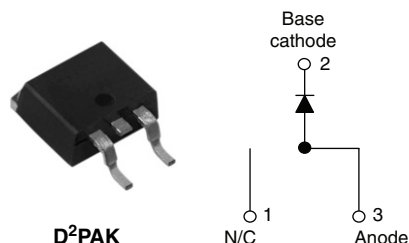


## Schottky Rectifier, 16 A



### FEATURES

- 150 °C T<sub>J</sub> 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
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for Q101 level


**RoHS\***  
COMPLIANT

### PRODUCT SUMMARY

|                    |                 |
|--------------------|-----------------|
| I <sub>F(AV)</sub> | 16 A            |
| V <sub>R</sub>     | 35/45 V         |
| I <sub>RM</sub>    | 40 mA at 125 °C |

### DESCRIPTION

This MBRB16.. 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            | 16          | A     |
| V <sub>RRM</sub>   |                                 | 35/45       | V     |
| I <sub>FSM</sub>   | t <sub>p</sub> = 5 μs sine      | 1800        | A     |
| V <sub>F</sub>     | 16 Apk, T <sub>J</sub> = 125 °C | 0.57        | V     |
| T <sub>J</sub>     |                                 | - 65 to 150 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL           | MBRB1635PbF | MBRB1645PbF | 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   | I <sub>F(AV)</sub> | T <sub>C</sub> = 134 °C, rated V <sub>R</sub>                                                                                          |                                                                            | 16     | A     |
| Non-repetitive peak surge current | 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 | 1800   |       |
|                                   |                    | Surge applied at rated load condition halfwave single phase 60 Hz                                                                      |                                                                            | 150    |       |
| Non-repetitive avalanche energy   | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 3.6 A, L = 3.7 mH                                                                            |                                                                            | 24     | mJ    |
| Repetitive avalanche current      | 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 |                                                                            | 3.6    | A     |

\* Pb containing terminations are not RoHS compliant, exemptions may apply

| ELECTRICAL SPECIFICATIONS             |                |                                                                                           |                                     |        |       |
|---------------------------------------|----------------|-------------------------------------------------------------------------------------------|-------------------------------------|--------|-------|
| PARAMETER                             | SYMBOL         | TEST CONDITIONS                                                                           |                                     | VALUES | UNITS |
| Maximum forward voltage drop          | $V_{FM}^{(1)}$ | 16 A                                                                                      | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.63   | V     |
|                                       |                |                                                                                           | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.57   |       |
| Maximum instantaneous reverse current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                        | Rated DC voltage                    | 0.2    | mA    |
|                                       |                | $T_J = 125\text{ }^{\circ}\text{C}$                                                       |                                     | 40     |       |
| Maximum junction capacitance          | $C_T$          | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$ |                                     | 1400   | pF    |
| Typical series inductance             | $L_S$          | Measured lead 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

<sup>(1)</sup> Pulse width < 300  $\mu$ 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 | R <sub>thJC</sub> | DC operation                         | 1.50        | °C/W                   |
| Typical thermal resistance, case to heatsink | R <sub>thCS</sub> | Mounting surface, smooth and greased | 0.50        |                        |
| 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        | MBRB1645    |                        |

