

# BB152

## VHF variable capacitance diode

Rev. 03 — 5 October 2004

Product data sheet

## 1. Product profile

### 1.1 General description

The BB152 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

- High linearity
- Excellent matching to 2 % DMA
- Very small SMD plastic package
- $C_{d(28V)}$ : 2.7 pF;  $C_{d(1V)}$  to  $C_{d(28V)}$  ratio: 22
- Low series resistance.

### 1.3 Applications

- Electronic tuning in VHF television tuners, band A up to 160 MHz
- Voltage Controlled Oscillators (VCO).

## 2. Pinning information

Table 1: Pinning

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

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 2: Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description                              | Version |
| BB152       | SC-76   | plastic surface mounted package; 2 leads | SOD323  |

# PHILIPS

## 4. Marking

**Table 3: Marking**

| Type number | Marking code |
|-------------|--------------|
| BB152       | PB           |

## 5. Limiting values

**Table 4: Limiting values**

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

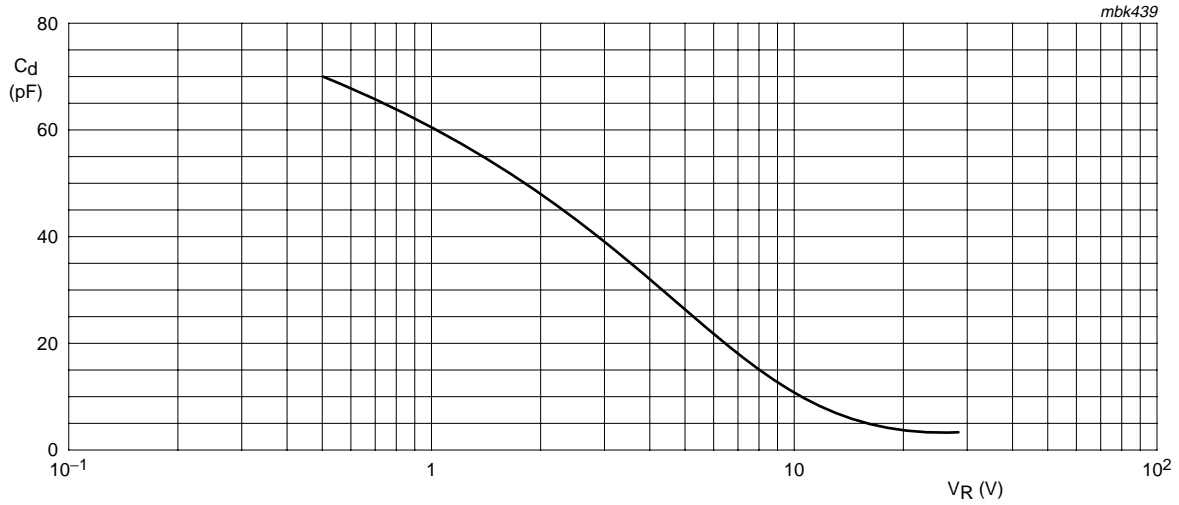
| Symbol    | Parameter            | Conditions                              | Min | Max  | Unit               |
|-----------|----------------------|---|-----|------|--------------------|
| $V_R$     | reverse voltage      |   | -   | 32   | V                  |
| $V_{RM}$  | peak reverse voltage | in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

## 6. Characteristics

**Table 5: Characteristics**

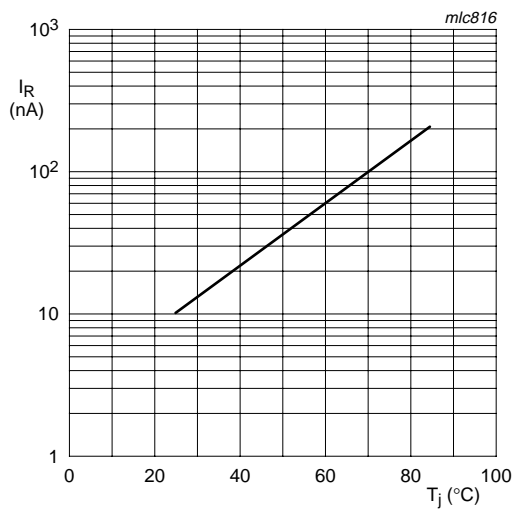
$T_j = 25^{\circ}\text{C}$  unless otherwise specified.

