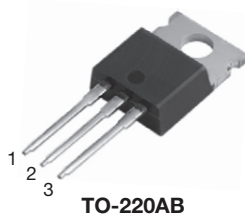


Dual High Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F = 0.34 \text{ V}$ at $I_F = 5.0 \text{ A}$



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



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-220AB

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

Mounting torque: 10 in-lbs maximum

| PRIMARY CHARACTERISTICS | |
|--|----------------|
| $I_{F(AV)}$ | 2 x 20 A |
| V_{RRM} | 60 V |
| I_{FSM} | 250 A |
| V_F at $I_F = 20 \text{ A}$ ($T_J = 125 \text{ °C}$) | 0.5 V |
| T_J max. | 175 °C |
| Package | TO-220AB |
| Circuit configuration | Common cathode |

| MAXIMUM RATINGS ($T_A = 25 \text{ °C}$ unless otherwise noted) | | | |
|--|-------------|-------------|------|
| PARAMETER | SYMBOL | VX40M60C | UNIT |
| Maximum repetitive peak reverse voltage | V_{RRM} | 60 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}$ | 40 | A |
| | | 20 | |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 250 | A |
| Operating junction temperature range | T_J (1) | -40 to +175 | °C |
| Storage temperature range | T_{STG} | -40 to +175 | |

Note

(1) 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 °C unless otherwise noted) | | | | | | |
|--|-----------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage per diode | I _F = 5 A | T _J = 25 °C | V _F ⁽¹⁾ | 0.45 | - | V |
| | I _F = 10 A | | | 0.50 | - | |
| | I _F = 20 A | | | 0.56 | 0.62 | |
| | I _F = 5 A | T _J = 125 °C | | 0.34 | - | |
| | I _F = 10 A | | | 0.40 | - | |
| | I _F = 20 A | | | 0.50 | 0.55 | |
| Reverse current at rated V _R per diode | V _R = 60 V | T _J = 25 °C | I _R ⁽²⁾ | - | 0.50 | mA |
| | | T _J = 125 °C | | 7 | 30 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | C _J | 3100 | - | pF |

Notes(1) Pulse test: 300 μs 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 | VX40M60C | UNIT |
| Typical thermal resistance per device | $R_{\theta JC}^{(1)}$ | 1 | $^{\circ}\text{C/W}$ |

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 |
| VX40M60C-M3/P | 2.03 | P | 50/tube | Tube |
| VX40M60CHM3/P ⁽¹⁾ | 2.03 | P | 50/tube | Tube |

Note

(1) AEC-Q101 qualified

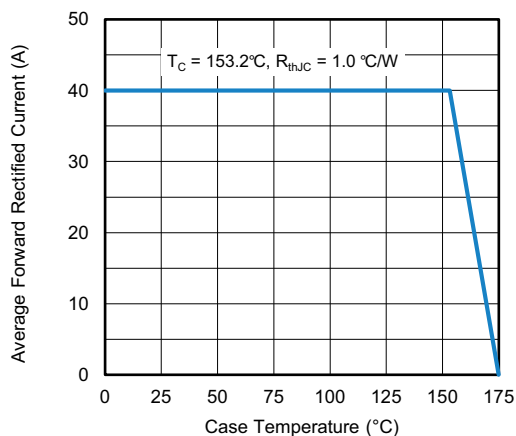
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

