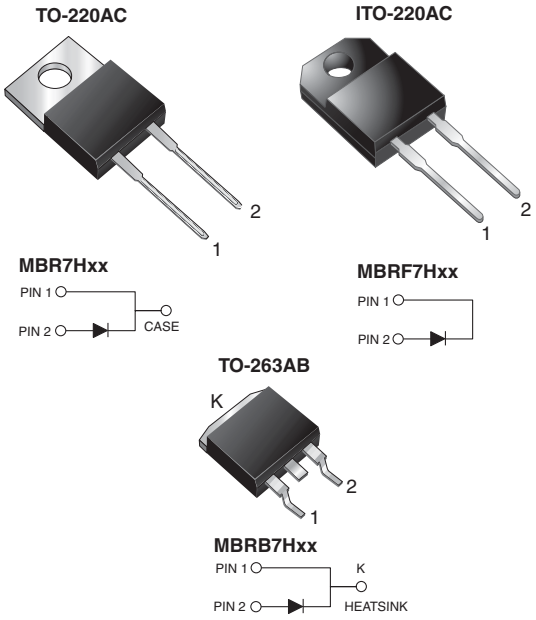
# Schottky Barrier Rectifier

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.

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 7.5 A |
| $V_{RRM}$ | 35 V to 60 V |
| $I_{FSM}$ | 150 A |
| $V_F$ | 0.55 V, 0.61 V |
| $I_R$ | 50 µA |
| $T_J$ max. | 175 °C |

## 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

**MAXIMUM RATINGS** ($T_C$ = 25 °C unless otherwise noted)

| PARAMETER | SYMBOL | MBR7H35 | MBR7H45 | MBR7H50 | MBR7H60 | 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 |
| Max. average forward rectified current (Fig. 1) | $I_{F(AV)}$ | 7.5 | | | | 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 surge current at $t_p$ = 2.0 µs, 1 kHz | $I_{RRM}$ | 1.0 | | 0.5 | | A |
| Peak non-repetitive reverse energy (8/20 µs waveform) | $E_{RSM}$ | 20 | | 10 | | mJ |
| Electrostatic discharge capacitor voltage human body model: C = 100 pF, R = 1.5 kΩ | $V_C$ | 25 | | | | kV |
| Voltage rate of change (rated $V_R$) | dV/dt | 10 000 | | | | V/µs |

| **MAXIMUM RATINGS** ($T_C$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **MBR7H35** | **MBR7H45** | **MBR7H50** | **MBR7H60** | **UNIT** |
| Operating junction and storage temperature range | $T_J$, $T_{STG}$ | - 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** | **MBR7H35 MBR7H45** | | **MBR7H50 MBR7H60** | | **UNIT** |
| | | | | **TYP.** | **MAX.** | **TYP.** | **MAX.** | |
| Maximum instantaneous forward voltage (1) | $I_F$ = 7.5 A<br>$I_F$ = 7.5 A<br>$I_F$ = 15 A<br>$I_F$ = 15 A | $T_C$ = 25 °C<br>$T_C$ = 125 °C<br>$T_C$ = 25 °C<br>$T_C$ = 125 °C | $V_F$ | -<br>0.50<br>-<br>0.61 | 0.63<br>0.55<br>0.75<br>0.66 | -<br>0.58<br>-<br>0.68 | 0.73<br>0.61<br>0.87<br>0.72 | V |
| Maximum reverse current at rated $V_R$ (2) | | $T_C$ = 25 °C<br>$T_C$ = 125 °C | $I_R$ | -<br>3.0 | 50<br>10 | -<br>2.0 | 50<br>10 | µA<br>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** |
| Thermal resistance, junction to case | $R_{\theta JC}$ | 3.0 | 5.0 | 3.0 | °C/W |

| **ORDERING INFORMATION** (Example) | | | | | |
|---|---|---|---|---|---|
| **PACKAGE** | **PREFERRED P/N** | **UNIT WEIGHT (g)** | **PACKAGE CODE** | **BASE QUANTITY** | **DELIVERY MODE** |
| TO-220AC | MBR7H45-E3/45 | 1.80 | 45 | 50/tube | Tube |
| ITO-220AC | MBRF7H45-E3/45 | 1.94 | 45 | 50/tube | Tube |
| TO-263AB | MBRB7H45-E3/45 | 1.33 | 45 | 50/tube | Tube |
| TO-263AB | MBRB7H45-E3/81 | 1.33 | 81 | 800/reel | Tape and reel |
| TO-220AC | MBR7H45HE3/45 (1) | 1.80 | 45 | 50/tube | Tube |
| ITO-220AC | MBRF7H45HE3/45 (1) | 1.94 | 45 | 50/tube | Tube |
| TO-263AB | MBRB7H45HE3/45 (1) | 1.33 | 45 | 50/tube | Tube |
| TO-263AB | MBRB7H45HE3/81 (1) | 1.33 | 81 | 800/reel | Tape and reel |

