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Kind regards,

Team Nexperia
1. Product profile

1.1 General description
Two high-speed switching diodes fabricated in planar technology, and encapsulated in a small SOT143B Surface-Mounted Device (SMD) plastic package. The diodes are not connected.

1.2 Features and benefits
- High switching speed: $t_r \leq 6\ \text{ns}$
- Reverse voltage: $V_R \leq 60\ \text{V}$
- Repetitive peak reverse voltage: $V_{RRM} \leq 60\ \text{V}$
- Repetitive peak forward current: $I_{FRM} \leq 600\ \text{mA}$
- AEC-Q101 qualified
- Small SMD plastic package

1.3 Applications
- High-speed switching in e.g. surface-mounted circuits

1.4 Quick reference data

<table>
<thead>
<tr>
<th>Table 1. Quick reference data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
</tr>
<tr>
<td>$I_F$</td>
</tr>
<tr>
<td>$I_R$</td>
</tr>
<tr>
<td>$V_R$</td>
</tr>
<tr>
<td>$t_{rr}$</td>
</tr>
</tbody>
</table>

[3] When switched from $I_F = 400\ \text{mA}$ to $I_R = 400\ \text{mA};\ R_L = 100\ \Omega$; measured at $I_R = 40\ \text{mA}$. 
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 (diode 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>cathode (diode 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>anode (diode 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>anode (diode 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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>BAS56</td>
<td></td>
<td>plastic surface-mounted package; 4 leads</td>
<td>SOT143B</td>
</tr>
</tbody>
</table>

4. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAS56</td>
<td>*L5</td>
</tr>
</tbody>
</table>

[1]  * = -: made in Hong Kong  
     * = p: made in Hong Kong  
     * = t: made in Malaysia  
     * = W: made in China
5. Limiting values

Table 5. Limiting values

<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>60 V</td>
<td>120 V</td>
<td></td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>-</td>
<td>60 V</td>
<td>120 V</td>
<td></td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>200 mA</td>
<td>150 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_{FRM}$</td>
<td>repetitive peak forward current</td>
<td>600 mA</td>
<td>430 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>square wave</td>
<td>9 A</td>
<td>3 A</td>
<td>1.7 A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} = 25 , ^\circ C$</td>
<td>-</td>
<td>250 mW</td>
<td></td>
</tr>
<tr>
<td>$T_J$</td>
<td>junction temperature</td>
<td>-</td>
<td>150 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td>-65</td>
<td>+150 °C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[2] Device mounted on an FR4 PCB.
[5] $T_J = 25 \, ^\circ C$ prior to surge.

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>-</td>
<td>-</td>
<td>500 K/W</td>
<td></td>
</tr>
<tr>
<td>$R_{th(j-t)}$</td>
<td>thermal resistance from junction to tie-point</td>
<td>-</td>
<td>-</td>
<td>360 K/W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1] Device mounted on an FR4 PCB.
7. 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>V_F</td>
<td>forward voltage</td>
<td>I_F = 200 mA</td>
<td>1</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>I_R</td>
<td>reverse current</td>
<td>V_R = 60 V</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_R = 60 V; T_j = 150 °C</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_R = 120 V</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_R = 120 V; T_j = 150 °C</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>μA</td>
</tr>
<tr>
<td>C_d</td>
<td>diode capacitance</td>
<td>f = 1 MHz; V_R = 0 V</td>
<td>-</td>
<td>-</td>
<td>2.5</td>
<td>pF</td>
</tr>
<tr>
<td>t_r</td>
<td>reverse recovery time</td>
<td>f = 1 MHz; V_R = 0 V</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>ns</td>
</tr>
<tr>
<td>V_FR</td>
<td>forward recovery voltage</td>
<td>f = 1 MHz; V_R = 0 V</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>V</td>
</tr>
</tbody>
</table>

[1] T_amb = 25 °C; device has reached the thermal equilibrium when mounted on an FR4 PCB.
[3] When switched from I_F = 400 mA to I_R = 400 mA; R_L = 100 Ω; measured at I_R = 40 mA.
[4] When switched from I_F = 400 mA; t_r = 30 ns.
[5] When switched from I_F = 400 mA; t_r = 100 ns.
Fig 1. Forward current as a function of forward voltage; typical values

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

Fig 3. Reverse current as a function of junction temperature

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

- (1) $V_R = 60 \, \text{V};$ maximum values
- (2) $V_R = 60 \, \text{V};$ typical values

Based on square wave currents.

$T_J = 25 \, ^\circ\text{C}$; prior to surge

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

![Diagram](image)

**Fig 5.** Forward current as a function of ambient temperature; derating curves

(1) Single diode loaded
(2) Double diode loaded

**Fig 6.** Reverse recovery time test circuit and waveforms

(1) $I_R = 40$ mA

**Fig 7.** Forward recovery voltage test circuit and waveforms

Input signal: pulse duration $t_p = 300$ ns; duty cycle $\delta = 0.01$. 
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

![Package outline BAS56 (SOT143B)](image)

Fig 8. Package outline BAS56 (SOT143B)

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>BAS56</td>
<td>SOT143B</td>
<td>4 mm pitch, 8 mm tape and reel</td>
<td>3000 10000 -215 -235</td>
</tr>
</tbody>
</table>

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

Fig 9. Reflow soldering footprint BAS56 (SOT143B)

Fig 10. Wave soldering footprint BAS56 (SOT143B)
12. 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>BAS56 v.3</td>
<td>20100629</td>
<td>Product data sheet</td>
<td>-</td>
<td>BAS56_2</td>
</tr>
<tr>
<td>BAS56_2</td>
<td>19960910</td>
<td>Product specification</td>
<td>-</td>
<td>BAS56_1</td>
</tr>
<tr>
<td>BAS56_1</td>
<td>19960423</td>
<td>Product specification</td>
<td>-</td>
<td>-</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
- **Section 4 “Marking”**: updated
- **Table 1 “Quick reference data”**: added
- **Section 8 “Test information”**: added
- **Figure 8**: superseded by minimized package outline drawing
- **Section 10 “Packing information”**: added
- **Section 11 “Soldering”**: added
- **Section 13 “Legal information”**: updated
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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For sales office addresses, please send an email to: salesaddresses@nxp.com
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