

# BB149

## UHF variable capacitance diode

Rev. 05 — 4 October 2004

Product data sheet

## 1. Product profile

### 1.1 General description

The BB149 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. The unmatched type, BB159 has the same specification.

### 1.2 Features



- Excellent linearity
- Excellent matching to 1 % DMA
- Very small SMD plastic package
- $C_{d(28V)}$ : 2.1 pF;  $C_{d(1V)}$  to  $C_{d(28V)}$  ratio: 9
- Low series resistance.

### 1.3 Applications

- Electronic tuning in UHF television tuners
- Voltage Controlled Oscillators (VCO).

## 2. Pinning information

Table 1: Pinning

Pin	Description	Simplified outline <a href="#">[1]</a>	Symbol
1	cathode		 <i>sym008</i>
2	anode		

[1] Marking bar indicates the cathode.

## 3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BB149	SC-76	plastic surface mounted package; 2 leads	SOD323

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## 4. Marking

**Table 3: Marking**

Type number	Marking code
BB149	P9

## 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		-	30	V
$I_F$	forward current		-	20	mA
$T_{stg}$	storage temperature		-55	+150	°C
$T_j$	junction temperature		-55	+125	°C

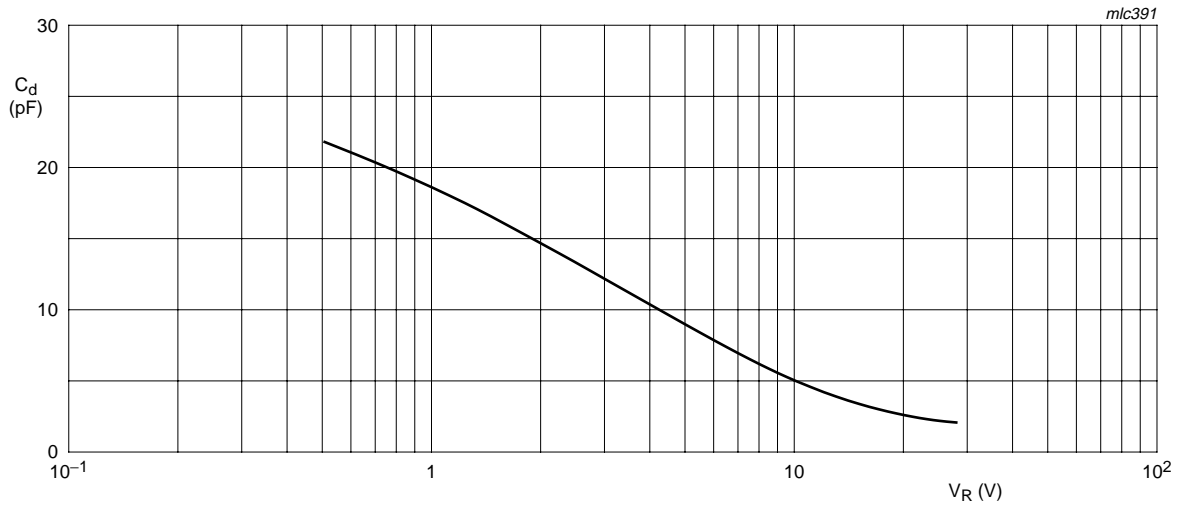
## 6. Characteristics

**Table 5: Characteristics**

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

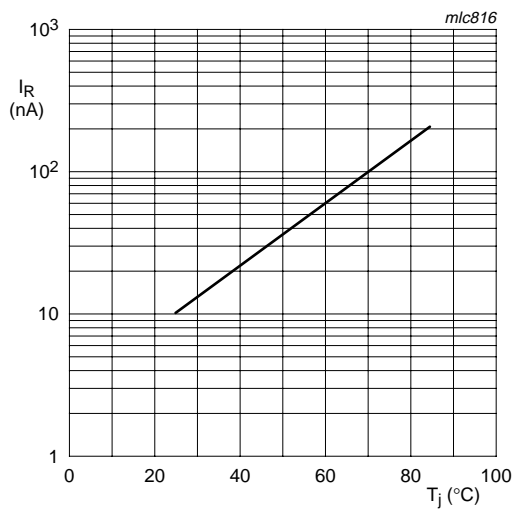
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_R$	reverse current	see <a href="#">Figure 2</a>				
		$V_R = 30\text{ V}$	-	-	10	nA
		$V_R = 30\text{ V}; T_j = 85\text{ °C}$	-	-	200	nA
$r_s$	diode series resistance	$f = 470\text{ MHz}$	[1]	-	0.75	$\Omega$
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; see <a href="#">Figure 1</a> and <a href="#">3</a>				
		$V_R = 1\text{ V}$	18	-	19.5	pF
		$V_R = 28\text{ V}$	1.9	2.1	2.25	pF
$\frac{C_{d(1V)}}{C_{d(28V)}}$	capacitance ratio	$f = 1\text{ MHz}$	8.2	9	10	
$\frac{C_{d(19V)}}{C_{d(28V)}}$	capacitance ratio	$f = 1\text{ MHz}$	1.2	-	-	
$\frac{\Delta C_d}{C_d}$	capacitance matching	$V_R = 0.5\text{ V to }28\text{ V}$ ; in a sequence of 10 diodes (gliding)	-	-	2	%

[1]  $V_R$  is the value at which  $C_d = 9\text{ pF}$ .

