

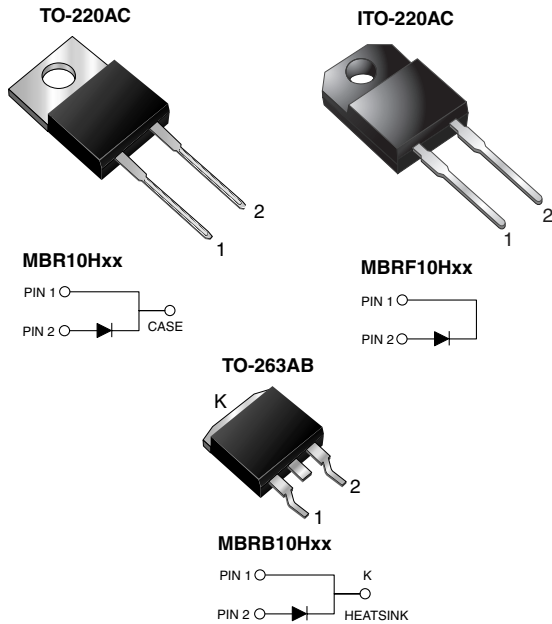


**THE DATASHEET OF
MBRB10H60HE3_A/P**



Schottky Barrier Rectifier

High Barrier Technology for Improved High Temperature Performance



FEATURES

- Guardring for overvoltage protection
- Lower power losses, high efficiency
- Low forward voltage drop
- Low leakage current
- High forward surge capability
- High frequency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C (for TO-263AB package)
- Solder dip 260 °C, 40 s (for TO-220AC and ITO-220AC package)
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



RoHS
COMPLIANT

TYPICAL APPLICATIONS

For use in low voltage, high frequency rectifier of switching mode power supplies, freewheeling diodes, dc-to-dc converters or polarity protection application.

MECHANICAL DATA

Case: TO-220AC, ITO-220AC, TO-263AB

Epoxy meets UL 94V-0 flammability rating

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD22-B102

E3 suffix for consumer grade, meets JESD 201 class 1A whisker test, HE3 suffix for high reliability grade (AEC Q101 qualified), meets JESD 201 class 2 whisker test

Polarity: As marked

Mounting Torque: 10 in-lbs maximum

| PRIMARY CHARACTERISTICS | |
|-------------------------|----------------|
| $I_{F(AV)}$ | 10 A |
| V_{RRM} | 35 V to 60 V |
| I_{FSM} | 150 A |
| V_F | 0.55 V, 0.61 V |
| I_R | 100 μ A |
| T_J max. | 175 °C |

| MAXIMUM RATINGS ($T_C = 25$ °C unless otherwise noted) | | | | | | |
|--|-------------|----------|----------|----------|----------|------------|
| PARAMETER | SYMBOL | MBR10H35 | MBR10H45 | MBR10H50 | MBR10H60 | UNIT |
| Maximum repetitive peak reverse voltage | V_{RRM} | 35 | 45 | 50 | 60 | V |
| Working peak reverse voltage | V_{RWM} | 35 | 45 | 50 | 60 | V |
| Maximum DC blocking voltage | V_{DC} | 35 | 45 | 50 | 60 | V |
| Maximum average forward rectified current (Fig. 1) | $I_{F(AV)}$ | 10 | | | | A |
| Non-repetitive avalanche energy at 25 °C, $I_{AS} = 4$ A, $L = 10$ mH | E_{AS} | 80 | | | | mJ |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 150 | | | | A |
| Peak repetitive reverse current at $t_p = 2.0$ μ s, 1 kHz | I_{RRM} | 1.0 | | 0.5 | | A |
| Peak non-repetitive reverse energy (8/20 μ s waveform) | E_{RSM} | 20 | | 10 | | mJ |
| Electrostatic discharge capacitor voltage human body model: $C = 100$ pF, $R = 1.5$ k Ω | V_C | 25 | | | | kV |
| Voltage rate of change (rated V_R) | dV/dt | 10 000 | | | | V/ μ s |

