



# 1N4728A to 1N4749A

## Voltage regulator diodes

Rev. 02 — 30 October 2009

Product data sheet

## 1. Product profile

### 1.1 General description

Low voltage regulator diodes in hermetically sealed small SOD66 (DO-41) glass packages.

The series consists of 22 types with nominal working voltages from 3.3 to 24 V.

### 1.2 Features

- Total power dissipation:  
max.  $\leq 1000$  mW
- Working voltage range:  
nom. 3.3 V to 24 V
- Tolerance series:  $\pm 5$  %
- Small hermetically sealed glass package

### 1.3 Applications

- Low voltage stabilizers

### 1.4 Quick reference data

Table 1. Quick reference data

| Symbol    | Parameter               | Conditions     | Min | Typ | Max  | Unit |
|-----------|-------------------------|----------------|-----|-----|------|------|
| $V_F$     | forward voltage         | $I_F = 200$ mA | -   | -   | 1.2  | V    |
| $P_{tot}$ | total power dissipation |                | -   | -   | 1000 | mW   |

## 2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------|--------------------|----------------|
| 1   | cathode     |                    |                |
| 2   | anode       |                    |                |

006aaa152

[1] The marking band indicates the cathode.

### 3. Ordering information

**Table 3. Ordering information**

| Type number                       | Package |                                                          |         |
|-----------------------------------|---------|----------------------------------------------------------|---------|
|                                   | Name    | Description                                              | Version |
| 1N4728A to 1N4749A <sup>[1]</sup> | -       | hermetically sealed glass package; axial leaded; 2 leads | SOD66   |

[1] The series consists of 22 types with nominal working voltages from 3.3 V to 24 V.

### 4. Marking

**Table 4. Marking codes**

| Type number        | Marking code                 |
|--------------------|------------------------------|
| 1N4728A to 1N4749A | The diodes are type branded. |

### 5. Limiting values

**Table 5. Limiting values**

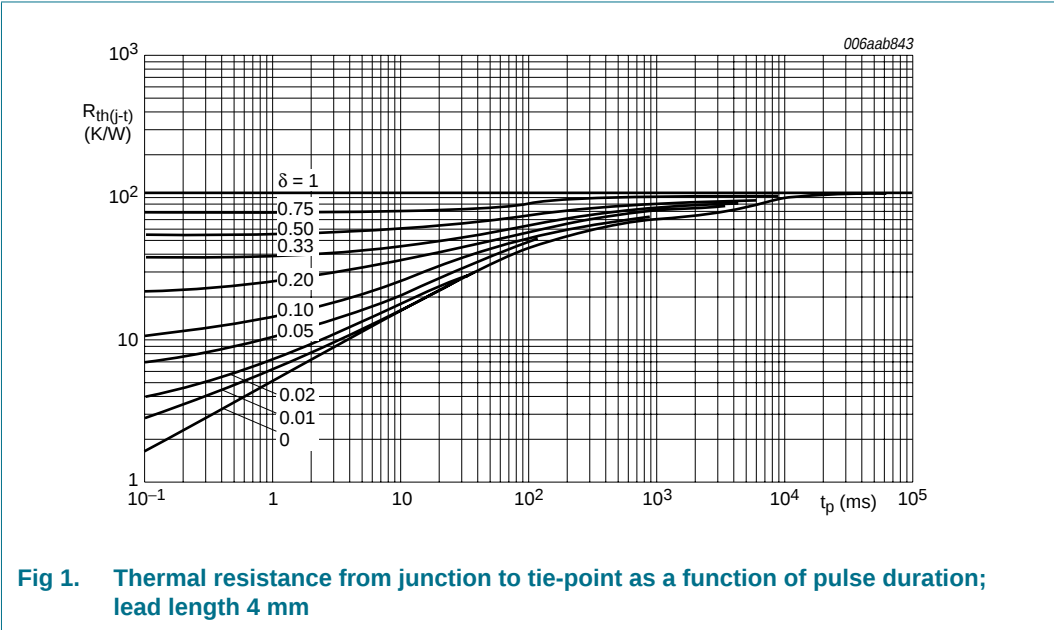
*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol    | Parameter                           | Conditions               | Min | Max                         | Unit |
|-----------|-------------------------------------|--------------------------|-----|-----------------------------|------|
| $I_F$     | forward current                     |                          | -   | 500                         | mA   |
| $I_Z$     | working current                     |                          | -   | see <a href="#">Table 8</a> |      |
| $I_{ZSM}$ | non-repetitive peak reverse current |                          | -   | see <a href="#">Table 8</a> |      |
| $P_{tot}$ | total power dissipation             | $T_{amb} = 50\text{ °C}$ | -   | 1000                        | mW   |
| $T_j$     | junction temperature                |                          | -65 | +200                        | °C   |
| $T_{stg}$ | storage temperature                 |                          | -65 | +200                        | °C   |

