High-Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low $V_F = 0.39$ V at $I_F = 5$ 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 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

**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**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V30100S</th>
<th>VF30100S</th>
<th>VB30100S</th>
<th>VI30100S</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>$V_{RRM}$</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Maximum average forward rectified current (fig. 1)</td>
<td>$I_{F(AV)}$</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load</td>
<td>$I_{FSM}$</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Non-repetitive avalanche energy at $T_J = 25$ °C, $L = 90$ mH</td>
<td>$E_{AS}$</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td>mJ</td>
</tr>
<tr>
<td>Peak repetitive reverse current at $t_p = 2$ μs, 1 kHz, $T_J = 38$ °C ± 2 °C</td>
<td>$I_{RRM}$</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Voltage rate of change (rated $V_o$)</td>
<td>$dV/dt$</td>
<td>10 000</td>
<td></td>
<td></td>
<td></td>
<td>V/μs</td>
</tr>
<tr>
<td>Isolation voltage (ITO-220AB only) from terminal to heatsink $t = 1$ min</td>
<td>$V_{AC}$</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>$T_J, T_{STG}$</td>
<td>- 40 to + 150</td>
<td></td>
<td></td>
<td></td>
<td>°C</td>
</tr>
</tbody>
</table>

**MAXIMUM RATINGS** ($T_A = 25$ °C unless otherwise noted)

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**VISHAY GENERAL SEMICONDUCTOR**

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- **www.vishay.com**
- DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

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V30100S, VF30100S, VB30100S, VI30100S
Vishay General Semiconductor

ELECTRICAL CHARACTERISTICS (TA = 25 °C unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>SYMBOL</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakdown voltage</td>
<td>IR = 10 mA</td>
<td>VBR</td>
<td>105</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Instantaneous forward voltage</td>
<td>IF = 5 A, 10 A</td>
<td>Vf (1)</td>
<td>0.47</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Reverse current</td>
<td>VR = 70 V</td>
<td>IR (2)</td>
<td>27</td>
<td>-</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td>VR = 100 V</td>
<td></td>
<td>70</td>
<td>1000</td>
<td>μA</td>
</tr>
</tbody>
</table>

Notes
(1) Pulse test: 300 μs pulse width, 1 % duty cycle
(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (TA = 25 °C unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V30100S</th>
<th>VF30100S</th>
<th>VB30100S</th>
<th>VI30100S</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance</td>
<td>RθJC</td>
<td>2.0</td>
<td>4.0</td>
<td>2.0</td>
<td>2.0</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION (Example)

<table>
<thead>
<tr>
<th>PACKAGE</th>
<th>PREFERRED P/N</th>
<th>UNIT WEIGHT (g)</th>
<th>PACKAGE CODE</th>
<th>BASE QUANTITY</th>
<th>DELIVERY MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO-220AB</td>
<td>V30100S-E3/4W</td>
<td>1.875</td>
<td>4W</td>
<td>50/tube</td>
<td>Tube</td>
</tr>
<tr>
<td>ITO-220AB</td>
<td>VF30100S-E3/4W</td>
<td>1.805</td>
<td>4W</td>
<td>50/tube</td>
<td>Tube</td>
</tr>
<tr>
<td>TO-263AB</td>
<td>VB30100S-E3/4W</td>
<td>1.380</td>
<td>4W</td>
<td>50/tube</td>
<td>Tube</td>
</tr>
<tr>
<td>TO-263AB</td>
<td>VB30100S-E3/8W</td>
<td>1.380</td>
<td>8W</td>
<td>800/reel</td>
<td>Tape and reel</td>
</tr>
<tr>
<td>TO-262AA</td>
<td>VI30100S-E3/4W</td>
<td>1.455</td>
<td>4W</td>
<td>50/tube</td>
<td>Tube</td>
</tr>
</tbody>
</table>

RATINGS AND CHARACTERISTICS CURVES (TA = 25 °C unless otherwise noted)

Fig. 1 - Forward Current Derating Curve

Fig. 2 - Forward Power Loss Characteristics
**V30100S, VF30100S, VB30100S, VI30100S**

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**Fig. 3 - Typical Instantaneous Forward Characteristics**

- **Instantaneous Forward Voltage (V)**
  - $T_A = 150 \degree C$
  - $T_A = 125 \degree C$
  - $T_A = 25 \degree C$

**Fig. 4 - Typical Reverse Characteristics**

- **Percent of Rated Peak Reverse Voltage (%)**
  - $T_A = 150 \degree C$
  - $T_A = 125 \degree C$
  - $T_A = 25 \degree C$

**Fig. 5 - Typical Junction Capacitance**

- **Reverse Voltage (V)**
  - $0.1, 1, 10, 100$

**Fig. 6 - Typical Transient Thermal Impedance**

- **Junction to Case (°C/W)**
  - $0.001, 0.01, 0.1, 1, 10, 100$
  - $0.01, 0.1, 1, 10, 100$

**Fig. 7 - Typical Transient Thermal Impedance**

- **Junction to Case (°C/W)**
  - $0.001, 0.01, 0.1, 1, 10, 100$
  - $0.01, 0.1, 1, 10, 100$
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