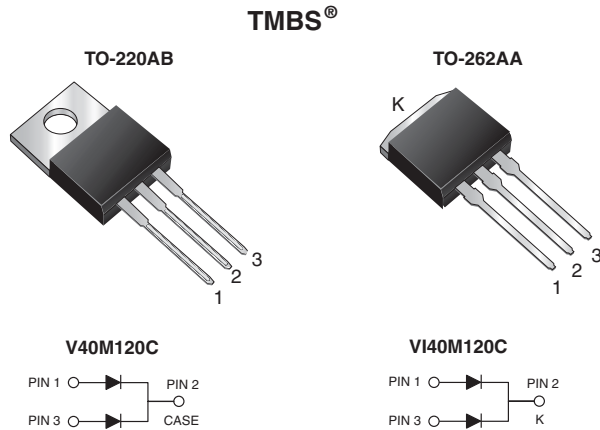




# Dual High-Voltage Trench MOS Barrier Schottky Rectifier

 Ultra Low  $V_F = 0.46 \text{ V}$  at  $I_F = 5 \text{ A}$ 


## FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- 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.

## MECHANICAL DATA

**Case:** TO-220AB and TO-262AA

 Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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

M3 suffix meets JESD 201 class 1A whisker test

**Polarity:** as marked

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

| PRIMARY CHARACTERISTICS       |                    |
|-------------------------------|--------------------|
| $I_{F(AV)}$                   | 2 x 20 A           |
| $V_{RRM}$                     | 120 V              |
| $I_{FSM}$                     | 250 A              |
| $V_F$ at $I_F = 20 \text{ A}$ | 0.64 V             |
| $T_J$ max.                    | 175 °C             |
| Package                       | TO-220AB, TO-262AA |
| Diode variations              | Common cathode     |

| MAXIMUM RATINGS ( $T_A = 25 \text{ °C}$ unless otherwise noted)                              |                |             |           |            |
|--|----------------|-------------|-----------|------------|
| PARAMETER  | SYMBOL         | V40M120C    | VI40M120C | UNIT       |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$      | 120         |           | V          |
| Maximum average forward rectified current (fig. 1)   | $I_{F(AV)}$    | per device  | 40        | A          |
|  |                | per diode   | 20        |            |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$      | 250         |           |            |
| Voltage rate of change (rated $V_R$ )  | $dV/dt$        | 10 000      |           | V/ $\mu$ s |
| Operating junction and storage temperature range   | $T_J, T_{STG}$ | -40 to +175 |           | °C         |



**ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25 °C unless otherwise noted)

| PARAMETER                               | TEST CONDITIONS        |                         | SYMBOL                        | TYP. | MAX. | UNIT |
|---|------------------------|-------------------------|-------------------------------|------|------|------|
| Instantaneous forward voltage per diode | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.54 | -    | V    |
|   | I <sub>F</sub> = 10 A  |                         |                               | 0.64 | -    |      |
|   | I <sub>F</sub> = 20 A  |                         |                               | 0.79 | 0.89 |      |
|   | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.46 | -    |      |
|   | I <sub>F</sub> = 10 A  |                         |                               | 0.54 | -    |      |
|   | I <sub>F</sub> = 20 A  |                         |                               | 0.64 | 0.72 |      |
| Reverse current per diode               | V <sub>R</sub> = 90 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 4    | -    | μA   |
|   |                        | T <sub>A</sub> = 125 °C |                               | 3    | -    | mA   |
|   | V <sub>R</sub> = 120 V | T <sub>A</sub> = 25 °C  |                               | -    | 500  | μA   |
|   |                        | T <sub>A</sub> = 125 °C |                               | 6    | 32   | mA   |

**Notes**

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 5 ms

**THERMAL CHARACTERISTICS** (T<sub>A</sub> = 25 °C unless otherwise noted)

| PARAMETER                                 | SYMBOL                          | V40M120C   | VI40M120C | UNIT |
|---|---------------------------------|------------|-----------|------|
| Typical thermal resistance <sup>(1)</sup> | R <sub>θJC</sub>                | per diode  |           | °C/W |
|   |                                 | per device |           |      |
|   | R <sub>θJA</sub> <sup>(2)</sup> | 45         | 55        |      |

**Notes**

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>
- (2) Free air, without heatsink

