

# 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


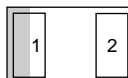

- Excellent linearity
- Excellent matching to 2 % DMA
- Ultra small leadless SMD package
- $C_{d(28V)}$ : 2.6 pF;  $C_{d(1V)}$  to  $C_{d(28V)}$  ratio typical 15
- Low series resistance

### 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	<a href="#">[1]</a>	
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).*

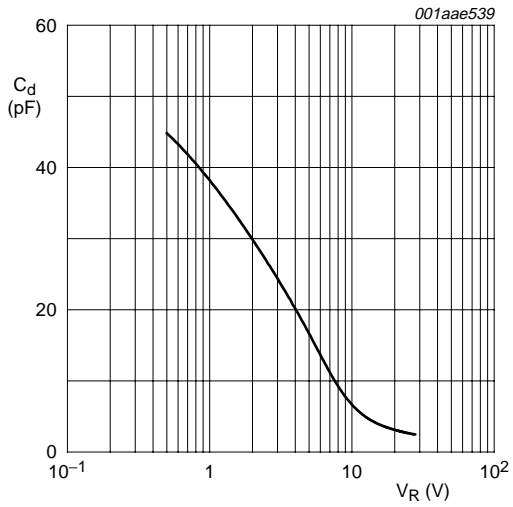
Symbol	Parameter	Conditions	Min	Max	Unit
$V_R$	reverse voltage		-	32	V
$I_F$	forward current		-	20	mA
$T_{stg}$	storage temperature		-55	+150	°C
$T_j$	junction temperature		-55	+125	°C

## 6. Characteristics

**Table 5. Characteristics**

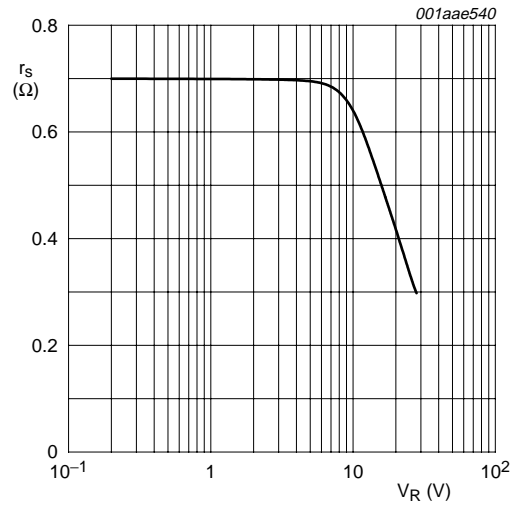
$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_R$	reverse current	see <a href="#">Figure 3</a>				
		$V_R = 30\text{ V}$	-	-	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 <a href="#">Figure 2</a>	-	0.7	-	$\Omega$
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; see <a href="#">Figure 1</a> and <a href="#">Figure 4</a>				
		$V_R = 1\text{ V}$	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	%



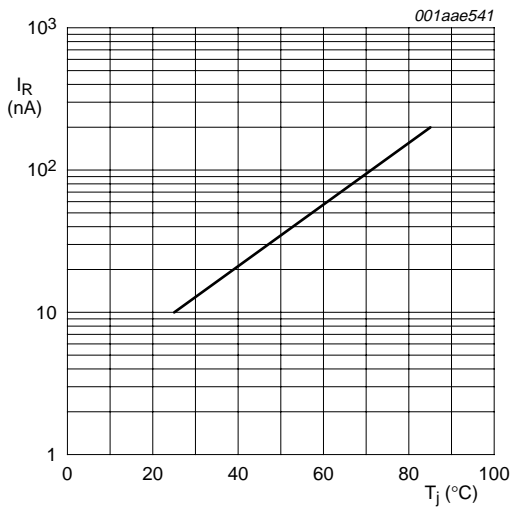
$f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

