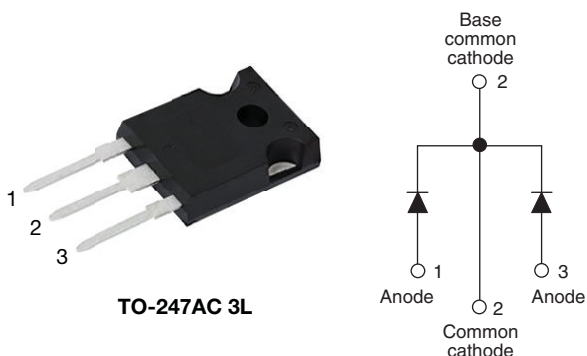


# High Performance Schottky Rectifier, 2 x 15 A



## FEATURES

- 150 °C  $T_J$  operation
- Very 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
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

## PRIMARY CHARACTERISTICS

|                       |                      |
|-----------------------|----------------------|
| $I_{F(AV)}$           | 2 x 15 A             |
| $V_R$                 | 35 V, 45 V           |
| $V_F$ at $I_F$        | See Electrical table |
| $I_{RM}$ max.         | 100 mA at 125 °C     |
| $T_J$ max.            | 150 °C               |
| $E_{AS}$              | 10 mJ                |
| Package               | TO-247AC 3L          |
| Circuit configuration | Common cathode       |

## DESCRIPTION

The VS-MBR30..WT... center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. 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 (per device)   | 30          | A     |
| $I_{FRM}$   | $T_C = 125$ °C (per leg)            | 30          |       |
| $V_{RRM}$   |                                     | 35/45       | V     |
| $I_{FSM}$   | $t_p = 5$ $\mu$ s sine              | 1020        | A     |
| $V_F$       | 20 A <sub>pk</sub> , $T_J = 125$ °C | 6           | V     |
| $T_J$       | Range                               | -65 to +150 | °C    |

## VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | VS-MBR3035WT-N3 | VS-MBR3045WT-N3 | 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         | $I_{F(AV)}$ | $T_C = 125$ °C, rated $V_R$                                                                                         | 15     | A     |
|                                         |             |                                                                                                                     | 30     |       |
| Peak repetitive forward current per leg | $I_{FRM}$   | Rated $V_R$ , square wave, 20 kHz $T_C = 125$ °C                                                                    | 30     |       |
| Non-repetitive peak surge current       | $I_{FSM}$   | 5 $\mu$ s sine or 3 $\mu$ s rect. pulse<br>Following any rated load condition and with rated $V_{RRM}$ applied      | 1020   |       |
|                                         |             | Surge applied at rated load conditions half wave, single phase, 60 Hz                                               | 200    |       |
| Non-repetitive avalanche energy per leg | $E_{AS}$    | $T_J = 25$ °C, $I_{AS} = 2$ A, $L = 5$ mH                                                                           | 10     | mJ    |
| Repetitive avalanche current per leg    | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu$ s<br>Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical | 2      | A     |
| Peak repetitive reverse surge current   | $I_{RRM}$   | 2.0 $\mu$ s 1.0 kHz                                                                                                 | 2.0    |       |



| ELECTRICAL SPECIFICATIONS             |                |                                                                    |                                     |        |       |
|---------------------------------------|----------------|--------------------------------------------------------------------|-------------------------------------|--------|-------|
| PARAMETER                             | SYMBOL         | TEST CONDITIONS                                                    |                                     | VALUES | UNITS |
| Maximum forward voltage drop          | $V_{FM}^{(1)}$ | 30 A                                                               | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.76   | V     |
|                                       |                | 20 A                                                               | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.60   |       |
|                                       |                | 30 A                                                               |                                     | 0.72   |       |
| Maximum instantaneous reverse current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                 | Rated DC voltage                    | 1.0    | mA    |
|                                       |                | $T_J = 125\text{ }^{\circ}\text{C}$                                |                                     | 100    |       |
| Threshold voltage                     | $V_{F(TO)}$    | $T_J = T_J$ maximum                                                |                                     | 0.29   | V     |
| Forward slope resistance              | $r_T$          |                                                                    |                                     | 13.8   | mΩ    |
| Maximum junction capacitance          | $C_T$          | $V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C |                                     | 800    | pF    |
| Typical series inductance             | $L_S$          | Measured from top of terminal to mounting plane                    |                                     | 7.5    | nH    |
| Maximum voltage rate of change        | dV/dt          | Rated $V_R$                                                        |                                     | 10 000 | V/μs  |