MBR(F,B)10H35 thru MBR(F,B)10H60

Vishay General Semiconductor



| MAXIMUM RATINGS (T _C = 25 °C unless otherwise noted) | | | | | | |
|---|------------------|---------------|----------|----------|----------|------|
| PARAMETER | SYMBOL | MBR10H35 | MBR10H45 | MBR10H50 | MBR10H60 | UNIT |
| Operating junction temperature range | T _J | - 65 to + 175 | | | | °C |
| Storage temperature range | T _{STG} | - 65 to + 175 | | | | °C |
| Isolation voltage (ITO-220AC only) from terminal to heatsink t = 1 min | V _{AC} | 1500 | | | | V |

| ELECTRICAL CHARACTERISTICS (T _C = 25 °C unless otherwise noted) | | | | | | | | |
|--|-----------------------|---|----------------|----------------------|-----------|----------------------|-----------|----------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | MBR10H35 MBR10H45 | | MBR10H50 MBR10H60 | | UNIT |
| | | | | TYP. | MAX. | TYP. | MAX. | |
| Maximum instantaneous forward voltage ⁽¹⁾ | I _F = 10 A | T _J = 25 °C | V _F | - | 0.63 | - | 0.71 | V |
| | I _F = 10 A | T _J = 125 °C | | 0.49 | 0.55 | 0.57 | 0.61 | |
| | I _F = 20 A | T _J = 25 °C | | - | 0.75 | - | 0.85 | |
| | I _F = 20 A | T _J = 125 °C | | 0.62 | 0.68 | 0.68 | 0.71 | |
| Maximum reverse current at rated V _R ⁽²⁾ | | T _J = 25 °C T _J = 125 °C | I _R | - 4.0 | 100 12 | - 2.0 | 100 12 | μA mA |

Notes:

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS (T _C = 25 °C unless otherwise noted) | | | | | |
|---|------------------|-----|------|------|------|
| PARAMETER | SYMBOL | MBR | MBRF | MBRB | UNIT |
| Maximum thermal resistance | R _{θJC} | 2.0 | 4.0 | 2.0 | °C/W |

| ORDERING INFORMATION (Example) | | | | | |
|--------------------------------|--------------------------------|-----------------|--------------|---------------|---------------|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AC | MBR10H45-E3/45 | 1.80 | 45 | 50/tube | Tube |
| ITO-220AC | MBRF10H45-E3/45 | 1.94 | 45 | 50/tube | Tube |
| TO-263AB | MBRB10H45-E3/45 | 1.33 | 45 | 50/tube | Tube |
| TO-263AB | MBRB10H45-E3/81 | 1.33 | 81 | 800/reel | Tape and reel |
| TO-220AC | MBR10H45HE3/45 ⁽¹⁾ | 1.80 | 45 | 50/tube | Tube |
| ITO-220AC | MBRF10H45HE3/45 ⁽¹⁾ | 1.94 | 45 | 50/tube | Tube |
| TO-263AB | MBRB10H45HE3/45 ⁽¹⁾ | 1.33 | 45 | 50/tube | Tube |
| TO-263AB | MBRB10H45HE3/81 ⁽¹⁾ | 1.33 | 81 | 800/reel | Tape and reel |

Note:

