Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

FEATURES

• Low profile package - typical height of 0.88 mm
• Leadless DFN package with side-wettable flanks suitable for customer AOI (Automatic Optical Inspection)
• Trench MOS Schottky technology
• Low power losses, high efficiency
• Low forward voltage drop
• Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
• AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
• Compatible to SMP (DO-220AA) package case outline
• 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: DFN3820A
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
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 meet JESD 201 class 2 whisker test
Polarity: color band denotes the cathode end

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V2N22</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device marking code</td>
<td>V2D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>V_RM</td>
<td>200</td>
<td>V</td>
</tr>
<tr>
<td>Maximum average forward rectified current (fig. 1)</td>
<td>I_F_AV (1)</td>
<td>2</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>50</td>
<td>A</td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>T_J (3)</td>
<td>-40 to +175</td>
<td>°C</td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>T_STG</td>
<td>-55 to +175</td>
<td>°C</td>
</tr>
</tbody>
</table>

Notes

(1) With infinite heatsink
(2) Free air, mounted on FR4 PCB, 2 oz., standard footprint
(3) The heat generated must be less than the thermal conductivity from junction-to-ambient: dP_dT_J < 1/R_1JA

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For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
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# ELECTRICAL CHARACTERISTICS (\(T_J = 25 \degree C\) 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>Instantaneous forward voltage</td>
<td>(I_F = 1.0\ A), (T_J = 25 \degree C)</td>
<td>(V_F) (^{(1)})</td>
<td>0.74</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>(I_F = 2.0\ A), (T_J = 25 \degree C)</td>
<td></td>
<td>0.80</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 1.0\ A), (T_J = 125 \degree C)</td>
<td></td>
<td>0.60</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 2.0\ A), (T_J = 125 \degree C)</td>
<td></td>
<td>0.66</td>
<td>0.72</td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>(V_R = 160\ V), (T_J = 25 \degree C)</td>
<td>(I_R) (^{(2)})</td>
<td>0.00015</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>(V_R = 200\ V), (T_J = 25 \degree C)</td>
<td></td>
<td>0.14</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(T_J = 125 \degree C)</td>
<td></td>
<td>0.3</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Typical junction capacitance</td>
<td>(4.0\ V, 1\ MHz)</td>
<td>(C_J)</td>
<td>110</td>
<td>-</td>
<td>pF</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 (\(T_A = 25 \degree C\) unless otherwise specified)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal resistance</td>
<td>(R_{JA}) (^{(1)(2)})</td>
<td>140</td>
<td>175</td>
<td>(\degree C/W)</td>
</tr>
<tr>
<td></td>
<td>(R_{JM}) (^{(3)})</td>
<td>6</td>
<td>7.5</td>
<td></td>
</tr>
</tbody>
</table>

Notes

\(^{(1)}\) The heat generated must be less than the thermal conductivity from junction-to-ambient: \(dP/dT_J < 1/R_{JA}\)
\(^{(2)}\) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint
\(^{(3)}\) Thermal resistance junction-to-mount to follow JEDEC® 51-14 transient dual interface test method (TDIM)

## ORDERING INFORMATION TABLE

<table>
<thead>
<tr>
<th>Device code</th>
<th>V</th>
<th>2</th>
<th>N</th>
<th>2</th>
<th>2</th>
<th>H</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

1 - Vishay TMBS product
2 - Current rating (2 = 2 A)
3 - Package type (N = DFN3820A)
4 - Voltage rating (2 = 200 V)
5 - TMBS generation option (2 = gen 2)
6 - Quality grade (H = AEC-Q101 qualified, - = industry grade)
7 - Material / Environmental category (M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)

## 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>V2N22-M3/H</td>
<td>0.023</td>
<td>H</td>
<td>3500</td>
<td>7&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>V2N22-M3/I</td>
<td>0.023</td>
<td>I</td>
<td>14 000</td>
<td>13&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>V2N22HM3/H (^{(1)})</td>
<td>0.023</td>
<td>H</td>
<td>3500</td>
<td>7&quot; diameter plastic tape and reel</td>
</tr>
<tr>
<td>V2N22HM3/I (^{(1)})</td>
<td>0.023</td>
<td>I</td>
<td>14 000</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 °C unless otherwise noted)

**Fig. 1 - Maximum Forward Current Derating Curve**

**Fig. 2 - Forward Power Loss Characteristics**

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

**Fig. 4 - Typical Reverse Characteristics**

**Fig. 5 - Typical Junction Capacitance**

**Fig. 6 - Typical Transient Thermal Impedance**
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DFN3820A

0.086 (2.18)
0.078 (1.98)
0.156 (3.95)
0.148 (3.75)

0.006 (0.15)
0.039 (0.98)
0.031 (0.79)

0.076 (1.93)
0.068 (1.73)
0.051 (1.30)
0.043 (1.10)

0.031 (0.80) ref.
0.014 (0.35) ref.
0.051 (1.30)
0.034 (0.86)

0.028 (0.70)
0.020 (0.50)
0.034 (0.86)
0.028 (0.70)

0.100 (2.55)
0.093 (2.35)
0.100 (2.55)
0.156 (3.96)

Mounting Pad Layout
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