



# BB178

## VHF variable capacitance diode

Rev. 3 — 5 September 2011

Product data sheet

## 1. Product profile

### 1.1 General description

The BB178 is a planar technology variable capacitance diode, in a SOD523 (SC-79) ultra small plastic package. The excellent matching performance is achieved by gliding matching and a Direct Matching Assembly (DMA) procedure.

### 1.2 Features and benefits

- Excellent linearity
- Excellent matching to 2 % DMA
- Ultra small plastic SMD 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 <sup>[1]</sup>	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
BB178	SC-79	plastic surface mounted package; 2 leads	SOD523



## 4. Marking

**Table 3. Marking**

Type number	Marking code
BB178	8

## 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	$^{\circ}\text{C}$

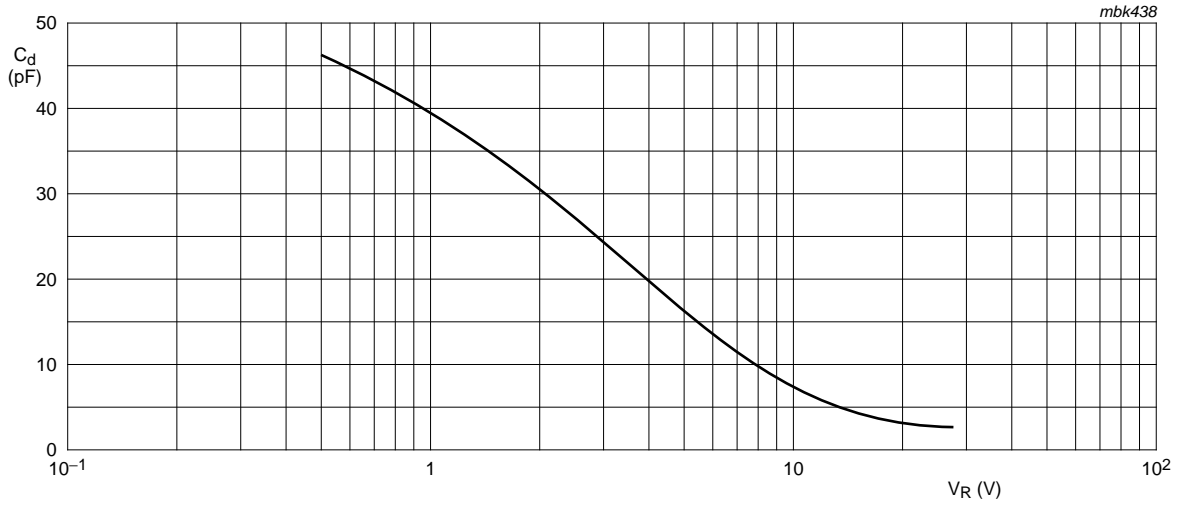
## 6. Characteristics

**Table 5. Characteristics**

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

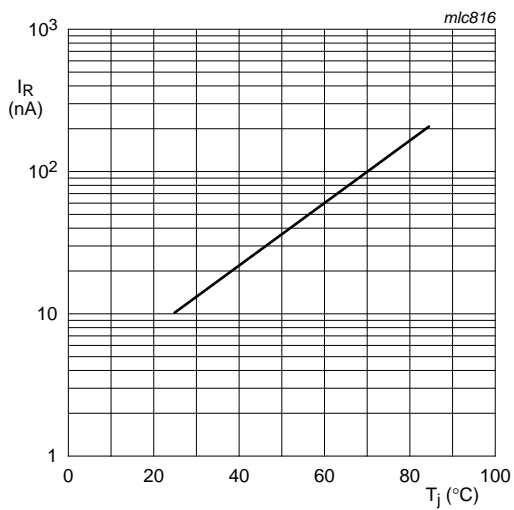
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_R$	reverse current	see <a href="#">Figure 2</a>				
		$V_R = 30\text{ V}$	-	-	10	nA
		$V_R = 30\text{ V}; T_j = 85\text{ }^{\circ}\text{C}$	-	-	200	nA
$r_s$	diode series resistance	$f = 100\text{ MHz}$	[1]	0.65	0.8	$\Omega$
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; see <a href="#">Figure 1</a> and <a href="#">Figure 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	%

[1]  $V_R$  is the value at which  $C_d = 30\text{ pF}$ .

