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Kind regards,

Team Nexperia
1. Product profile

1.1 General description
Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOD523 (SC-79) ultra small and flat lead Surface-Mounted Device (SMD) plastic package.

1.2 Features
- Average forward current: $I_{F(AV)} \leq 0.2 \, A$
- Reverse voltage: $V_R \leq 30 \, V$
- Low reverse current: $I_R \leq 30 \, \mu A$
- AEC-Q101 qualified
- Ultra small and flat lead SMD plastic package

1.3 Applications
- Low current rectification
- High efficiency DC-to-DC conversion
- Switch Mode Power Supply (SMPS)
- Reverse polarity protection
- Low power consumption applications

1.4 Quick reference data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>square wave; $\delta = 0.5$; $f = 20 , kHz$</td>
<td>$T_{amb} \leq 120 , ^\circ C$</td>
<td>0.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{sp} \leq 140 , ^\circ C$</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
<td>A</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 , V$</td>
<td>-</td>
<td>2.5</td>
<td>30</td>
<td>$\mu A$</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.2 , A$</td>
<td>420</td>
<td>-</td>
<td>500</td>
<td>mV</td>
</tr>
</tbody>
</table>

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, mounting pad for cathode 1 cm².

[2] Pulse test: $t_p \leq 300 \, \mu s; \delta \leq 0.02$. 

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RB521S30
200 mA low $V_F$ MEGA Schottky barrier rectifier
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Product data sheet
2. Pinning information

Table 2. Pinning

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cathode</td>
<td><img src="image1" alt="Simplified outline" /></td>
<td><img src="image2" alt="Graphic symbol" /></td>
</tr>
<tr>
<td>2</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB521S30</td>
<td>SC-79</td>
<td>plastic surface-mounted package; 2 leads</td>
<td>SOD523</td>
</tr>
</tbody>
</table>

4. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB521S30</td>
<td>ZB</td>
</tr>
</tbody>
</table>

5. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_J = 25 , ^\circ C$</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>square wave; $\delta = 0.5$; $f = 20 , kHz$</td>
<td>$T_{amb} \leq 120 , ^\circ C$</td>
<td>$0.2$</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{sp} \leq 140 , ^\circ C$</td>
<td>$0.2$</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8.3 , ms$ half sine wave; JEDEC method</td>
<td>-</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>$275$</td>
<td></td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>$420$</td>
<td></td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>$500$</td>
<td></td>
<td>mW</td>
</tr>
</tbody>
</table>
Table 5. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>T J</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>T amb</td>
<td>ambient temperature</td>
<td>-55</td>
<td>+150</td>
<td></td>
<td>°C</td>
</tr>
<tr>
<td>T stg</td>
<td>storage temperature</td>
<td>-65</td>
<td>+150</td>
<td></td>
<td>°C</td>
</tr>
</tbody>
</table>

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².
[3] Reflow soldering is the only recommended soldering method.

6. Thermal characteristics

Table 6. Thermal characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>R th(j-a)</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1][2]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>455</td>
<td>K/W</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>300</td>
<td>K/W</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>250</td>
<td>K/W</td>
<td></td>
</tr>
<tr>
<td>R th(j-sp)</td>
<td>thermal resistance from junction to solder point</td>
<td>[6]</td>
<td></td>
<td></td>
<td>90</td>
<td>K/W</td>
</tr>
</tbody>
</table>

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P R are a significant part of the total power losses.
[2] Reflow soldering is the only recommended soldering method.
Fig 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

Fig 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
7. Characteristics

Table 7. Characteristics
$T_j = 25\,^\circ\text{C}$ unless otherwise specified.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.1,\text{mA}$</td>
<td>-</td>
<td>130</td>
<td>190</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1,\text{mA}$</td>
<td>-</td>
<td>190</td>
<td>250</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10,\text{mA}$</td>
<td>-</td>
<td>255</td>
<td>300</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 100,\text{mA}$</td>
<td>-</td>
<td>355</td>
<td>410</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 200,\text{mA}$</td>
<td>-</td>
<td>420</td>
<td>500</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10,\text{V}$</td>
<td>-</td>
<td>2.5</td>
<td>30</td>
<td>$\mu\text{A}$</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$f = 1,\text{MHz}$; $V_R = 1,\text{V}$</td>
<td>-</td>
<td>20</td>
<td>25</td>
<td>pF</td>
</tr>
</tbody>
</table>

[1] Pulse test: $t_p \leq 300\,\mu\text{s}$; $\delta \leq 0.02$. 