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

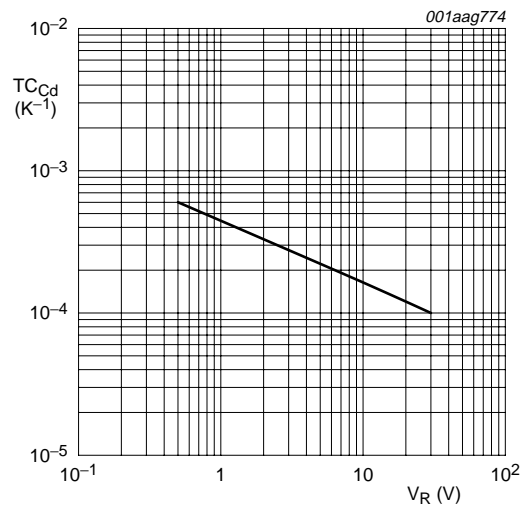


$f = 100 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

**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**



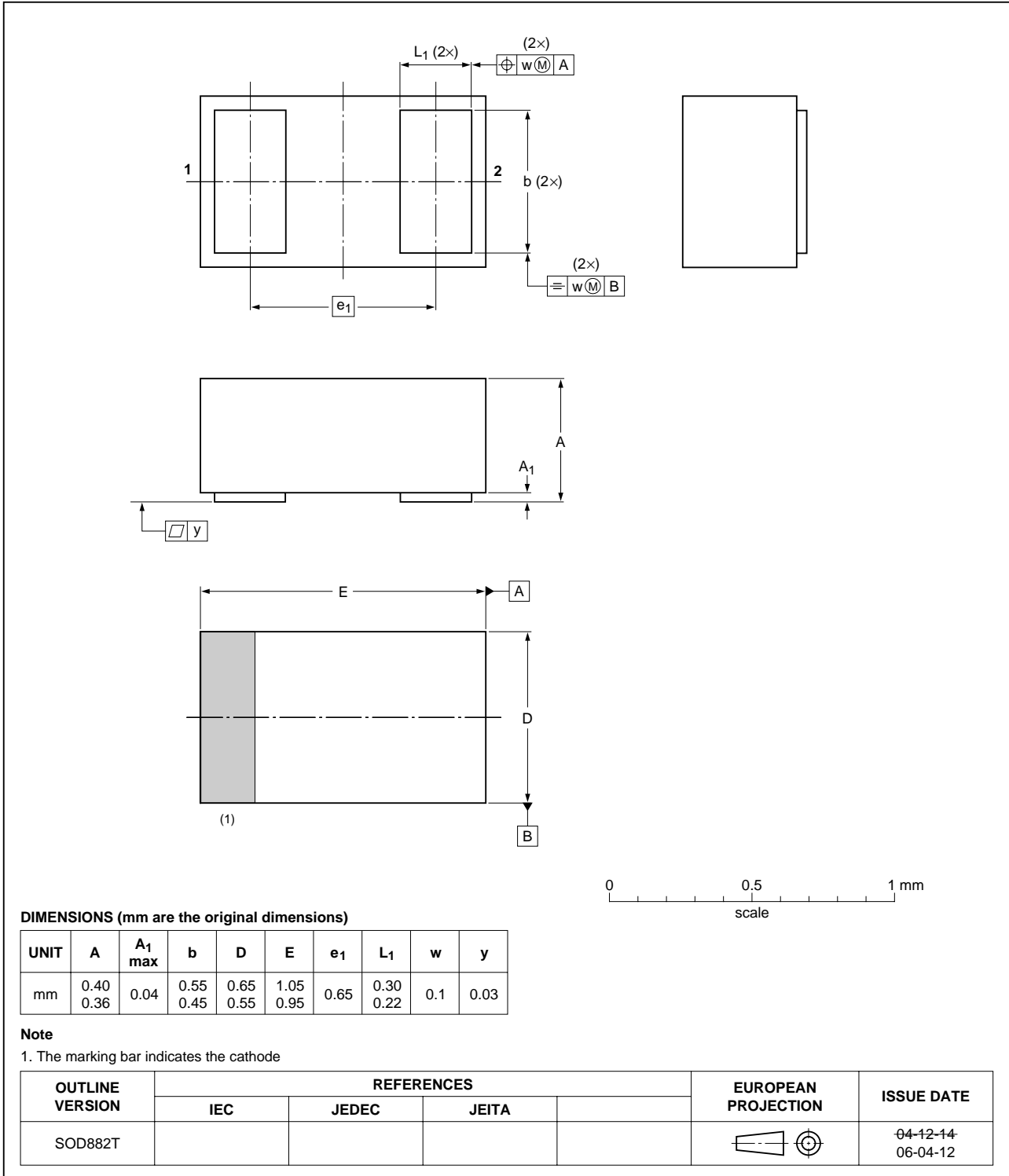
$T_j = 0 \text{ }^\circ\text{C} \text{ to } 85 \text{ }^\circ\text{C}.$

**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"><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>• Descriptive title: 'UHF diode' changed to 'VHF diode'</li><li>• <a href="#">Table 5 "Characteristics"</a>: <math>r_s</math> Condition 'f = 470 MHz' changed to 'f = 100 MHz'</li></ul>		
BB178LX_1	20060414	Preliminary data sheet	-	-

## 10. Legal information

### 10.1 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>.

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