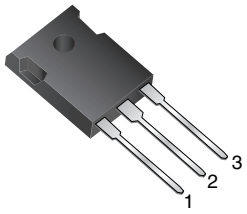
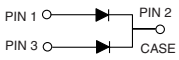
# Dual Common-Cathode Schottky Rectifier

High Barrier Technology for Improved High Temperature Performance




**TO-247AD (TO-3P)**




## FEATURES

- Guardring for overvoltage protection
- Lower power losses, high efficiency
- Low forward voltage drop
- High forward surge capability
- High frequency operation
- Solder dip 260 °C, 40 s
- 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 | |
|---|---|
| $I_{F(AV)}$ | 40 A |
| $V_{RRM}$ | 35 V to 60 V |
| $I_{FSM}$ | 400 A |
| $V_F$ | 0.55 V, 0.60 V |
| $T_J$ max. | 175 °C |

## MECHANICAL DATA

**Case:** TO-247AD (TO-3P)

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

**Polarity:** As marked

**Mounting Torque:** 10 in-lbs maximum

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

| PARAMETER | SYMBOL | MBR40H35PT | MBR40H45PT | MBR40H50PT | MBR40H60PT | UNIT |
|---|---|---|---|---|---|---|
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 35 | 45 | 50 | 60 | V |
| Maximum 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) | $I_{F(AV)}$ | 40 | | | | A |
| Non-repetitive avalanche energy per diode 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 per diode | $I_{FSM}$ | 400 | | | | A |
| Peak repetitive reverse surge current per diode (1) | $I_{RRM}$ | 2.0 | | 1.0 | | A |
| Peak non-repetitive reverse energy (8/20 µs waveform) | $E_{RSM}$ | 30 | | 25 | | mJ |
| Electrostatic discharge capacitor voltage human body model: C = 100 pF, R = 1.5 kΩ | $V_C$ | 25 | | | | kV |
| Voltage rate of change at (rated $V_R$) | dV/dt | 10 000 | | | | V/µs |
| Operating junction temperature range | $T_J$ | - 65 to + 175 | | | | °C |
| Storage temperature range | $T_{STG}$ | - 65 to + 175 | | | | °C |

**Note:**

(1) 2.0 µs pulse width, f = 1.0 kHz

| **ELECTRICAL CHARACTERISTICS** ($T_C$ = 25 °C unless otherwise noted) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **MBR40H35PT MBR40H45PT** | | **MBR40H50PT MBR40H60PT** | | **UNIT** |
| | | | | **TYP.** | **MAX.** | **TYP.** | **MAX.** | |
| Maximum instantaneous forward voltage per diode (1) | $I_F$ = 20 A<br>$I_F$ = 20 A<br>$I_F$ = 40 A<br>$I_F$ = 40 A | $T_J$ = 25 °C<br>$T_J$ = 125 °C<br>$T_J$ = 25 °C<br>$T_J$ =125 °C | $V_F$ | -<br>0.49<br>-<br>0.62 | 0.63<br>0.55<br>0.73<br>0.66 | -<br>0.56<br>-<br>0.68 | 0.69<br>0.60<br>0.83<br>0.72 | V |
| Maximum reverse current at rated $V_R$ per diode (2) | | $T_J$ = 25 °C<br>$T_J$ = 125 °C | $I_R$ | -<br>9.0 | 150<br>25 | -<br>6.0 | 150<br>25 | µA<br>mA |

**Notes:**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **MBR40H35PT** | **MBR40H45PT** | **MBR40H50PT** | **MBR40H60PT** | **UNIT** |
| Thermal resistance, junction to case per diode | $R_{\theta JC}$ | 1.2 | | | | °C/W |

| **ORDERING INFORMATION** (Example) | | | | | |
|---|---|---|---|---|---|
| **PACKAGE** | **PREFERRED P/N** | **UNIT WEIGHT (g)** | **PACKAGE CODE** | **BASE QUANTITY** | **DELIVERY MODE** |
| TO-247AD | MBR40H45PT-E3/45 | 6.13 | 45 | 30/tube | Tube |

## RATINGS AND CHARACTERISTICS CURVES

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

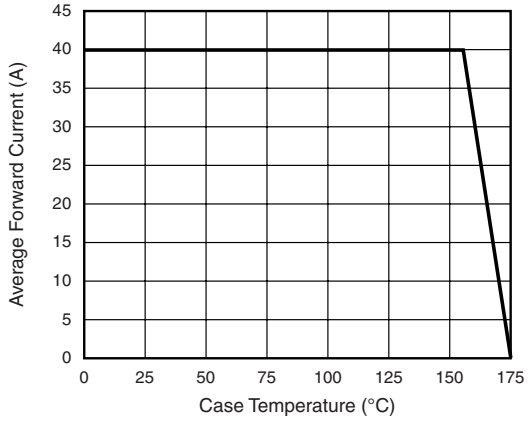



Figure 1. Forward Current Derating Curve

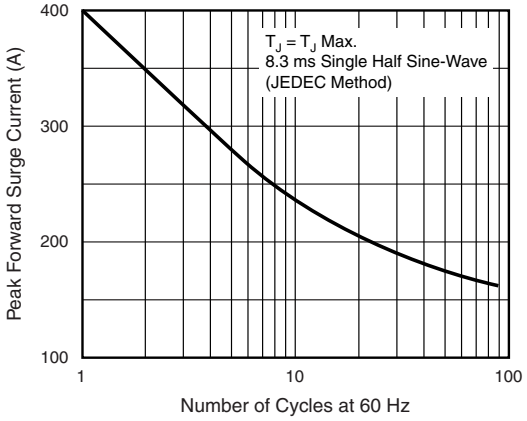



Figure 2. Maximum Non-Repetitive Peak Forward Surge Current Per Diode


For technical questions within your region, please contact one of the following:
PDD-Americas@vishay.com, PDD-Asia@vishay.com, PDD-Europe@vishay.com
Document Number: 88794
Revision: 19-May-08