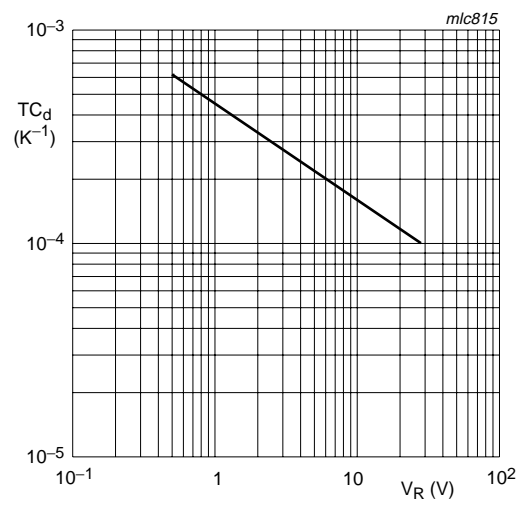


$f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

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



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



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

**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

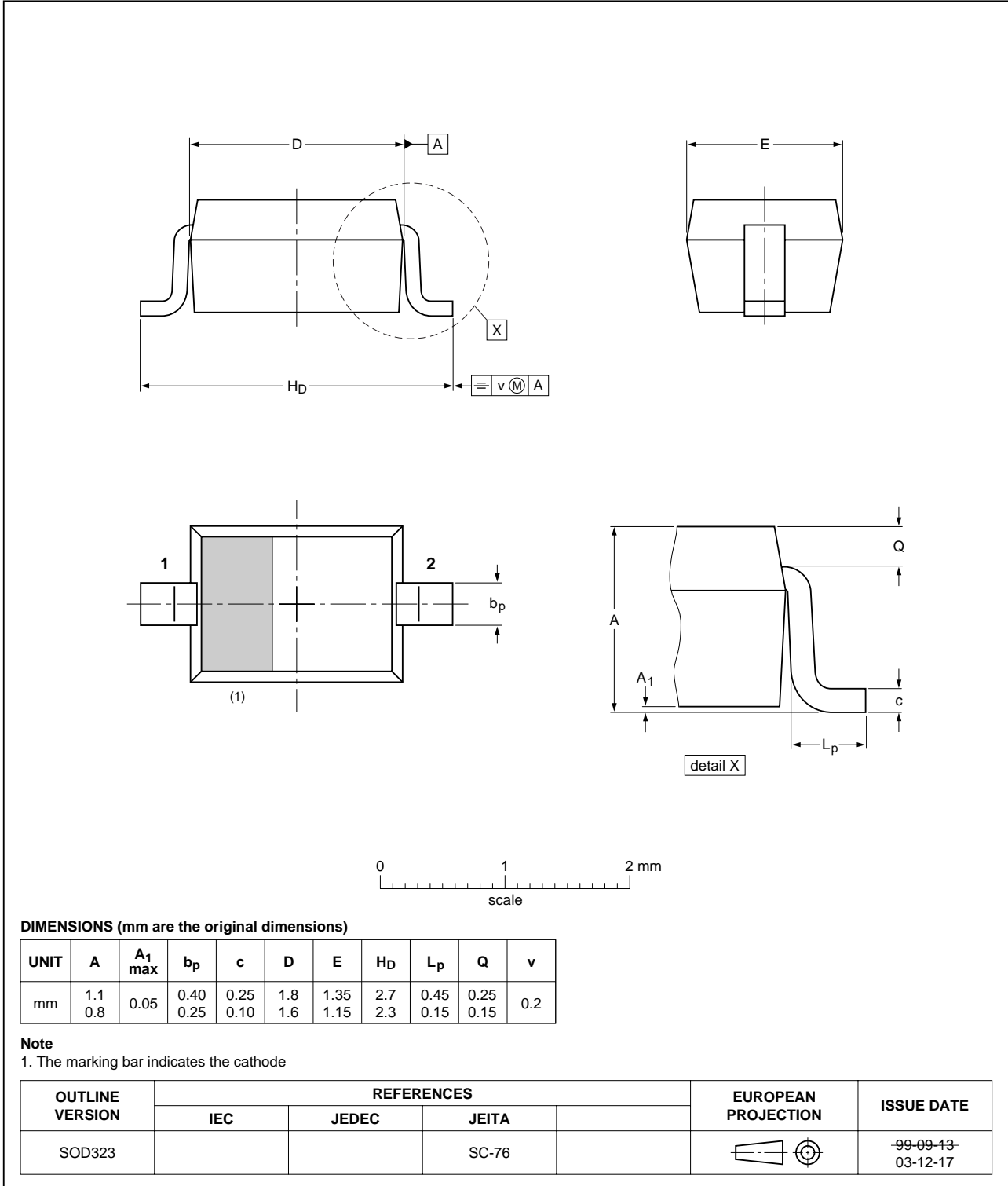


Fig 4. Package outline SOD323 (SC-76).

## 8. Revision history

**Table 6: Revision history**

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BB149_5	20041004	Product data sheet	-	9397 750 13825	BB149_4
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>: <math>\Delta C_d/C_d</math> in a sequence of 4 diodes removed</li> <li><a href="#">Table 5 "Characteristics"</a>: added typical value of 2.1 pF for <math>C_{d(28V)}</math></li> <li><a href="#">Table 5 "Characteristics"</a>: added typical value of 9 for <math>C_{d(1V)}</math> to <math>C_{d(28V)}</math> ratio.</li> </ul>				
BB149_4	20040301	Product specification	-	9397 750 12653	BB149_3
BB149_3	19980915	Product specification	-	9397 750 04378	BB149_2
BB149_2	19960503	n.a.	-	n.a.	BB149_1
BB149_1	19941209	n.a.	-	n.a.	-

## 9. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2]</sup> <sup>[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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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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**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

<b>1</b>	<b>Product profile</b> .....	<b>1</b>
1.1	General description .....	1
1.2	Features .....	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>
<b>5</b>	<b>Limiting values</b> .....	<b>2</b>
<b>6</b>	<b>Characteristics</b> .....	<b>2</b>
<b>7</b>	<b>Package outline</b> .....	<b>4</b>
<b>8</b>	<b>Revision history</b> .....	<b>5</b>
<b>9</b>	<b>Data sheet status</b> .....	<b>6</b>
<b>10</b>	<b>Definitions</b> .....	<b>6</b>
<b>11</b>	<b>Disclaimers</b> .....	<b>6</b>
<b>12</b>	<b>Contact information</b> .....	<b>6</b>



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