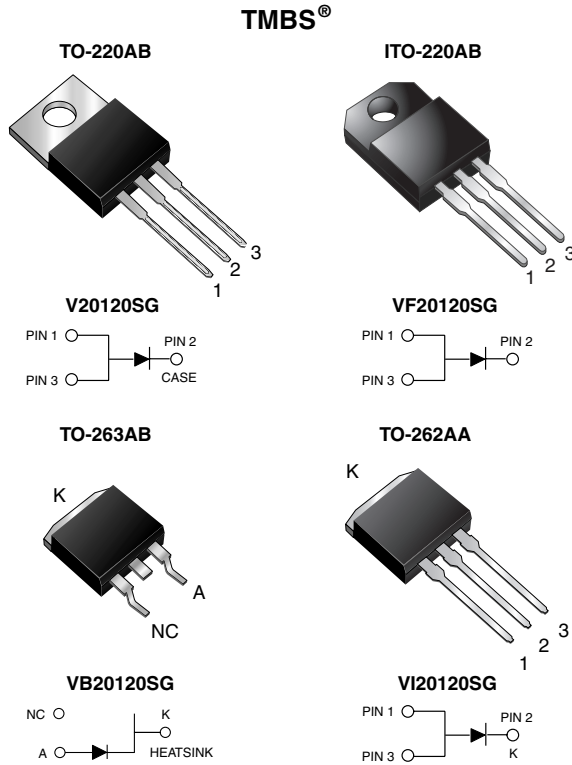


High-Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low $V_F = 0.54 \text{ V}$ at $I_F = 5 \text{ A}$



FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C (for TO-263AB package)
- Solder bath temperature 275 °C maximum, 10 s, per JESD 22-B106 (for TO-220AB, ITO-220AB, and TO-262AA package)
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS COMPLIANT

TYPICAL APPLICATIONS

For use in high frequency converters, switching power supplies, freewheeling diodes, OR-ing diode, dc-to-dc converters and reverse battery protection.

MECHANICAL DATA

Case: TO-220AB, ITO-220AB, TO-263AB and TO-262AA

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS compliant, commercial grade

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

E3 suffix meets JESD 201 class 1A whisker test

Polarity: As marked

Mounting Torque: 10 in-lbs maximum

PRIMARY CHARACTERISTICS

| | |
|-------------------------------|--------|
| $I_{F(AV)}$ | 20 A |
| V_{RRM} | 120 V |
| I_{FSM} | 150 A |
| V_F at $I_F = 20 \text{ A}$ | 0.78 V |
| T_J max. | 150 °C |

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

| PARAMETER | SYMBOL | V20120SG | VF20120SG | VB20120SG | VI20120SG | 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} | | | 150 | | A |
| Non-repetitive avalanche energy at $T_J = 25 \text{ °C}$, $L = 60 \text{ mH}$ | E_{AS} | | | 80 | | mJ |
| Peak repetitive reverse current at $t_p = 2 \text{ }\mu\text{s}$, 1 kHz, $T_J = 38 \text{ °C} \pm 2 \text{ °C}$ | I_{RRM} | | | 0.5 | | A |
| Voltage rate of change (rated V_R) | dV/dt | | | 10 000 | | V/ μs |
| Isolation voltage (ITO-220AB only) from terminal to heatsink $t = 1 \text{ min}$ | V_{AC} | | | 1500 | | V |
| Operating junction and storage temperature range | T_J, T_{STG} | | | - 40 to + 150 | | °C |

| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | | |
|--|--|---|-----------------|----------------------|----------------|----------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Breakdown voltage | I _R = 1.0 mA | T _A = 25 °C | V _{BR} | 120 (minimum) | - | V |
| Instantaneous forward voltage ⁽¹⁾ | I _F = 5 A I _F = 10 A I _F = 20 A | T _A = 25 °C | V _F | 0.62 0.81 1.20 | - - 1.33 | |
| | I _F = 5 A I _F = 10 A I _F = 20 A | T _A = 125 °C | | 0.54 0.65 0.78 | - - 0.88 | |
| Reverse current ⁽²⁾ | V _R = 90 V | T _A = 25 °C T _A = 125 °C | I _R | 10 7 | - - | |
| | V _R = 120 V | T _A = 25 °C T _A = 125 °C | | - 12 | 250 25 | μA 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 | V20120SG | VF20120SG | VB20120SG | VI20120SG | UNIT |
| Typical thermal resistance | R _{θJC} | 2.2 | 4.2 | 2.2 | 2.2 | °C/W |

| ORDERING INFORMATION (Example) | | | | | |
|--------------------------------|-----------------|-----------------|--------------|---------------|---------------|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AB | V20120SG-E3/4W | 1.88 | 4W | 50/tube | Tube |
| ITO-220AB | VF20120SG-E3/4W | 1.75 | 4W | 50/tube | Tube |
| TO-263AB | VB20120SG-E3/4W | 1.38 | 4W | 50/tube | Tube |
| TO-263AB | VB20120SG-E3/8W | 1.38 | 8W | 800/reel | Tape and reel |
| TO-262AA | VI20120SG-E3/4W | 1.45 | 4W | 50/tube | Tube |

RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

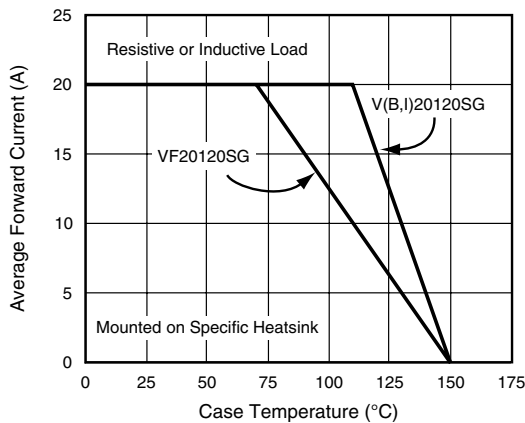


Figure 1. Forward Current Derating Curve

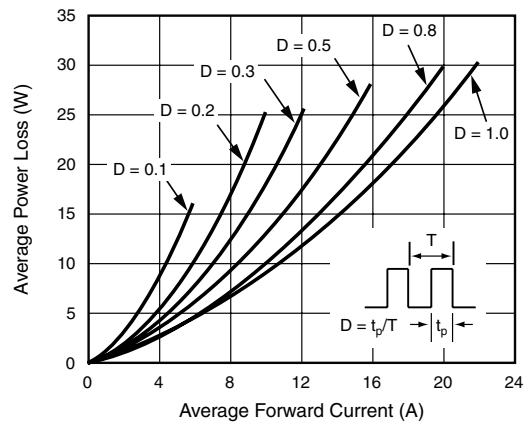


Figure 2. Forward Power Loss Characteristics

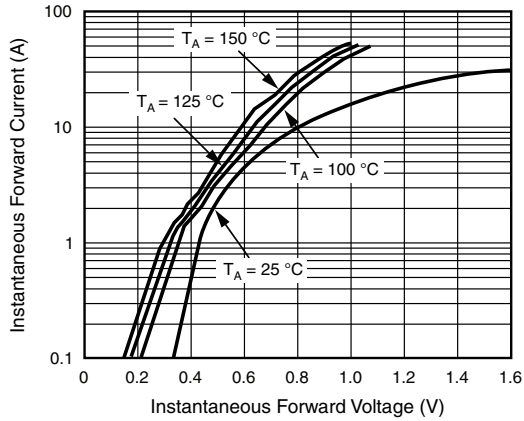


Figure 3. Typical Instantaneous Forward Characteristics

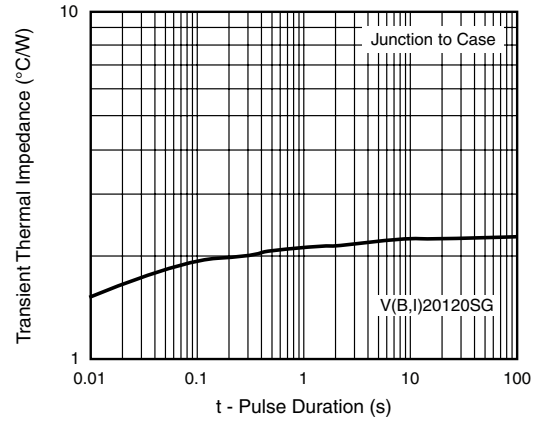


Figure 6. Typical Transient Thermal Impedance

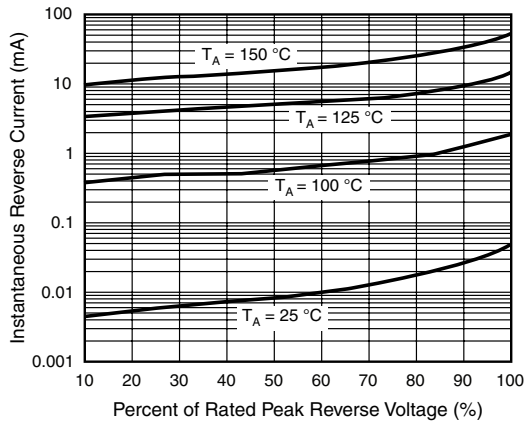


Figure 4. Typical Reverse Characteristics

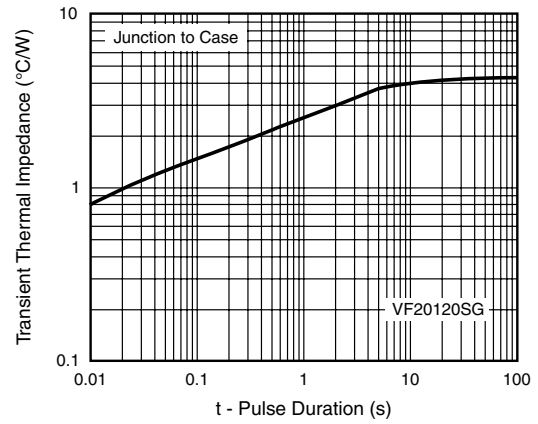