**Note:**

(1) Automotive grade AEC Q101 qualified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## RATINGS AND CHARACTERISTICS CURVES

($T_A$ = 25 °C unless otherwise noted)

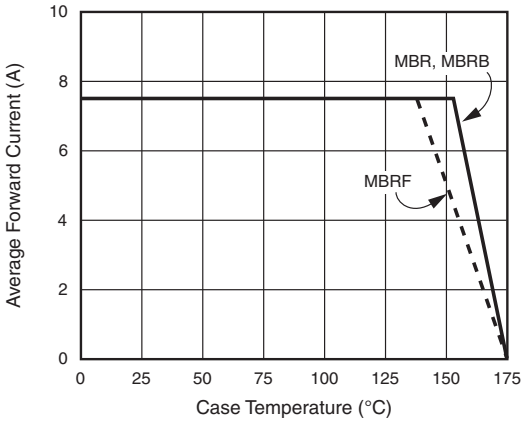



Figure 1. Forward Current Derating Curve

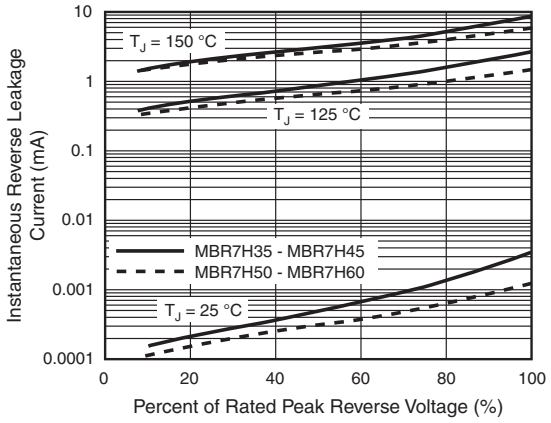



Figure 4. Typical Reverse Characteristics Per Leg

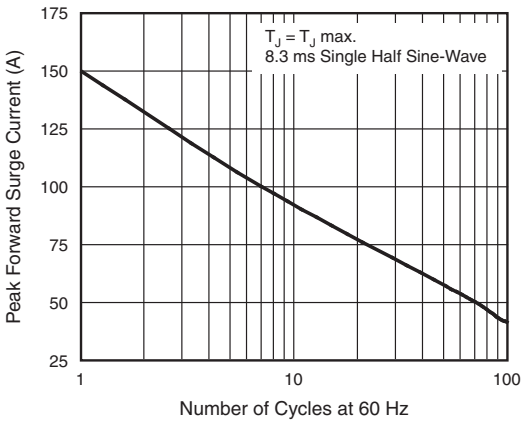



Figure 2. Maximum Non-Repetitive Peak Forward Surge Current Per Leg

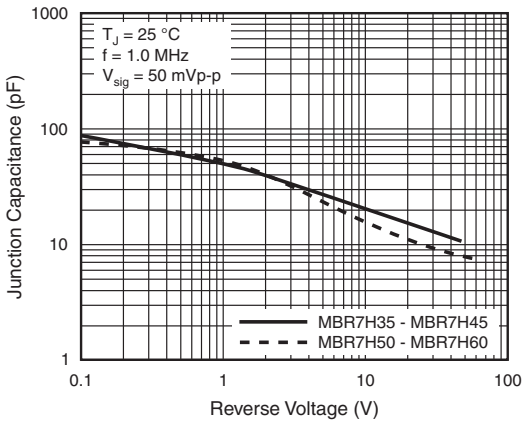



Figure 5. Typical Junction Capacitance Per Leg

