

Vishay General Semiconductor

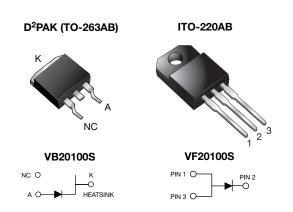
RoHS

HALOGEN

FREE

# High Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

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



| PRIMARY CHARACTERISTICS |  |  |  |  |
|-------------------------|--|--|--|--|
| I <sub>F(AV)</sub>      | 20 A                                     |  |  |  |
| $V_{RRM}$               | 100 V                                    |  |  |  |
| I <sub>FSM</sub>        | 250 A                                    |  |  |  |
| $V_F$ at $I_F = 20 A$   | 0.69 V                                   |  |  |  |
| T <sub>J</sub> max.     | 150 °C                                   |  |  |  |
| Package                 | ITO-220AB, D <sup>2</sup> PAK (TO-263AB) |  |  |  |
| Circuit configuration   | Single                                   |  |  |  |

#### **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 D<sup>2</sup>PAK (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 <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>



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.

| <b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °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 <sub>F(AV)</sub>                | 20          |          | Α    |  |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load    | I <sub>FSM</sub>                  | 250         |          | А    |  |
| Non-repetitive avalanche energy at T <sub>J</sub> = 25 °C, L = 60 mH                  | E <sub>AS</sub>                   | 210         |          | mJ   |  |
| Peak repetitive reverse current at $t_p$ = 2 $\mu$ s, 1 kHz, $T_J$ = 38 °C $\pm$ 2 °C | I <sub>RRM</sub>                  | 1.0         |          | Α    |  |
| Voltage rate of change (rated V <sub>R</sub> )  | dV/dt                             | 10 000      |          | V/µs |  |
| Isolation voltage (ITO-220AB only) from terminal to heatsink t = 1 min                | V <sub>AC</sub>                   | 1500        |          | V    |  |
| Operating junction and storage temperature range                                      | T <sub>J</sub> , T <sub>STG</sub> | -40 to +150 |          | °C   |  |



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| <b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                                 |            |      |      |  |  |
|---|------------------------|-------------------------|---------------------------------|------------|------|------|--|--|
| PARAMETER   | TEST CO                | TEST CONDITIONS         |                                 | TYP.       | MAX. | UNIT |  |  |
| Breakdown voltage   | I <sub>R</sub> = 10 mA | T <sub>A</sub> = 25 °C  | V <sub>BR</sub>                 | 105 (min.) | -    | V    |  |  |
| Instantaneous forward voltage   | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 25 °C  | - V <sub>F</sub> <sup>(1)</sup> | 0.51       | -    | V    |  |  |
|   | I <sub>F</sub> = 10 A  |                         |                                 | 0.60       | -    |      |  |  |
|   | I <sub>F</sub> = 20 A  |                         |                                 | 0.79       | 0.90 |      |  |  |
|   | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                                 | 0.45       | -    |      |  |  |
|   | I <sub>F</sub> = 10 A  |                         |                                 | 0.53       | -    |      |  |  |
|   | I <sub>F</sub> = 20 A  |                         |                                 | 0.69       | 0.76 |      |  |  |
| Reverse current   | V <sub>R</sub> = 70 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup>   | 17         | -    | μA   |  |  |
|   | v <sub>R</sub> = 70 v  | T <sub>A</sub> = 125 °C |                                 | 7          | -    | mA   |  |  |
|   | V = 100 V              | T <sub>A</sub> = 25 °C  |                                 | 70         | 500  | μA   |  |  |
|   | V <sub>R</sub> = 100 V | T <sub>A</sub> = 125 °C |                                 | 14         | 30   | mA   |  |  |

