

# BAP65-02

## Silicon PIN diode

Rev. 5 — 28 September 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Planar PIN diode in a SOD523 ultra small SMD plastic package.

### 1.2 Features and benefits

- High voltage, current controlled
- RF resistor for RF switches
- Low diode capacitance
- Low diode forward resistance (low loss)
- Very low series inductance

### 1.3 Applications

- RF attenuators and switches
- Bandswitch for TV tuners
- Series diode for mobile communication transmit/receive switch

## 2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	cathode		
2	anode		 sym006

## 3. Ordering information

Table 2. Ordering information

Type number	Package			Version
	Name	Description		
BAP65-02	-	plastic surface-mounted package; 2 leads		SOD523

## 4. Marking

Table 3. Marking codes

Type number	Marking code
BAP65-02	K6



## 5. Limiting values

**Table 4. Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_R$	continuous reverse voltage		-	30	V
$I_F$	continuous forward current		-	100	mA
$P_{tot}$	total power dissipation	$T_s \leq 90^\circ\text{C}$	-	715	mW
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-65	+150	°C
$T_{amb}$	ambient temperature		-40	+85	°C

## 6. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Typ	Unit
$R_{th j-s}$	thermal resistance from junction to soldering point		85	K/W

## 7. Characteristics

**Table 6. Characteristics**

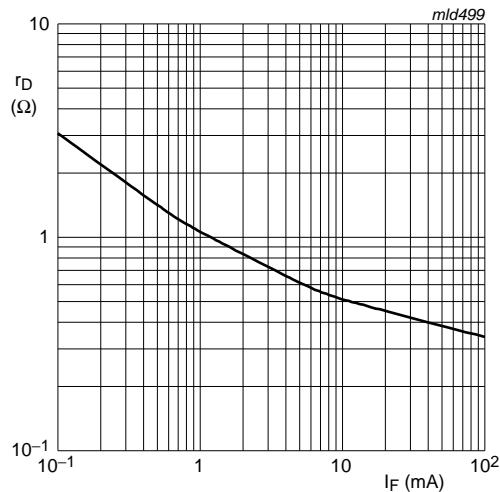
$T_j = 25^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 50 \text{ mA}$	-	0.9	1.1	V
$I_R$	reverse leakage current	$V_R = 20 \text{ V}$	-	-	20	nA
$C_d$	diode capacitance	$V_R = 0 \text{ V}; f = 1 \text{ MHz}$	-	0.65	-	pF
		$V_R = 1 \text{ V}; f = 1 \text{ MHz}$	-	0.55	0.9	pF
		$V_R = 3 \text{ V}; f = 1 \text{ MHz}$	-	0.5	0.8	pF
		$V_R = 20 \text{ V}; f = 1 \text{ MHz}$	-	0.375	-	pF
$r_D$	diode forward resistance	$I_F = 1 \text{ mA}; f = 100 \text{ MHz}$	-	1	-	Ω
		$I_F = 5 \text{ mA}; f = 100 \text{ MHz}$	[1]	0.65	0.95	Ω
		$I_F = 10 \text{ mA}; f = 100 \text{ MHz}$	[1]	0.56	0.9	Ω
		$I_F = 100 \text{ mA}; f = 100 \text{ MHz}$	-	0.35	-	Ω
$ S_{21} ^2$	isolation	$V_R = 0; f = 900 \text{ MHz}$	-	10	-	dB
		$V_R = 0; f = 1800 \text{ MHz}$	-	5.8	-	dB
		$V_R = 0; f = 2450 \text{ MHz}$	-	4.4	-	dB
$ S_{21} ^2$	insertion loss	$I_F = 1 \text{ mA}; f = 900 \text{ MHz}$	-	0.11	-	dB
		$I_F = 1 \text{ mA}; f = 1800 \text{ MHz}$	-	0.13	-	dB
		$I_F = 1 \text{ mA}; f = 2450 \text{ MHz}$	-	0.16	-	dB
$ S_{21} ^2$	insertion loss	$I_F = 5 \text{ mA}; f = 900 \text{ MHz}$	-	0.08	-	dB
		$I_F = 5 \text{ mA}; f = 1800 \text{ MHz}$	-	0.11	-	dB
		$I_F = 5 \text{ mA}; f = 2450 \text{ MHz}$	-	0.13	-	dB

