



# BAP51LX

Silicon PIN diode

Rev. 2 — 6 August 2013

Product data sheet

## 1. Product profile

### 1.1 General description

Planar PIN diode in a SOD882D leadless ultra small plastic SMD package.

### 1.2 Features and benefits

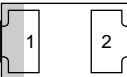

- High speed switching for RF signals
- Low diode capacitance
- Low forward resistance
- Very low series inductance
- For applications up to 3 GHz

### 1.3 Applications

- RF attenuators and switches

## 2. Pinning information

Table 1. Discrete pinning

| Pin | Description            | Simplified outline  | Symbol  |
|-----|------------------------|---|---|
| 1   | cathode <sup>[1]</sup> |  |  |
| 2   | anode                  |   |   |

Transparent top view

sym006

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 2. Ordering information

| Type number | Package    |  |         |
|-------------|------------|--|---------|
|             | Name       | Description  | Version |
| BAP51LX     | DFN1006D-2 | leadless ultra small plastic package; 2 terminals; body 1 × 0.6 × 0.4 mm | SOD882D |



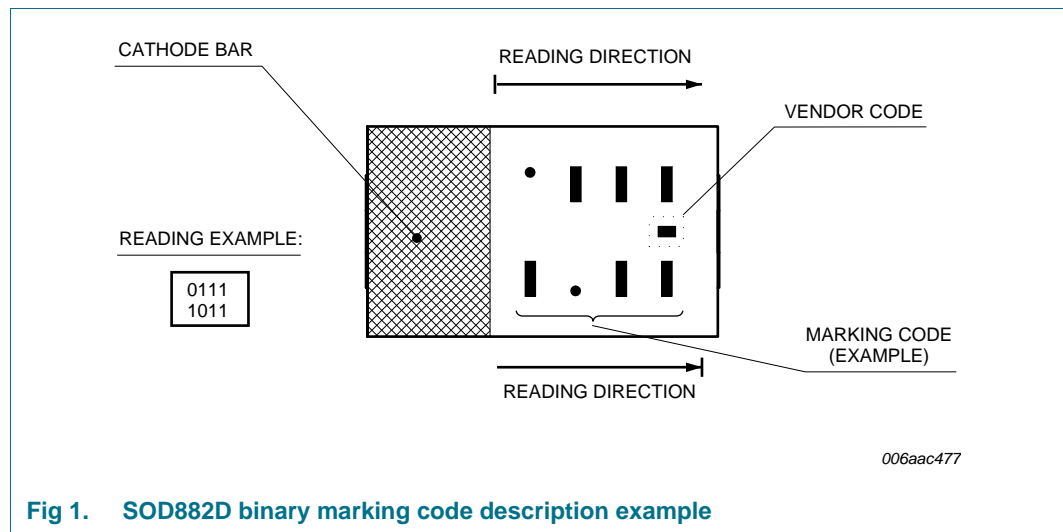
## 4. Marking

**Table 3. Marking codes**

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| BAP51LX     | 1001<br>0100                |

[1] For SOD882D binary marking code description, see [Figure 1](#).

### 4.1 Binary marking code description



## 5. Limiting values

**Table 4. Limiting values**

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

| Symbol    | Parameter               | Conditions              | Min | Max  | Unit |
|-----------|-------------------------|-------------------------|-----|------|------|
| $V_R$     | reverse voltage         |                         | -   | 60   | V    |
| $I_F$     | forward current         |                         | -   | 100  | mA   |
| $P_{tot}$ | total power dissipation | $T_{sp} = 90\text{ °C}$ | -   | 140  | mW   |
| $T_{stg}$ | storage temperature     |                         | -65 | +150 | °C   |
| $T_j$     | junction temperature    |                         | -65 | +150 | °C   |

