

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		
	Name	Description	Version
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	$T_s \leq 90\text{ °C}$	-	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

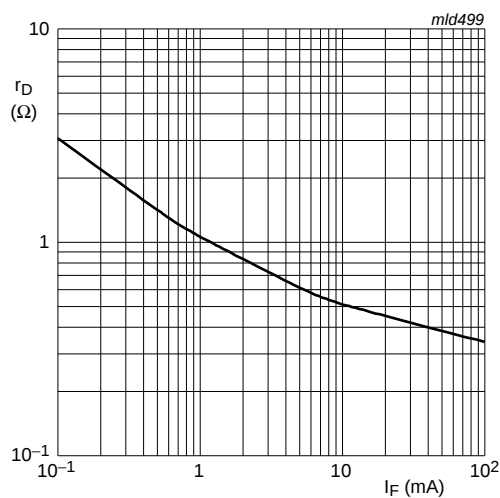
$T_j = 25\text{ °C}$ unless otherwise specified.

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

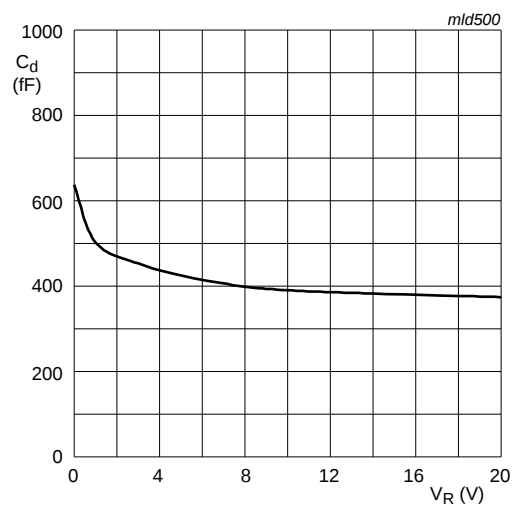
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$ S_{21} ^2$	insertion loss	$I_F = 10\text{ mA}$; $f = 900\text{ MHz}$	-	0.07	-	dB
		$I_F = 10\text{ mA}$; $f = 1800\text{ MHz}$	-	0.1	-	dB
		$I_F = 10\text{ mA}$; $f = 2450\text{ MHz}$	-	0.13	-	dB
$ S_{21} ^2$	insertion loss	$I_F = 100\text{ mA}$; $f = 900\text{ MHz}$	-	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
τ_L	charge carrier life time	when switched from $I_F = 10\text{ mA}$ to $I_R = 6\text{ mA}$; $R_L = 100\text{ }\Omega$; measured at $I_R = 3\text{ mA}$	-	0.17	-	μs
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.



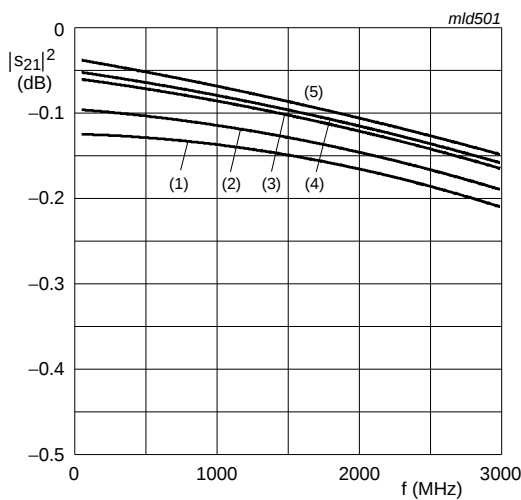
$f = 100 \text{ MHz}$; $T_j = 25 \text{ °C}$

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



$f = 1 \text{ MHz}$; $T_j = 25 \text{ °C}$

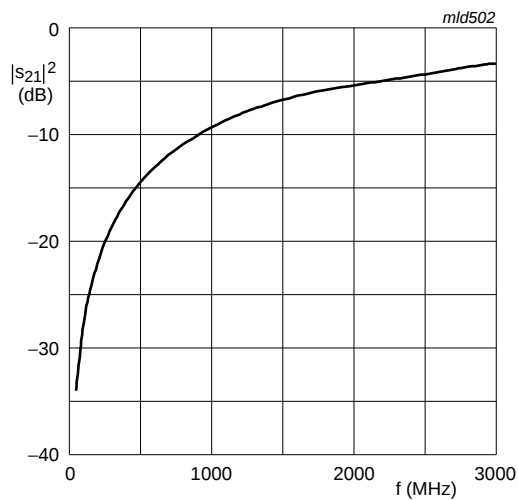
Fig 2. Diode capacitance as a function of reverse voltage; typical values



- (1) $I_F = 0.5 \text{ mA}$
- (2) $I_F = 1 \text{ mA}$
- (3) $I_F = 5 \text{ mA}$
- (4) $I_F = 10 \text{ mA}$
- (5) $I_F = 100 \text{ mA}$

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

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 $50 \text{ } \Omega$ stripline circuit. $T_{amb} = 25 \text{ °C}$.

