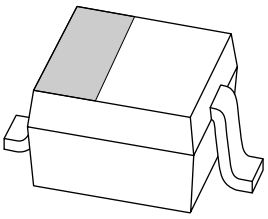
# DATA SHEET



# BB156
## Low-voltage variable capacitance diode

Product specification
Supersedes data of 1998 Aug 17

2004 Mar 01

Philips
Semiconductors

PHILIPS

# Low-voltage variable capacitance diode BB156

## FEATURES

- Excellent linearity
- Very small plastic SMD package
- C7.5: 4.8 pF; ratio 3.3
- Very low series resistance.

## APPLICATIONS

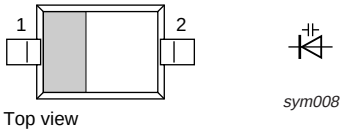
- Voltage controlled oscillators (VCO).

## DESCRIPTION

The BB156 is a planar technology variable capacitance diode, in a SOD323 very small plastic SMD package.

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | cathode |
| 2 | anode |




**Marking code:** PF.
The marking bar indicates the cathode.

Fig.1 Simplified outline (SOD323; SC-76) and symbol.

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|---|---|---|---|
| | NAME | DESCRIPTION | VERSION |
| BB156 | – | plastic surface mounted package; 2 leads | SOD323 |

## LIMITING VALUES

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

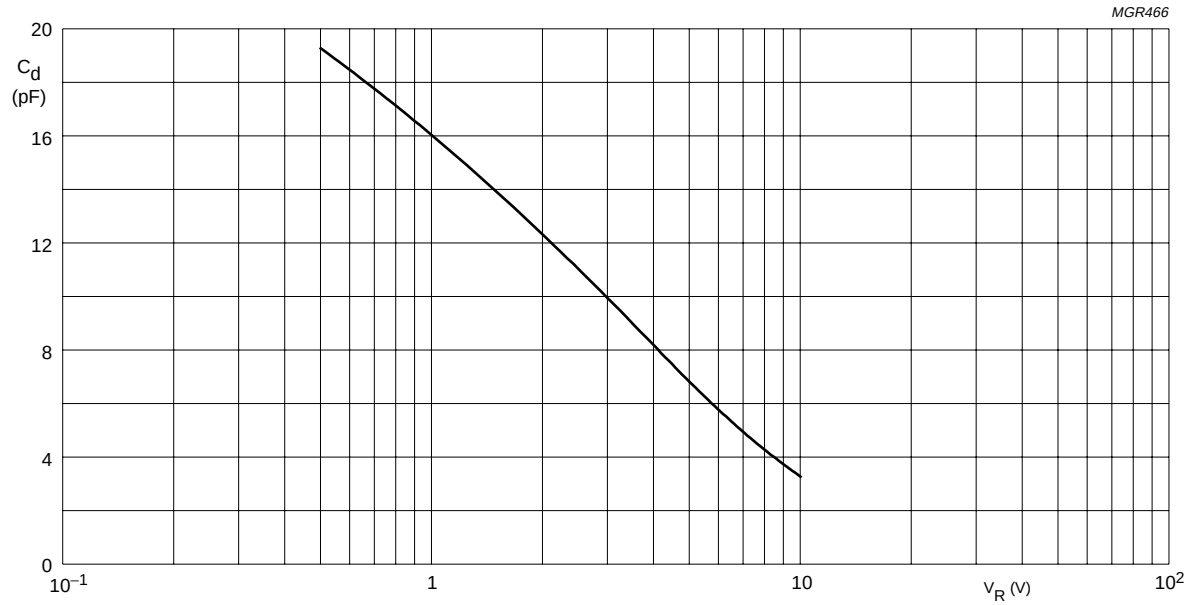
| SYMBOL | PARAMETER | MIN. | MAX. | UNIT |
|---|---|---|---|---|
| $V_R$ | continuous reverse voltage | – | 10 | V |
| $I_F$ | continuous forward current | – | 20 | mA |
| $T_{stg}$ | storage temperature | –55 | +150 | °C |
| $T_j$ | operating junction temperature | –55 | +125 | °C |

## ELECTRICAL CHARACTERISTICS

$T_j$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $I_R$ | reverse current | $V_R$ = 10 V; see Fig.3 | – | – | 10 | nA |
| | | $V_R$ = 10 V; $T_j$ = 85 °C; see Fig.3 | – | – | 200 | nA |
| $r_s$ | diode series resistance | f = 470 MHz; $C_d$ = 9 pF | – | 0.4 | 0.7 | Ω |
| $C_d$ | diode capacitance | f = 1 MHz; see Figs 2 and 4 | | | | |
| | | $V_R$ = 1 V | 14.4 | 16 | 17.6 | pF |
| | | $V_R$ = 4 V | 7.6 | 8.6 | 9.6 | pF |
| | | $V_R$ = 7.5 V | 4.2 | 4.8 | 5.4 | pF |
| $\frac{C_{d\ (1\ V)}}{C_{d\ (7.5\ V)}}$ | capacitance ratio | f = 1 MHz | 2.7 | 3.3 | 3.9 | |

## GRAPHICAL DATA




f = 1 MHz; $T_j$ = 25 °C.