6. Thermal characteristics

Table 6. Thermal characteristics

| Symbol        | Parameter                                     | Conditions       | Min | Typ | Max | Unit |
|---------------|-----------------------------------------------|------------------|-----|-----|-----|------|
| $R_{th(j-t)}$ | thermal resistance from junction to tie-point | lead length 4 mm | -   | -   | 110 | K/W  |



7. Characteristics

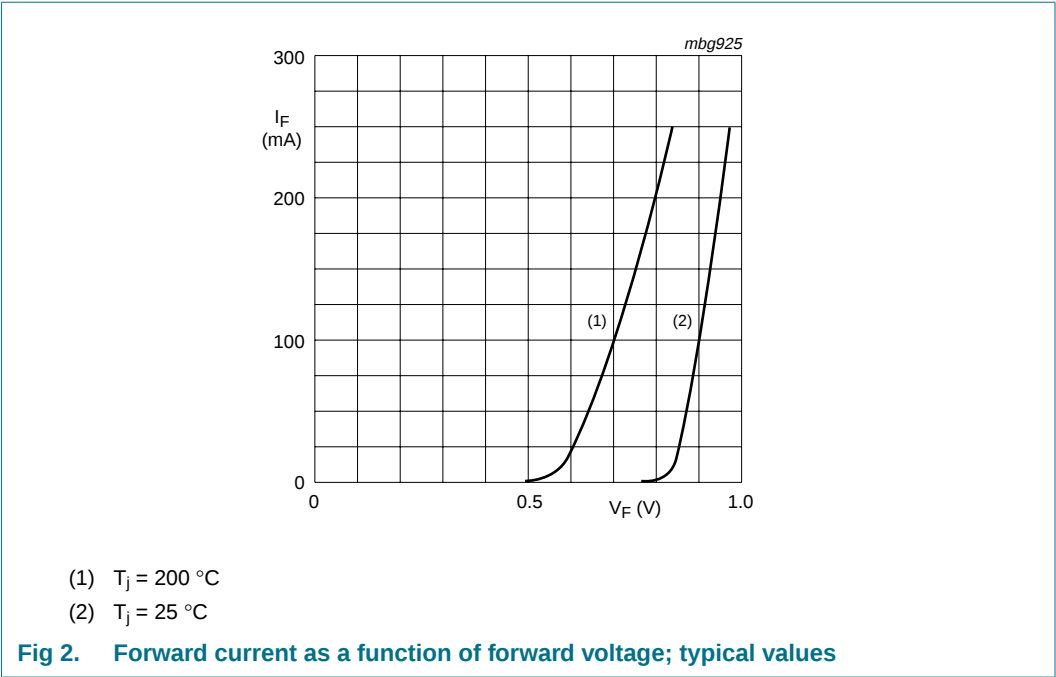
Table 7. Characteristics  
 $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| Symbol | Parameter       | Conditions            | Min | Typ | Max | Unit |
|--------|-----------------|-----------------------|-----|-----|-----|------|
| $V_F$  | forward voltage | $I_F = 200\text{ mA}$ | -   | -   | 1.2 | V    |

