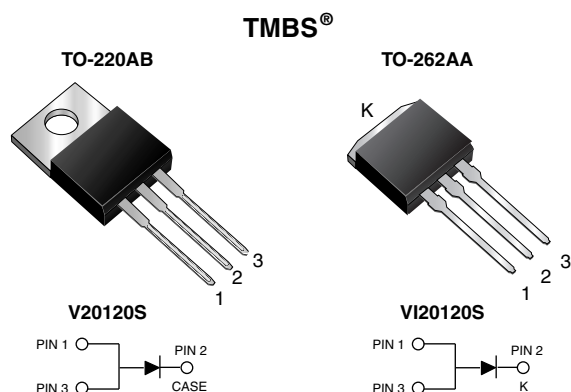




# High-Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.50\text{ V}$  at  $I_F = 5\text{ A}$



## FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Solder bath temperature 275 °C max. 10 s, per JESD 22-B106
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



**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.

## PRIMARY CHARACTERISTICS

|                              |        |
|------------------------------|--------|
| $I_{F(AV)}$                  | 20 A   |
| $V_{RRM}$                    | 120 V  |
| $I_{FSM}$                    | 200 A  |
| $V_F$ at $I_F = 20\text{ A}$ | 0.73 V |
| $T_J$ max.                   | 150 °C |

## 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

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 class 2 whisker test

**Polarity:** As marked

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

## MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER                                                                          | SYMBOL         | V20120S       | VI20120S | UNIT       |
|------------------------------------------------------------------------------------|----------------|---------------|----------|------------|
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$      | 120           |          | V          |
| Maximum average forward rectified current (fig. 1)                                 | $I_{F(AV)}$    | 20            |          | A          |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 200           |          | A          |
| 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 + 150 |          | °C         |

**V20120S, VI20120S**

Vishay General Semiconductor



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |      |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP. | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.57 | -    | V    |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.71 | -    |      |
|                                                                            | I <sub>F</sub> = 20 A  |                         |                               | 0.99 | 1.12 |      |
|                                                                            | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.50 | -    |      |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.61 | -    |      |
|                                                                            | I <sub>F</sub> = 20 A  |                         |                               | 0.73 | 0.81 |      |
| Reverse current                                                            | V <sub>R</sub> = 90 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 10   | -    | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 6    | -    | mA   |
|                                                                            | V <sub>R</sub> = 120 V | T <sub>A</sub> = 25 °C  |                               | -    | 300  | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 14   | 30   | mA   |

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ 

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                 |         |          |                      |
|---------------------------------------------------------------------------------------------|-----------------|---------|----------|----------------------|
| PARAMETER                                                                                   | SYMBOL          | V20120S | VI20120S | UNIT                 |
| Typical thermal resistance                                                                  | $R_{\theta JC}$ | 2.0     |          | $^{\circ}\text{C/W}$ |

| <b>ORDERING INFORMATION</b> (Example) |                               |                 |              |               |               |
|---------------------------------------|-------------------------------|-----------------|--------------|---------------|---------------|
| PACKAGE                               | PREFERRED P/N                 | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AB                              | V20120S-M3/4W                 | 1.88            | 4W           | 50/tube       | Tube          |
| TO-262AA                              | VI20120S-M3/4W                | 1.45            | 4W           | 50/tube       | Tube          |
| TO-220AB                              | V20120SHM3/4W <sup>(1)</sup>  | 1.88            | 4W           | 50/tube       | Tube          |
| TO-262AA                              | VI20120SHM3/4W <sup>(1)</sup> | 1.45            | 4W           | 50/tube       | Tube          |