## 6. Thermal characteristics

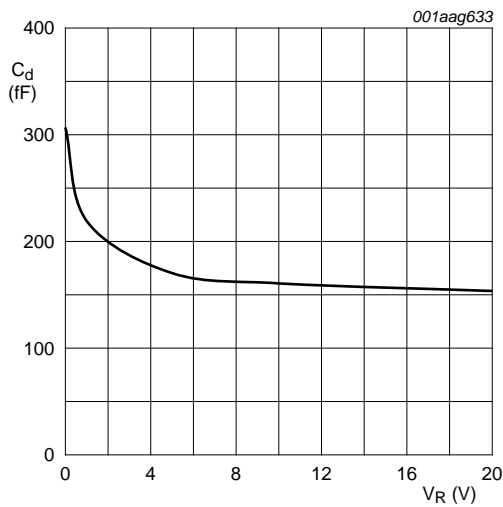
**Table 5. Thermal characteristics**

| Symbol         | Parameter  | Conditions | Typ | Unit |
|----------------|--|------------|-----|------|
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |            | 66  | K/W  |

## 7. Characteristics

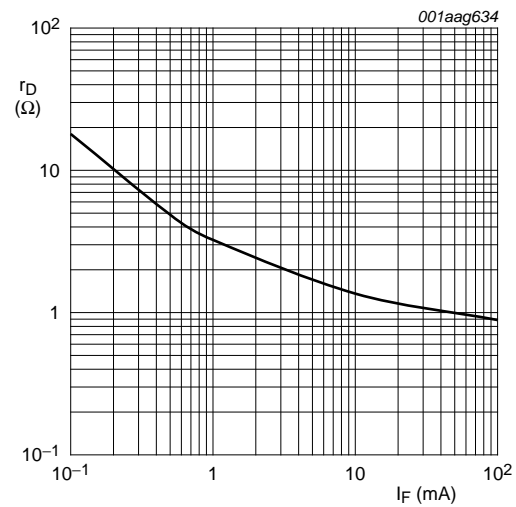
**Table 6. Characteristics**
 $T_{amb} = 25\text{ °C}$  unless otherwise specified.

