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

Ultra Low $V_F = 0.33\,\mathrm{V}$ at $I_F = 5\,\mathrm{A}$

FEATURES
- Very low profile - typical height of 1.1 mm
- Ideal for automated 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

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 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

PRIMARY CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V15P6</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{FWM}$</td>
<td>15 A</td>
<td></td>
</tr>
<tr>
<td>$V_{RRM}$</td>
<td>60 V</td>
<td></td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>220 A</td>
<td></td>
</tr>
<tr>
<td>$V_F$ at $I_F = 15,\mathrm{A}$ ($T_A = 125,\mathrm{C}$)</td>
<td>0.48 V</td>
<td></td>
</tr>
<tr>
<td>$T_J$ max.</td>
<td>150 °C</td>
<td></td>
</tr>
<tr>
<td>Package</td>
<td>SMPC (TO-277A)</td>
<td></td>
</tr>
<tr>
<td>Circuit configuration</td>
<td>Single</td>
<td></td>
</tr>
</tbody>
</table>

MAXIMUM RATINGS ($T_A = 25\,\mathrm{C}$ unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V15P6</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device marking code</td>
<td></td>
<td>V156</td>
<td></td>
</tr>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>$V_{RRM}$</td>
<td>60</td>
<td>V</td>
</tr>
<tr>
<td>Maximum average forward rectified current (fig. 1)</td>
<td>$I_F$ (1)</td>
<td>15</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>$I_F$ (2)</td>
<td>4.8</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>220</td>
<td>A</td>
</tr>
<tr>
<td>Voltage rate of change (rated $V_R$)</td>
<td>$dV/dt$</td>
<td>10 000</td>
<td>V/μs</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>

Notes
(1) Mounted on 30 mm x 30 mm pad areas aluminum PCB
(2) Free air, mounted on recommended copper pad area
## ELECTRICAL CHARACTERISTICS \( (T_A = 25 \, \degree C \text{ unless otherwise noted}) \)

<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</td>
<td>( I_F = 5.0 , A ) ( T_A = 25 , \degree C )</td>
<td>( V_F ) ((1))</td>
<td>0.43</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>( I_F = 7.5 , A )</td>
<td>0.46</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( I_F = 15 , A )</td>
<td>0.54</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( I_F = 5.0 , A ) ( T_A = 125 , \degree C )</td>
<td>0.33</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( I_F = 7.5 , A )</td>
<td>0.37</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( I_F = 15 , A )</td>
<td>0.48</td>
<td>0.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>( V_R = 60 , V ) ( T_A = 25 , \degree C )</td>
<td>( I_R ) ((2))</td>
<td>-</td>
<td>3.6</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>( T_A = 125 , \degree C )</td>
<td>20</td>
<td>65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes

1. Pulse test: 300 \( \mu s \) pulse width, 1 \% duty cycle
2. Pulse test: pulse width \( \leq 5 \, ms \)

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V15P6</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance</td>
<td>( R_{JA} ) ((1)(2))</td>
<td>75</td>
<td>( ^\circ C/W )</td>
</tr>
<tr>
<td></td>
<td>( R_{JM} ) ((3))</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

1. The heat generated must be less than the thermal conductivity from junction to ambient: \( dP_t/dT_J < 1/R_{JA} \)
2. Free air mounted on recommended copper pad area; thermal resistance \( R_{JA} \) - junction to ambient
3. Mounted on 30 mm x 30 mm aluminum PCB; thermal resistance \( R_{JM} \) - junction to mount

## ORDERING INFORMATION (Example)

<table>
<thead>
<tr>
<th>PREFERRED P/N</th>
<th>UNIT WEIGHT (g)</th>
<th>PREFERRED PACKAGE CODE</th>
<th>BASE QUANTITY</th>
<th>DELIVERY MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>V15P6-M3/86A</td>
<td>0.10</td>
<td>86A</td>
<td>1500</td>
<td>7” diameter plastic tape and reel</td>
</tr>
<tr>
<td>V15P6-M3/87A</td>
<td>0.10</td>
<td>87A</td>
<td>6500</td>
<td>13” diameter plastic tape and reel</td>
</tr>
<tr>
<td>V15P6HM3_A/H  ((1))</td>
<td>0.10</td>
<td>H</td>
<td>1500</td>
<td>7” diameter plastic tape and reel</td>
</tr>
<tr>
<td>V15P6HM3_A/I  ((1))</td>
<td>0.10</td>
<td>I</td>
<td>6500</td>
<td>13” diameter plastic tape and reel</td>
</tr>
</tbody>
</table>

### Note

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

![Fig. 1 - Forward Current Derating Curve](image1)

![Fig. 2 - Forward Power Loss Characteristics](image2)

![Fig. 3 - Typical Instantaneous Forward Characteristics](image3)

![Fig. 4 - Typical Reverse Leakage Characteristics](image4)

![Fig. 5 - Typical Junction Capacitance](image5)

![Fig. 6 - Typical Transient Thermal Impedance](image6)
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

Conform to JEDEC® TO-277A

SMPC (TO-277A)

Conforming Pad Layout

0.049 (1.24)
0.037 (0.94)
0.084 (2.13) NOM.
0.053 (1.36)
0.041 (1.06)

0.146 (3.70)
0.134 (3.40)
0.087 (2.20)
0.075 (1.90)

0.189 (4.80)
0.173 (4.40)
0.155 (3.94) NOM.
0.030 (0.75) NOM.

0.262 (6.65)
0.250 (6.35)
0.242 (6.15)
0.238 (6.05)

0.171 (4.35)
0.167 (4.25)

0.016 (0.40)
0.006 (0.15)

0.047 (1.20)
0.039 (1.00)

0.084 (2.13) NOM.

0.084 (2.13) NOM.

0.155 (3.94) NOM.

0.268 (6.80)

0.189 (4.80) MIN.

0.016 (0.40)
0.006 (0.15)

0.047 (1.20)
0.039 (1.00)

0.050 (1.27) MIN.
0.055 (1.40) MIN.
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