**Note**

(1) AEC-Q101 qualified



## RATINGS AND CHARACTERISTICS CURVES

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

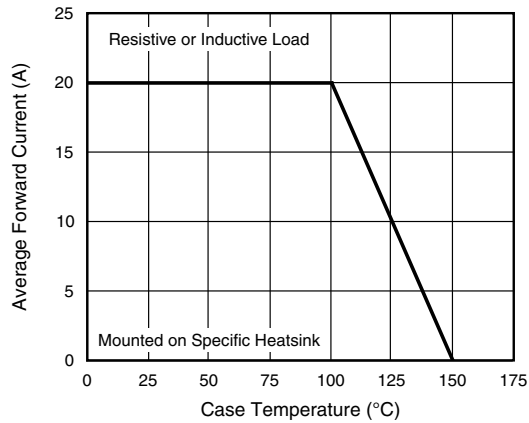


Fig. 1 - Maximum Forward Current Derating Curve

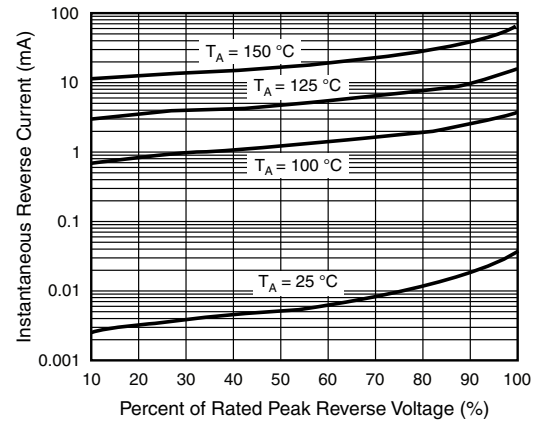


Fig. 4 - Typical Reverse Characteristics

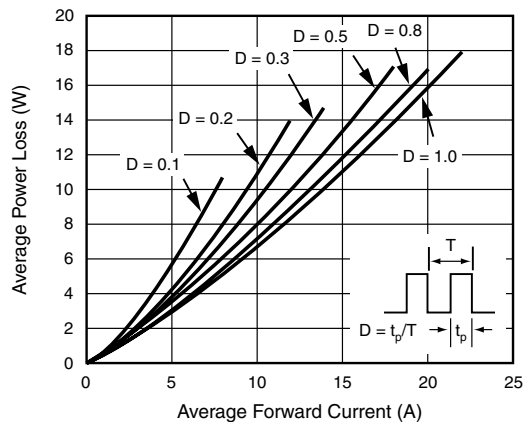


Fig. 2 - Forward Power Dissipation Characteristics

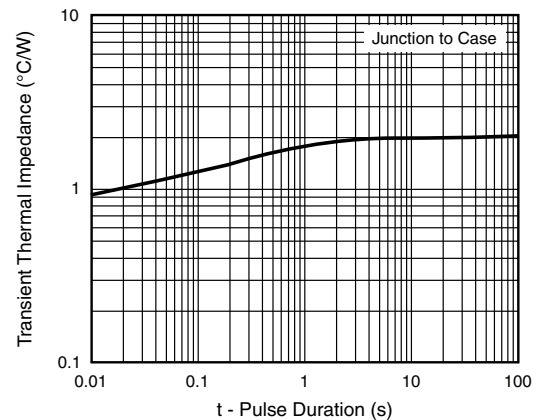


Fig. 5 - Typical Transient Thermal Impedance

