

# BB153

## VHF variable capacitance diode

Rev. 03 — 5 October 2004

Product data sheet

## 1. Product profile

### 1.1 General description

The BB153 is a variable capacitance diode, fabricated in planar technology and encapsulated in the SOD323 (SC-76) very small SMD plastic 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
- Very small SMD plastic package
- $C_{d(28V)}$ : 2.6 pF;  $C_{d(1V)}$  to  $C_{d(28V)}$  ratio: 15
- Very low series resistance.

### 1.3 Applications

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

## 2. Pinning information

Table 1: Pinning

Pin	Description	Simplified outline <a href="#">[1]</a>	Symbol
1	cathode		
2	anode		

*sym008*

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BB153	SC-76	plastic surface mounted package; 2 leads	SOD323

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## 4. Marking

Table 3: Marking

Type number	Marking code
BB153	PC

## 5. Limiting values

Table 4: Limiting values

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

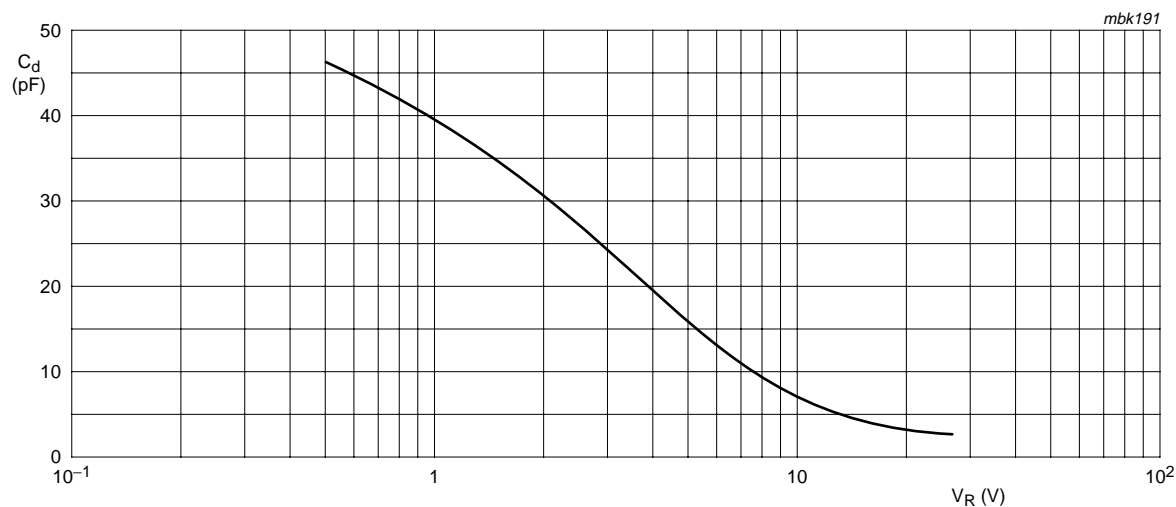
Symbol	Parameter	Conditions	Min	Max	Unit
$V_R$	reverse voltage		-	32	V
$V_{RM}$	peak reverse voltage	in series with a 10 k $\Omega$ resistor	-	35	V
$I_F$	forward current		-	20	mA
$T_{stg}$	storage temperature		-55	+150	°C
$T_j$	junction temperature		-55	+125	°C

## 6. Characteristics

Table 5: Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_R$	reverse current	see <a href="#">Figure 2</a>				
		$V_R = 30\text{ V}$	-	-	10	nA
		$V_R = 30\text{ V}; T_j = 85^\circ\text{C}$	-	-	200	nA
$r_s$	diode series resistance	$f = 100\text{ MHz}; C_d = 30\text{ pF}$	-	0.65	0.8	$\Omega$
$C_d$	diode capacitance	$f = 1\text{ MHz};$ see <a href="#">Figure 1</a> and <a href="#">3</a>				
		$V_R = 1\text{ V}$	34.65	-	42.35	pF
		$V_R = 28\text{ V}$	2.361	2.6	2.754	pF
$\frac{C_{d(1V)}}{C_{d(2V)}}$	capacitance ratio	$f = 1\text{ MHz}$	-	1.3	-	
$\frac{C_{d(1V)}}{C_{d(28V)}}$	capacitance ratio	$f = 1\text{ MHz}$	13.5	15	-	
$\frac{C_{d(25V)}}{C_{d(28V)}}$	capacitance ratio	$f = 1\text{ MHz}$	-	1.08	-	
$\frac{\Delta C_d}{C_d}$	capacitance matching	$V_R = 1\text{ V to } 28\text{ V};$ in a sequence of 10 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.

