

BB178LX

VHF variable capacitance diode

Rev. 02 — 12 February 2009

Product data sheet

1. Product profile

1.1 General description

The BB178LX is a planar technology variable capacitance diode in a SOD882T ultra small leadless plastic SMD package. The excellent matching performance is achieved by gliding matching and a Direct Matching Assembly (DMA) procedure.

1.2 Features


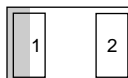

- Excellent linearity
- Excellent matching to 2 % DMA
- Ultra small leadless SMD package
- $C_{d(28V)}$: 2.6 pF; $C_{d(1V)}$ to $C_{d(28V)}$ ratio typical 15
- Low series resistance

1.3 Applications

- Voltage Controlled Oscillators (VCO)
- Electronic tuning in VHF television tuners, Band B up to 460 MHz

2. Pinning information

Table 1. Pinning

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

Transparent top view

[1] The marking bar indicates the cathode.

3. Ordering information

Table 2. Ordering information

| Type number | Package | | |
|-------------|---------|--------------------------------------------------------------------------|---------|
| | Name | Description | Version |
| BB178LX | - | leadless ultra small plastic package; 2 terminals; body 1 × 0.6 × 0.4 mm | SOD882T |

4. Marking

Table 3. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BB178LX | L3 |

5. Limiting values

Table 4. Limiting values

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

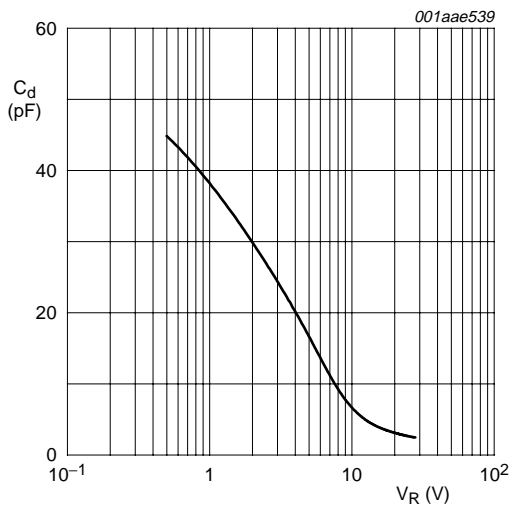
| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|----------------------|------------|-----|------|------|
| V_R | reverse voltage | | - | 32 | V |
| I_F | forward current | | - | 20 | mA |
| T_{stg} | storage temperature | | -55 | +150 | °C |
| T_j | junction temperature | | -55 | +125 | °C |

6. Characteristics

Table 5. Characteristics

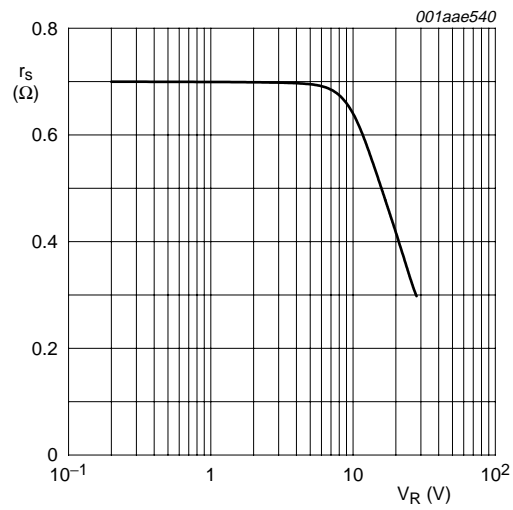
$T_j = 25\text{ °C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------------------|----------------------------------------|-----------------------------------------------------------------------------------|-------|------|-------|----------|
| I_R | reverse current | see Figure 3 | | | | |
| | | $V_R = 30\text{ V}$ | - | - | 10 | nA |
| | | $V_R = 30\text{ V}; T_j = 85\text{ °C}$ | - | - | 200 | nA |
| r_s | diode series resistance | $f = 100\text{ MHz}$ at $C_d = 30\text{ pF}$; see Figure 2 | - | 0.7 | - | Ω |
| C_d | diode capacitance | $f = 1\text{ MHz}$; see Figure 1 and Figure 4 | | | | |
| | | $V_R = 1\text{ V}$ | 34.65 | - | 42.35 | pF |
| | | $V_R = 28\text{ V}$ | 2.36 | 2.6 | 2.75 | pF |
| $C_{d(1V)}/C_{d(2V)}$ | diode capacitance ratio (1 V to 2 V) | $f = 1\text{ MHz}$ | - | 1.3 | - | |
| $C_{d(1V)}/C_{d(28V)}$ | diode capacitance ratio (1 V to 28 V) | $f = 1\text{ MHz}$ | 13.5 | 15 | - | |
| $C_{d(25V)}/C_{d(28V)}$ | diode capacitance ratio (25 V to 28 V) | $f = 1\text{ MHz}$ | - | 1.08 | - | |
| $\Delta C_d/C_d$ | diode capacitance matching | $V_R = 1\text{ V to }28\text{ V}$; in sequence of 5 diodes (gliding) | - | - | 2 | % |



