SS15P3S

Vishay General Semiconductor

SMD Photovoltaic Solar Cell Protection Schottky Rectifier

Features
- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Guarding for overvoltage protection
- Low forward voltage drop, low power losses
- High efficiency
- Low thermal resistance
- 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 solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

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

Primary Characteristics
- \( I_{F\text{AV}} \) 15 A
- \( V_{RRM} \) 30 V
- \( I_{FSM} \) 280 A
- \( E_{AS} \) 20 mJ
- \( V_{F} \) at \( I_{F} = 15 \) A 0.42 V
- \( T_{J, \text{max.}} \) 150 °C

Maximum Ratings \((T_{A} = 25 \, ^{\circ}\text{C} \text{unless otherwise noted})\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>SS15P3S</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device marking code</td>
<td>.Device marking code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>( V_{RRM} )</td>
<td>153S</td>
<td>V</td>
</tr>
<tr>
<td>Maximum DC forward current (fig. 1)</td>
<td>( I_{F} )</td>
<td>15 ( (1) )</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5 ( (2) )</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>280</td>
<td>A</td>
</tr>
<tr>
<td>Non-repetitive avalanche energy at ( I_{AS} = 2.0 , \text{A} ), ( T_{J} = 25 , ^{\circ}\text{C} )</td>
<td>( E_{AS} )</td>
<td>20</td>
<td>mJ</td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>( T_{OP, TSTG} )</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Junction temperature in DC forward current without reverse bias, ( t \leq 1 , \text{h} ( (3) )</td>
<td>( T_{J} )</td>
<td>( \leq 200 )</td>
<td>°C</td>
</tr>
</tbody>
</table>

Notes
1. Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink
2. Free air, mounted on recommended copper pad area
3. Meets the requirements of IEC 61215 Ed. 2 bypass diode thermal test
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>Instantaneous forward voltage</td>
<td>(I_F = 7.5 , \text{A})</td>
<td>(V_F) (1)</td>
<td>0.43</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>(I_F = 15 , \text{A})</td>
<td></td>
<td>0.50</td>
<td>0.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 7.5 , \text{A})</td>
<td></td>
<td>0.32</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 15 , \text{A})</td>
<td></td>
<td>0.42</td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>(V_R = 30 , \text{V})</td>
<td>(I_R) (2)</td>
<td>150</td>
<td>1000</td>
<td>(\mu\text{A})</td>
</tr>
<tr>
<td></td>
<td>(T_A = 25 , ^\circ\text{C})</td>
<td></td>
<td>59</td>
<td>120</td>
<td>(\text{mA})</td>
</tr>
<tr>
<td>Typical junction capacitance</td>
<td>4.0 V, 1 MHz</td>
<td>(C_J)</td>
<td>930</td>
<td>-</td>
<td>(\text{pF})</td>
</tr>
</tbody>
</table>

Notes
(1) Pulse test: 300 μs pulse width, 1 % duty cycle
(2) Pulse test: Pulse width ≤ 40 ms

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance</td>
<td>(R_{\text{JA}}) (1)</td>
<td>100</td>
<td>(^\circ\text{C}/\text{W})</td>
</tr>
<tr>
<td></td>
<td>(R_{\text{JM}}) (2)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Notes
(1) Free air, mounted on recommended copper pad area. Thermal resistance \(R_{\text{JA}}\) - junction to ambient.
(2) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink. Thermal resistance \(R_{\text{JM}}\) - 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>SS15P3S-M3/86A</td>
<td>0.10</td>
<td>86A</td>
<td>1500</td>
<td>7” diameter plastic tape and reel</td>
</tr>
<tr>
<td>SS15P3S-M3/87A</td>
<td>0.10</td>
<td>87A</td>
<td>6500</td>
<td>13” diameter plastic tape and reel</td>
</tr>
</tbody>
</table>

RATINGS AND CHARACTERISTICS CURVES (\(T_A = 25 \, ^\circ\text{C}\) unless otherwise noted)

![Maximum Current Derating Curve](image)

Notes
(1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink, \(T_M\) measured at the terminal of cathode band
(2) Mounted on 30 mm x 30 mm Al PCB (\(R_{\text{JA}} = 20 \, ^\circ\text{C}/\text{W}\))
(3) Mounted on 30 mm x 30 mm x 2 copper pad areas FR4 PCB (\(R_{\text{JA}} = 30 \, ^\circ\text{C}/\text{W}\))
(4) Mounted on 25 mm x 25 mm x 2 copper pad areas FR4 PCB (\(R_{\text{JA}} = 30 \, ^\circ\text{C}/\text{W}\))
(5) Free air, mounted on recommended copper pad area (\(R_{\text{JA}} = 100 \, ^\circ\text{C}/\text{W}\))
**Fig. 2 - Forward Power Loss Characteristics**

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

**Fig. 4 - Typical Reverse Leakage Characteristics**

**Fig. 5 - Typical Junction Capacitance**
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

Conform to JEDEC® TO-277A

Mounting Pad Layout

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

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