**Note**

(1) Pulse width &lt; 300 μs, duty cycle &lt; 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                         | 1.40       | °C/W                   |
| Typical thermal resistance, case to heatsink         |         | R <sub>thCS</sub> | Mounting surface, smooth and greased | 0.24       |                        |
| Approximate weight                                   |         |                   |                                      | 6          | g                      |
|                                                      |         |                   |                                      | 0.21       | oz.                    |
| Mounting torque                                      | minimum |                   |                                      | 6 (5)      | kgf · cm<br>(lbf · in) |
|                                                      | maximum |                   |                                      | 12 (10)    |                        |
| Marking device                                       |         |                   | Case style TO-247AC 3L               | MBR3035WT  |                        |
|                                                      |         |                   |                                      | MBR3045WT  |                        |

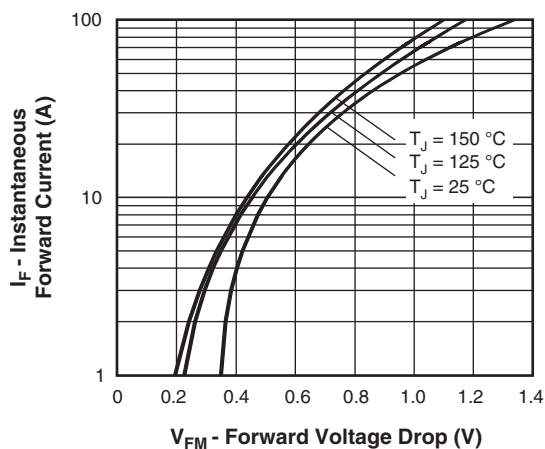


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

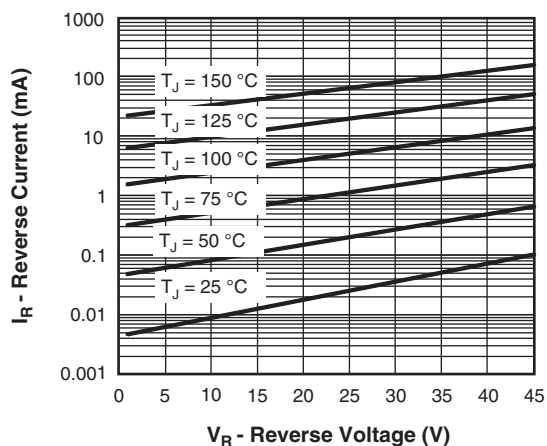


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

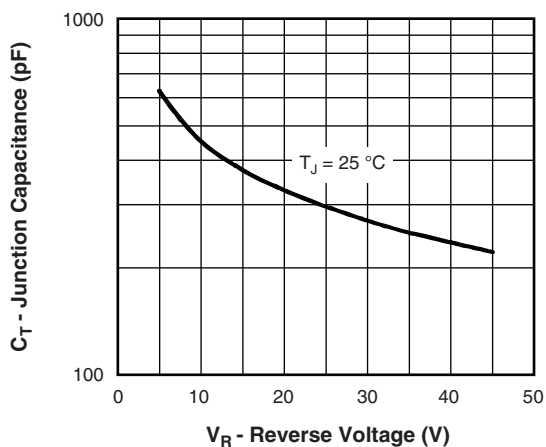


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

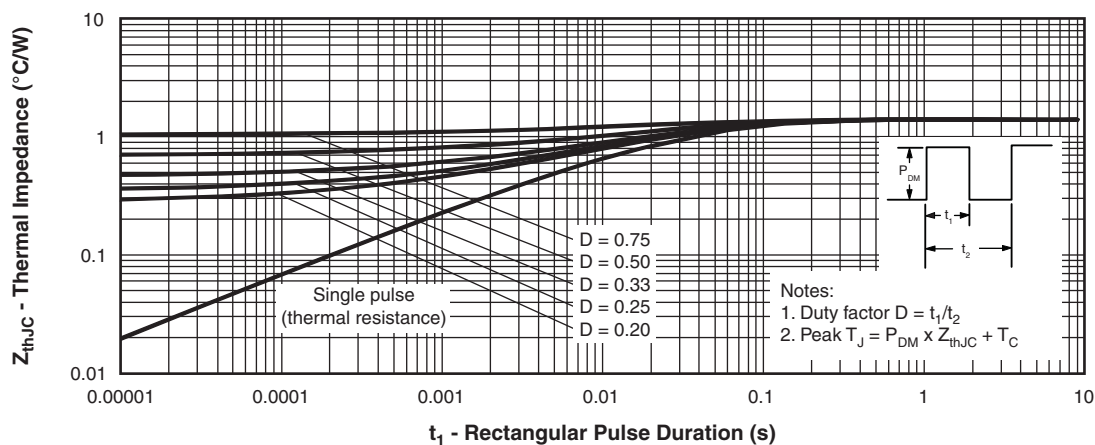


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

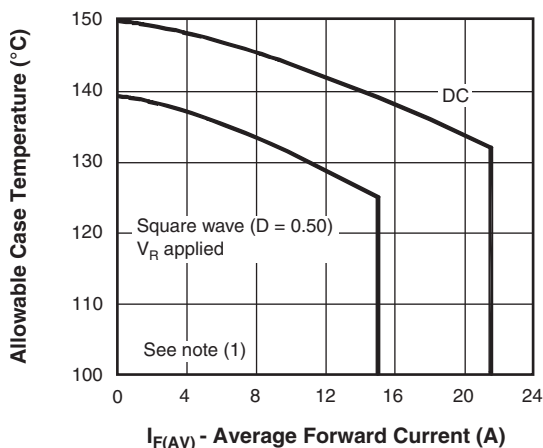


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