**ORDERING INFORMATION** (Example)

| PACKAGE  | PREFERRED P/N   | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|----------|-----------------|-----------------|--------------|---------------|---------------|
| TO-220AB | V40M120C-M3/4W  | 1.88            | 4W           | 50/tube       | Tube          |
| TO-262AA | VI40M120C-M3/4W | 1.45            | 4W           | 50/tube       | Tube          |



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

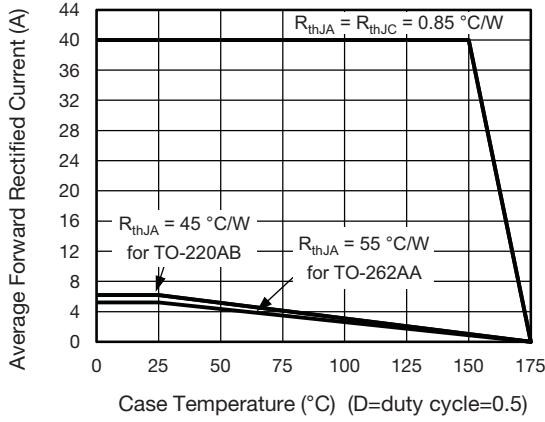


Fig. 1 - Maximum Forward Current Derating Curve

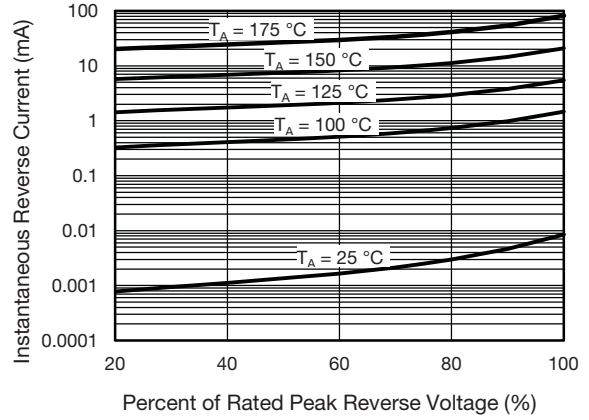


Fig. 4 - Typical Reverse Characteristics Per Diode

