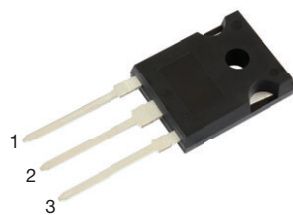


# Dual High Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.27\text{ V}$  at  $I_F = 5.0\text{ A}$



TO-247AD 3L



## FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Solder bath temperature 275 °C maximum, 10 s per JESD 22-B106
- AEC-Q101 qualified available:
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection in commercial, industrial, and automotive application.

## MECHANICAL DATA

**Case:** TO-247AD 3L

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant  
Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** as marked

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

| PRIMARY CHARACTERISTICS                                |                |
|--------------------------------------------------------|----------------|
| $I_{F(AV)}$                                            | 2 x 30 A       |
| $V_{RRM}$                                              | 45 V           |
| $I_{FSM}$                                              | 350 A          |
| $V_F$ at $I_F = 30\text{ A}$ ( $T_J = 125\text{ °C}$ ) | 0.43 V         |
| $T_J$ max.                                             | 150 °C         |
| Package                                                | TO-247AD 3L    |
| Circuit configuration                                  | Common cathode |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                     |             |             |      |
|------------------------------------------------------------------------------------|-------------|-------------|------|
| PARAMETER                                                                          | SYMBOL      | VX6045PW    | UNIT |
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$   | 45          | V    |
| Maximum average forward rectified current<br>(fig. 1)                              | $I_{F(AV)}$ | 60          | A    |
|                                                                                    |             | 30          |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$   | 350         | A    |
| Operating junction temperature range                                               | $T_J^{(1)}$ | -40 to +150 | °C   |
| Storage temperature range                                                          | $T_{STG}$   | -40 to +150 |      |

### Note

<sup>(1)</sup> The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$

**ELECTRICAL CHARACTERISTICS** ( $T_J = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                                         | TEST CONDITIONS       |                         | SYMBOL                        | TYP. | MAX. | UNIT |
|---------------------------------------------------|-----------------------|-------------------------|-------------------------------|------|------|------|
| Instantaneous forward voltage per diode           | I <sub>F</sub> = 5 A  | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.40 | -    | V    |
|                                                   | I <sub>F</sub> = 15 A |                         |                               | 0.45 | -    |      |
|                                                   | I <sub>F</sub> = 30 A |                         |                               | 0.50 | 0.55 |      |
|                                                   | I <sub>F</sub> = 5 A  | T <sub>J</sub> = 125 °C |                               | 0.27 | -    |      |
|                                                   | I <sub>F</sub> = 15 A |                         |                               | 0.35 | -    |      |
|                                                   | I <sub>F</sub> = 30 A |                         |                               | 0.43 | 0.48 |      |
| Reverse current at rated V <sub>R</sub> per diode | V <sub>R</sub> = 45 V | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 1.1  | mA   |
|                                                   |                       | T <sub>J</sub> = 125 °C |                               | 19.5 | 60   |      |
| Typical junction capacitance                      | 4.0 V, 1 MHz          |                         | C <sub>J</sub>                | 5350 | -    | pF   |

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 5\text{ ms}$ **THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                             | SYMBOL                | VX6045PW | UNIT                 |
|---------------------------------------|-----------------------|----------|----------------------|
| Typical thermal resistance per device | $R_{\theta JC}^{(1)}$ | 0.6      | $^{\circ}\text{C/W}$ |

**Note**

(1) Thermal resistance junction-to-case to follow JEDEC® 51-14 transient dual interface test method (TDIM)

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|------------------------------|-----------------|--------------|---------------|---------------|
| VX6045PW-M3/P                | 5.64            | P            | 25/tube       | Tube          |
| VX6045PWHM3/P <sup>(1)</sup> | 5.64            | P            | 25/tube       | Tube          |

**Note**

(1) AEC-Q101 qualified

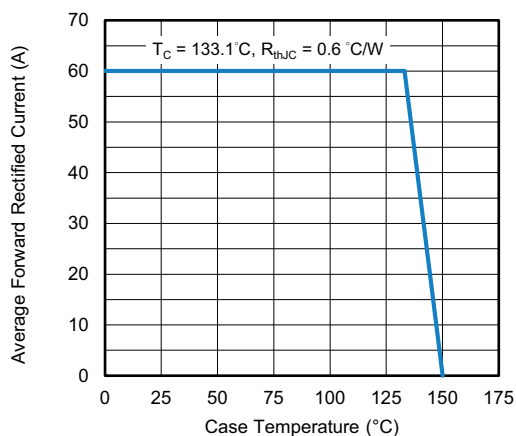
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

