15 A                                                                                              |                                     | 0.72   |       |
| Maximum instantaneous reverse current | $I_{\text{RM}}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                                | Rated DC voltage                    | 0.1    | mA    |
|                                       |                       | $T_J = 125\text{ }^{\circ}\text{C}$                                                               |                                     | 15     |       |
| Maximum junction capacitance          | $C_T$                 | $V_R = 5\text{ V}_{\text{DC}}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$ |                                     | 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  $\mu\text{s}$ , duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS                  |                   |                                      |             |                        |
|------------------------------------------------------|-------------------|--------------------------------------|-------------|------------------------|
| PARAMETER                                            | SYMBOL            | TEST CONDITIONS                      | VALUES      | UNITS                  |
| Maximum junction temperature range                   | T <sub>J</sub>    |                                      | -65 to +150 | °C                     |
| Maximum storage temperature range                    | T <sub>Stg</sub>  |                                      | -65 to +175 |                        |
| Maximum thermal resistance, junction to case per leg | R <sub>thJC</sub> | DC operation                         | 3.0         | °C/W                   |
| Typical thermal resistance, case to heatsink         | R <sub>thCS</sub> | Mounting surface, smooth and greased | 0.50        |                        |
| Maximum thermal resistance, junction to ambient      | R <sub>thJA</sub> | DC operation                         | 60          |                        |
| 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        | MBRB1545CT  |                        |
|                                                      |                   | Case style TO-262                    | MBR1545CT-1 |                        |

