



**THE DATASHEET OF
VB20100S-M3/8W**

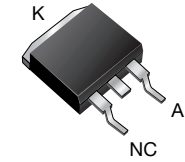




High Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

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

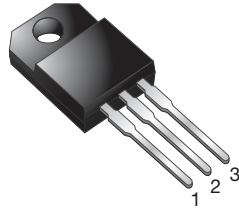
D²PAK (TO-263AB)



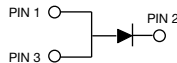
VB20100S



ITO-220AB



VF20100S



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 D²PAK (TO-263AB) package)
- Solder bath temperature 275 °C maximum, 10 s, per JESD 22-B106 (for ITO-220AB package)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: ITO-220AB, D²PAK (TO-263AB)

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

VF20100-M3 suffix meets JESD 201 class 1A whisker test

VI20100-M3 suffix meets JESD 201 class 2 whisker test

Polarity: as marked

Mounting Torque: 10 in-lbs max.

| 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 max. | 150 °C |
| Package | ITO-220AB, D ² PAK (TO-263AB) |
| Circuit configuration | Single |

| MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted) | | | | |
|---|----------------|-------------|----------|------------------|
| PARAMETER | SYMBOL | VF20100S | VB20100S | UNIT |
| Max. repetitive peak reverse voltage | V_{RRM} | 100 | | V |
| Max. 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 |
| Non-repetitive avalanche energy at $T_J = 25\text{ °C}$, $L = 60\text{ mH}$ | E_{AS} | 210 | | 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} | 1.0 | | 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 ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|----------------------|-----------------------------------|-------------|------------|------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Breakdown voltage | $I_R = 10\text{ mA}$ | $T_A = 25\text{ }^\circ\text{C}$ | V_{BR} | 105 (min.) | - | V |
| Instantaneous forward voltage | $I_F = 5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.51 | - | V |
| | $I_F = 10\text{ A}$ | | | 0.60 | - | |
| | $I_F = 20\text{ A}$ | | | 0.79 | 0.90 | |
| | $I_F = 5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.45 | - | |
| | $I_F = 10\text{ A}$ | | | 0.53 | - | |
| | $I_F = 20\text{ A}$ | | | 0.69 | 0.76 | |
| Reverse current | $V_R = 70\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | 17 | - | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 7 | - | mA |
| | $V_R = 100\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | | 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: Pulse width $\leq 40\text{ ms}$

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

| ORDERING INFORMATION (Example) | | | | | |
|---------------------------------------|----------------|-----------------|--------------|---------------|---------------|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| ITO-220AB | VF20100S-M3/4W | 1.75 | 4W | 50/tube | Tube |
| D ² PAK (TO-263AB) | VB20100S-M3/4W | 1.37 | 4W | 50/tube | Tube |
| D ² PAK (TO-263AB) | VB20100S-M3/8W | 1.37 | 8W | 800/reel | Tape and reel |

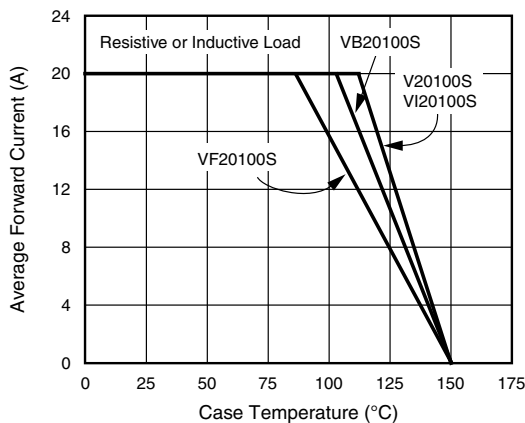
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