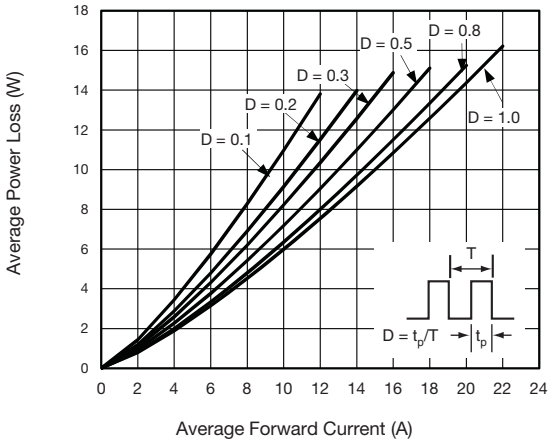


Fig. 2 - Forward Power Loss Characteristics Per Diode

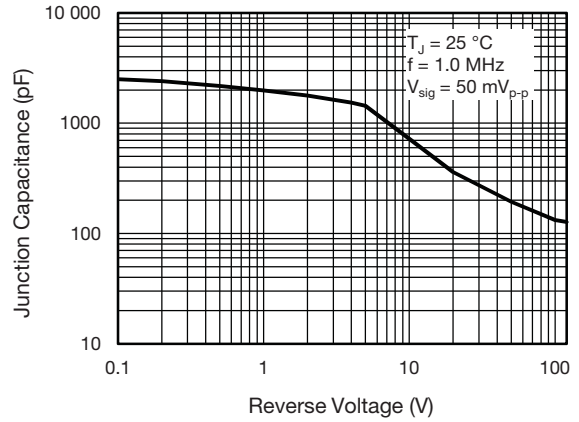


Fig. 5 - Typical Junction Capacitance Per Diode

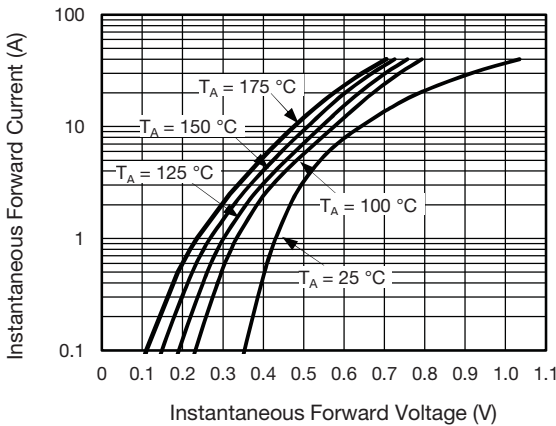


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

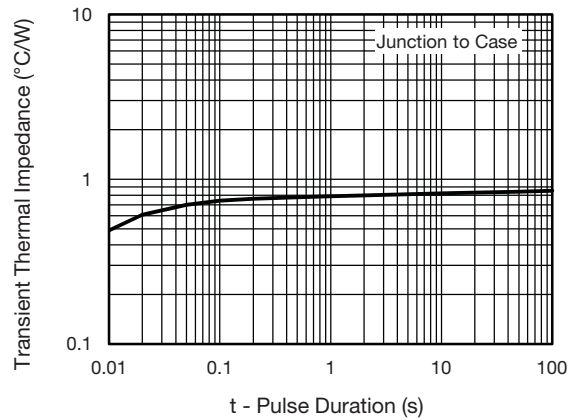
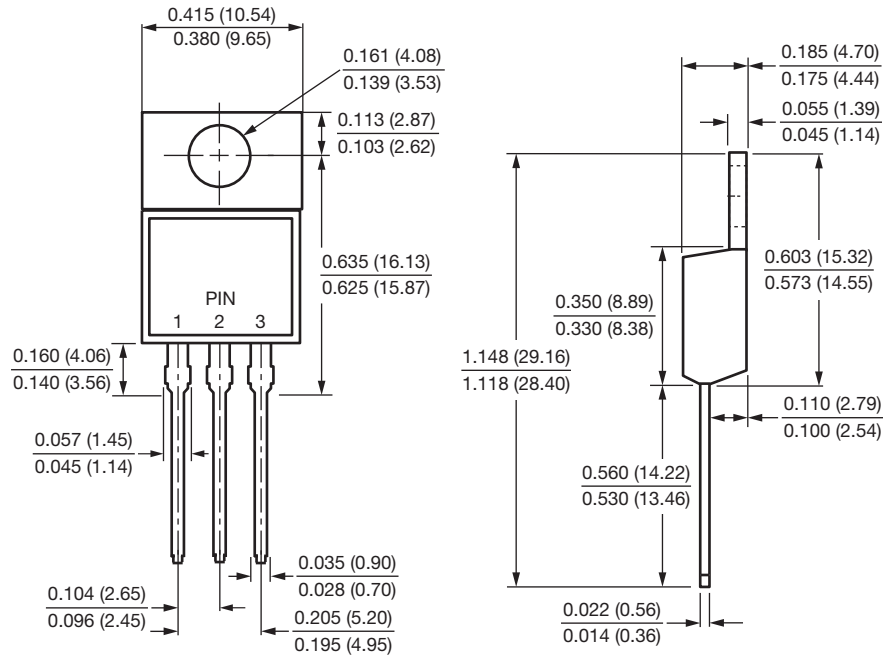


Fig. 6 - Typical Transient Thermal Impedance Per Diode

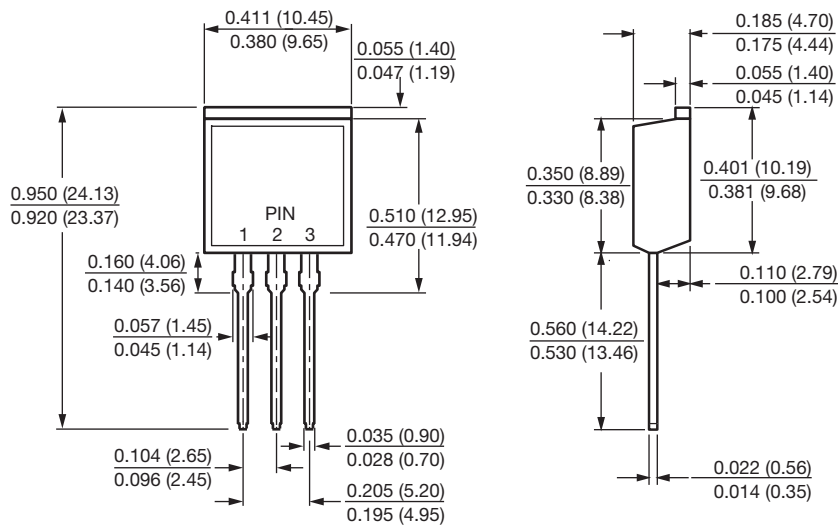


### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### TO-220AB



#### TO-262AA





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