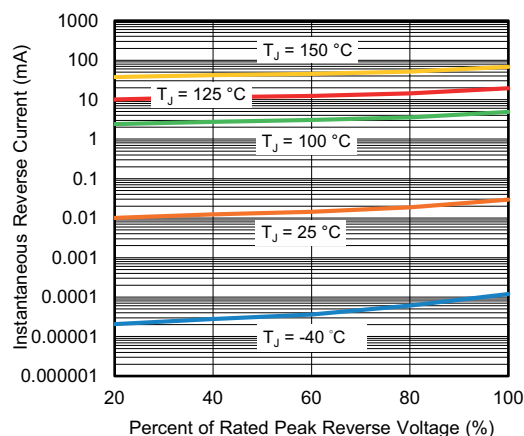


Fig. 4 - Typical Reverse Leakage Characteristics

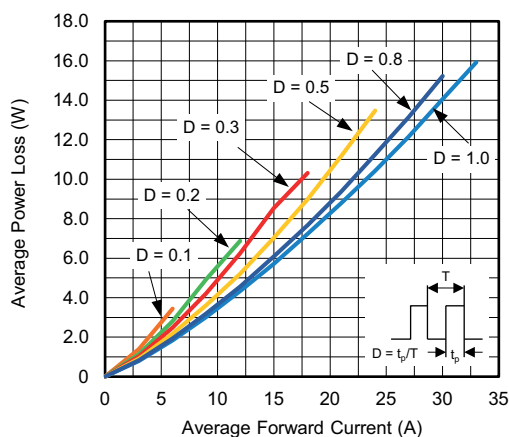


Fig. 2 - Average Power Loss Characteristics

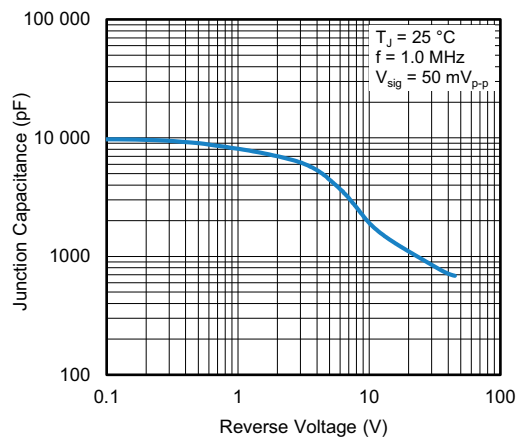


Fig. 5 - Typical Junction Capacitance

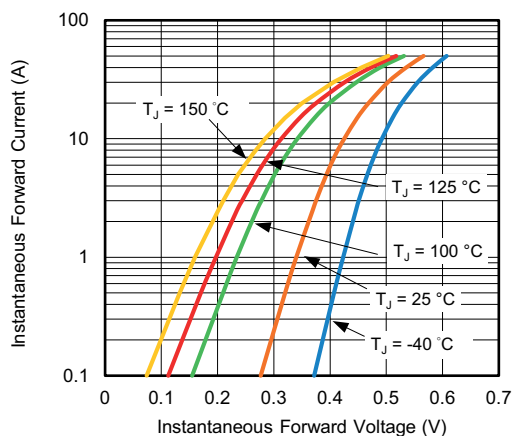


Fig. 3 - Typical Instantaneous Forward Characteristics

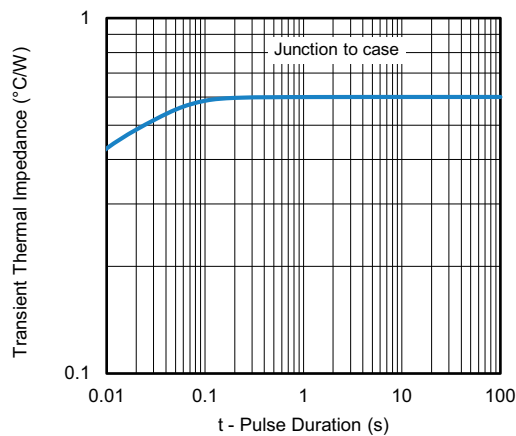
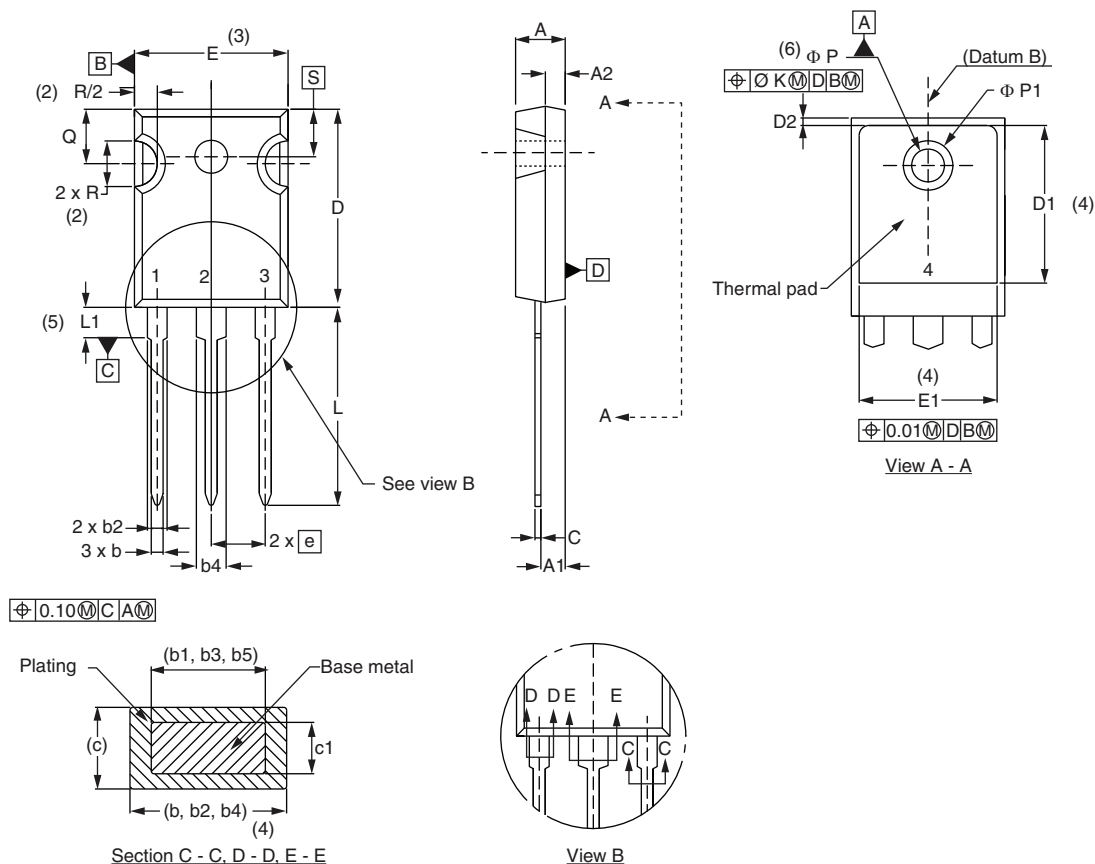


Fig. 6 - Typical Transient Thermal Impedance

**PACKAGE OUTLINE DIMENSIONS** in millimeters (inches) **TO-247AD 3L**


| 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     | 1.50        | 2.49  | 0.059  | 0.098 |       |
| 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        | 1.30  | 0.020     | 0.051 |       |
| E      | 15.29       | 15.87 | 0.602     | 0.625 | 3     |
| E1     | 13.46       | -     | 0.53      | -     |       |
| e      | 5.46 BSC    |       | 0.215 BSC |       |       |
| Ø K    | 0.254       |       | 0.010     |       |       |
| L      | 19.81       | 20.32 | 0.780     | 0.800 |       |
| L1     | 3.71        | 4.29  | 0.146     | 0.169 |       |
| Ø P    | 3.56        | 3.66  | 0.14      | 0.144 |       |
| Ø P1   | -           | 6.98  | -         | 0.275 |       |
| 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**

- Dimensioning and tolerancing per ASME Y14.5M-1994
- Contour of slot optional
- Dimension D and E do not include mold flash. These dimensions are measured at the outermost extremes of the plastic body
- Thermal pad contour optional with dimensions D1 and E1
- Lead finish uncontrolled in L1
- Ø 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")
- Outline conforms to JEDEC® outline TO-247 with exception of dimension A min., D, E min., Q min., S, and note 4



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