Surface Mount Trench MOS Barrier Schottky Rectifier

FEATURES
- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- 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
- 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: DO-221BC (SMPA)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD22-B102
M3 suffix meets JESD 201 class 2 whisker test
Polarity: Color band denotes cathode end

PRIMARY CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward voltage drop at IF = 4.0 A (T_A = 125 °C)</td>
<td>V_F</td>
<td>0.46 V</td>
</tr>
<tr>
<td>T_J max.</td>
<td></td>
<td>150 °C</td>
</tr>
<tr>
<td>Package</td>
<td></td>
<td>DO-221BC (SMPA)</td>
</tr>
<tr>
<td>Diode variation</td>
<td></td>
<td>Single die</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V4PAN50</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device marking code</td>
<td></td>
<td>4N5</td>
<td></td>
</tr>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>V_RRM</td>
<td>50</td>
<td>V</td>
</tr>
<tr>
<td>Maximum DC forward current</td>
<td>I_F (1)</td>
<td>4.0</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>I_F (2)</td>
<td>3.0</td>
<td>A</td>
</tr>
<tr>
<td>Maximum DC reverse voltage</td>
<td>V_DC</td>
<td>35</td>
<td>V</td>
</tr>
<tr>
<td>Peak forward surge current 10 ms single half sine-wave superimposed on rated load</td>
<td>I_FSM</td>
<td>80</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>

Notes
(1) Units mounted on 15 mm x 15 mm pad areas, 2 oz. PCB
(2) Free air, mounted on recommended copper pad area
**ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 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>Instantaneous forward voltage</td>
<td>I&lt;sub&gt;F&lt;/sub&gt; = 2.0 A</td>
<td>V&lt;sub&gt;F&lt;/sub&gt;</td>
<td>0.43</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>I&lt;sub&gt;F&lt;/sub&gt; = 4.0 A</td>
<td></td>
<td>0.51</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T&lt;sub&gt;A&lt;/sub&gt; = 25 °C</td>
<td></td>
<td>0.34</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I&lt;sub&gt;F&lt;/sub&gt; = 4.0 A</td>
<td></td>
<td>0.46</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T&lt;sub&gt;A&lt;/sub&gt; = 125 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>V&lt;sub&gt;R&lt;/sub&gt; = 35 V</td>
<td>I&lt;sub&gt;R&lt;/sub&gt;</td>
<td>8</td>
<td>-</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td>T&lt;sub&gt;A&lt;/sub&gt; = 25 °C</td>
<td></td>
<td>8.8</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>T&lt;sub&gt;A&lt;/sub&gt; = 125 °C</td>
<td></td>
<td>-</td>
<td>600</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td>V&lt;sub&gt;R&lt;/sub&gt; = 50 V</td>
<td></td>
<td>12</td>
<td>35</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>T&lt;sub&gt;A&lt;/sub&gt; = 25 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>T&lt;sub&gt;A&lt;/sub&gt; = 125 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical junction capacitance</td>
<td>4.0 V, 1 MHz</td>
<td>C&lt;sub&gt;J&lt;/sub&gt;</td>
<td>480</td>
<td>-</td>
<td>pF</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<sub>A</sub> = 25 °C unless otherwise specified)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V4PAN50</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance</td>
<td>R&lt;sub&gt;θJA&lt;/sub&gt;</td>
<td>100</td>
<td>°C/W</td>
</tr>
<tr>
<td></td>
<td>R&lt;sub&gt;θJM&lt;/sub&gt;</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

1. Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance R<sub>θJA</sub> - junction to ambient; R<sub>θJM</sub> - 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>V4PAN50-M3/l</td>
<td>0.032</td>
<td>I</td>
<td>14 000</td>
<td>13” diameter plastic tape and reel</td>
</tr>
</tbody>
</table>

**RATINGS AND CHARACTERISTICS CURVES**

(T<sub>A</sub> = 25 °C unless otherwise noted)

![Maximum Forward Current Derating Curve](image1.png)

![Forward Power Loss Characteristics](image2.png)

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

**Fig. 2 - Forward Power Loss Characteristics**
Fig. 3 - Typical Instantaneous Forward Characteristics

Fig. 4 - Typical Reverse Leakage Characteristics

Fig. 5 - Typical Junction Capacitance

Fig. 6 - Typical Transient Thermal Impedance

Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Areas
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-221BC (SMPA)

Cathode Band

0.106 (2.70)
0.098 (2.50)
0.171 (4.35)
0.163 (4.15)
0.211 (5.35)
0.199 (5.05)
0.039 (1.00)
0.035 (0.90)
0.012 (0.30)
0.006 (0.15)

Typ.: 0.019 (0.48)

0.057 (1.45)
0.049 (1.25)
0.087 (2.20)
0.063 (0.75)
0.059 (1.50)
0.030 (0.75)

0.037 (0.92)

0.122 (3.10)
0.098 (2.50)
0.059 (1.50)
0.030 (0.75)

MIN.

MAX.

0.060 (1.52)

MIN.

0.087 (2.20)
MIN.

MIN. 0.122 (3.10)

0.217 (5.52)
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