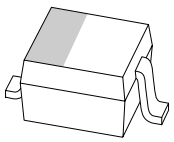


BB133

VHF variable capacitance diode

Rev. 05 — 15 October 2004 Product data sheet

1. Product profile

1.1 General description

The BB133 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, BB150 has the same specification.

1.2 Features

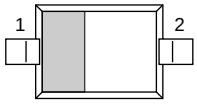
- Excellent linearity
- Excellent matching to 0.7 % DMA
- Very small SMD plastic package
- $C_{d(28V)}$: 2.5 pF; $C_{d(0.5V)}$ to $C_{d(28V)}$ ratio: 16
- Low series resistance.

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 [1]	Symbol
1	cathode		 sym008
2	anode		

[1] The marking bar indicates the cathode.

3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BB133	SC-76	plastic surface mounted package; 2 leads	SOD323

PHILIPS

4. Marking

Table 3: Marking

Type number	Marking code
BB133	P3

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 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_R	reverse current	see Figure 2					
		V_R = 30 V		-	-	10	nA
		V_R = 30 V; T_j = 85 °C		-	-	200	nA
r_s	diode series resistance	f = 100 MHz	[1]	-	-	0.9	Ω
C_d	diode capacitance	f = 1 MHz; see Figure 1 and 3					
		V_R = 0.5 V		38	-	46	pF
		V_R = 28 V		2.2	2.5	2.6	pF
$\frac{C_{d(0.5V)}}{C_{d(28V)}}$	capacitance ratio	f = 1 MHz		14	16	21	
$\frac{\Delta C_d}{C_d}$	capacitance matching	V_R = 0.5 V to 28 V; in a sequence of 10 diodes (gliding)		-	-	2	%

[1] V_R is the value at which C_d = 30 pF.

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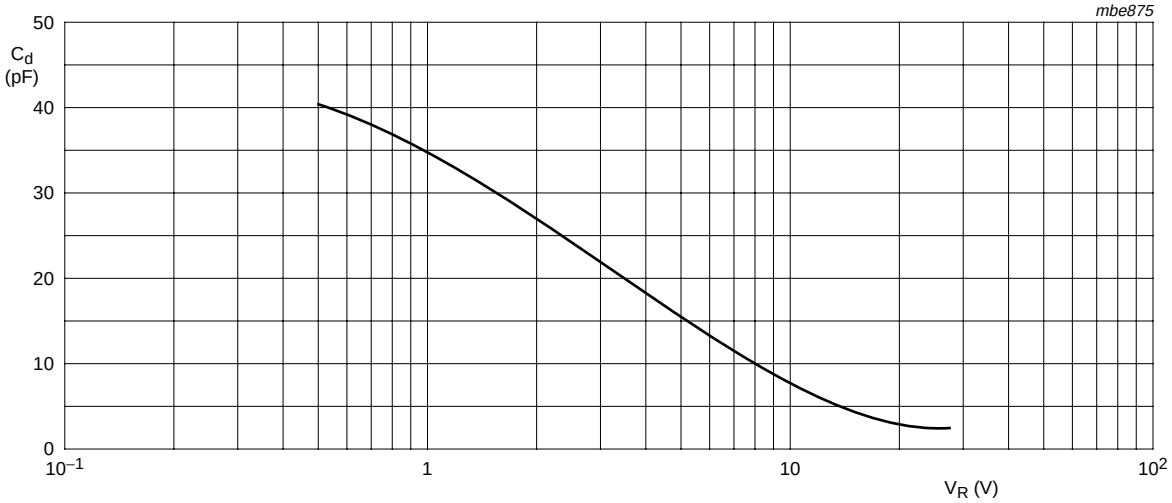


f = 1 MHz; T_j = 25 °C.

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

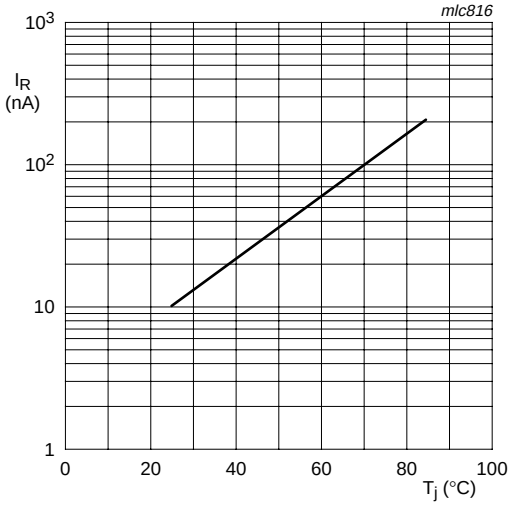
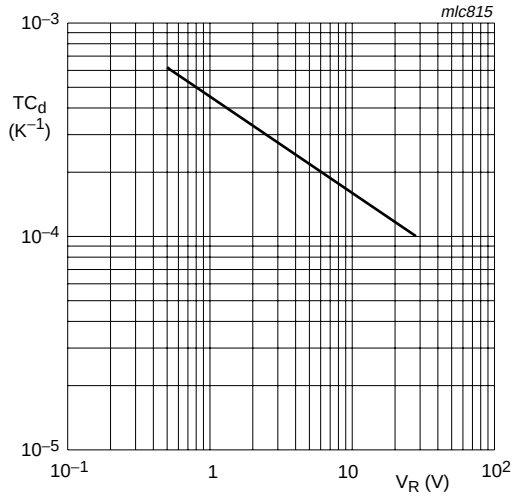