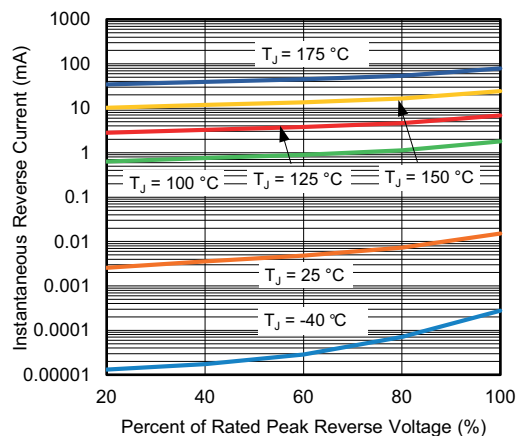


Fig. 4 - Typical Reverse Leakage Characteristics

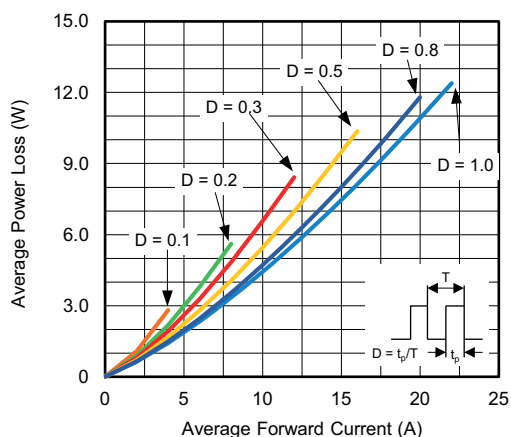


Fig. 2 - Average Power Loss Characteristics

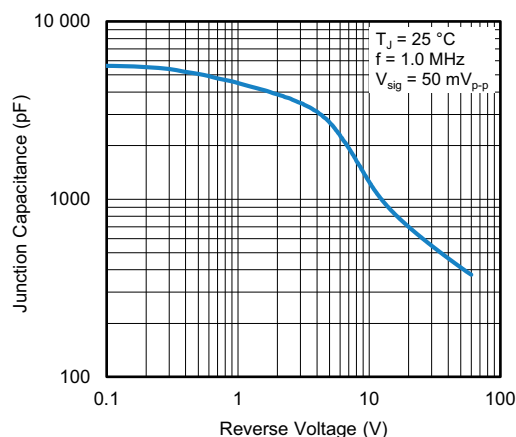


Fig. 5 - Typical Junction Capacitance

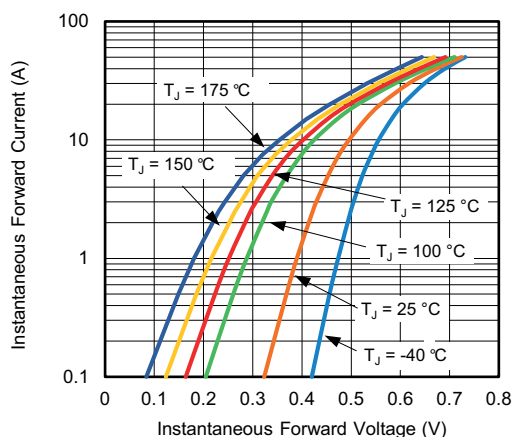


Fig. 3 - Typical Instantaneous Forward Characteristics

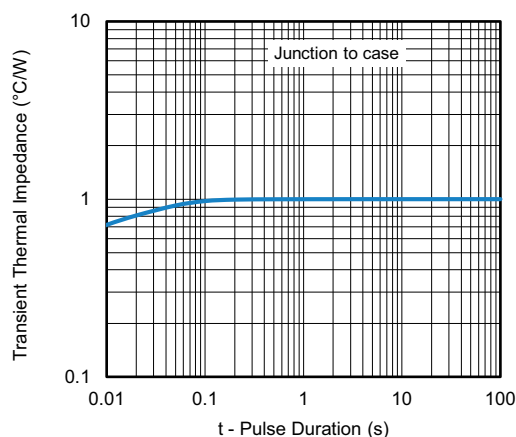
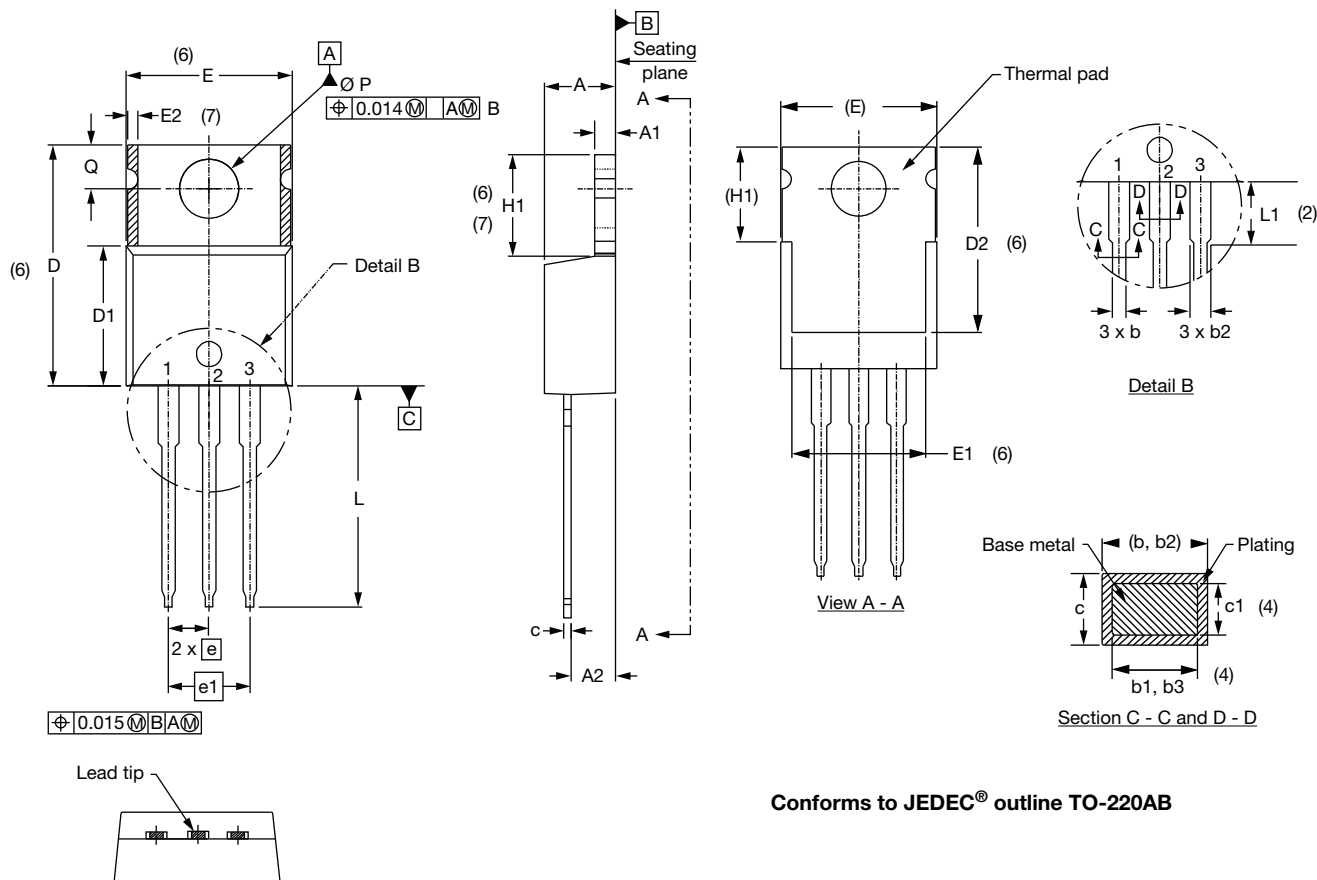


Fig. 6 - Typical Transient Thermal Impedance

**DIMENSIONS** in millimeters (inches) **TO-220AB**

Conforms to JEDEC® outline TO-220AB

| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| A | 4.25 | 4.65 | 0.167 | 0.183 | |
| A1 | 1.14 | 1.40 | 0.045 | 0.055 | |
| A2 | 2.56 | 2.92 | 0.101 | 0.115 | |
| b | 0.69 | 1.01 | 0.027 | 0.040 | |
| b1 | 0.38 | 0.97 | 0.015 | 0.038 | 4 |
| b2 | 1.20 | 1.73 | 0.047 | 0.068 | |