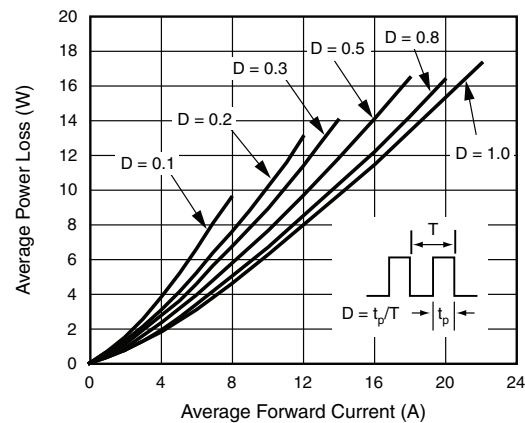


Fig. 2 - Forward Power Loss Characteristics

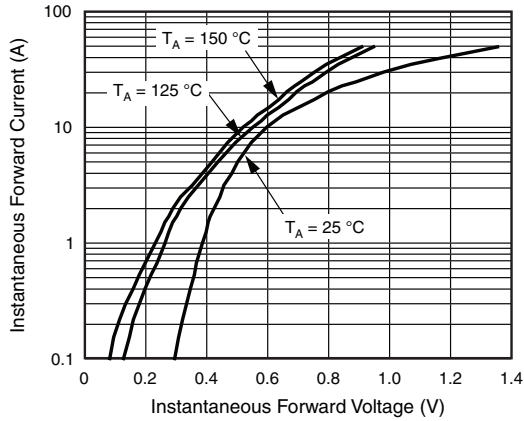


Fig. 3 - Typical Instantaneous Forward Characteristics

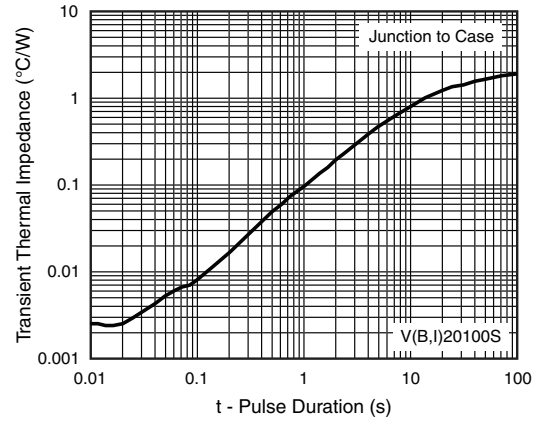


Fig. 6 - Typical Transient Thermal Impedance

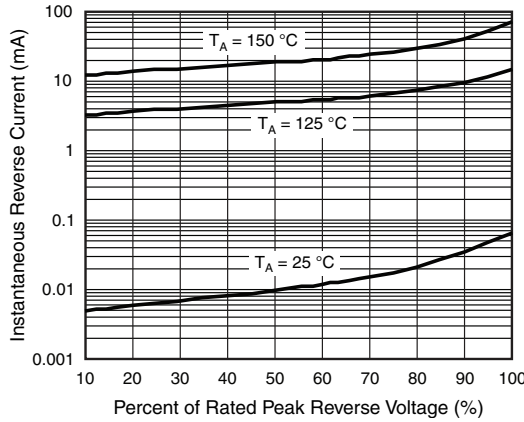


Fig. 4 - Typical Reverse Characteristics