| Symbol    | Parameter                | Conditions   | Min | Typ  | Max  | Unit          |
|-----------|--------------------------|--|-----|------|------|---------------|
| $V_F$     | forward voltage          | $I_F = 50\text{ mA}$   | -   | 0.95 | 1.1  | V             |
| $I_R$     | reverse current          | $V_R = 50\text{ V}$  | -   | -    | 100  | nA            |
| $C_d$     | diode capacitance        | see <a href="#">Figure 2</a> ; $f = 1\text{ MHz}$ ;  |     |      |      |               |
|           |                          | $V_R = 0\text{ V}$   | -   | 0.30 | -    | pF            |
|           |                          | $V_R = 1\text{ V}$   | -   | 0.22 | 0.40 | pF            |
|           |                          | $V_R = 5\text{ V}$   | -   | 0.17 | 0.30 | pF            |
| $r_D$     | diode forward resistance | see <a href="#">Figure 3</a> ; $f = 100\text{ MHz}$ ;  |     |      |      |               |
|           |                          | $I_F = 0.5\text{ mA}$  | -   | 4.9  | 9    | $\Omega$      |
|           |                          | $I_F = 1\text{ mA}$  | -   | 3.2  | 6.5  | $\Omega$      |
|           |                          | $I_F = 10\text{ mA}$   | -   | 1.4  | 2.5  | $\Omega$      |
|           |                          | $I_F = 100\text{ mA}$  | -   | 0.9  | 1.5  | $\Omega$      |
| ISL       | isolation                | see <a href="#">Figure 4</a> ; $V_R = 0\text{ V}$ ;  |     |      |      |               |
|           |                          | $f = 900\text{ MHz}$   | -   | 19   | -    | dB            |
|           |                          | $f = 1800\text{ MHz}$  | -   | 15   | -    | dB            |
|           |                          | $f = 2450\text{ MHz}$  | -   | 13   | -    | dB            |
| $L_{ins}$ | insertion loss           | see <a href="#">Figure 5</a> ; $I_F = 0.5\text{ mA}$ ;   |     |      |      |               |
|           |                          | $f = 900\text{ MHz}$   | -   | 0.36 | -    | dB            |
|           |                          | $f = 1800\text{ MHz}$  | -   | 0.36 | -    | dB            |
|           |                          | $f = 2450\text{ MHz}$  | -   | 0.38 | -    | dB            |
| $L_{ins}$ | insertion loss           | see <a href="#">Figure 5</a> ; $I_F = 1\text{ mA}$ ;   |     |      |      |               |
|           |                          | $f = 900\text{ MHz}$   | -   | 0.25 | -    | dB            |
|           |                          | $f = 1800\text{ MHz}$  | -   | 0.26 | -    | dB            |
|           |                          | $f = 2450\text{ MHz}$  | -   | 0.27 | -    | dB            |
| $L_{ins}$ | insertion loss           | see <a href="#">Figure 5</a> ; $I_F = 10\text{ mA}$ ;  |     |      |      |               |
|           |                          | $f = 900\text{ MHz}$   | -   | 0.12 | -    | dB            |
|           |                          | $f = 1800\text{ MHz}$  | -   | 0.14 | -    | dB            |
|           |                          | $f = 2450\text{ MHz}$  | -   | 0.15 | -    | dB            |
| $L_{ins}$ | insertion loss           | see <a href="#">Figure 5</a> ; $I_F = 100\text{ mA}$ ;   |     |      |      |               |
|           |                          | $f = 900\text{ MHz}$   | -   | 0.09 | -    | dB            |
|           |                          | $f = 1800\text{ MHz}$  | -   | 0.10 | -    | dB            |
|           |                          | $f = 2450\text{ MHz}$  | -   | 0.12 | -    | dB            |
| $\tau_L$  | charge carrier life time | when switched from $I_F = 10\text{ mA}$ to $I_R = 6\text{ mA}$ ; $R_L = 100\ \Omega$ ; measured at $I_R = 3\text{ mA}$ | -   | 0.55 | -    | $\mu\text{s}$ |
| $L_S$     | series inductance        | $I_F = 100\text{ mA}$ ; $f = 100\text{ MHz}$   | -   | 0.4  | -    | nH            |



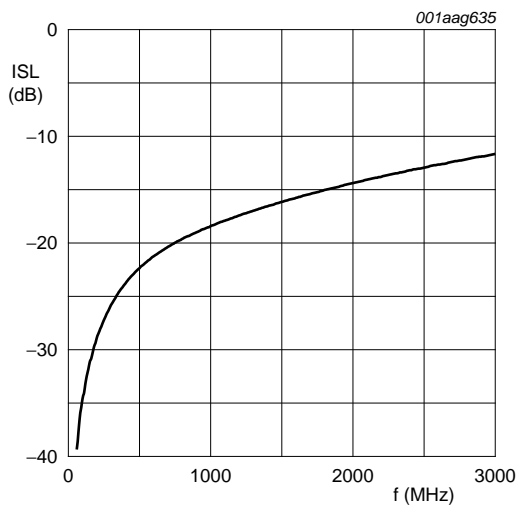
$f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

**Fig 2. Diode capacitance as a function of reverse voltage; typical values**



$f = 100 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

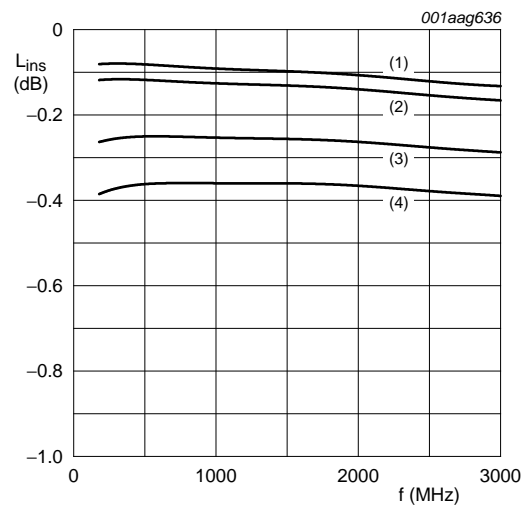
**Fig 3. Forward resistance as a function of forward current; typical values**



