Dual High-Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F = 0.36$ V at $I_F = 5$ A

**FEATURES**

- Trench MOS Schottky technology
- Very low profile - typical height of 1.7 mm
- Ideal for automated placement
- Low forward voltage drop, low power losses
- High efficiency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available:
  - Automotive ordering code: base P/NHM3

**TYPICAL APPLICATIONS**

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

**MECHANICAL DATA**

**Case:** SMPD (TO-263AC)

Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant
Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** as marked

**PRIMARY CHARACTERISTICS**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V60D100C</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{F(AV)}$</td>
<td>2 x 30 A</td>
<td></td>
</tr>
<tr>
<td>$V_{RRM}$</td>
<td>100 V</td>
<td></td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>320 A</td>
<td></td>
</tr>
<tr>
<td>$V_F$ at $I_F = 30$ A ($T_A = 125$ °C)</td>
<td>0.66 V</td>
<td></td>
</tr>
<tr>
<td>$T_J$ max.</td>
<td>150 °C</td>
<td></td>
</tr>
<tr>
<td>Package</td>
<td>SMPD (TO-263AC)</td>
<td></td>
</tr>
<tr>
<td>Circuit configuration</td>
<td>Common cathode</td>
<td></td>
</tr>
</tbody>
</table>

**MAXIMUM RATINGS**

$(T_A = 25 \degree C$ unless otherwise noted $)$

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V60D100C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>$V_{RRM}$</td>
<td>100 V</td>
</tr>
<tr>
<td>Maximum average forward rectified current per device</td>
<td>$I_{F(AV)}$</td>
<td>60 A</td>
</tr>
<tr>
<td>per diode</td>
<td>30 A</td>
<td></td>
</tr>
<tr>
<td>Peak forward surge current 10 ms single half sine-wave superimposed on rated load</td>
<td>$I_{FSM}$</td>
<td>320 A</td>
</tr>
<tr>
<td>Voltage rate of change (rated $V_R$)</td>
<td>$dV/dt$</td>
<td>10 000 V/μs</td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>$T_J, T_{STG}$</td>
<td>-40 to +150 °C</td>
</tr>
</tbody>
</table>
## ELECTRICAL CHARACTERISTICS \( (T_A = 25 \, ^\circ C \text{ unless otherwise noted}) \)

<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>Instantaneous forward voltage per diode</td>
<td>( I_F = 5 , A ) ( T_A = 25 , ^\circ C )</td>
<td>( V_F ) ( ^{(1)} )</td>
<td>0.45</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>( I_F = 15 , A ) ( T_A = 25 , ^\circ C )</td>
<td></td>
<td>0.62</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( I_F = 30 , A ) ( T_A = 25 , ^\circ C )</td>
<td></td>
<td>0.75</td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( I_F = 5 , A ) ( T_A = 125 , ^\circ C )</td>
<td></td>
<td>0.36</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( I_F = 15 , A ) ( T_A = 125 , ^\circ C )</td>
<td></td>
<td>0.54</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Reversed current at rated ( V_R ) per diode</td>
<td>( V_R = 70 , V ) ( T_A = 25 , ^\circ C )</td>
<td>( I_R ) ( ^{(2)} )</td>
<td>12</td>
<td>-</td>
<td>( \mu A )</td>
</tr>
<tr>
<td></td>
<td>( V_R = 70 , V ) ( T_A = 125 , ^\circ C )</td>
<td></td>
<td>11</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>( V_R = 100 , V ) ( T_A = 25 , ^\circ C )</td>
<td></td>
<td>27</td>
<td>85</td>
<td>mA</td>
</tr>
</tbody>
</table>

### Notes

1. Pulse test: 300 μs pulse width, 1 % duty cycle
2. Pulse test: Pulse width ≤ 5 ms

## THERMAL CHARACTERISTICS \( (T_A = 25 \, ^\circ C \text{ unless otherwise noted}) \)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>( V60D100C )</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance</td>
<td>( R_{JC} )</td>
<td>1.8</td>
<td>°C/W</td>
</tr>
<tr>
<td></td>
<td>( R_{JUC} )</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( R_{JUM} ) ( ^{(2)} )</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( R_{JUA} ) ( ^{(1)(2)} )</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

1. The heat generated must be less than the thermal conductivity from junction-to-ambient: \( dP_d/dT_J < 1/R_{JUA} \)
2. Free air, without heatsink; thermal resistance \( R_{JUA} \) - junction to ambient; thermal resistance \( R_{JUM} \) - junction to mount

## 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>SMPD (TO-263AC)</td>
<td>V60D100C-M3/I</td>
<td>0.55</td>
<td>I</td>
<td>2000/reel</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>SMPD (TO-263AC)</td>
<td>V60D100CHM3/I ( ^{(1)} )</td>
<td>0.55</td>
<td>I</td>
<td>2000/reel</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
</tbody>
</table>

### Note

1. AEC-Q101 qualified
RATINGS AND CHARACTERISTICS CURVES \( T_A = 25 \, ^\circ\text{C} \) unless otherwise noted

Fig. 1 - Forward Current Derating Curve

Fig. 2 - Forward Power Loss Characteristics Per Diode

Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

Fig. 4 - Typical Reverse Characteristics Per Diode

Fig. 5 - Typical Junction Capacitance Per Diode

Fig. 6 - Typical Transient Thermal Impedance Per Device
**Figure 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas**

### Package Outline Dimensions

**SMPD (TO-263AC)**

- **Epoxy printed circuit board FR4 copper thickness = 70 μm**
- **Mounting Pad Layout**

**Dimensions in inches (millimeters):**

- **Width:** 0.420 (10.66) MIN.
- **Height:** 0.330 (8.38) REF.
- **Thermal resistance (°C/W):**
  - **20:** 0.059 (1.50) REF.
- **Copper Pad Areas (cm²):**
  - **1:**
    - 0.042 (1.06)
    - 0.030 (0.76) FR4
    - 0.059 (1.50) REF.
  - **2:**
    - 0.063 (1.60)
    - 0.063 (1.60)
    - 0.059 (1.50) REF.
  - **3:**
    - 0.063 (1.60)
    - 0.063 (1.60)
    - 0.059 (1.50) REF.
  - **4:**
    - 0.063 (1.60)
    - 0.063 (1.60)
    - 0.059 (1.50) REF.
  - **5:**
    - 0.063 (1.60)
    - 0.063 (1.60)
    - 0.059 (1.50) REF.
  - **6:**
    - 0.063 (1.60)
    - 0.063 (1.60)
    - 0.059 (1.50) REF.
  - **7:**
    - 0.063 (1.60)
    - 0.063 (1.60)
    - 0.059 (1.50) REF.
  - **8:**
    - 0.063 (1.60)
    - 0.063 (1.60)
    - 0.059 (1.50) REF.
  - **9:**
    - 0.063 (1.60)
    - 0.063 (1.60)
    - 0.059 (1.50) REF.

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

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