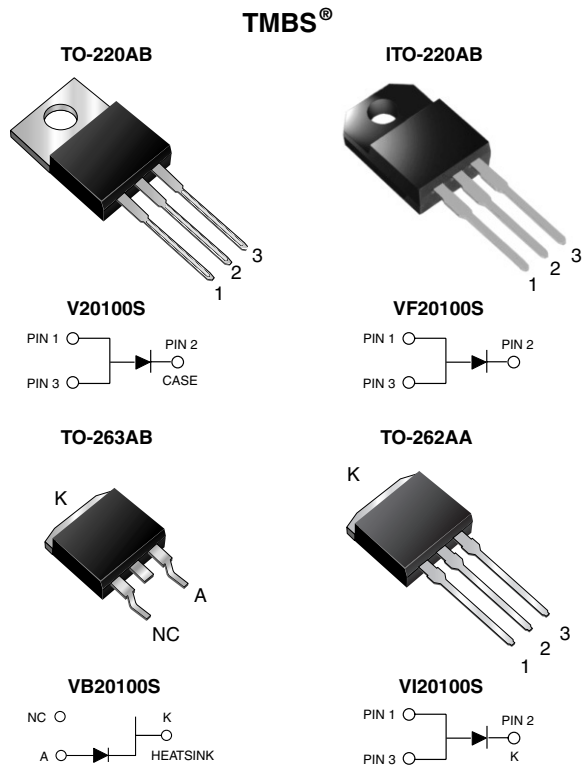


High-Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low $V_F = 0.446 \text{ V}$ at $I_F = 5 \text{ A}$



FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Low thermal resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C (for TO-263AB package)
- Solder dip 260 °C, 40 s (for TO-220AB, ITO-220AB and TO-262AA package)
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



TYPICAL APPLICATIONS

For use in high frequency inverters, 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

Epoxy meets UL 94V-0 flammability rating

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD22-B102

E3 suffix for commercial grade, 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} | 100 V |
| I_{FSM} | 250 A |
| V_F at $I_F = 20 \text{ A}$ | 0.69 V |
| $T_J \text{ max.}$ | 150 °C |

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

| PARAMETER | SYMBOL | V20100S | VF20100S | VB20100S | VI20100S | UNIT |
|---|----------------|---------------|----------|----------|----------|------|
| Maximum repetitive peak reverse voltage | V_{RRM} | 100 | | | | 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} | 250 | | | | A |
| 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 ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|---|-----------------------------------|----------|---------------|------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Breakdown voltage | at $I_R = 1.0\text{ mA}$ | $T_A = 25\text{ }^\circ\text{C}$ | V_{BR} | 100 (minimum) | - | V |
| Instantaneous forward voltage ⁽¹⁾ | at $I_F = 5\text{ A}$ $I_F = 10\text{ A}$ $I_F = 20\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | V_F | 0.51 | - | V |
| | | | | 0.60 | - | |
| | | | | 0.79 | 0.85 | |
| | at $I_F = 5\text{ A}$ $I_F = 10\text{ A}$ $I_F = 20\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.45 | - | |
| 0.53 | | | - | | | |
| 0.69 | | | 0.74 | | | |
| Reverse current ⁽²⁾ | at $V_R = 70\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | I_R | 17 | - | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 7 | - | mA |
| | at $V_R = 100\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | | 70 | 500 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 14 | 30 | mA |

Notes:

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: 10 ms pulse width

| THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|-----------------|---------|----------|----------|----------|--------------------|
| PARAMETER | SYMBOL | V20100S | VF20100S | VB20100S | VI20100S | UNIT |
| Typical thermal resistance | $R_{\theta JC}$ | 2.0 | 4.0 | 2.0 | 2.0 | $^\circ\text{C/W}$ |

| ORDERING INFORMATION (Example) | | | | | | |
|---------------------------------------|----------------|-----------------|--------------|---------------|---------------|--|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE | |
| TO-220AB | V20100S-E3/4W | 1.88 | 4W | 50/tube | Tube | |
| ITO-220AB | VF20100S-E3/4W | 1.75 | 4W | 50/tube | Tube | |
| TO-263AB | VB20100S-E3/4W | 1.37 | 4W | 50/tube | Tube | |
| TO-263AB | VB20100S-E3/8W | 1.37 | 8W | 800/reel | Tape and reel | |
| TO-262AA | VI20100S-E3/4W | 1.45 | 4W | 50/tube | Tube | |