- (1) Automotive grade AEC Q101 qualified

RATINGS AND CHARACTERISTICS CURVES

($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

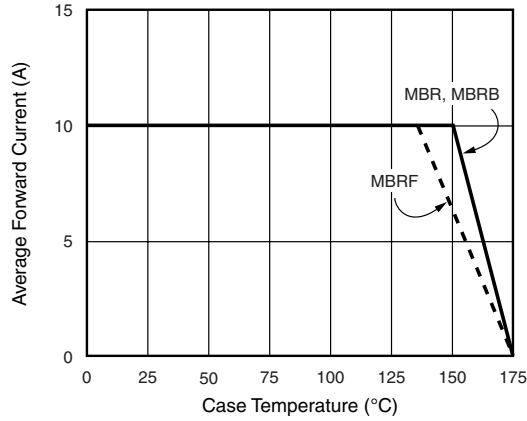


Figure 1. Forward Current Derating Curve

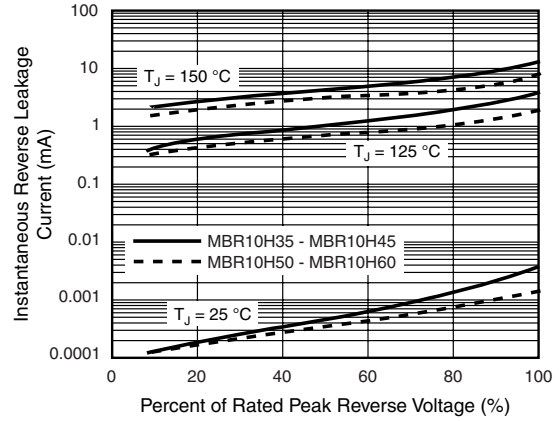


Figure 4. Typical Reverse Characteristics

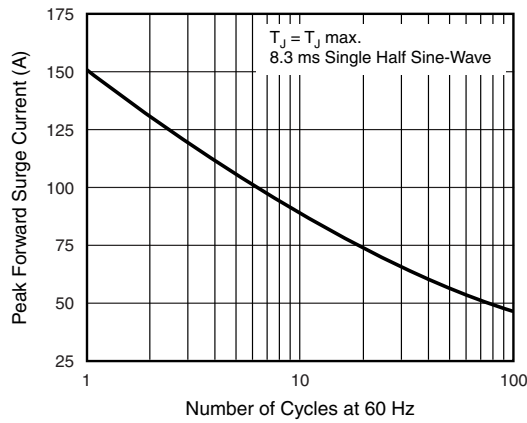


Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

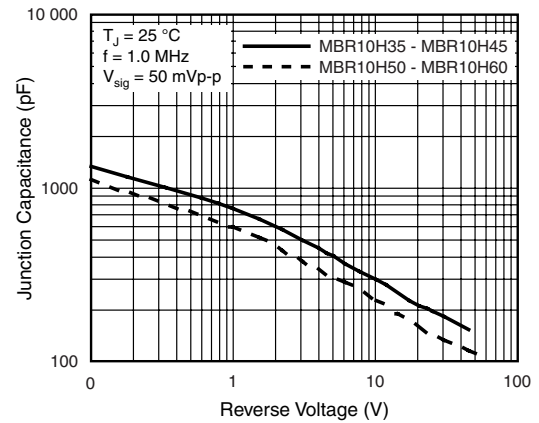