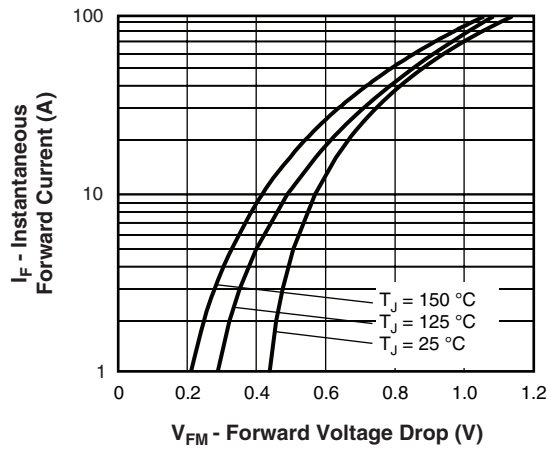


Fig. 1 - Maximum Forward Voltage Drop Characteristics

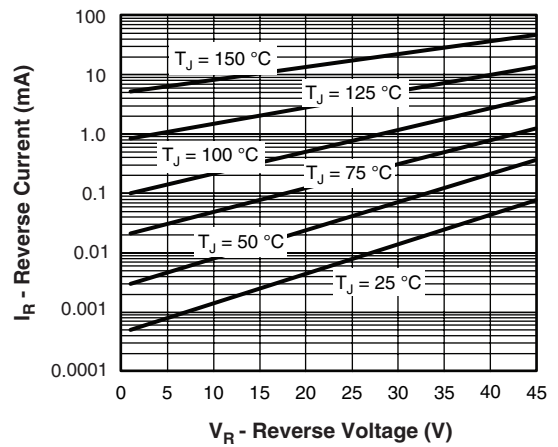


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

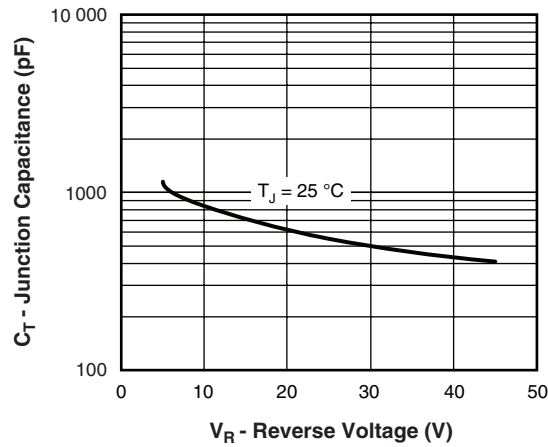
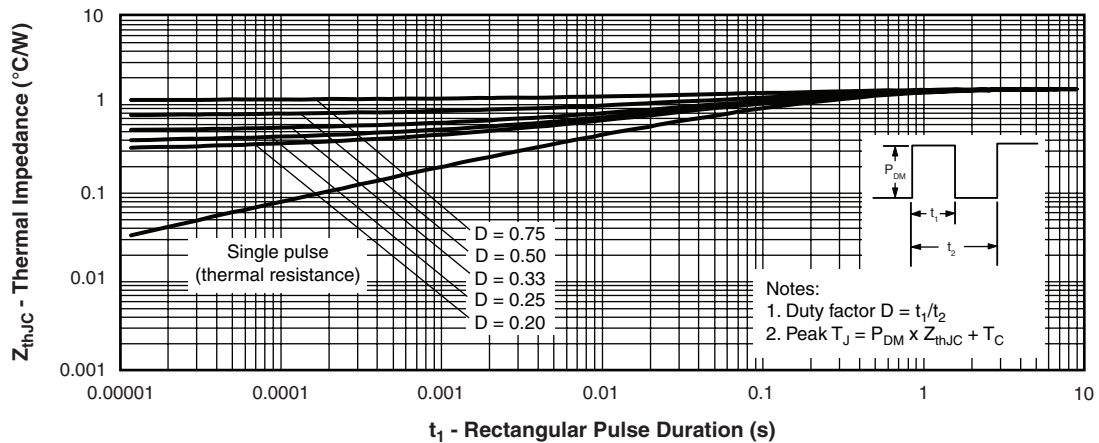