Fig 2. Reverse current as a function of junction temperature; maximum values.



T_j = 0 °C to 85 °C.

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

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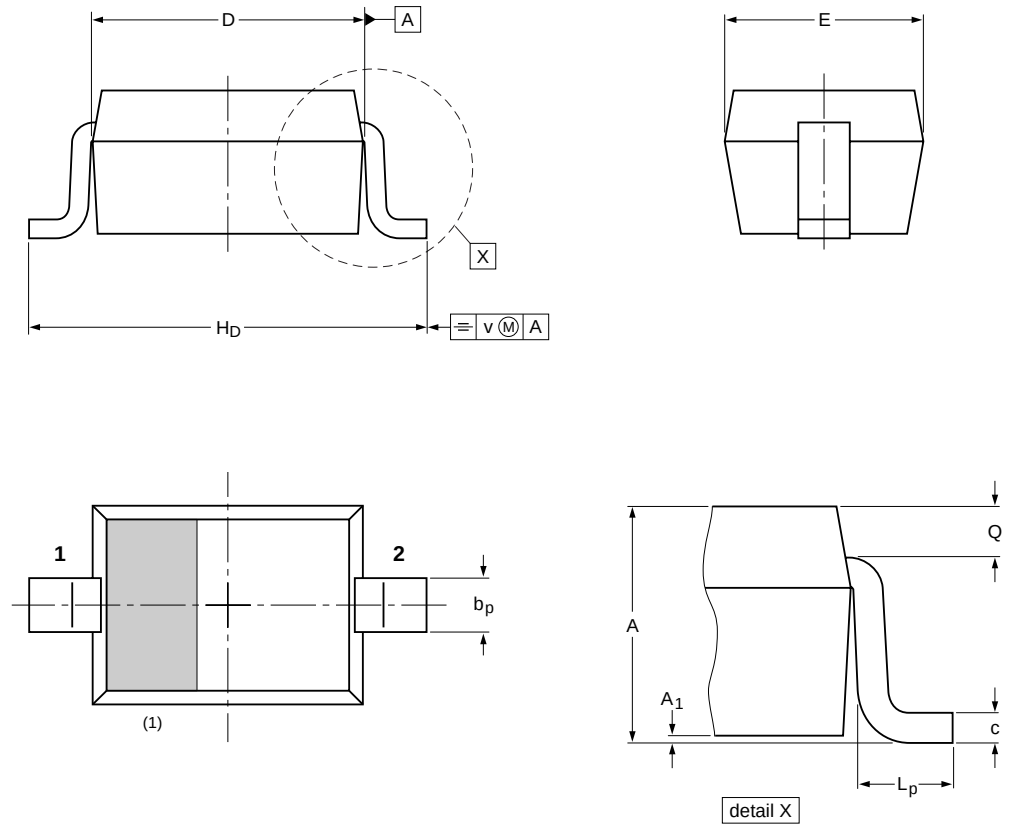
7. Package outline

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 0.8	0.05	0.40 0.25	0.25 0.10	1.8 1.6	1.35 1.15	2.7 2.3	0.45 0.15	0.25 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~~ 03-12-17

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

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8. Revision history

Table 6: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BB133_5	20041015	Product data sheet	-	9397 750 13823	BB133_4
Modifications:	• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors • Table 5 “Characteristics”: $\Delta C_d/C_d$ conditions changed from sequence of 15 diodes to sequence of 10 diodes • Table 5 “Characteristics”: $\Delta C_d/C_d$ in a sequence of 4 diodes removed • Table 5 “Characteristics”: added typical value of 16 for $C_{d(0.5V)}$ to $C_{d(28V)}$ ratio • Table 5 “Characteristics”: added typical value of 2.5 pF for $C_{d(28V)}$.				
BB133_4	20040301	Product specification	-	9397 750 12642	BB133_3
BB133_3	19980915	Product specification	-	9397 750 04374	BB133_2
BB133_2	19960503	n.a.	-	n.a.	-

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9. 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).

[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.

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13. Contents

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