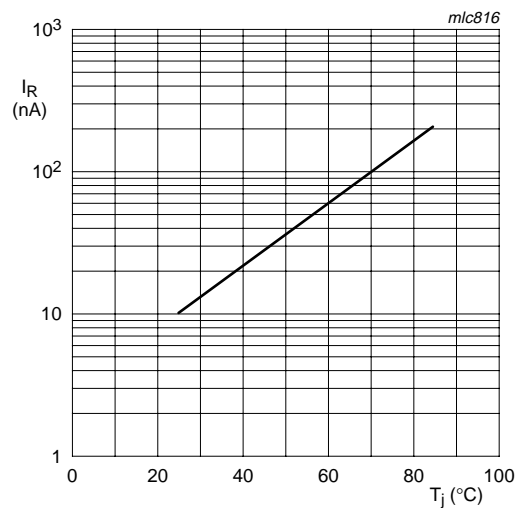
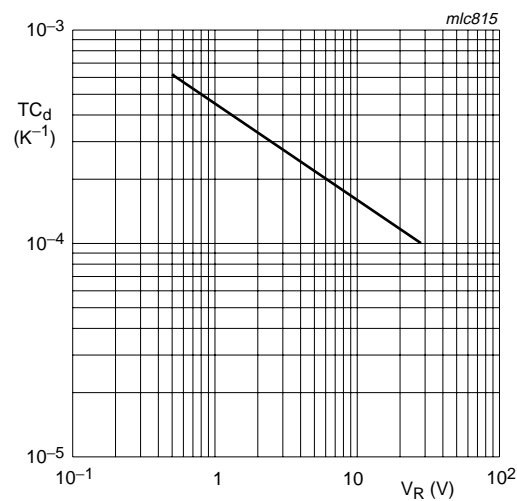


Fig 2. Reverse current as a function of junction temperature; maximum values.



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

Fig 3. Temperature coefficient of diode capacitance as a function of reverse voltage; typical values.