| b3 | 1.14 | 1.73 | 0.045 | 0.068 | 4 |
| c | 0.36 | 0.61 | 0.014 | 0.024 | |
| c1 | 0.36 | 0.56 | 0.014 | 0.022 | 4 |
| D | 14.85 | 15.25 | 0.585 | 0.600 | 3 |
| D1 | 8.38 | 9.02 | 0.330 | 0.355 | |
| D2 | 11.68 | 12.88 | 0.460 | 0.507 | 6 |
| E | 10.11 | 10.51 | 0.398 | 0.414 | 3, 6 |
| E1 | 6.86 | 8.89 | 0.270 | 0.350 | 6 |
| E2 | - | 0.76 | - | 0.030 | 7 |
| e | 2.41 | 2.67 | 0.095 | 0.105 | |
| e1 | 4.88 | 5.28 | 0.192 | 0.208 | |
| H1 | 5.84 | 6.86 | 0.230 | 0.270 | 6, 7 |
| L | 13.52 | 14.02 | 0.532 | 0.552 | |
| L1 | 3.32 | 3.82 | 0.131 | 0.150 | 2 |
| Ø P | 3.54 | 3.73 | 0.139 | 0.147 | |
| Q | 2.60 | 3.00 | 0.102 | 0.118 | |

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- (7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC® TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline



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