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Kind regards,

Team Nexperia
DATA SHEET

1N4148; 1N4448
High-speed diodes

Product data sheet
Supersedes data of 2002 Jan 23

2004 Aug 10

DISCRETE SEMICONDUCTORS

NXP
founded by Philips
High-speed diodes

FEATURES
- Hermetically sealed leaded glass SOD27 (DO-35) package
- High switching speed: max. 4 ns
- General application
- Continuous reverse voltage: max. 100 V
- Repetitive peak reverse voltage: max. 100 V
- Repetitive peak forward current: max. 450 mA.

APPLICATIONS
- High-speed switching.

DESCRIPTION
The 1N4148 and 1N4448 are high-speed switching diodes fabricated in planar technology, and encapsulated in hermetically sealed leaded glass SOD27 (DO-35) packages.

MARKING

<table>
<thead>
<tr>
<th>TYPE NUMBER</th>
<th>MARKING CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1N4148</td>
<td>1N4148PH or 4148PH</td>
</tr>
<tr>
<td>1N4448</td>
<td>1N4448</td>
</tr>
</tbody>
</table>

The diodes are type branded.

Fig. 1 Simplified outline (SOD27; DO-35) and symbol.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>TYPE NUMBER</th>
<th>PACKAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1N4148</td>
<td>hermetically sealed glass package; axial leaded; 2 leads</td>
</tr>
<tr>
<td>1N4448</td>
<td>SOD27</td>
</tr>
</tbody>
</table>

2004 Aug 10
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>100</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>V_R</td>
<td>continuous reverse voltage</td>
<td>–</td>
<td>100</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>I_F</td>
<td>continuous forward current</td>
<td>see Fig.2; note 1</td>
<td>–</td>
<td>200</td>
<td>mA</td>
</tr>
<tr>
<td>I_{FRM}</td>
<td>repetitive peak forward current</td>
<td>–</td>
<td>450</td>
<td>mA</td>
<td></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</td>
<td>–</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
<td>A</td>
</tr>
<tr>
<td>P_{tot}</td>
<td>total power dissipation</td>
<td>T_{amb} = 25 °C; note 1</td>
<td>–</td>
<td>500</td>
<td>mW</td>
</tr>
<tr>
<td>T_{stg}</td>
<td>storage temperature</td>
<td>–65</td>
<td>+200</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>T_j</td>
<td>junction temperature</td>
<td>–</td>
<td>200</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

Note
1. Device mounted on an FR4 printed-circuit board; lead length 10 mm.

ELECTRICAL CHARACTERISTICS
T_j = 25 °C unless otherwise specified.

<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_F</td>
<td>forward voltage</td>
<td>see Fig.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1N4148</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1N4448</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 10 mA</td>
<td>–</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 5 mA</td>
<td>0.62</td>
<td>0.72</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 100 mA</td>
<td>–</td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td>I_R</td>
<td>reverse current</td>
<td>V_R = 20 V; see Fig.5</td>
<td>–</td>
<td>25</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_R = 20 V; T_j = 150 °C; see Fig.5</td>
<td>–</td>
<td>50</td>
<td>µA</td>
</tr>
<tr>
<td>I_R</td>
<td>reverse current; 1N4448</td>
<td>V_R = 20 V; T_j = 100 °C; see Fig.5</td>
<td>–</td>
<td>3</td>
<td>µA</td>
</tr>
<tr>
<td>C_d</td>
<td>diode capacitance</td>
<td>f = 1 MHz; V_R = 0 V; see Fig.6</td>
<td>–</td>
<td>4</td>
<td>pF</td>
</tr>
<tr>
<td>t_{rr}</td>
<td>reverse recovery time</td>
<td>when switched from I_F = 10 mA to I_R = 60 mA; R_L = 100 Ω; measured at I_R = 1 mA; see Fig.7</td>
<td>–</td>
<td>4</td>
<td>ns</td>
</tr>
<tr>
<td>V_{ff}</td>
<td>forward recovery voltage</td>
<td>when switched from I_F = 50 mA; t_R = 20 ns; see Fig.8</td>
<td>–</td>
<td>2.5</td>
<td>V</td>
</tr>
</tbody>
</table>

THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_{th(j-tp)}</td>
<td>thermal resistance from junction to tie-point</td>
<td>lead length 10 mm</td>
<td>240</td>
<td>K/W</td>
</tr>
<tr>
<td>R_{th(j-a)}</td>
<td>thermal resistance from junction to ambient</td>
<td>lead length 10 mm; note 1</td>
<td>350</td>
<td>K/W</td>
</tr>
</tbody>
</table>

Note
1. Device mounted on a printed-circuit board without metallization pad.
High-speed diodes

GRAPHICAL DATA

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

Device mounted on an FR4 printed-circuit board; lead length 10 mm.

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

(1) $T_j = 175 \, ^\circ\text{C}$; typical values.
(2) $T_j = 25 \, ^\circ\text{C}$; typical values.
(3) $T_j = 25 \, ^\circ\text{C}$; maximum values.

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

Based on square wave currents.

$T_j = 25 \, ^\circ\text{C}$ prior to surge.
High-speed diodes

1N4148; 1N4448

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

(1) \( V_R = 75 \text{ V} \); typical values.
(2) \( V_R = 20 \text{ V} \); typical values.

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

\( f = 1 \text{ MHz}; T_j = 25 \text{ °C} \).
Fig. 7  Reverse recovery voltage test circuit and waveforms.

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

1N4148; 1N4448

PACKAGE OUTLINE

Hermetically sealed glass package; axial leaded; 2 leads  

SOD27

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>b max.</th>
<th>D max.</th>
<th>G1 max.</th>
<th>L min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>0.56</td>
<td>1.85</td>
<td>4.25</td>
<td>25.4</td>
</tr>
</tbody>
</table>

Note

1. The marking band indicates the cathode.

OUTLINE VERSION | REFERENCES | EUROPEAN PROJECTION | ISSUE DATE
--- | --- | --- | ---
SOD27 | IEC: A24 | JEDEC: DO-35 | JEITA: SC-40 | 05-12-22
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