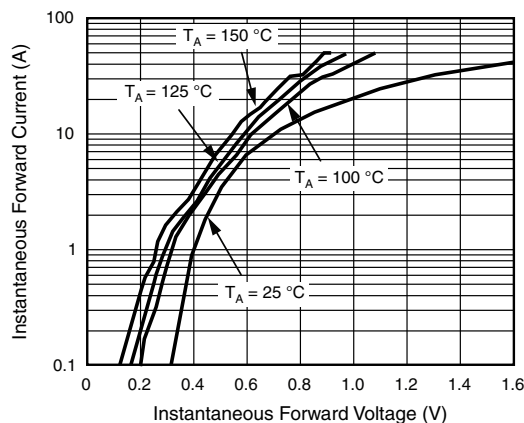


Fig. 3 - Typical Instantaneous Forward Characteristics

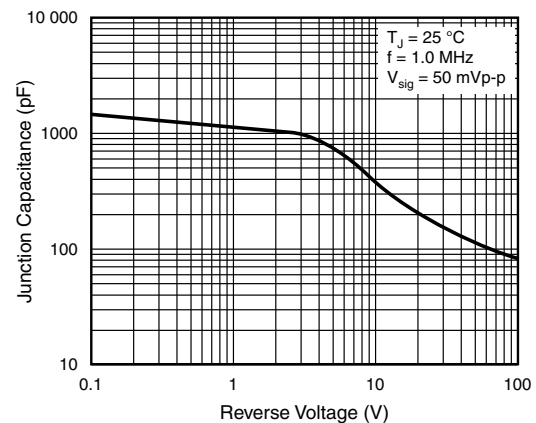
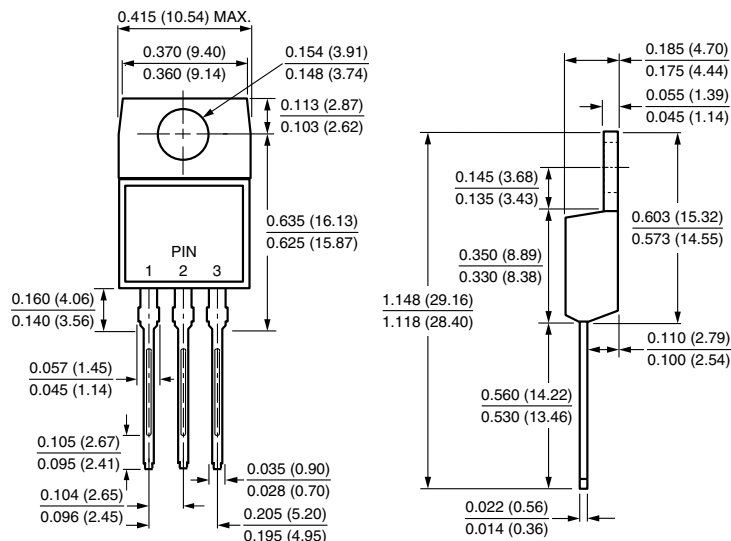
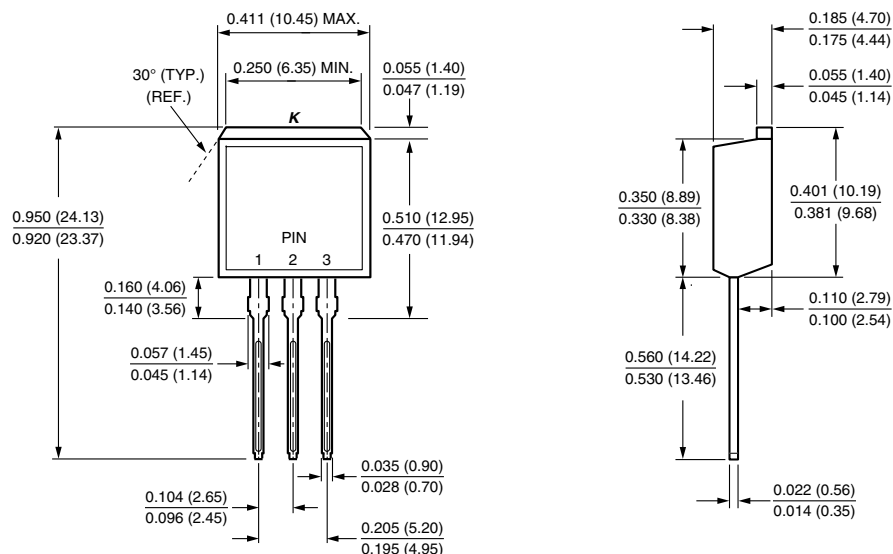


Fig. 6 - Typical Junction Capacitance

**V20120S, VI20120S**

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**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)**TO-220AB****TO-262AA**



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