High Current Density Surface Mount
TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F = 0.43$ V at $I_F = 5$ A

**FEATURES**
- Very low profile - typical height of 1.1 mm
- Ideal for automatic placement
- Trench MOS Schottky technology
- 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

**TYPICAL APPLICATIONS**
For use in low voltage high frequency inverters, freewheeling, DC/DC converters and polarity protection applications.

**MECHANICAL DATA**
- Case: SMPC (TO-277A)
- Molding compound meets UL 94 V-0 flammability rating
- Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
- Base P/NHM3_X - halogen-free, RoHS-compliant and AEC-Q101 qualified
  ("_X" denotes revision code e.g. A, B,......)

**TERMINALS:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
- M3 suffix meets JESD 201 class 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

### PRIMARY CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V12P10</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{F(AV)}$</td>
<td></td>
<td>12 A</td>
<td></td>
</tr>
<tr>
<td>$V_{RRM}$</td>
<td></td>
<td>100 V</td>
<td></td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td></td>
<td>200 A</td>
<td></td>
</tr>
<tr>
<td>$E_{AS}$</td>
<td></td>
<td>100 mJ</td>
<td></td>
</tr>
<tr>
<td>$V_F$ at $I_F = 12$ A</td>
<td></td>
<td>0.58 V</td>
<td></td>
</tr>
<tr>
<td>$T_J$ max.</td>
<td></td>
<td>150 °C</td>
<td></td>
</tr>
<tr>
<td>Package</td>
<td></td>
<td>SMPC (TO-277A)</td>
<td></td>
</tr>
<tr>
<td>Circuit configuration</td>
<td></td>
<td>Single</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V12P10</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device marking code</td>
<td></td>
<td>V1210</td>
<td></td>
</tr>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>$V_{RRM}$</td>
<td>100</td>
<td>V</td>
</tr>
<tr>
<td>Maximum average forward rectified current (fig. 1)</td>
<td>$I_{F(AV)}$</td>
<td>12</td>
<td>A</td>
</tr>
<tr>
<td>Peak forward surge current 10 ms single half sine-wave superimposed on rated load</td>
<td>$I_{FSM}$</td>
<td>200</td>
<td>A</td>
</tr>
<tr>
<td>Non-repetitive avalanche energy at $I_{AS} = 2.0$, $T_J = 25$ °C</td>
<td>$E_{AS}$</td>
<td>100</td>
<td>mJ</td>
</tr>
<tr>
<td>Peak repetitive reverse current at $t_p = 2$, 1 kHz, $T_J = 38$ °C ± 2 °C</td>
<td>$I_{RRM}$</td>
<td>1.0</td>
<td>A</td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>$T_J, T_{STG}$</td>
<td>-40 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>
### ELECTRICAL CHARACTERISTICS (\(T_A = 25\,^{\circ}\text{C}\) 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>(I_D = 1.0,\text{mA}) (T_A = 25,^{\circ}\text{C})</td>
<td>(V_{BR})</td>
<td>100 (minimum)</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Instantaneous forward voltage</td>
<td>(I_F = 5,\text{A}) (T_A = 25,^{\circ}\text{C})</td>
<td>(V_F) (1)</td>
<td>0.50</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 12,\text{A}) (T_A = 25,^{\circ}\text{C})</td>
<td></td>
<td>0.65</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 5,\text{A}) (T_A = 125,^{\circ}\text{C})</td>
<td></td>
<td>0.43</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 12,\text{A}) (T_A = 125,^{\circ}\text{C})</td>
<td></td>
<td>0.58</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>(V_R = 70,\text{V}) (T_A = 25,^{\circ}\text{C})</td>
<td>(I_R) (2)</td>
<td>7.0</td>
<td>-</td>
<td>(\mu\text{A})</td>
</tr>
<tr>
<td></td>
<td>(T_A = 125,^{\circ}\text{C})</td>
<td></td>
<td>4.4</td>
<td>-</td>
<td>(\text{mA})</td>
</tr>
<tr>
<td></td>
<td>(V_R = 100,\text{V}) (T_A = 25,^{\circ}\text{C})</td>
<td></td>
<td>21.3</td>
<td>250</td>
<td>(\mu\text{A})</td>
</tr>
<tr>
<td></td>
<td>(T_A = 125,^{\circ}\text{C})</td>
<td></td>
<td>11.8</td>
<td>20</td>
<td>(\text{mA})</td>
</tr>
</tbody>
</table>