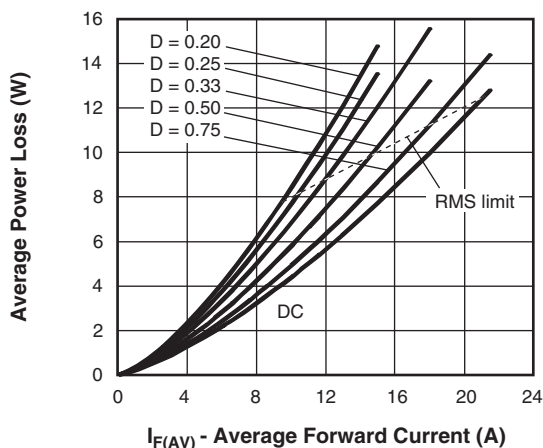


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

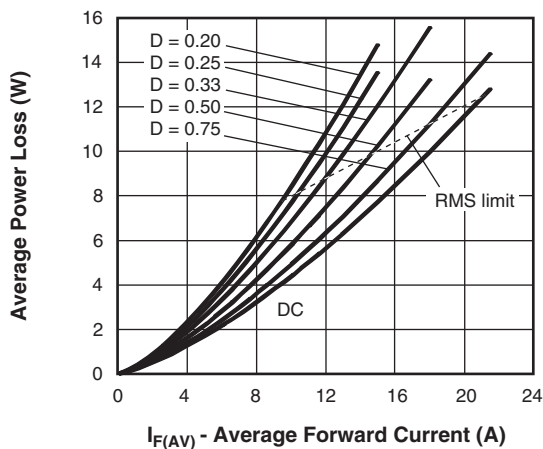


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

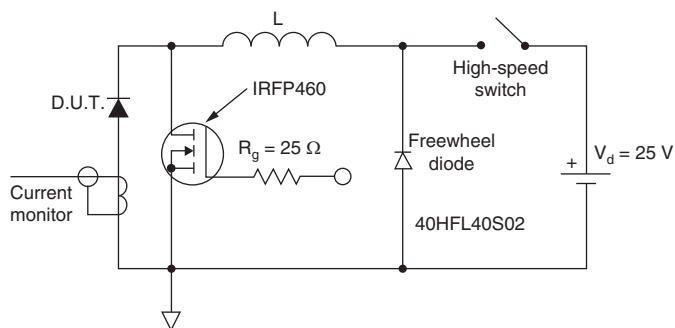


Fig. 8 - Unclamped Inductive Test Circuit

#### Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{dREV}$  = 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>30</b> | <b>45</b> | <b>WT</b> | <b>-N3</b> |
|             | 1          | 2          | 3         | 4         | 5         | 6          |

- |          |   |                                                                                       |
|----------|---|---------------------------------------------------------------------------------------|
| <b>1</b> | - | Vishay Semiconductors product                                                         |
| <b>2</b> | - | Schottky MBR series                                                                   |
| <b>3</b> | - | Current rating (30 = 30 A)                                                            |
| <b>4</b> | - | Voltage ratings                                                                       |
| <b>5</b> | - | Circuit configuration:<br>Center tap (dual) TO-247                                    |
| <b>6</b> | - | Environmental digit<br>-N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free |
- 35 = 35 V

45 = 45 V

**ORDERING INFORMATION** (Example)

| PREFERRED P/N   | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION   |
|-----------------|------------------|------------------------|-------------------------|
| VS-MBR3035WT-N3 | 25               | 500                    | Antistatic plastic tube |
| VS-MBR3045WT-N3 | 25               | 500                    | Antistatic plastic tube |