#### **Notes**

 $^{(1)}\,$  Pulse test: 300  $\mu s$  pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                |          |          |      |  |
|---|----------------|----------|----------|------|--|
| PARAMETER   | SYMBOL         | VF20100S | VB20100S | UNIT |  |
| Typical thermal resistance  | $R_{	heta JC}$ | 4.0      | 2.0      | °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 <sup>2</sup> PAK (TO-263AB)  | VB20100S-M3/4W | 1.37            | 4W           | 50/tube       | Tube          |  |
| D <sup>2</sup> PAK (TO-263AB)  | VB20100S-M3/8W | 1.37            | 8W           | 800/reel      | Tape and reel |  |

## **RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25$ °C unless otherwise noted)

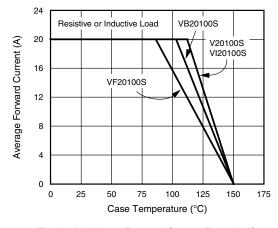


Fig. 1 - Maximum Forward Current Derating Curve

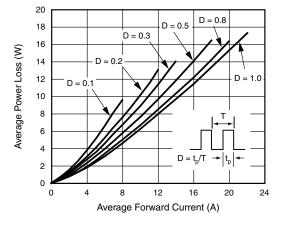


Fig. 2 - Forward Power Loss Characteristics

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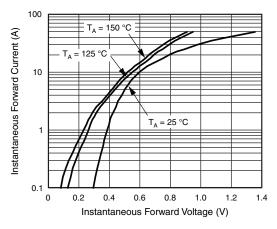


Fig. 3 - Typical Instantaneous Forward Characteristics

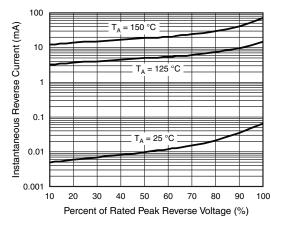


Fig. 4 - Typical Reverse Characteristics

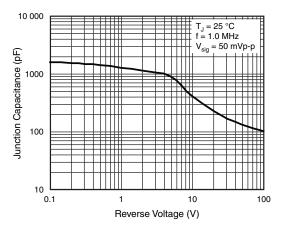


Fig. 5 - Typical Junction Capacitance

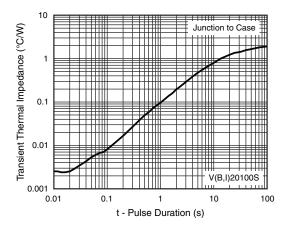


Fig. 6 - Typical Transient Thermal Impedance

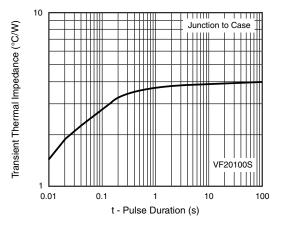
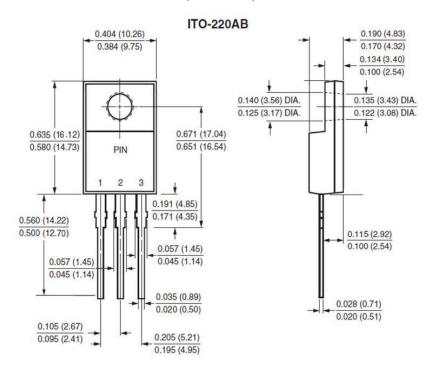


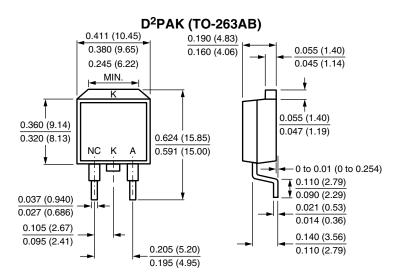
Fig. 7 - Typical Transient Thermal Impedance

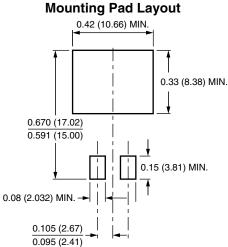


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### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)









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