**Table 8. Characteristics per type***T<sub>j</sub> = 25 °C unless otherwise specified.*

| Type number | Working voltage<br>V <sub>Z</sub> (V) <sup>[1]</sup> | Test current<br>I <sub>test</sub> (mA) | Differential resistance<br>r <sub>diff</sub> (Ω) |                   |                     | Reverse current<br>I <sub>R</sub> (μA) |                    | Working current<br>I <sub>Z</sub> (mA) | Non-repetitive peak reverse current<br>I <sub>ZSM</sub> (mA) <sup>[2]</sup> |
|-------------|------------------------------------------------------|----------------------------------------|--------------------------------------------------|-------------------|---------------------|----------------------------------------|--------------------|----------------------------------------|-----------------------------------------------------------------------------|
|             | at I <sub>test</sub>                                 |                                        | at I <sub>test</sub>                             | at I <sub>Z</sub> | I <sub>Z</sub> (mA) |                                        |                    |                                        |                                                                             |
|             | Nom                                                  |                                        | Max                                              | Max               |                     | Max                                    | V <sub>R</sub> (V) | Max                                    | Max                                                                         |
| 1N4728A     | 3.3                                                  | 76                                     | 10                                               | 400               | 1                   | 100                                    | 1                  | 276                                    | 1380                                                                        |
| 1N4729A     | 3.6                                                  | 69                                     | 10                                               | 400               | 1                   | 100                                    | 1                  | 252                                    | 1260                                                                        |
| 1N4730A     | 3.9                                                  | 64                                     | 9                                                | 400               | 1                   | 50                                     | 1                  | 234                                    | 1190                                                                        |
| 1N4731A     | 4.3                                                  | 58                                     | 9                                                | 400               | 1                   | 10                                     | 1                  | 217                                    | 1070                                                                        |
| 1N4732A     | 4.7                                                  | 53                                     | 8                                                | 500               | 1                   | 10                                     | 1                  | 193                                    | 970                                                                         |
| 1N4733A     | 5.1                                                  | 49                                     | 7                                                | 550               | 1                   | 10                                     | 1                  | 178                                    | 890                                                                         |
| 1N4734A     | 5.6                                                  | 45                                     | 5                                                | 600               | 1                   | 10                                     | 2                  | 162                                    | 810                                                                         |
| 1N4735A     | 6.2                                                  | 41                                     | 2                                                | 700               | 1                   | 10                                     | 3                  | 146                                    | 730                                                                         |
| 1N4736A     | 6.8                                                  | 37                                     | 3.5                                              | 700               | 1                   | 10                                     | 4                  | 133                                    | 660                                                                         |
| 1N4737A     | 7.5                                                  | 34                                     | 4                                                | 700               | 0.5                 | 10                                     | 5                  | 121                                    | 605                                                                         |
| 1N4738A     | 8.2                                                  | 31                                     | 4.5                                              | 700               | 0.5                 | 10                                     | 6                  | 110                                    | 550                                                                         |
| 1N4739A     | 9.1                                                  | 28                                     | 5                                                | 700               | 0.5                 | 10                                     | 7                  | 100                                    | 500                                                                         |
| 1N4740A     | 10                                                   | 25                                     | 7                                                | 700               | 0.25                | 10                                     | 7.6                | 91                                     | 454                                                                         |
| 1N4741A     | 11                                                   | 23                                     | 8                                                | 700               | 0.25                | 5                                      | 8.4                | 83                                     | 414                                                                         |
| 1N4742A     | 12                                                   | 21                                     | 9                                                | 700               | 0.25                | 5                                      | 9.1                | 76                                     | 380                                                                         |
| 1N4743A     | 13                                                   | 19                                     | 10                                               | 700               | 0.25                | 5                                      | 9.9                | 69                                     | 344                                                                         |
| 1N4744A     | 15                                                   | 17                                     | 14                                               | 700               | 0.25                | 5                                      | 11.4               | 61                                     | 304                                                                         |
| 1N4745A     | 16                                                   | 15.5                                   | 16                                               | 700               | 0.25                | 5                                      | 12.2               | 57                                     | 285                                                                         |
| 1N4746A     | 18                                                   | 14                                     | 20                                               | 750               | 0.25                | 5                                      | 13.7               | 50                                     | 250                                                                         |
| 1N4747A     | 20                                                   | 12.5                                   | 22                                               | 750               | 0.25                | 5                                      | 15.2               | 45                                     | 225                                                                         |
| 1N4748A     | 22                                                   | 11.5                                   | 23                                               | 750               | 0.25                | 5                                      | 16.7               | 41                                     | 205                                                                         |
| 1N4749A     | 24                                                   | 10.5                                   | 25                                               | 750               | 0.25                | 5                                      | 18.2               | 38                                     | 190                                                                         |

[1] V<sub>Z</sub> is measured with device at thermal equilibrium while held in clips at 10 mm from body in still air at 25 °C.[2] Half square wave or equivalent sine wave pulse 1/120 second duration superimposed on I<sub>test</sub>.