Figure 7. Typical Transient Thermal Impedance

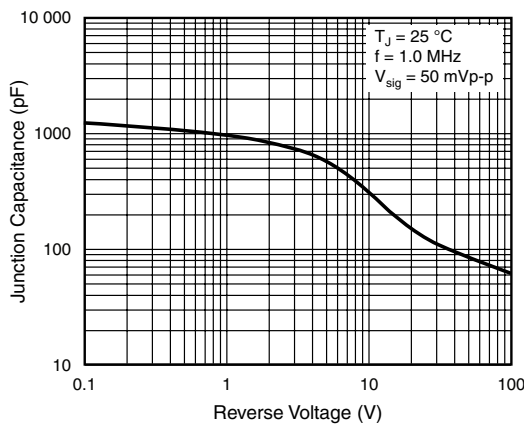


Figure 5. Typical Junction Capacitance

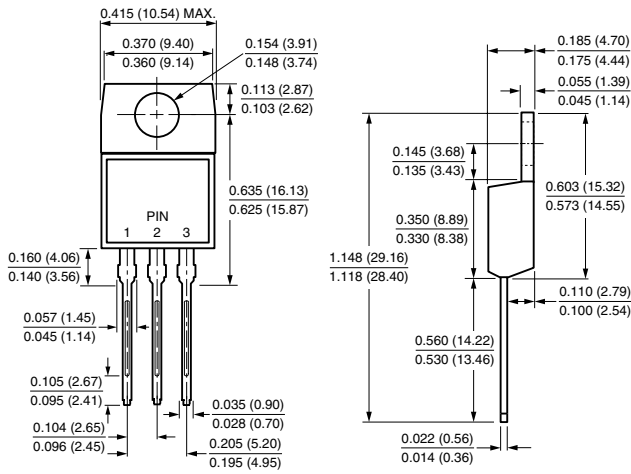
V20120SG, VF20120SG, VB20120SG & VI20120SG



Vishay General Semiconductor

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

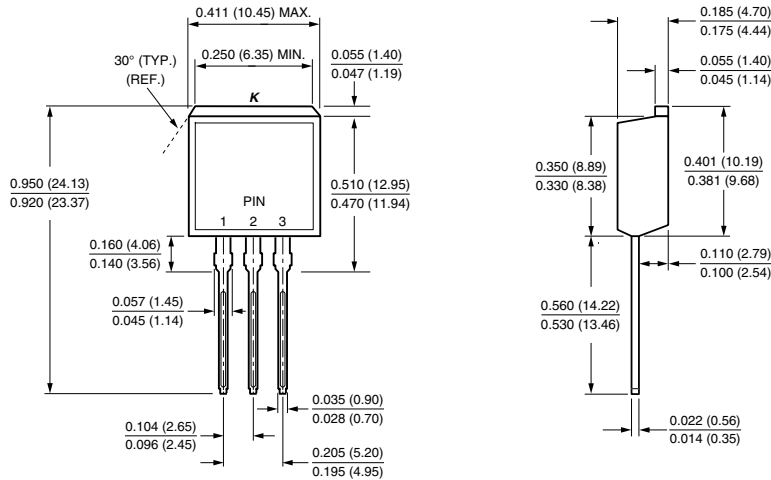
TO-220AB



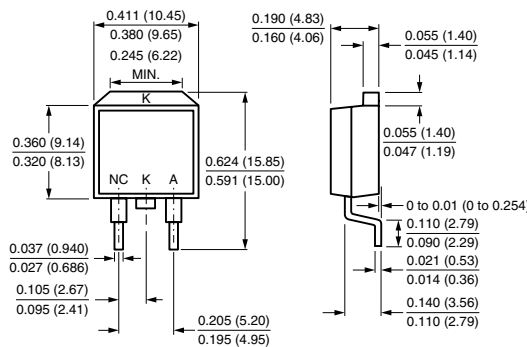
ITO-220AB



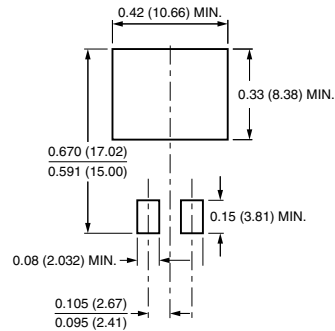
TO-262AA



TO-263AB



Mounting Pad Layout





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