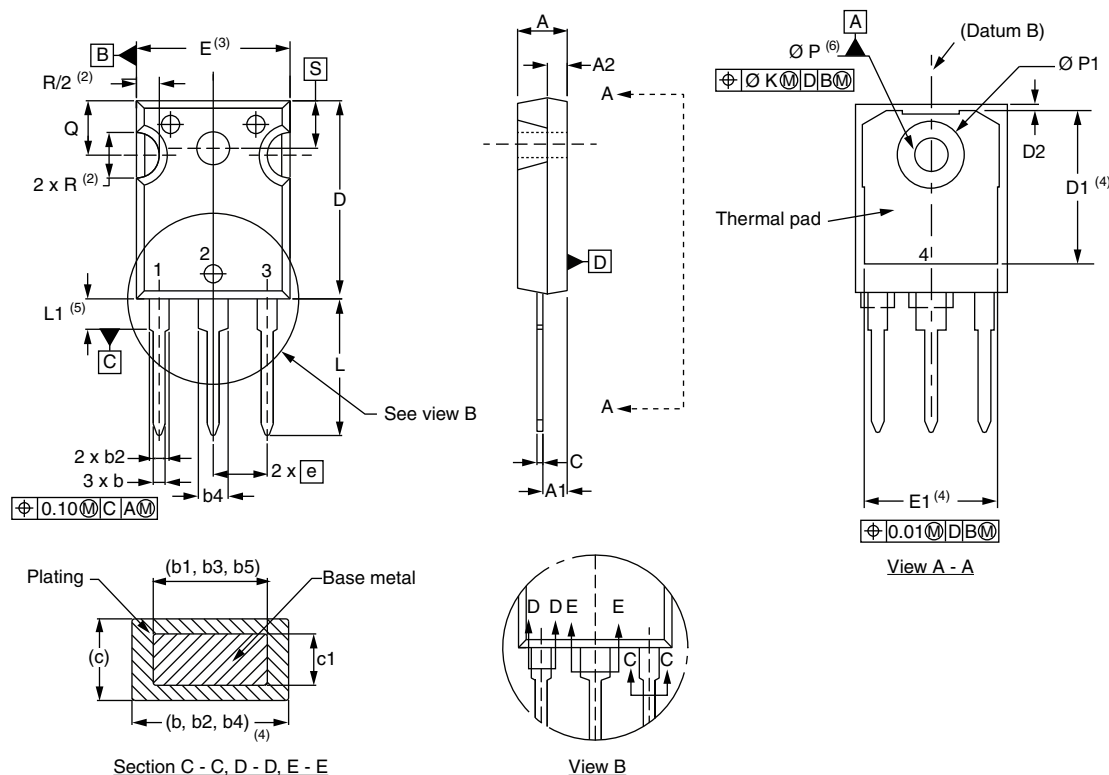
**LINKS TO RELATED DOCUMENTS**

|                          |                                                                        |
|--------------------------|------------------------------------------------------------------------|
| Dimensions               | <a href="http://www.vishay.com/doc?96138">www.vishay.com/doc?96138</a> |
| Part marking information | <a href="http://www.vishay.com/doc?95007">www.vishay.com/doc?95007</a> |



## TO-247AC 3L

DIMENSIONS in millimeters and inches



| SYMBOL | MILLIMETERS |       | INCHES |       | NOTES |
|--------|-------------|-------|--------|-------|-------|
|        | MIN.        | MAX.  | MIN.   | MAX.  |       |
| A      | 4.65        | 5.31  | 0.183  | 0.209 |       |
| A1     | 2.21        | 2.59  | 0.087  | 0.102 |       |
| A2     | 1.17        | 1.37  | 0.046  | 0.054 |       |
| b      | 0.99        | 1.40  | 0.039  | 0.055 |       |
| b1     | 0.99        | 1.35  | 0.039  | 0.053 |       |
| b2     | 1.65        | 2.39  | 0.065  | 0.094 |       |
| b3     | 1.65        | 2.34  | 0.065  | 0.092 |       |
| b4     | 2.59        | 3.43  | 0.102  | 0.135 |       |
| b5     | 2.59        | 3.38  | 0.102  | 0.133 |       |
| c      | 0.38        | 0.89  | 0.015  | 0.035 |       |
| c1     | 0.38        | 0.84  | 0.015  | 0.033 |       |
| D      | 19.71       | 20.70 | 0.776  | 0.815 | 3     |