Figure 5. Typical Junction Capacitance

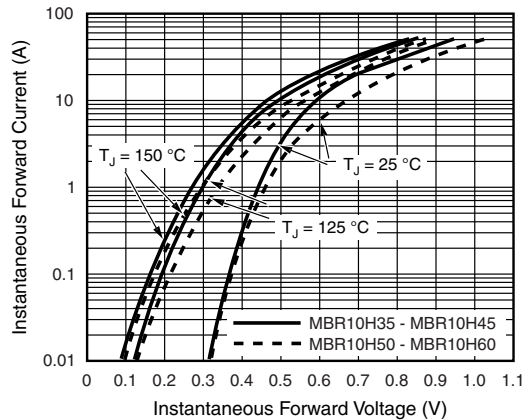


Figure 3. Typical Instantaneous Forward Characteristics

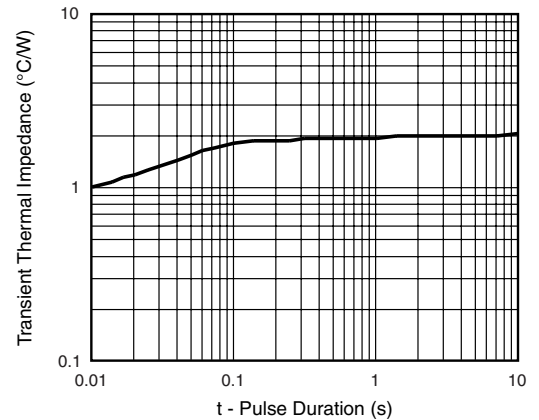


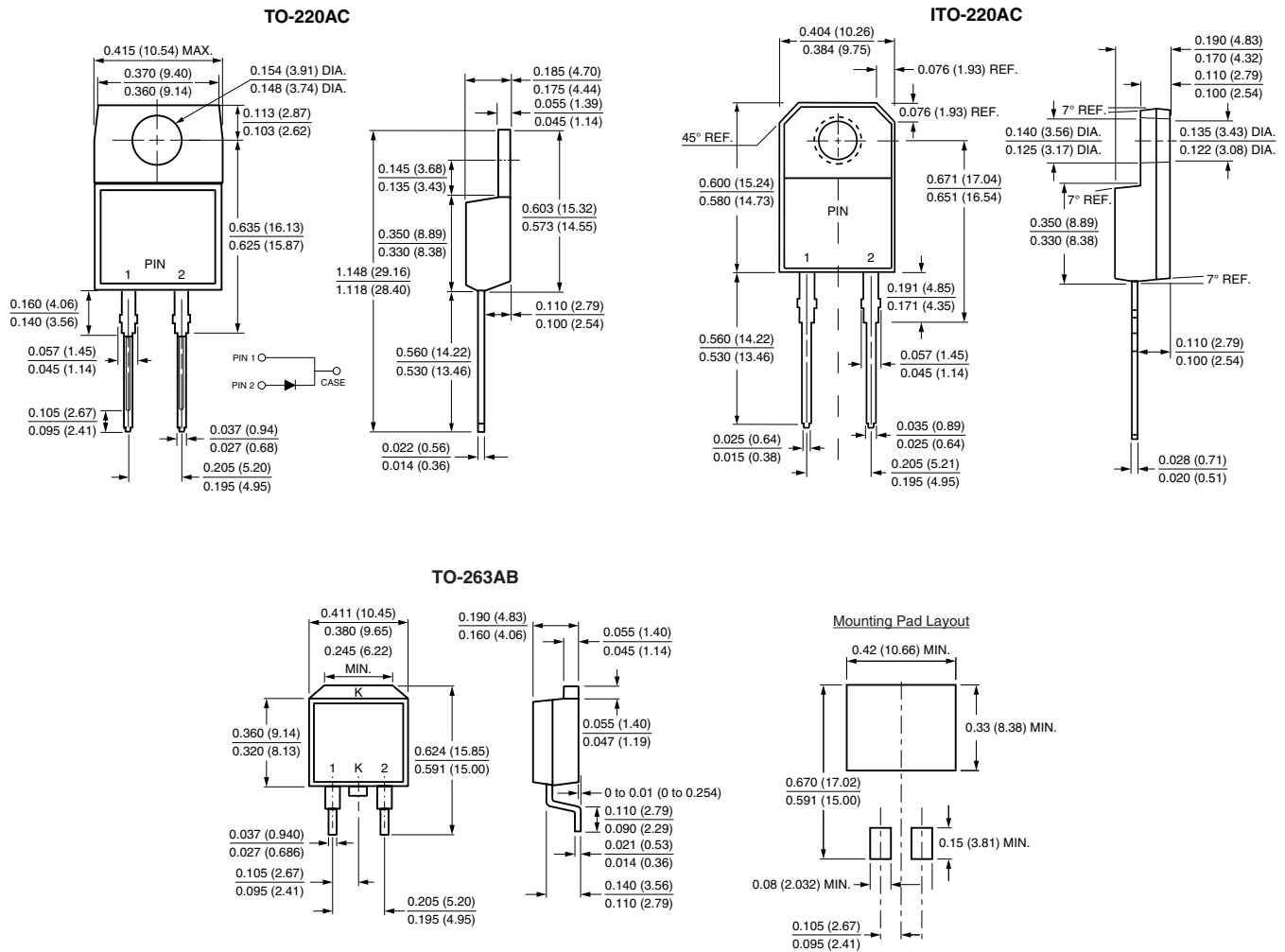
Figure 6. Typical Transient Thermal Impedance

MBR(F,B)10H35 thru MBR(F,B)10H60

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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