8. Package outline

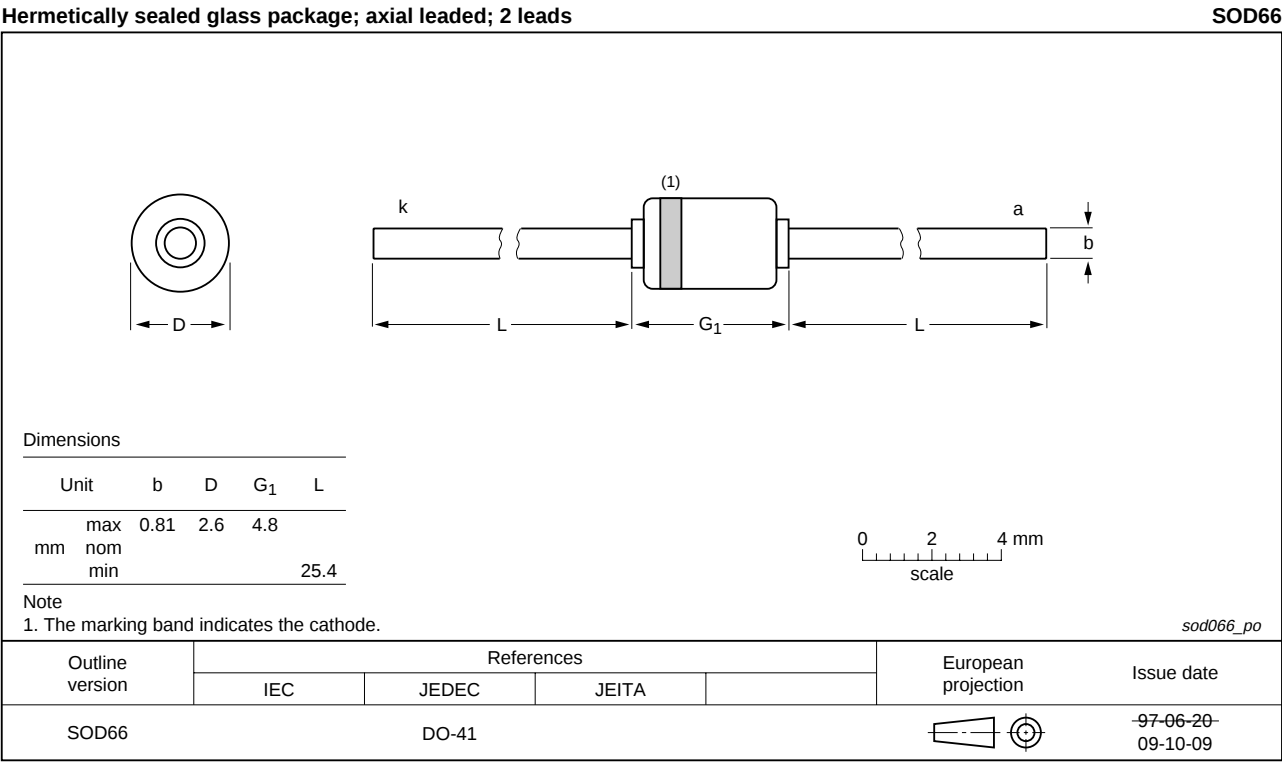


Fig 3. Package outline SOD66 (DO-41)

## 9. Packing information

**Table 9. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code.[\[1\]](#)

| Type number                               | Package | Description                | Packing quantity |
|-------------------------------------------|---------|----------------------------|------------------|
|                                           |         |                            | 10000            |
| 1N4728A to<br>1N4749A <a href="#">[2]</a> | SOD66   | 52 mm tape ammopack, axial | -133             |
|                                           |         | 52 mm reel pack, axial     | -113             |

[1] For further information and the availability of packing methods, see [Section 11](#).