| D1     | 13.08       | -     | 0.515  | -     | 4     |

| SYMBOL    | MILLIMETERS |       | INCHES    |       | NOTES |
|-----------|-------------|-------|-----------|-------|-------|
|           | MIN.        | MAX.  | MIN.      | MAX.  |       |
| D2        | 0.51        | 1.35  | 0.020     | 0.053 |       |
| E         | 15.29       | 15.87 | 0.602     | 0.625 | 3     |
| E1        | 13.46       | -     | 0.53      | -     |       |
| e         | 5.46 BSC    |       | 0.215 BSC |       |       |
| $\phi K$  | 0.254       |       | 0.010     |       |       |
| L         | 14.20       | 16.10 | 0.559     | 0.634 |       |
| L1        | 3.71        | 4.29  | 0.146     | 0.169 |       |
| $\phi P$  | 3.56        | 3.66  | 0.14      | 0.144 |       |
| $\phi P1$ | -           | 7.39  | -         | 0.291 |       |
| Q         | 5.31        | 5.69  | 0.209     | 0.224 |       |
| R         | 4.52        | 5.49  | 0.178     | 0.216 |       |
| S         | 5.51 BSC    |       | 0.217 BSC |       |       |

## Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) 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 outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6)  $\phi P$  to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC® outline TO-247 with exception of dimension Q



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