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Kind regards,

Team Nexperia
DATA SHEET

BAL99
High-speed diode

Product data sheet
Supersedes data of 1999 May 26

2003 Dec 12

NXP
founded by Philips
High-speed diode BAL99

FEATURES
- Small plastic SMD package
- High switching speed: max. 4 ns
- Continuous reverse voltage: max. 70 V
- Repetitive peak reverse voltage: max. 70 V
- Repetitive peak forward current: max. 500 mA.

APPLICATIONS
- High-speed switching in e.g. surface mounted circuits.

DESCRIPTION
The BAL99 is a high-speed switching diode fabricated in planar technology, and encapsulated in the small SOT23 plastic SMD package.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>TYPE NUMBER</th>
<th>PACKAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAL99</td>
<td>plastic surface mounted package; 3 leads</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{RRM}</td>
<td>repetitive peak reverse voltage</td>
<td>– 70 V</td>
</tr>
<tr>
<td>V_R</td>
<td>continuous reverse voltage</td>
<td>– 70 V</td>
</tr>
<tr>
<td>I_F</td>
<td>continuous forward current</td>
<td>see Fig.2; note 1 – 215 mA</td>
</tr>
<tr>
<td>I_{FRM}</td>
<td>repetitive peak forward current</td>
<td>– 500 mA</td>
</tr>
<tr>
<td>I_{FSM}</td>
<td>non-repetitive peak forward current</td>
<td>square wave; T_j = 25 °C prior to surge; see Fig.4: t_p = 1 µs – 4 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t_p = 1 ms – 1 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t_p = 1 s – 0.5 A</td>
</tr>
<tr>
<td>P_{tot}</td>
<td>total power dissipation</td>
<td>T_{amb} = 25 °C; note 1 – 250 mW</td>
</tr>
<tr>
<td>T_{stg}</td>
<td>storage temperature</td>
<td>–65 °C +150 °C</td>
</tr>
<tr>
<td>T_j</td>
<td>junction temperature</td>
<td>– 150 °C</td>
</tr>
</tbody>
</table>

Note
1. Device mounted on an FR4 printed-circuit board.
ELECTRICAL CHARACTERISTICS

$T_J = 25 \, ^\circ\text{C}$ unless otherwise specified.

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>see Fig.3</td>
<td>715</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td>$I_F = 1 , \text{mA}$</td>
<td></td>
<td>855</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td>$I_F = 10 , \text{mA}$</td>
<td></td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>$I_F = 50 , \text{mA}$</td>
<td></td>
<td>1.25</td>
<td>V</td>
</tr>
</tbody>
</table>

$V_F = 150 \, \text{mA}$ |

$V_R = 25 \, \text{V}$ |
$V_R = 70 \, \text{V}$ |
$V_R = 25 \, \text{V}; \, T_J = 150 \, ^\circ\text{C}$ |
$V_R = 70 \, \text{V}; \, T_J = 150 \, ^\circ\text{C}$ |

$R_{th(j-a)}$ thermal resistance from junction to ambient |

R_{th(j-a)} note 1 |

500 K/W |

THERMAL CHARACTERISTICS

$R_{th(j-a)}$ thermal resistance from junction to ambient |

Note 1. Device mounted on an FR4 printed-circuit board.
High-speed diode

**GRAPHICAL DATA**

**Fig. 2**  Maximum permissible continuous forward current as a function of ambient temperature.

**Fig. 3**  Forward current as a function of forward voltage.

**Fig. 4**  Maximum permissible non-repetitive peak forward current as a function of pulse duration.

Device mounted on an FR4 printed-circuit board.

Based on square wave currents; $T_J = 25 \, ^\circ C$ prior to surge.
High-speed diode

Fig. 5 Reverse current as a function of junction temperature.

(1) $V_R = 70$ V; maximum values.
(2) $V_R = 70$ V; typical values.
(3) $V_R = 25$ V; typical values.

Fig. 6 Diode capacitance as a function of reverse voltage; typical values.

$f = 1$ MHz; $T_j = 25$ °C.
Fig. 7 Reverse recovery time test circuit and waveforms.

Fig. 8 Forward recovery voltage test circuit and waveforms.
High-speed diode

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>A₁ max.</th>
<th>bP</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e₁</th>
<th>Hₑ</th>
<th>Lp</th>
<th>Q</th>
<th>v</th>
<th>w</th>
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<tr>
<td>mm</td>
<td>1.1</td>
<td>0.9</td>
<td>0.1</td>
<td>0.48</td>
<td>0.15</td>
<td>3.0</td>
<td>1.4</td>
<td>1.9</td>
<td>2.5</td>
<td>0.45</td>
<td>0.55</td>
<td>0.2</td>
<td>0.1</td>
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REFERENCES

<table>
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<tr>
<th>OUTLINE VERSION</th>
<th>IEC</th>
<th>JEDEC</th>
<th>JEITA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOT23</td>
<td>TO-236AB</td>
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</tbody>
</table>

EUROPEAN PROJECTION

 ISSUE DATE

2003 Dec 12
**DATA SHEET STATUS**

<table>
<thead>
<tr>
<th>DOCUMENT STATUS(1)</th>
<th>PRODUCT STATUS(2)</th>
<th>DEFINITION</th>
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</thead>
<tbody>
<tr>
<td>Objective data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
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NXP Semiconductors

Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

Contact information

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