| 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 | $f = 100\text{ MHz}; C_d = 30\text{ pF}$                                 | -    | 1    | 1.2  | $\Omega$ |
| $C_d$                           | diode capacitance       | $f = 1\text{ MHz};$ see <a href="#">Figure 1</a> and <a href="#">3</a>   |      |      |      |          |
|                                 |                         | $V_R = 1\text{ V}$   | 52   | -    | 62   | pF       |
|                                 |                         | $V_R = 28\text{ V}$  | 2.48 | 2.7  | 2.89 | pF       |
| $\frac{C_{d(1V)}}{C_{d(2V)}}$   | capacitance ratio       | $f = 1\text{ MHz}$   | -    | 1.31 | -    |          |
| $\frac{C_{d(1V)}}{C_{d(28V)}}$  | capacitance ratio       | $f = 1\text{ MHz}$   | 20.6 | 22   | -    |          |
| $\frac{C_{d(25V)}}{C_{d(28V)}}$ | capacitance ratio       | $f = 1\text{ MHz}$   | -    | 1.05 | -    |          |
| $\frac{\Delta C_d}{C_d}$        | capacitance matching    | $V_R = 1\text{ V to } 28\text{ V};$ in a sequence of 10 diodes (gliding) | -    | -    | 2    | %        |