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

Fig 1. Diode capacitance as a function of reverse voltage; typical values



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

Fig 2. Diode series resistance as a function of reverse voltage; typical values

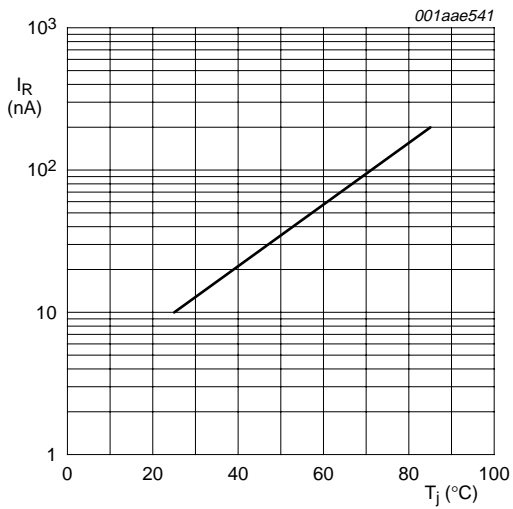
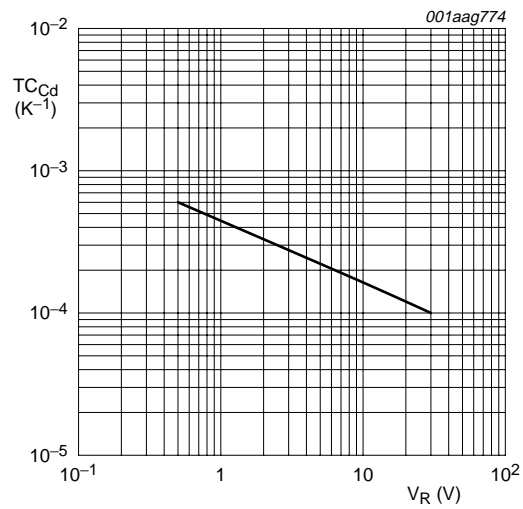


Fig 3. Reverse current as a function of junction temperature; maximum values



$T_j = 0 \text{ }^\circ\text{C} \text{ to } 85 \text{ }^\circ\text{C}.$

Fig 4. Temperature coefficient of diode capacitance as a function of reverse voltage; typical values