[2] The series consists of 22 types with nominal working voltages from 3.3 V to 24 V.

## 10. Revision history

**Table 10. Revision history**

| Document ID    | Release date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Data sheet status  | Change notice | Supersedes |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|------------|
| 1N4728A_SER_2  | 20091030                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet | -             | 1N4728A_1  |
| Modifications: | <ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• <a href="#">Table 5 "Limiting values"</a>: <math>I_{ZM}</math> redefined to <math>I_Z</math> working current</li><li>• <a href="#">Table 6</a>: <math>R_{th(j-tp)}</math> redefined to <math>R_{th(j-t)}</math> thermal resistance from junction to tie-point</li><li>• <a href="#">Figure 1</a>: <math>R_{th(j-tp)}</math> redefined to <math>R_{th(j-t)}</math> thermal resistance from junction to tie-point</li><li>• <a href="#">Table 8 "Characteristics per type"</a>: <math>I_{Ztest}</math> redefined to <math>I_{test}</math> test current</li><li>• <a href="#">Figure 3 "Package outline SOD66 (DO-41)"</a>: updated</li></ul> |                    |               |            |
| 1N4728A_1      | 19960426                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Product data sheet | -             | -          |

## 11. Legal information

### 11.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | Definition                                                                            |
|-----------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet      | Development                   | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet    | Qualification                 | This document contains data from the preliminary specification.                       |
| Product [short] data sheet        | Production                    | This document contains the product specification.                                     |

[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>.

### 11.2 Definitions

**Draft** — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

**Short data sheet** — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

### 11.3 Disclaimers

**General** — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

**Right to make changes** — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

**Suitability for use** — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental

damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

**Limiting values** — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

**Terms and conditions of sale** — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

**No offer to sell or license** — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

**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 national 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.

### 11.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

## 12. Contact information

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

For sales office addresses, please send an email to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

## 13. Contents

|           |                                          |           |
|-----------|------------------------------------------|-----------|
| <b>1</b>  | <b>Product profile</b> . . . . .         | <b>1</b>  |
| 1.1       | General description. . . . .             | 1         |
| 1.2       | Features . . . . .                       | 1         |
| 1.3       | Applications . . . . .                   | 1         |
| 1.4       | Quick reference data. . . . .            | 1         |
| <b>2</b>  | <b>Pinning information</b> . . . . .     | <b>1</b>  |
| <b>3</b>  | <b>Ordering information</b> . . . . .    | <b>2</b>  |
| <b>4</b>  | <b>Marking</b> . . . . .                 | <b>2</b>  |
| <b>5</b>  | <b>Limiting values</b> . . . . .         | <b>2</b>  |
| <b>6</b>  | <b>Thermal characteristics</b> . . . . . | <b>3</b>  |
| <b>7</b>  | <b>Characteristics</b> . . . . .         | <b>3</b>  |
| <b>8</b>  | <b>Package outline</b> . . . . .         | <b>6</b>  |
| <b>9</b>  | <b>Packing information</b> . . . . .     | <b>7</b>  |
| <b>10</b> | <b>Revision history</b> . . . . .        | <b>8</b>  |
| <b>11</b> | <b>Legal information</b> . . . . .       | <b>9</b>  |
| 11.1      | Data sheet status . . . . .              | 9         |
| 11.2      | Definitions . . . . .                    | 9         |
| 11.3      | Disclaimers . . . . .                    | 9         |
| 11.4      | Trademarks . . . . .                     | 9         |
| <b>12</b> | <b>Contact information</b> . . . . .     | <b>9</b>  |
| <b>13</b> | <b>Contents</b> . . . . .                | <b>10</b> |

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

© NXP B.V. 2009.

All rights reserved.

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

For sales office addresses, please send an email to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

Date of release: 30 October 2009

Document identifier: 1N4728A\_SER\_2

founded by

**PHILIPS**