$T_{amb} = 25 \text{ }^\circ\text{C}$

Diode zero biased and inserted in series with a  $50 \text{ } \Omega$  stripline circuit

**Fig 4. Isolation of the diode as a function of frequency; typical values**



$T_{amb} = 25 \text{ }^\circ\text{C}$

- (1)  $I_F = 100 \text{ mA}$
- (2)  $I_F = 10 \text{ mA}$
- (3)  $I_F = 1 \text{ mA}$
- (4)  $I_F = 0.5 \text{ mA}$

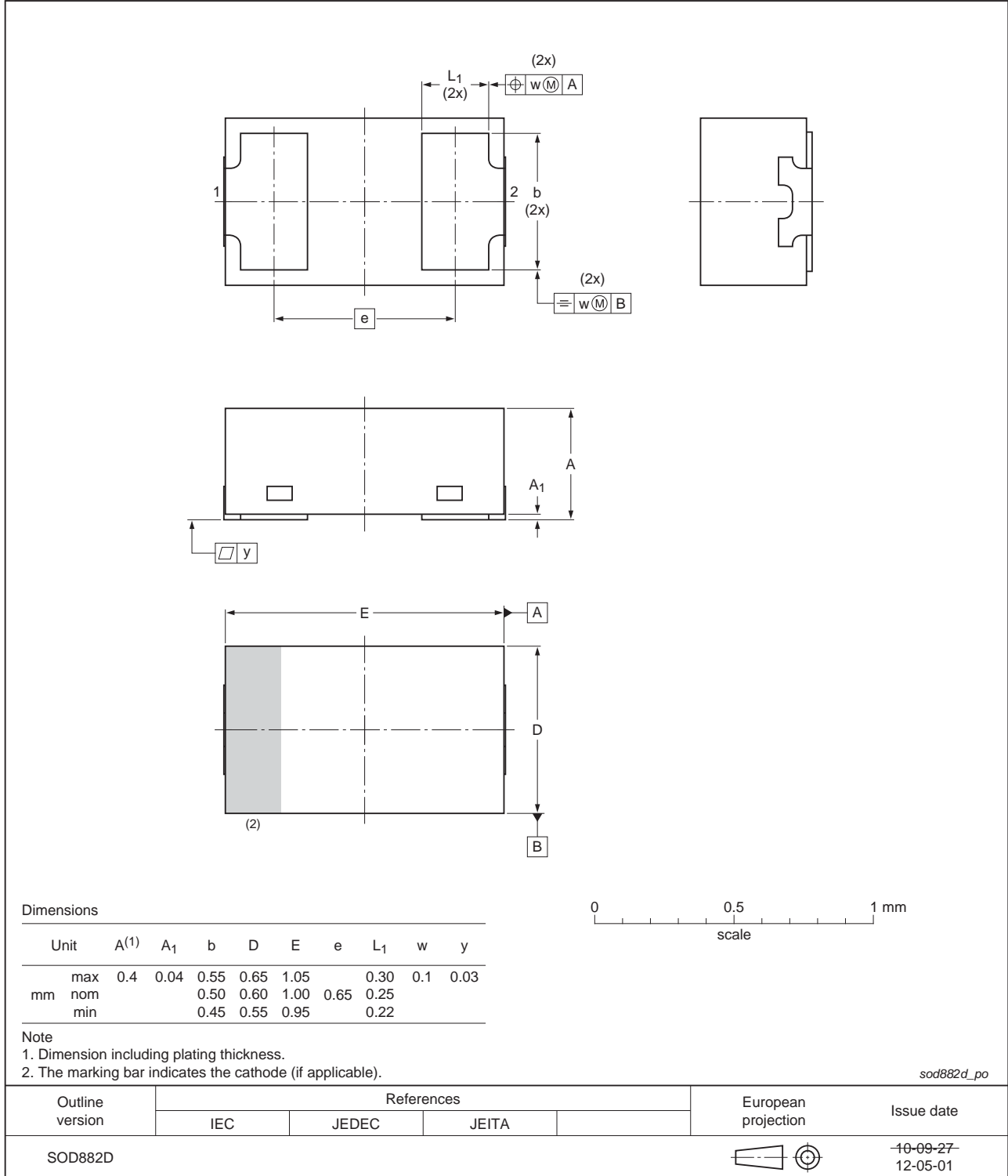
Diode inserted in series with a  $50 \text{ } \Omega$  stripline circuit and biased via the analyzer Tee network