7. Package outline

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

SOD882T

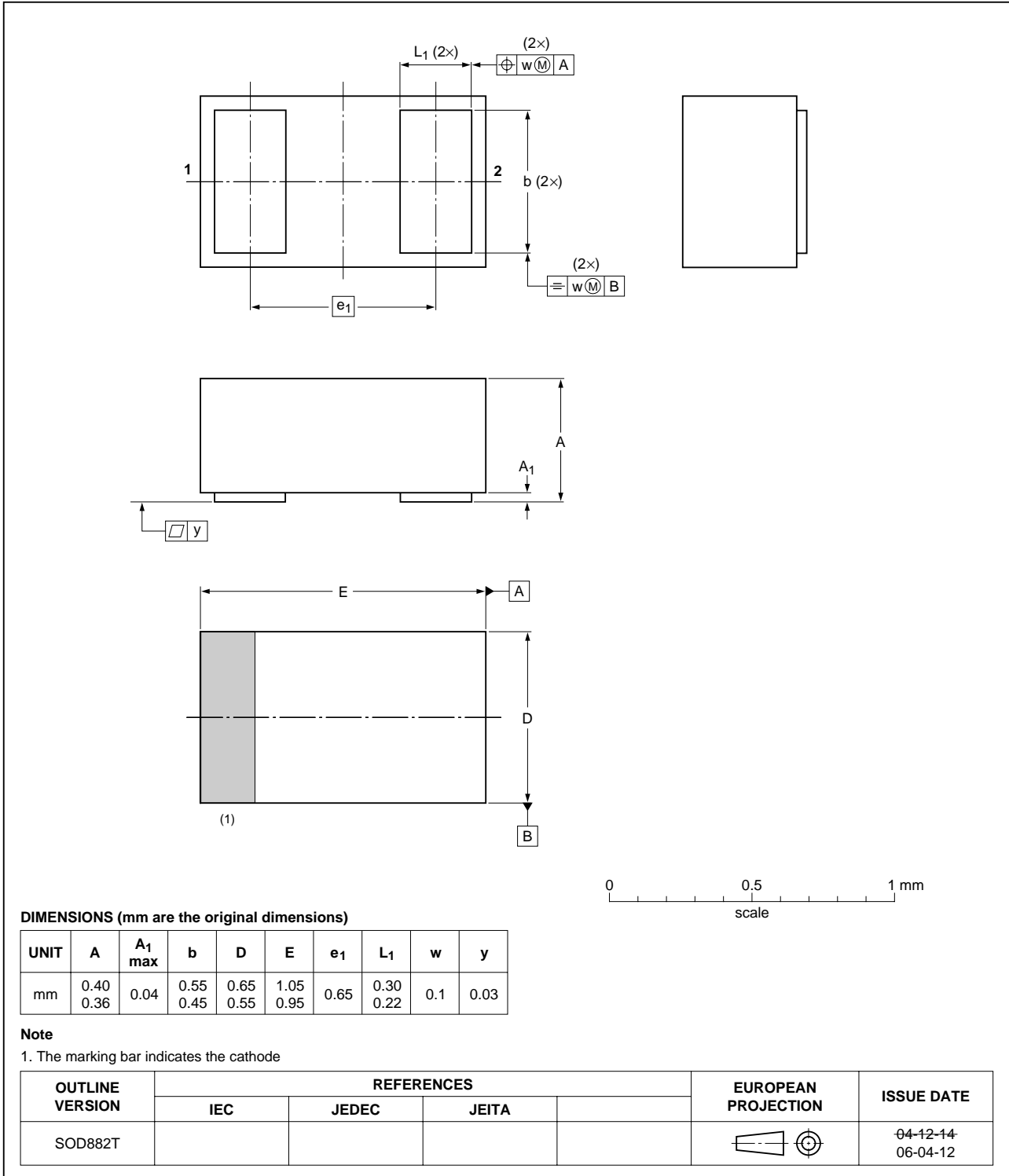


Fig 5. Package outline SOD882T

8. Abbreviations

Table 6. Abbreviations

| Acronym | Description |
|---------|------------------------|
| SMD | Surface Mounted Device |
| VHF | Very High Frequency |

9. Revision history

Table 7. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|
| BB178LX_2 | 20090212 | Product data sheet | - | BB178LX_1 |
| Modifications: | | <ul style="list-style-type: none">• The format of this data sheet 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.• Descriptive title: 'UHF diode' changed to 'VHF diode'• Table 5 "Characteristics": r_s Condition 'f = 470 MHz' changed to 'f = 100 MHz' | | |
| BB178LX_1 | 20060414 | Preliminary data sheet | - | - |

10. Legal information

10.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | 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>.

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