7. Package outline

Plastic surface mounted package; 2 leads

SOD323

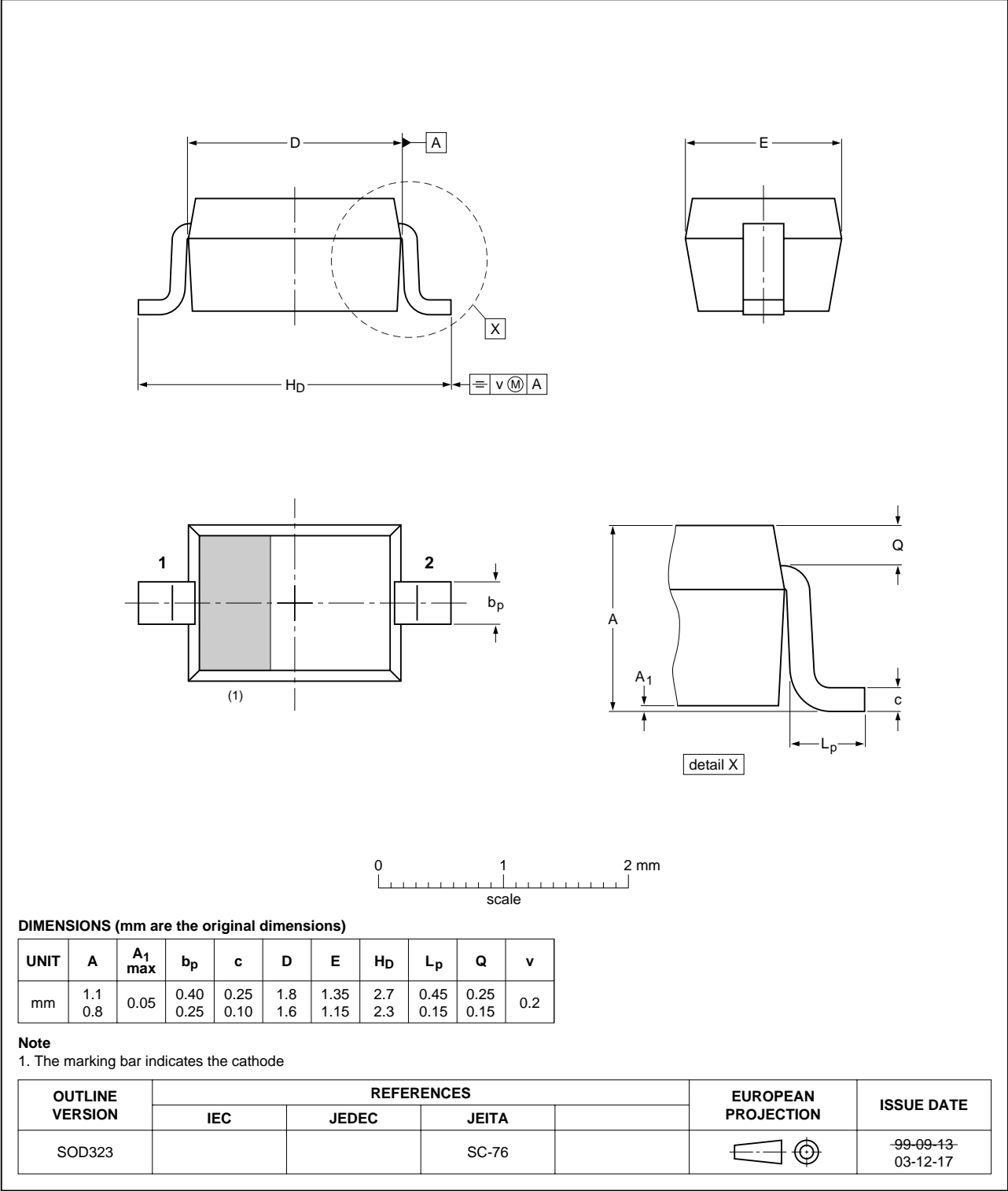


Fig 4. Package outline SOD323 (SC-76).

## 8. Revision history

**Table 6:** Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BB153_3	20041005	Product data sheet	-	9397 750 13829	BB153_2
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors</li><li>• <a href="#">Table 5 “Characteristics”</a>: <math>\Delta C_d/C_d</math> conditions changed from sequence of 15 diodes to sequence of 10 diodes</li><li>• <a href="#">Table 5 “Characteristics”</a>: added typical value of 2.6 pF for <math>C_{d(28V)}</math></li><li>• <a href="#">Table 5 “Characteristics”</a>: added typical value of 15 for <math>C_{d(1V)}</math> to <math>C_{d(28V)}</math> ratio.</li></ul>				
BB153_2	20040225	Product specification	-	9397 750 12646	BB153_1
BB153_1	19971217	Product specification	-	9397 750 02654	-

## 9. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

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[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## 10. Definitions

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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

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13. Contents

1    **Product profile** ..... 1

1.1    General description..... 1

1.2    Features ..... 1

1.3    Applications ..... 1

2    **Pinning information**..... 1

3    **Ordering information**..... 1

4    **Marking**..... 2

5    **Limiting values**..... 2

6    **Characteristics**..... 2

7    **Package outline** ..... 4

8    **Revision history**..... 5

9    **Data sheet status**..... 6

10    **Definitions** ..... 6

11    **Disclaimers**..... 6

12    **Contact information** ..... 6