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

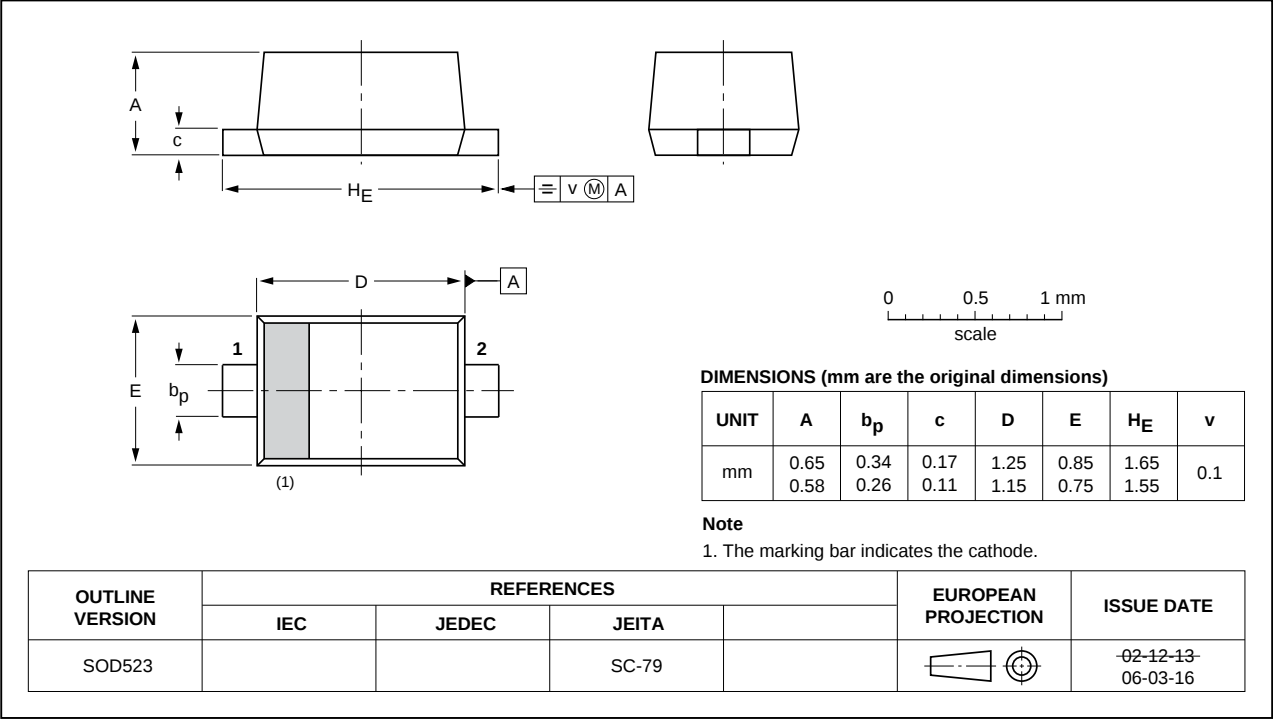


Fig 5. Package outline SOD523

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:	- The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. - Legal texts have been updated. Table 4 "Limiting values": added T_{amb} (ambient temperature).			
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 ^{[1][2]}	Product status ^[3]	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".

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12. Contents

1	Product profile	1
1.1	General description	1
1.2	Features and benefits	1
1.3	Applications	1
2	Pinning information	1
3	Ordering information	1
4	Marking	1
5	Limiting values	2
6	Thermal characteristics	2
7	Characteristics	2
8	Package outline	5
9	Revision history	6
10	Legal information	7
10.1	Data sheet status	7
10.2	Definitions	7
10.3	Disclaimers	7
10.4	Trademarks	8
11	Contact information	8
12	Contents	9

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