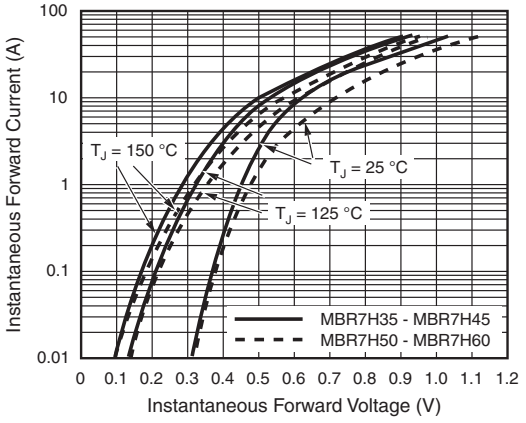



Figure 3. Typical Instantaneous Forward Characteristics Per Leg

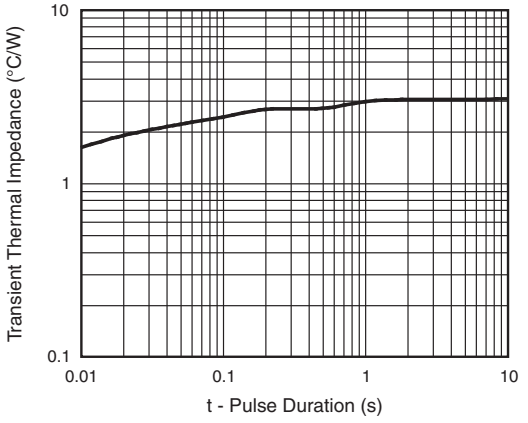
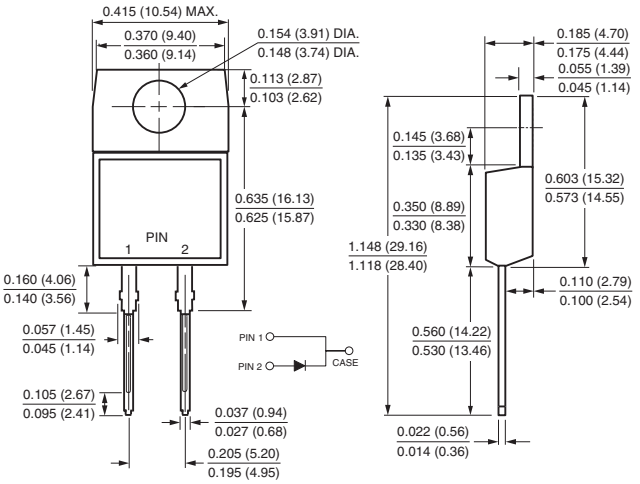


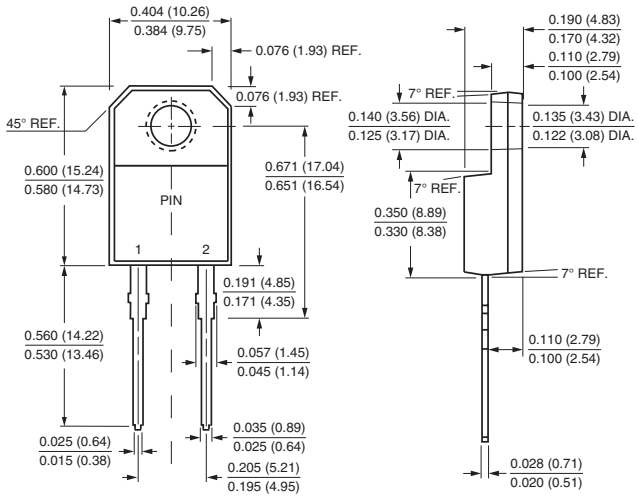

Figure 6. Typical Transient Thermal Impedance Per Leg

## **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

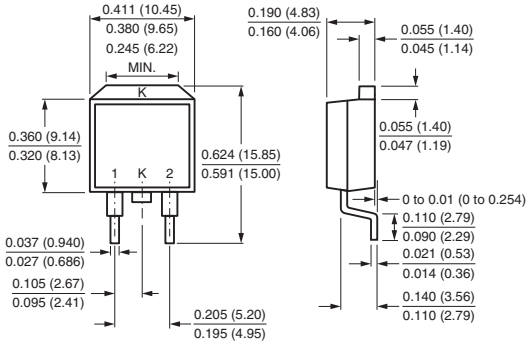
**TO-220AC**

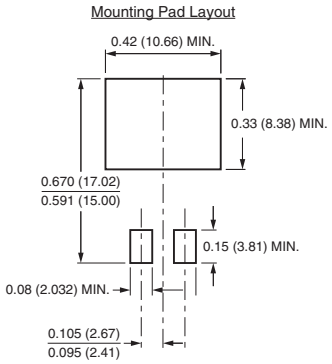



**ITO-220AC**




**TO-263AB**





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