**Table 6. Characteristics ...continued** $T_j = 25^\circ\text{C}$  unless otherwise specified.

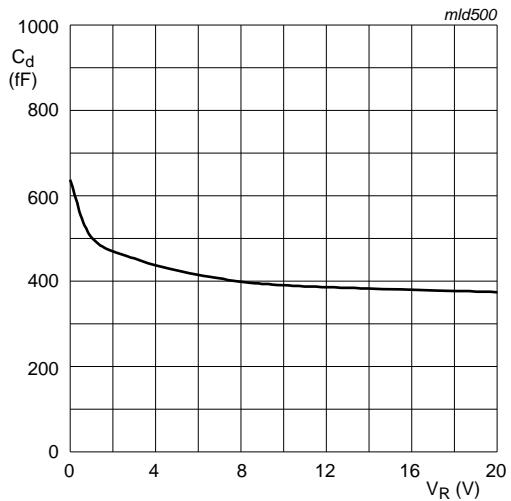
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$ \mathbf{S}_{21} ^2$	insertion loss	$I_F = 10 \text{ mA}; f = 900 \text{ MHz}$	-	0.07	-	dB
		$I_F = 10 \text{ mA}; f = 1800 \text{ MHz}$	-	0.1	-	dB
		$I_F = 10 \text{ mA}; f = 2450 \text{ MHz}$	-	0.13	-	dB
$ \mathbf{S}_{21} ^2$	insertion loss	$I_F = 100 \text{ mA}; f = 900 \text{ MHz}$	-	0.07	-	dB
		$I_F = 100 \text{ mA}; f = 1800 \text{ MHz}$	-	0.1	-	dB
		$I_F = 100 \text{ mA}; f = 2450 \text{ MHz}$	-	0.128	-	dB
$\tau_L$	charge carrier life time	when switched from $I_F = 10 \text{ mA}$ to $I_R = 6 \text{ mA}$ ; $R_L = 100 \Omega$ ; measured at $I_R = 3 \text{ mA}$	-	0.17	-	$\mu\text{s}$
$L_S$	series inductance	$I_F = 100 \text{ mA}; f = 100 \text{ MHz}$	-	0.6	-	nH

[1] Guaranteed on AQL basis: inspection level S4, AQL 1.0.



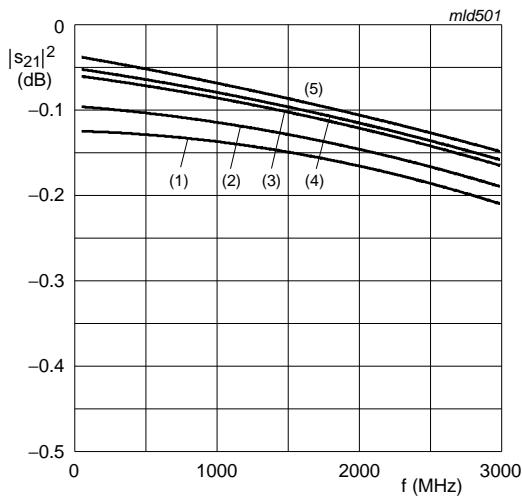
$f = 100$  MHz;  $T_j = 25$  °C

**Fig 1. Forward resistance as a function of forward current; typical values**



$f = 1$  MHz;  $T_j = 25$  °C

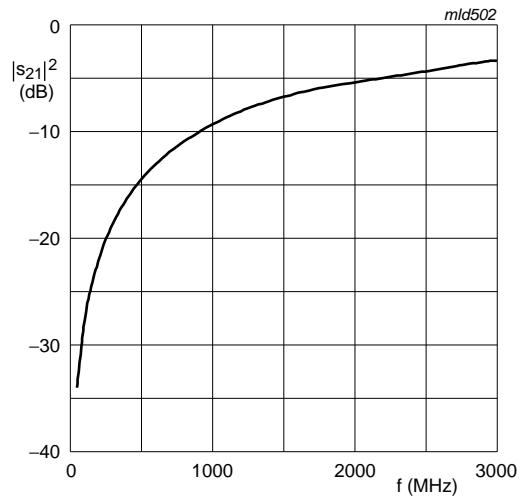
**Fig 2. Diode capacitance as a function of reverse voltage; typical values**



- (1)  $I_F = 0.5$  mA
- (2)  $I_F = 1$  mA
- (3)  $I_F = 5$  mA
- (4)  $I_F = 10$  mA
- (5)  $I_F = 100$  mA

Diode inserted in series with a 50  $\Omega$  stripline circuit and biased via the analyzer Tee network.  $T_{amb} = 25$  °C.