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

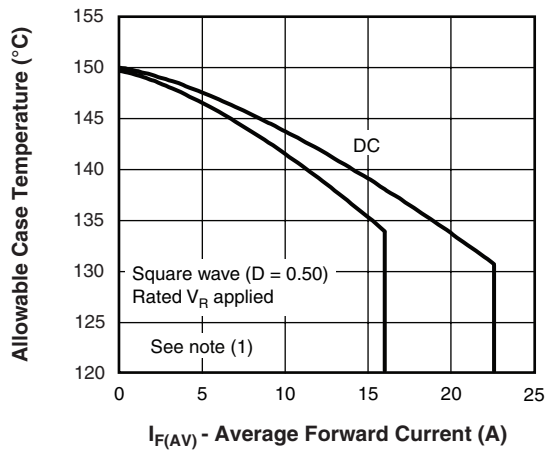


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

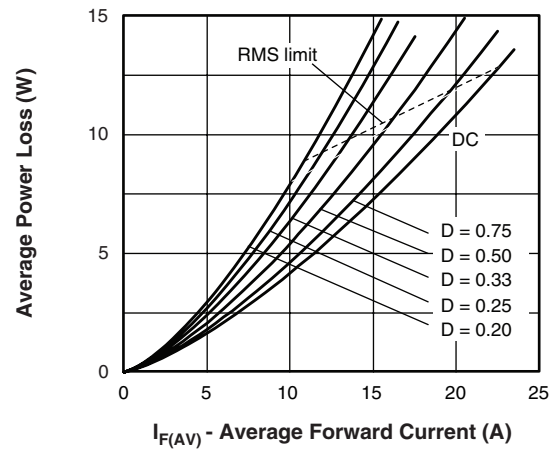


Fig. 6 - Forward Power Loss Characteristics

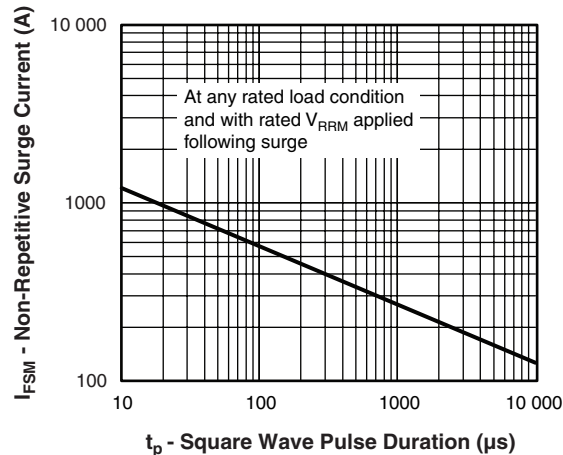


Fig. 7 - Maximum Non-Repitive Surge Current (Per Leg)

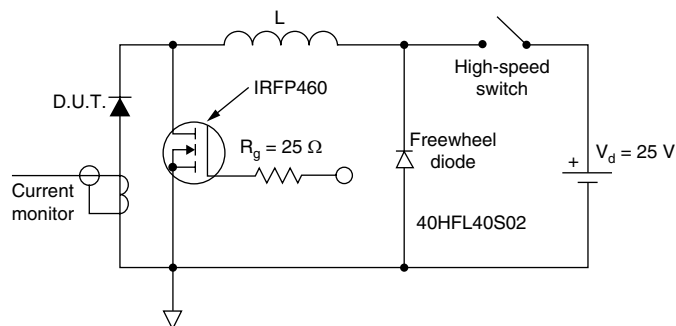


Fig. 8 - Unclamped Inductive Test Circuit

### 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  $V_R$  applied

**ORDERING INFORMATION TABLE**

| Device code | MBR | B                                      | 16 | 45 | TRL | PbF |
|-------------|-----|----------------------------------------|----|----|-----|-----|
|             | 1   | 2                                      | 3  | 4  | 5   | 6   |
| 1           | -   | Essential part number                  |    |    |     |     |
| 2           | -   | B = Surface mount                      |    |    |     |     |
| 3           | -   | Current rating (16 = 16 A)             |    |    |     |     |
| 4           | -   | Voltage code = $V_{RRM}$               |    |    |     |     |
| 5           | -   | • None = Tube (50 pieces)              |    |    |     |     |
|             |     | • TRL = Tape and reel (left oriented)  |    |    |     |     |
|             |     | • TRR = Tape and reel (right oriented) |    |    |     |     |
| 6           | -   | • None = Standard production           |    |    |     |     |
|             |     | • PbF = Lead (Pb)-free                 |    |    |     |     |

|           |
|-----------|
| 35 = 35 V |
| 45 = 45 V |

| LINKS TO RELATED DOCUMENTS |                                                                               |
|----------------------------|-------------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95046">http://www.vishay.com/doc?95046</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95054">http://www.vishay.com/doc?95054</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95032">http://www.vishay.com/doc?95032</a> |



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