**Fig 5. Insertion loss of the diode as a function of frequency; typical values**

**8. Package outline**

DFN1006D-2: Leadless ultra small plastic package; 2 terminals; body 1 x 0.6 x 0.4 mm

SOD882D



**Fig 6. Package outline SOD882D (DFN1006D-2)**

## 9. Abbreviations

Table 7. Abbreviations

| Acronym | Description               |
|---------|---------------------------|
| PIN     | P-type, Intrinsic, N-type |
| SMD     | Surface Mounted Device    |
| RF      | Radio Frequency           |

## 10. Revision history

Table 8. Revision history

| Document ID    | Release date   | Data sheet status  | Change notice | Supersedes  |
|----------------|--|--------------------|---------------|-------------|
| BAP51LX v.2    | 20130806   | Product data sheet | -             | BAP51LX v.1 |
| Modifications: | <ul style="list-style-type: none"> <li>• <a href="#">Section 1.1 on page 1</a>: Changed package to SOD882D</li> <li>• <a href="#">Table 1 on page 1</a>: Changed simplified outline to SOD882D</li> <li>• <a href="#">Table 2 on page 1</a>: Changed package to SOD882D</li> <li>• <a href="#">Section 4 on page 2</a>: Update 'Marking' section</li> <li>• <a href="#">Section 8 on page 5</a>: Changed package to SOD882D</li> </ul> |                    |               |             |
| BAP51LX v.1    | 20070626   | Product data sheet | -             | -           |

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### 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.                                     |

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## 13. Contents

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|           |   |          |
|-----------|---|----------|
| <b>1</b>  | <b>Product profile</b> . . . . .          | <b>1</b> |
| 1.1       | General description . . . . .             | 1        |
| 1.2       | Features and benefits . . . . .           | 1        |
| 1.3       | Applications . . . . .                    | 1        |
| <b>2</b>  | <b>Pinning information</b> . . . . .      | <b>1</b> |
| <b>3</b>  | <b>Ordering information</b> . . . . .     | <b>1</b> |
| <b>4</b>  | <b>Marking</b> . . . . .                  | <b>2</b> |
| 4.1       | Binary marking code description . . . . . | 2        |
| <b>5</b>  | <b>Limiting values</b> . . . . .          | <b>2</b> |
| <b>6</b>  | <b>Thermal characteristics</b> . . . . .  | <b>2</b> |
| <b>7</b>  | <b>Characteristics</b> . . . . .          | <b>3</b> |
| <b>8</b>  | <b>Package outline</b> . . . . .          | <b>5</b> |
| <b>9</b>  | <b>Abbreviations</b> . . . . .            | <b>6</b> |
| <b>10</b> | <b>Revision history</b> . . . . .         | <b>6</b> |
| <b>11</b> | <b>Legal information</b> . . . . .        | <b>7</b> |
| 11.1      | Data sheet status . . . . .               | 7        |
| 11.2      | Definitions . . . . .                     | 7        |
| 11.3      | Disclaimers . . . . .                     | 7        |
| 11.4      | Trademarks . . . . .                      | 8        |
| <b>12</b> | <b>Contact information</b> . . . . .      | <b>8</b> |
| <b>13</b> | <b>Contents</b> . . . . .                 | <b>9</b> |

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