RATINGS AND CHARACTERISTICS CURVES

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

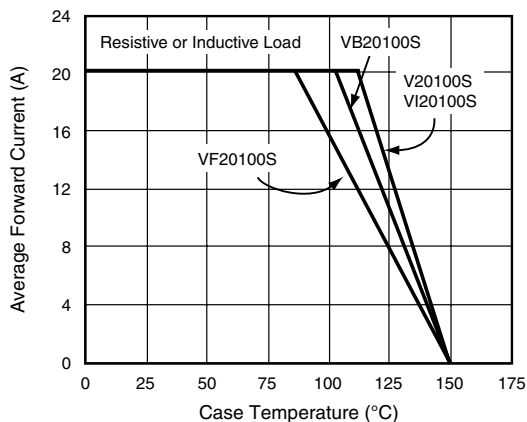


Figure 1. Maximum Forward Current Derating Curve

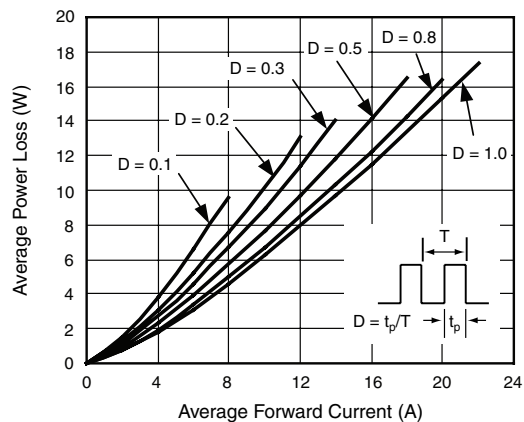


Figure 2. Forward Power Loss Characteristics

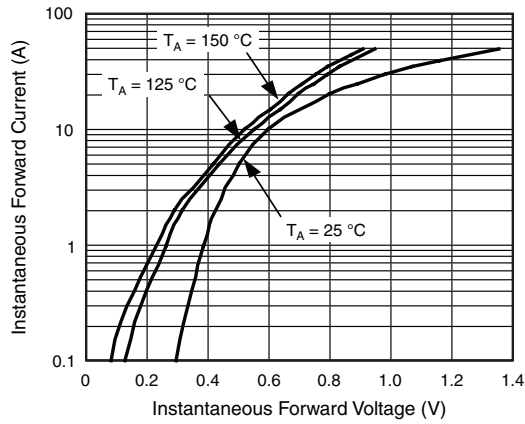


Figure 3. Typical Instantaneous Forward Characteristics

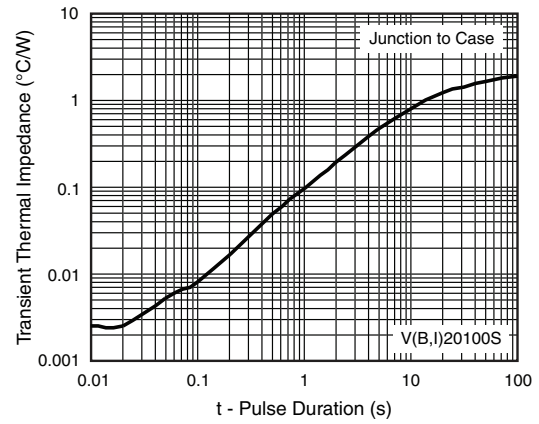


Figure 6. Typical Transient Thermal Impedance

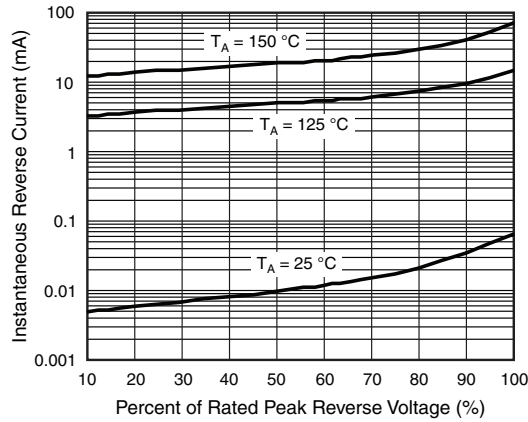


Figure 4. Typical Reverse Characteristics

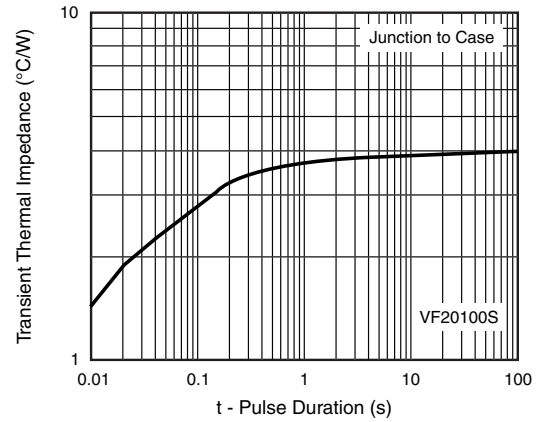


Figure 7. Typical Transient Thermal Impedance

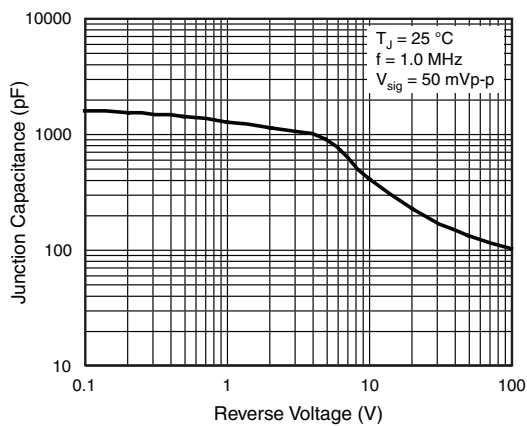


Figure 5. Typical Junction Capacitance



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