**Notes**

(1) Pulse test: 300 \(\mu\text{s}\) pulse width, 1\% duty cycle  
(2) Pulse test: Pulse width \(\leq 40\,\text{ms}\)

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V12P10</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance</td>
<td>(R_{JA}) (1)</td>
<td>60</td>
<td>°C/W</td>
</tr>
<tr>
<td></td>
<td>(R_{JL})</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

(1) Units mounted on recommended PCB 1 oz. pad layout

### ORDERING INFORMATION (Example)

<table>
<thead>
<tr>
<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>V12P10-M3/86A</td>
<td>0.10</td>
<td>86A</td>
<td>1500</td>
<td>7&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>V12P10-M3/87A</td>
<td>0.10</td>
<td>87A</td>
<td>6500</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>V12P10HM3_A/H (1)</td>
<td>0.10</td>
<td>H</td>
<td>1500</td>
<td>7&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>V12P10HM3_A/I (1)</td>
<td>0.10</td>
<td>I</td>
<td>6500</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
</tbody>
</table>

**Note**

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

Fig. 1 - Maximum Forward Current Derating Curve

![Maximum Forward Current Derating Curve](image1)

Fig. 2 - Forward Power Loss Characteristics

![Forward Power Loss Characteristics](image2)

Fig. 3 - Typical Instantaneous Forward Characteristics

![Typical Instantaneous Forward Characteristics](image3)

Fig. 4 - Typical Reverse Leakage Characteristics

![Typical Reverse Leakage Characteristics](image4)

Fig. 5 - Typical Junction Capacitance

![Typical Junction Capacitance](image5)

Fig. 6 - Typical Transient Thermal Impedance

![Typical Transient Thermal Impedance](image6)
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPC (TO-277A)

- 0.184 (4.70)
- 0.184 (4.70)
- 0.176 (4.45)
- 0.176 (4.45)
- 0.006 (0.15)
- 0.006 (0.15)
- 0.016 (0.40)
- 0.016 (0.40)
- 0.087 (2.20)
- 0.087 (2.20)
- 0.075 (1.90)
- 0.075 (1.90)
- 0.146 (3.70)
- 0.146 (3.70)
- 0.134 (3.40)
- 0.134 (3.40)
- 0.049 (1.24)
- 0.049 (1.24)
- 0.037 (0.94)
- 0.037 (0.94)
- 0.084 (2.13)
- 0.084 (2.13)
- 0.053 (1.35)
- 0.053 (1.35)
- 0.041 (1.05)
- 0.041 (1.05)
- 0.171 (4.35)
- 0.171 (4.35)
- 0.167 (4.25)
- 0.167 (4.25)
- 0.262 (6.65)
- 0.262 (6.65)
- 0.250 (6.35)
- 0.250 (6.35)
- 0.242 (6.15)
- 0.242 (6.15)
- 0.238 (6.05)
- 0.238 (6.05)

Mounting Pad Layout

- 0.268 (6.80)
- 0.268 (6.80)
- 0.189 (4.80)
- 0.189 (4.80)
- 0.186 (4.72)
- 0.186 (4.72)
- 0.050 (1.27)
- 0.050 (1.27)
- 0.055 (1.40)
- 0.055 (1.40)
- 0.041 (1.04)
- 0.041 (1.04)

Conform to JEDEC® TO-277A
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