Fig 3. Forward current as a function of forward voltage; typical values

Fig 4. Reverse current as a function of reverse voltage; typical values

(1) $T_j = 150\,^\circ\text{C}$
(2) $T_j = 125\,^\circ\text{C}$
(3) $T_j = 85\,^\circ\text{C}$
(4) $T_j = 25\,^\circ\text{C}$
(5) $T_j = -40\,^\circ\text{C}$
**NXP Semiconductors**

**RB521S30**

200 mA low $V_f$ MEGA Schottky barrier rectifier

---

**Fig 5.** Diode capacitance as a function of reverse voltage; typical values

- $f = 1 \text{ MHz}; T_{\text{amb}} = 25^\circ \text{C}$

**Fig 6.** Average forward power dissipation as a function of average forward current; typical values

- $T_j = 150^\circ \text{C}$
  - (1) $\delta = 0.1$
  - (2) $\delta = 0.2$
  - (3) $\delta = 0.5$
  - (4) $\delta = 1$

---

**Fig 7.** Average reverse power dissipation as a function of reverse voltage; typical values

- $T_j = 125^\circ \text{C}$
  - (1) $\delta = 1$
  - (2) $\delta = 0.9$
  - (3) $\delta = 0.8$
  - (4) $\delta = 0.5$

---

**Fig 8.** Average forward current as a function of ambient temperature; typical values

**FR4 PCB, standard footprint**

- $T_j = 150^\circ \text{C}$
  - (1) $\delta = 1$; DC
  - (2) $\delta = 0.5$; $f = 20 \text{ kHz}$
  - (3) $\delta = 0.2$; $f = 20 \text{ kHz}$
  - (4) $\delta = 0.1$; $f = 20 \text{ kHz}$

---

**Product data sheet**

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8. Test information

Fig 9. Average forward current as a function of ambient temperature; typical values

Fig 10. Average forward current as a function of solder point temperature; typical values

Fig 11. Reverse recovery time test circuit and waveforms

(1) \( I_R = 1 \text{ mA} \)

Input signal: reverse pulse rise time \( t_r = 0.6 \text{ ns} \); reverse voltage pulse duration \( t_p = 100 \text{ ns} \); duty cycle \( \delta = 0.05 \)

Oscilloscope: rise time \( t_r = 0.35 \text{ ns} \)
The current ratings for the typical waveforms as shown in Figure 8, 9 and 10 are calculated according to the equations: $I_{F(AV)} = I_M \times \delta$ with $I_M$ defined as peak current, $I_{RMS} = I_{F(AV)}$ at DC, and $I_{RMS} = I_M \times \sqrt{\delta}$ with $I_{RMS}$ defined as RMS current.

### 8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

### 9. Package outline
10. Packing information

Table 8. Packing methods

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3000</td>
</tr>
<tr>
<td>RB521S30</td>
<td>SOD523</td>
<td>2 mm pitch, 8 mm tape and reel</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 mm pitch, 8 mm tape and reel</td>
<td>-115</td>
</tr>
</tbody>
</table>

[1] For further information and the availability of packing methods, see Section 14.

11. Soldering

Reflow soldering is the only recommended soldering method.

Fig 14. Reflow soldering footprint SOD523 (SC-79)
# 12. Revision history

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB521S30_1</td>
<td>20091006</td>
<td>Product data sheet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
13. Legal information

13.1 Data sheet status

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective [short] data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
</tbody>
</table>

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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14. Contact information

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For sales office addresses, please send an email to: salesaddresses@nxp.com
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