1. Product profile

1.1 General description
Single high-voltage switching diode, encapsulated in a SOD123F small and flat lead Surface-Mounted Device (SMD) plastic package.

1.2 Features
- Small and flat lead SMD plastic package
- Reverse voltage: $V_R \leq 200$ V

1.3 Applications
- General-purpose switching

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>$I_F$</td>
<td>forward current</td>
<td>[1]</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>mA</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>V</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>[2]</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>ns</td>
</tr>
</tbody>
</table>

[1] Pulse test: $t_p \leq 300 \mu$s; $\delta \leq 0.02$.
[2] When switched from $I_F = 30$ mA to $I_R = 30$ mA; $R_L = 100$ Ω; measured at $I_R = 3$ mA.
2. Pinning information

Table 2. Pinning

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cathode</td>
<td>[1]</td>
<td></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 Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAS21H</td>
<td>-</td>
<td>plastic surface-mounted package; 2 leads</td>
<td>SOD123F</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>BAS21H</td>
<td>B2</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_{RRM} )</td>
<td>repetitive peak reverse voltage</td>
<td>-</td>
<td>250</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( V_R )</td>
<td>reverse voltage</td>
<td>-</td>
<td>200</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( I_F )</td>
<td>forward current</td>
<td>([1])</td>
<td>-</td>
<td>200</td>
<td>mA</td>
</tr>
<tr>
<td>( I_{FRM} )</td>
<td>repetitive peak forward current</td>
<td>( t_p = 1 \text{ ms}; \delta = 0.25 )</td>
<td>-</td>
<td>625</td>
<td>mA</td>
</tr>
<tr>
<td>( I_{FSM} )</td>
<td>non-repetitive peak forward current</td>
<td>square wave ([2])</td>
<td>( t_p = 1 \text{ ms} )</td>
<td>9</td>
<td>A</td>
</tr>
<tr>
<td> </td>
<td> </td>
<td>( t_p = 100 \text{ µs} )</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td> </td>
<td> </td>
<td>( t_p = 10 \text{ ms} )</td>
<td>-</td>
<td>1.7</td>
<td>A</td>
</tr>
<tr>
<td>( P_{tot} )</td>
<td>total power dissipation</td>
<td>( T_{amb} \leq 25 \degree C ) ([3])</td>
<td>-</td>
<td>375</td>
<td>mW</td>
</tr>
<tr>
<td>( T_j )</td>
<td>junction temperature</td>
<td>-</td>
<td>150</td>
<td>\degree C</td>
<td></td>
</tr>
<tr>
<td>( T_{amb} )</td>
<td>ambient temperature</td>
<td>-65</td>
<td>+150</td>
<td>\degree C</td>
<td></td>
</tr>
<tr>
<td>( T_{stg} )</td>
<td>storage temperature</td>
<td>-65</td>
<td>+150</td>
<td>\degree C</td>
<td></td>
</tr>
</tbody>
</table>

\([1]\) Pulse test: \( t_p \leq 300 \text{ µs}; \delta \leq 0.02 \).
\([2]\) \( T_j = 25 \degree C \) prior to surge.
\([3]\) Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

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 ([1][2])</td>
<td>-</td>
<td>-</td>
<td>330</td>
<td>\degree C/W</td>
</tr>
<tr>
<td>( R_{th(j-sp)} )</td>
<td>thermal resistance from junction to solder point</td>
<td>-</td>
<td>-</td>
<td>70</td>
<td>\degree C/W</td>
<td></td>
</tr>
</tbody>
</table>

\([1]\) Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
\([2]\) Reflow soldering is the only recommended soldering method.
\([3]\) Soldering point of cathode tab.
7. Characteristics

Table 7. Characteristics

$T_{\text{amb}} = 25^\circ \text{C}$ 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>$I_F = 100$ mA</td>
<td>[1]</td>
<td>-</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 200$ mA</td>
<td>[1]</td>
<td>-</td>
<td>1.25</td>
<td>V</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 200$ V</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 200$ V; $T_J = 150^\circ \text{C}$</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 0$ V; $f = 1$ MHz</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>pF</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$V_R = 0$ V; $f = 1$ MHz</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>ns</td>
</tr>
</tbody>
</table>

[1] Pulse test: $t_p \leq 300 \mu$s; $\delta \leq 0.02$.
[2] When switched from $I_F = 30$ mA to $I_R = 30$ mA; $R_L = 100$ $\Omega$; measured at $I_R = 3$ mA.
**Nexperia**

**BAS21H**

Single high-voltage switching diode

---

Fig 1. Forward current as a function of forward voltage

![Graph](image1)

1. $T_{\text{amb}} = 150 \, ^\circ \text{C}$; typical values
2. $T_{\text{amb}} = 25 \, ^\circ \text{C}$; typical values
3. $T_{\text{amb}} = 25 \, ^\circ \text{C}$; maximum values

Based on square wave currents.

Fig 2. Non-repetitive peak forward current as a function of pulse duration; maximum values

![Graph](image2)

$f = 1 \, \text{MHz}$; $T_{\text{amb}} = 25 \, ^\circ \text{C}$; prior to surge

---

Fig 3. Reverse current as a function of junction temperature

![Graph](image3)

1. $V_R = V_{R_{\text{lin}}}$; maximum values
2. $V_R = V_{R_{\text{lin}}}$; typical values

---

Fig 4. Diode capacitance as a function of reverse voltage; typical values

![Graph](image4)

$f = 1 \, \text{MHz}$; $T_{\text{amb}} = 25 \, ^\circ \text{C}$
8. Test information

Fig 5. Reverse recovery time test circuit and waveforms

(1) \( I_R = 3 \text{ mA} \)

9. Package outline

Fig 6. Package outline SOD123F

10. Packing information

Please refer to packing information on www.nexperia.com.
11. Soldering

Reflow soldering is the only recommended soldering method.

Fig 7. Reflow soldering footprint SOD123F

12. Mounting

PCB thickness = 1.6 mm

Fig 8. FR4 PCB, standard footprint SOD123F
13. Revision history

Table 9. 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>BAS21H_2</td>
<td>20061103</td>
<td>Product data sheet</td>
<td>-</td>
<td>BAS21H_1</td>
</tr>
</tbody>
</table>

Modifications:

- The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.
- Legal texts have been adapted to the new company name where appropriate.
- Section 1.1 “General description”: amended
- Table 1 “Quick reference data”: $I_F$ forward current table note added
- Table 5 “Limiting values”: $I_F$ forward current table note added
- Table 5 “Limiting values”: $I_{FRM}$ repetitive peak forward current condition amended
- Table 5 “Limiting values”: $I_{FSM}$ non-repetitive peak forward current condition amended
- Table 6: $R_{th(j-sp)}$ thermal resistance from junction to solder point table note added
- Table 7 “Characteristics”: $V_F$ forward voltage unit amended
- Figure 2: figure title and figure note amended
- Figure 3: amended
- Section 12 “Mounting”: added
- Section 14.4 “Trademarks”: added

BAS21H_1 20050411  Product data sheet - -
14. Legal information

14.1 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.nexperia.com.

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14.4 Trademarks

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