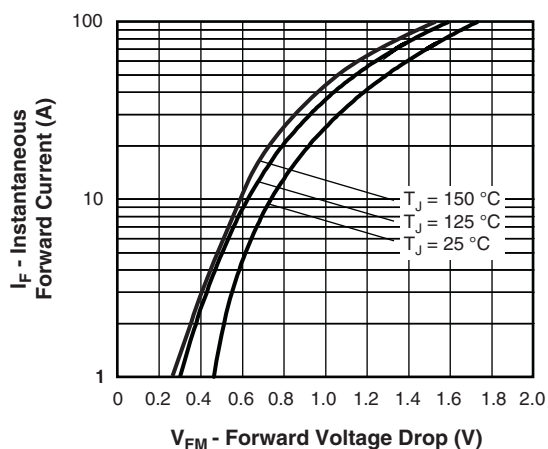


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

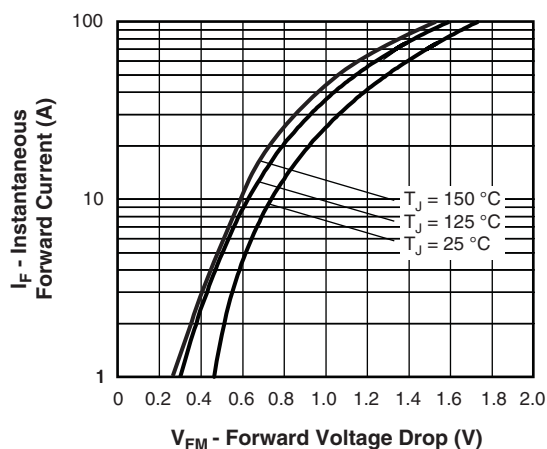


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

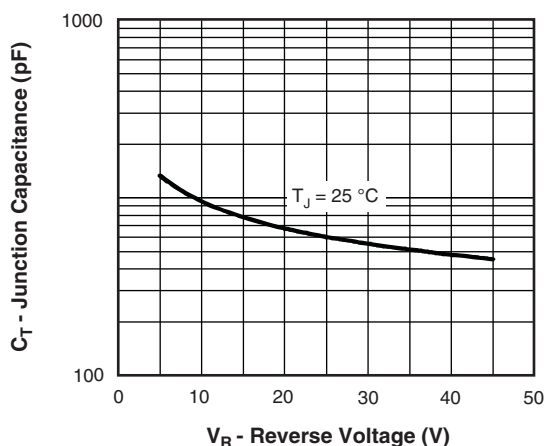


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

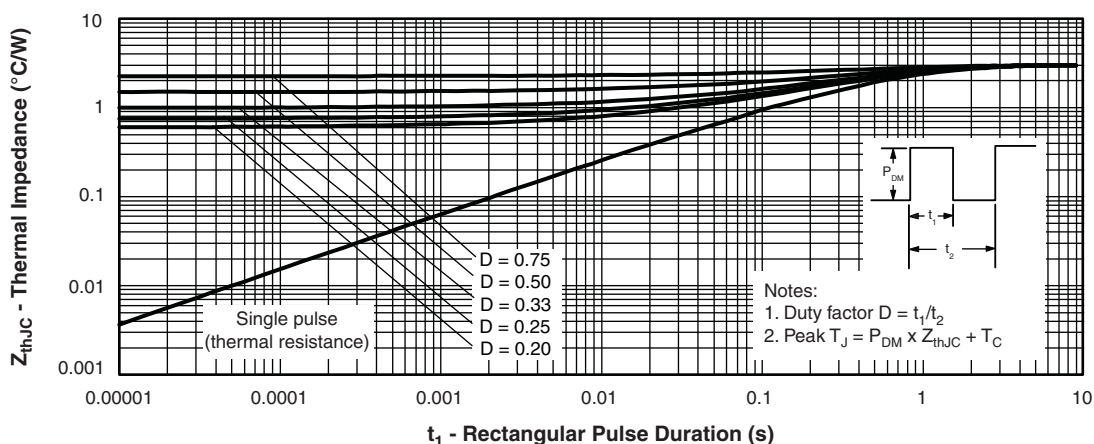


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

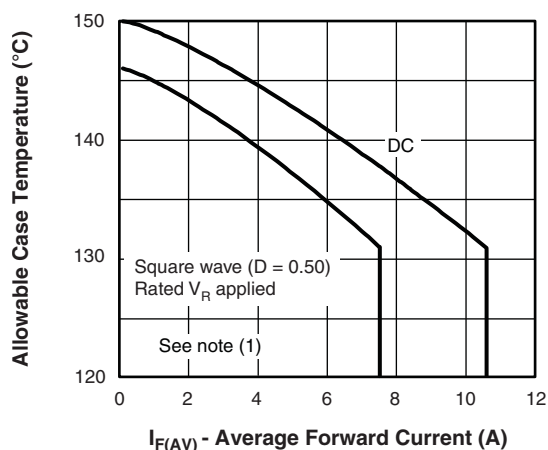


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

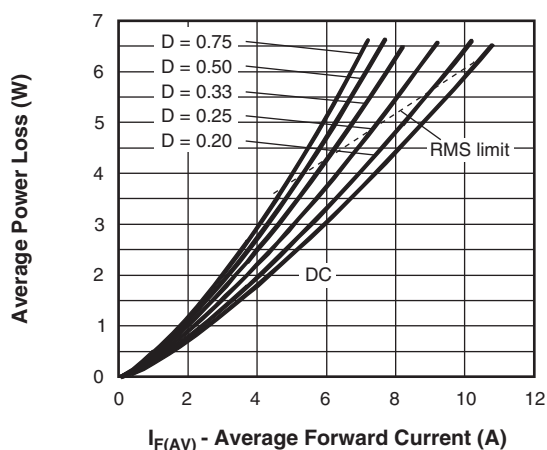


Fig. 6 - Forward Power Loss Characteristics

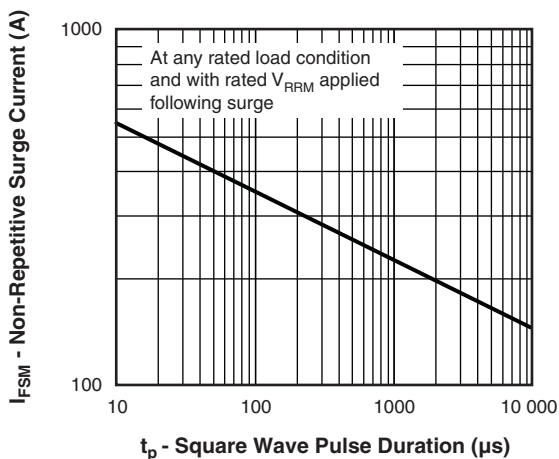


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

**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**

|             |                                                                                                                                                            |            |          |           |           |           |           |          |            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|-----------|-----------|-----------|-----------|----------|------------|
| Device code | <b>VS-</b>                                                                                                                                                 | <b>MBR</b> | <b>B</b> | <b>15</b> | <b>45</b> | <b>CT</b> | <b>-1</b> | <b>L</b> | <b>-M3</b> |
|             | 1                                                                                                                                                          | 2          | 3        | 4         | 5         | 6         | 7         | 8        | 9          |
| 1           | - Vishay Semiconductors product                                                                                                                            |            |          |           |           |           |           |          |            |
| 2           | - Essential part number                                                                                                                                    |            |          |           |           |           |           |          |            |
| 3           | - • B = D <sup>2</sup> PAK 7 None<br>• None = TO-262 7 = -1                                                                                                |            |          |           |           |           |           |          |            |
| 4           | - Current rating (15 = 15 A)                                                                                                                               |            |          |           |           |           |           |          |            |
| 5           | - Voltage ratings 35 = 35 V<br>45 = 45 V                                                                                                                   |            |          |           |           |           |           |          |            |
| 6           | - CT = essential part number                                                                                                                               |            |          |           |           |           |           |          |            |
| 7           | - • None = D <sup>2</sup> PAK 3 = B<br>• -1 = TO-262 3 None                                                                                                |            |          |           |           |           |           |          |            |