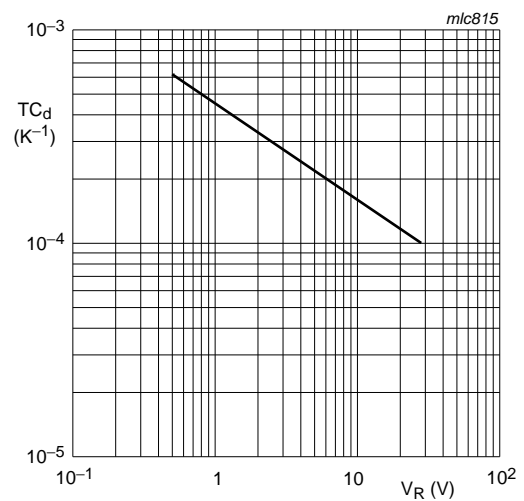


$f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

**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

SOD523

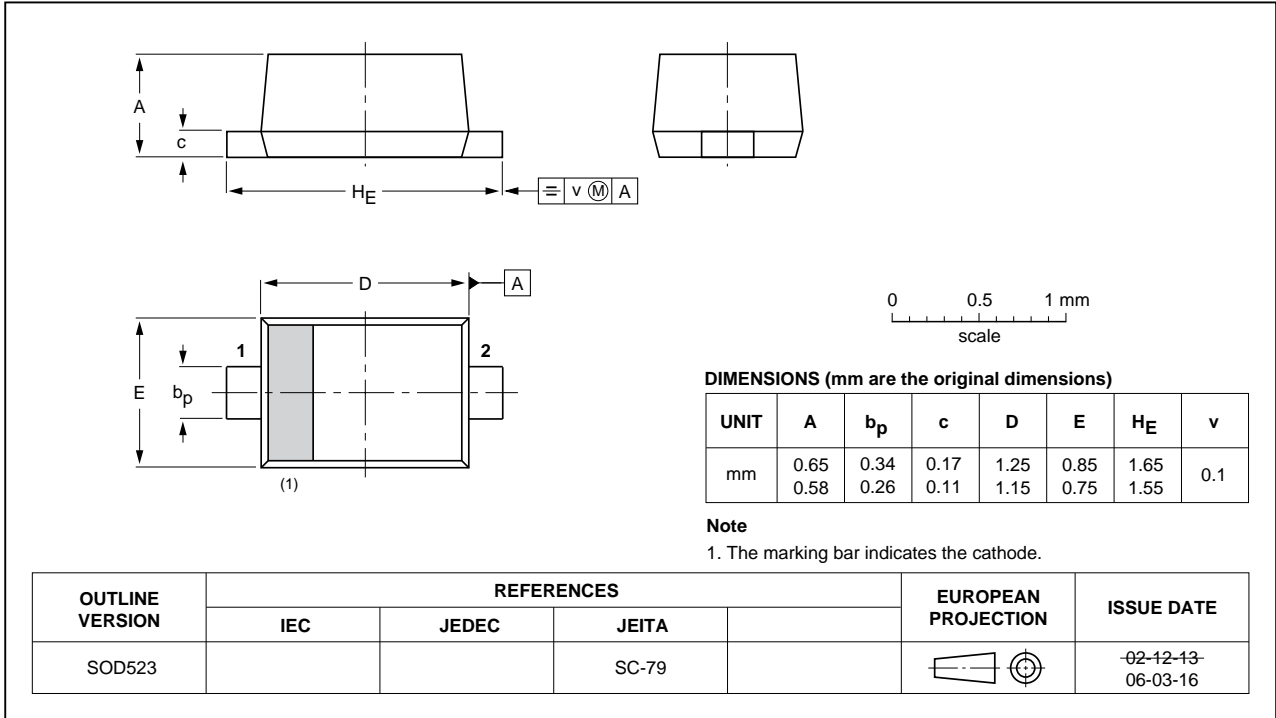


Fig 4. Package outline SOD523 (SC-79).

## 8. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BB178 v.3	20110905	Product data sheet	-	BB178 v.2
Modifications:		<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Package outline drawings have been updated to the latest version.</li></ul>		
BB178 v.2 (9397 750 13831)	20041103	Product data sheet	-	BB178 v.1
BB178 v.1 (9397 750 02982)	19971113	Product specification	-	-

## 9. Legal information

### 9.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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