**Fig 3. Insertion loss ( $|s_{21}|^2$ ) of the diode as a function of frequency; typical values**



Diode zero biased and inserted in series with a 50  $\Omega$  stripline circuit.  $T_{amb} = 25$  °C.

**Fig 4. Isolation ( $|s_{21}|^2$ ) of the diode as a function of frequency; typical values**

## 8. Package outline

Plastic surface-mounted package; 2 leads

SOD523

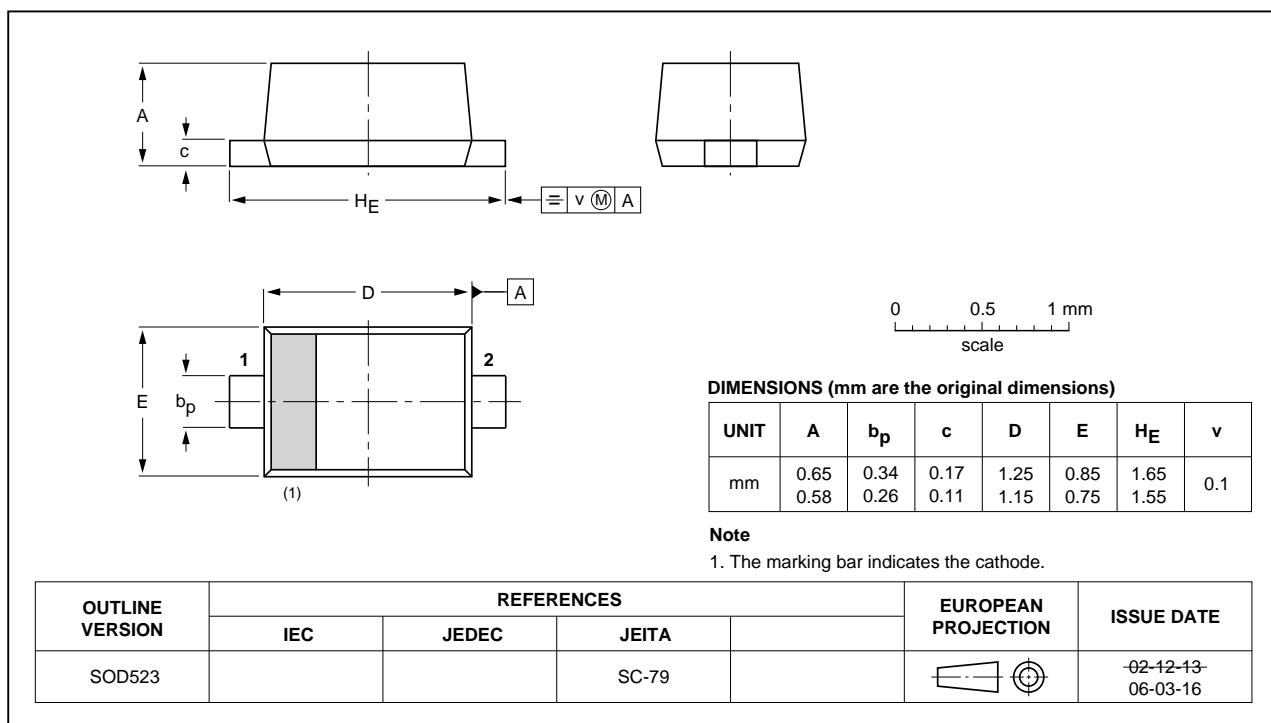


Fig 5. Package outline SOD523

## 9. Revision history

**Table 7. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAP65-02 v.5	20100928	Product data sheet	-	BAP65-02_N v.4
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 updated.</li><li>• <a href="#">Table 4 "Limiting values"</a>: added <math>T_{amb}</math> (ambient temperature).</li></ul>			
BAP65-02_N v.4	20080108	Product data sheet	-	BAP65-02 v.3
BAP65-02 v.3 (9397 750 08364)	20010511	Product specification	-	BAP65-02 v.2
BAP65-02 v.2 (9397 750 08237)	20010507	Product specification	-	BAP65-02 v.1
BAP65-02 v.1 (9397 750 07724)	20001220	Product specification	-	-

## 10. Legal information

### 10.1 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.

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

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