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

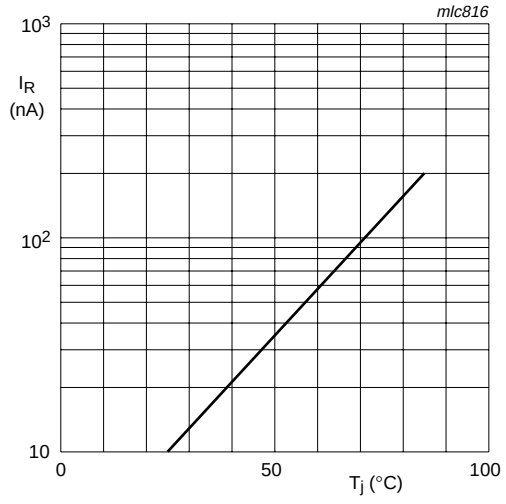
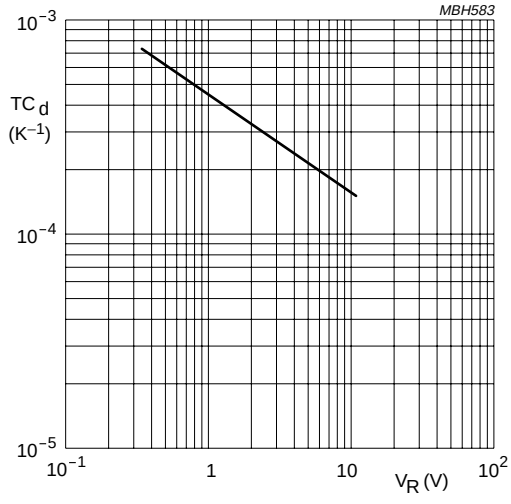



Fig.3 Reverse current as a function of junction temperature; maximum values.

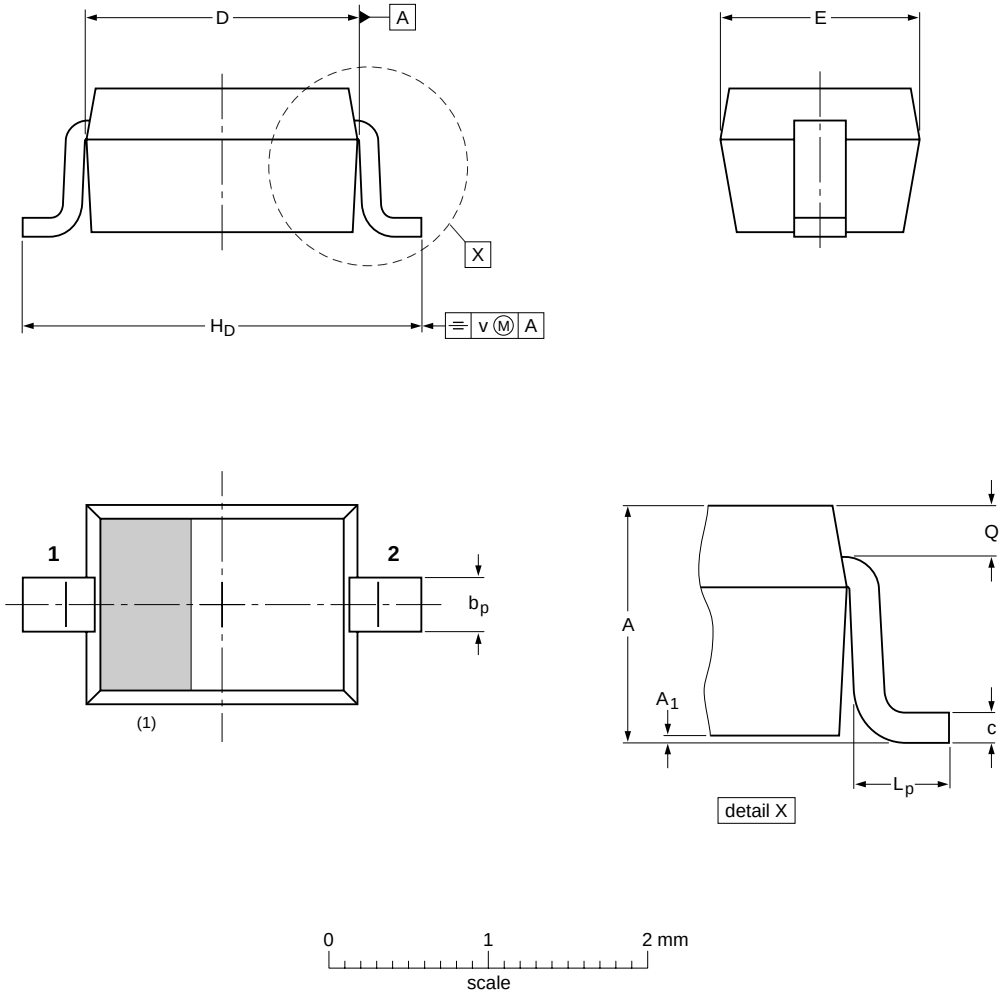



$T_j$ = 0 °C to 85 °C.

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

## PACKAGE OUTLINE

**Plastic surface mounted package; 2 leads** **SOD323**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max | $b_p$ | c | D | E | $H_D$ | $L_p$ | Q | v |
|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.8 | 0.05 | 0.40<br>0.25 | 0.25<br>0.10 | 1.8<br>1.6 | 1.35<br>1.15 | 2.7<br>2.3 | 0.45<br>0.15 | 0.25<br>0.15 | 0.2 |

**Note**

1. The marking bar indicates the cathode

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOD323 | | | SC-76 | | | ~~99-09-13~~<br>03-12-17 |

**DATA SHEET STATUS**

| LEVEL | DATA SHEET STATUS(1) | PRODUCT STATUS(2)(3) | 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). |

**Notes**

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.

**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.

**DISCLAIMERS**

**Life support applications** — 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 licence 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.

# *Philips Semiconductors – a worldwide company*

**Contact information**

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.



Printed in The Netherlands R77/02/pp7 Date of release: 2004 Mar 01 Document order number: 9397 750 12658

Let's make things better.

Philips
Semiconductors

PHILIPS