| 8           | - • None = tube<br>• L = tape and reel (left oriented - for D <sup>2</sup> PAK only)<br>• R = tape and reel (right oriented - for D <sup>2</sup> PAK only) |            |          |           |           |           |           |          |            |
| 9           | - -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-MBRB1535CT-M3     | 50               | 1000                   | Antistatic plastic tubes |
| VS-MBRB1535CTR-M3    | 800              | 800                    | 13" diameter reel        |
| VS-MBRB1535CTL-M3    | 800              | 800                    | 13" diameter reel        |
| VS-MBR1535CT-1-M3    | 50               | 1000                   | Antistatic plastic tubes |
| VS-MBRB1545CT-M3     | 50               | 1000                   | Antistatic plastic tubes |
| VS-MBRB1545CTR-M3    | 800              | 800                    | 13" diameter reel        |
| VS-MBRB1545CTL-M3    | 800              | 800                    | 13" diameter reel        |
| VS-MBR1545CT-1-M3    | 50               | 1000                   | Antistatic plastic tubes |

| LINKS TO RELATED DOCUMENTS |                               |                                                                        |
|----------------------------|-------------------------------|------------------------------------------------------------------------|
| Dimensions                 | TO-263AB (D <sup>2</sup> PAK) | <a href="http://www.vishay.com/doc?95046">www.vishay.com/doc?95046</a> |
| Dimensions                 | TO-262AA                      | <a href="http://www.vishay.com/doc?95419">www.vishay.com/doc?95419</a> |
| Part marking information   | TO-263AB (D <sup>2</sup> PAK) | <a href="http://www.vishay.com/doc?95444">www.vishay.com/doc?95444</a> |
| Part marking information   | TO-262AA                      | <a href="http://www.vishay.com/doc?95443">www.vishay.com/doc?95443</a> |
| Packaging information      |                               | <a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a> |
| SPICE model                |                               | <a href="http://www.vishay.com/doc?95294">www.vishay.com/doc?95294</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 |
|--------|-------------|-------|--------|-------|-------|
|        | 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

- (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

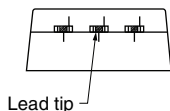
## TO-262

### DIMENSIONS in millimeters and inches

#### Modified JEDEC outline TO-262



$\pm 0.010$  A A B



#### Lead assignments

##### Diodes

1. - Anode (two die)/open (one die)
2. - Cathode
3. - Anode



Section A - A



Section B - B and C - C

Scale: None

| SYMBOL | MILLIMETERS |       | INCHES    |       | NOTES |
|--------|-------------|-------|-----------|-------|-------|
|        | MIN.        | MAX.  | MIN.      | MAX.  |       |
| A      | 4.06        | 4.83  | 0.160     | 0.190 |       |
| A1     | 2.03        | 3.02  | 0.080     | 0.119 |       |
| 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     |
| 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 |       |       |
| L      | 13.46       | 14.10 | 0.530     | 0.555 |       |
| L1     | -           | 1.65  | -         | 0.065 | 3     |
| L2     | 3.56        | 3.71  | 0.140     | 0.146 |       |

#### Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-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) Controlling dimension: inches
- (6) Outline conform to JEDEC TO-262 except A1 (maximum), b (minimum) and D1 (minimum) where dimensions derived the actual package outline



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