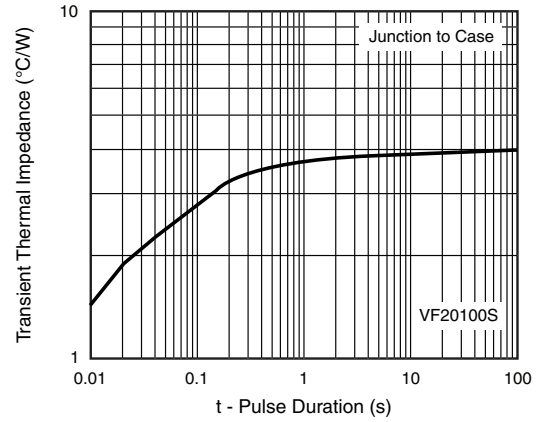


Fig. 7 - Typical Transient Thermal Impedance

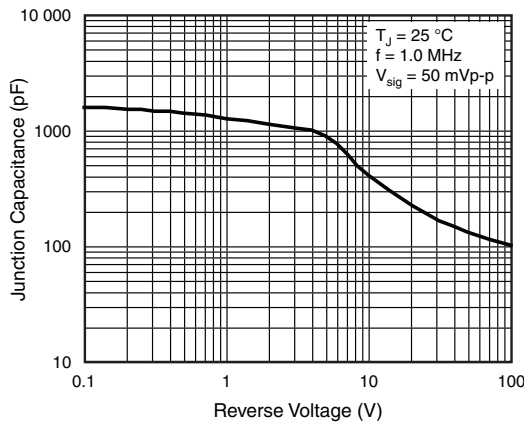
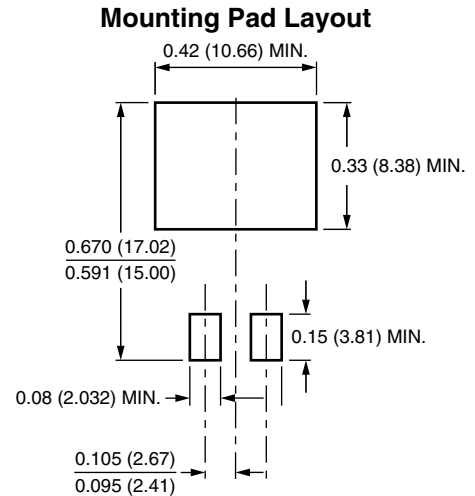
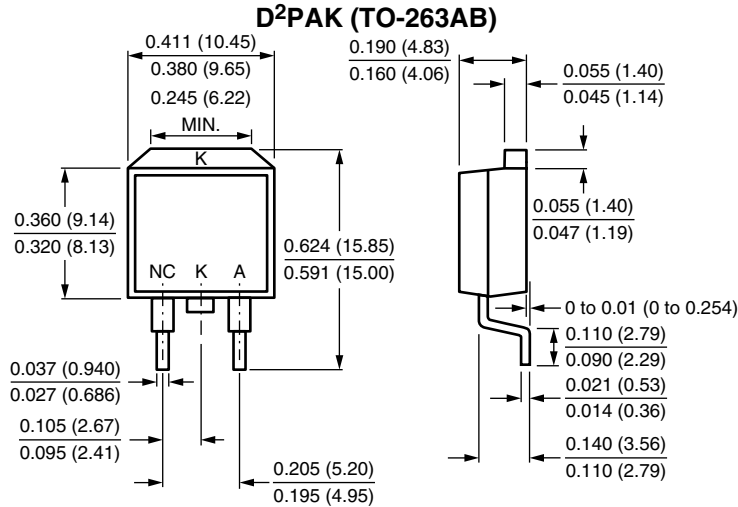
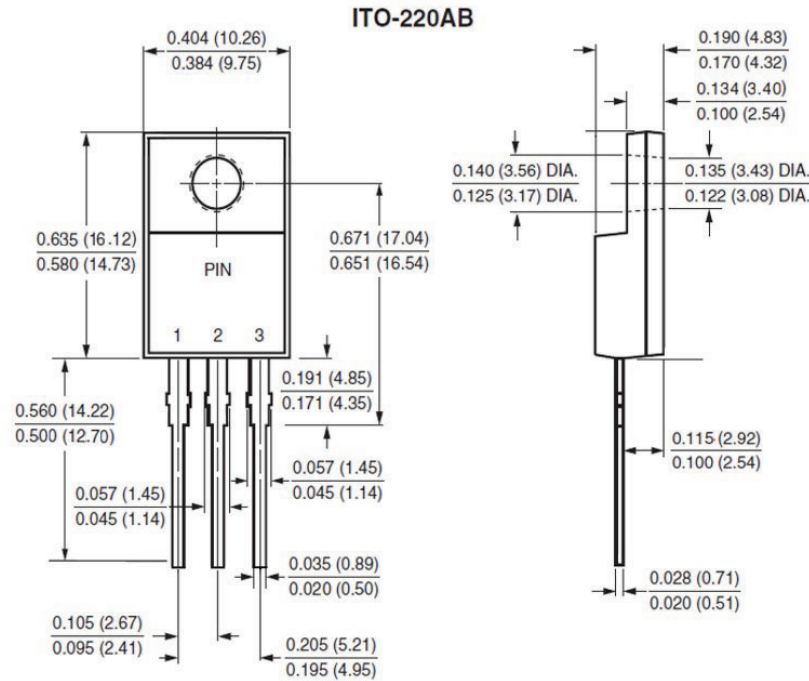


Fig. 5 - Typical Junction Capacitance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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