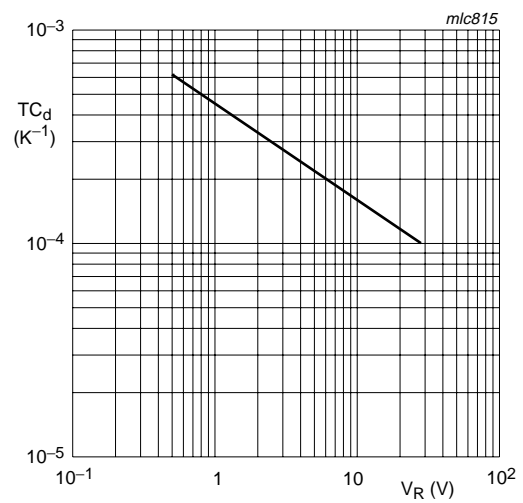


$f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

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



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



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

**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

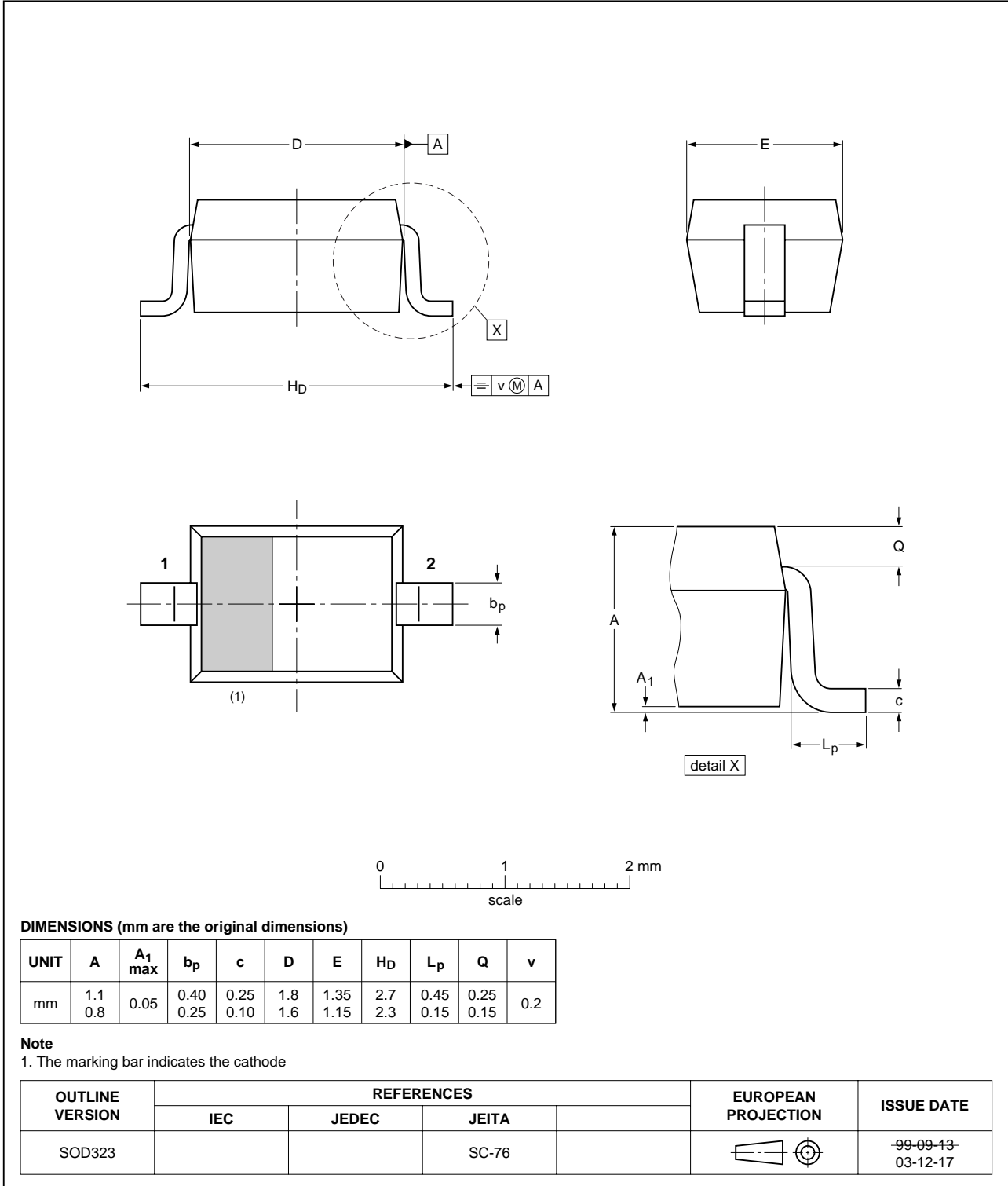


Fig 4. Package outline SOD323 (SC-76).

## 8. Revision history

**Table 6: Revision history**

| Document ID    | Release date  | Data sheet status     | Change notice | Doc. number    | Supersedes |
|----------------|---|-----------------------|---------------|----------------|------------|
| BB152_3        | 20041005  | Product data sheet    | -             | 9397 750 13828 | BB152_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 2.7 pF for <math>C_{d(28V)}</math></li> <li><a href="#">Table 5 “Characteristics”</a>: added typical value of 22 for <math>C_{d(1V)}</math> to <math>C_{d(28V)}</math> ratio.</li> </ul> |                       |               |                |            |
| BB152_2        | 20040225  | Product specification | -             | 9397 750 12645 | BB152_1    |
| BB152_1        | 19980909  | Product specification | -             | 9397 750 04275 | -          |

## 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.  |
| II    | Preliminary data                 | Qualification                                | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.             |
| 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). |

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[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.

**Application information** — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

## 11. Disclaimers

**Life support** — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

**Right to make changes** — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

## 12. Contact information

For additional information, please visit: <http://www.semiconductors.philips.com>

For sales office addresses, send an email to: [sales.addresses@www.semiconductors.philips.com](mailto:sales.addresses@www.semiconductors.philips.com)

## 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> |



© Koninklijke Philips Electronics N.V. 2004

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: 5 October 2004  
Document number: 9397 750 13828

Published in The Netherlands