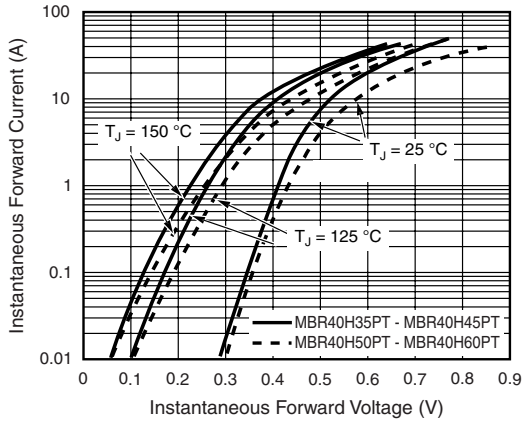



Figure 3. Typical Instantaneous Forward Characteristics Per Diode

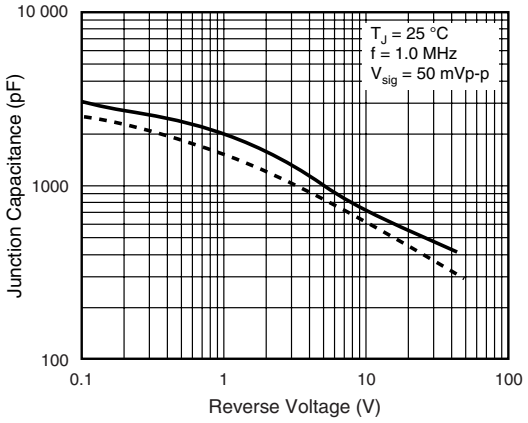



Figure 5. Typical Junction Capacitance Per Diode

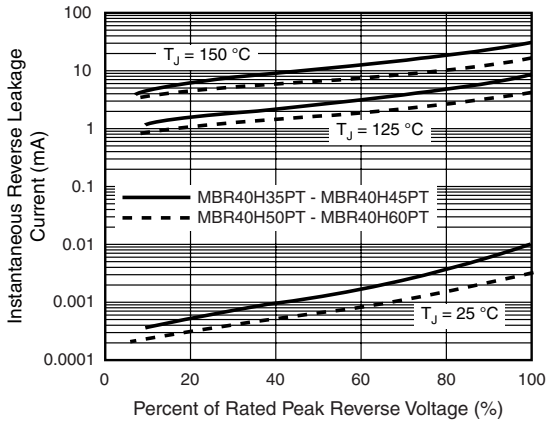



Figure 4. Typical Reverse Characteristics Per Diode

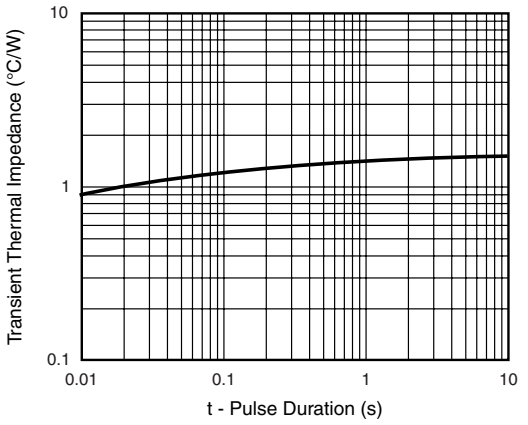
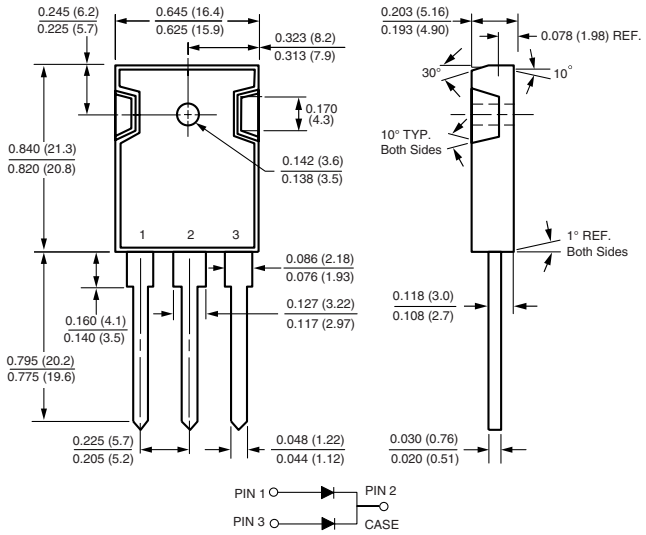



Figure 6. Typical Transient Thermal Impedance Per Diode

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

**TO-247AD (TO-3P)**



# Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

# Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**