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Kind regards,

Team Nexperia
1. Product profile

1.1 General description
Dual high-speed switching diode, encapsulated in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits
- High switching speed: $t_{rr} \leq 4 \text{ ns}$
- Repetitive peak reverse voltage: $V_{RRM} \leq 85 \text{ V}$
- Reverse voltage: $V_R \leq 80 \text{ V}$
- Low capacitance: $C_d \leq 2 \text{ pF}$
- Repetitive peak forward current: $I_{FRM} \leq 500 \text{ mA}$
- Very small SMD plastic package

1.3 Applications
- High-speed switching
- General-purpose switching

1.4 Quick reference data

Table 1. 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>$V_R = 80 \text{ V}$</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 80 \text{ V}$</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$V_R = 80 \text{ V}$</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>reverse recovery time</td>
<td>$V_R = 80 \text{ V}$</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>$\mu$A</td>
</tr>
</tbody>
</table>

[4] When switched from $I_F = 10 \text{ mA}$ to $I_R = 10 \text{ mA}; R_L = 100 \Omega$; measured at $I_R = 1 \text{ mA}$. 
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>common anode</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>Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>1PS300</td>
<td>SC-70</td>
<td>plastic surface-mounted package; 3 leads</td>
<td>SOT323</td>
<td></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>1PS300</td>
<td>A*3</td>
</tr>
</tbody>
</table>

[1] * = placeholder for manufacturing site code

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>-</td>
<td>85</td>
<td>V</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td></td>
<td>-</td>
<td>80</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_{FRM}$</td>
<td>repetitive peak forward current</td>
<td>$t_p \leq 0.5 \mu s$; $\delta \leq 0.25$</td>
<td>-</td>
<td>500</td>
<td>mA</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>square wave</td>
<td>$t_p = 1 \mu s$</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$t_p = 1 \mu s$</td>
<td>-</td>
<td>0.5</td>
</tr>
</tbody>
</table>
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>Per device</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R_{th(j-a)}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>-</td>
<td>-</td>
<td>415 K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>-</td>
<td>-</td>
<td>200 K/W</td>
<td></td>
</tr>
</tbody>
</table>


7. Characteristics

Table 7. Characteristics

$T_{amb} = 25$ °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>Per diode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 1 mA$</td>
<td>-</td>
<td>610</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 mA$</td>
<td>-</td>
<td>740</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 50 mA$</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 100 mA$</td>
<td>-</td>
<td>-</td>
<td>1.2</td>
<td>V</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 25 V$</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>nA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 80 V$</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 25 V; T_j = 150$ °C</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 80 V; T_j = 150$ °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</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>4</td>
<td>ns</td>
</tr>
<tr>
<td>$V_{F FR}$</td>
<td>forward recovery voltage</td>
<td></td>
<td>[2]</td>
<td>-</td>
<td>-</td>
<td>1.75 V</td>
</tr>
</tbody>
</table>

[1] When switched from $I_F = 10 mA$ to $I_R = 10 mA$; $R_L = 100 \Omega$; measured at $I_R = 1 mA$.

[2] When switched from $I_F = 10 mA$; $t_r = 20$ ns.
(1) $T_j = 150 \degree C$; typical values
(2) $T_j = 25 \degree C$; typical values
(3) $T_j = 25 \degree C$; maximum values

Fig 1. Forward current as a function of forward voltage

(1) $V_R = 80 V$; maximum values
(2) $V_R = 80 V$; typical values
(3) $V_R = 25 V$; typical values

Fig 2. Reverse current as a function of junction temperature

$\left(1\right) f = 1 \text{ MHz}; T_{\text{amb}} = 25 \degree C$

Fig 3. Diode capacitance as a function of reverse voltage; typical values

FR4 PCB, standard footprint
(1) single diode loaded
(2) double diode loaded

Fig 4. Forward current as a function of ambient temperature; derating curves
8. Test information

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.

---

(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 \( t_r = 0.35 \text{ ns} \)

Fig 5. Reverse recovery time test circuit and waveforms

Input signal: forward pulse rise time \( t_r = 20 \text{ ns} \); forward current pulse duration \( t_p \geq 100 \text{ ns} \); duty cycle \( \delta \leq 0.005 \)

Fig 6. Forward recovery voltage test circuit and waveforms
9. Package outline

Fig 7. Package outline SOT323 (SC-70)

10. Packing information

Table 8. Packing methods
The indicated -xxx are the last three digits of the 12NC ordering code.[1]

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SOT323</td>
<td>4 mm pitch, 8 mm tape and reel</td>
<td>-115 -135</td>
</tr>
</tbody>
</table>

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

Fig 8. Reflow soldering footprint SOT323 (SC-70)

Fig 9. Wave soldering footprint SOT323 (SC-70)
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>
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<tbody>
<tr>
<td>1PS300 v.5</td>
<td>20120305</td>
<td>Product data sheet</td>
<td>-</td>
<td>1PS300 v.4</td>
</tr>
</tbody>
</table>

Modifications:
- The format of this document 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": added
- Section 4 "Marking": updated
- Section 8 "Test information": added
- Figure 7: superseded by minimized package outline drawing
- Section 10 "Packing information": added
- Section 11 "Soldering": added
- Section 13 "Legal information": updated

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Release date</th>
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<th>Supersedes</th>
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<td>1PS300 v.4</td>
<td>19990526</td>
<td>Product data sheet</td>
<td>-</td>
<td>1PS300 v.3</td>
</tr>
<tr>
<td>1PS300 v.3</td>
<td>19961004</td>
<td>Product specification</td>
<td>-</td>
<td>1PS300 v.2</td>
</tr>
<tr>
<td>1PS300 v.2</td>
<td>19960903</td>
<td>Product specification</td>
<td>-</td>
<td>1PS300 v.1</td>
</tr>
<tr>
<td>1PS300 v.1</td>
<td>19960403</td>
<td>Product specification</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".

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1PS300

Dual high-speed switching diode

Product data sheet

Rev. 5 — 5 March 2012

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1PS300 Dual high-speed switching diode

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

14. Contact information

For more information, please visit: http://www.nxp.com

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

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