

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	$T_s \leq 90\text{ }^{\circ}\text{C}$	-	715	mW
T_{stg}	storage temperature		-65	+150	$^{\circ}\text{C}$
T_j	junction temperature		-65	+150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		-40	+85	$^{\circ}\text{C}$

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

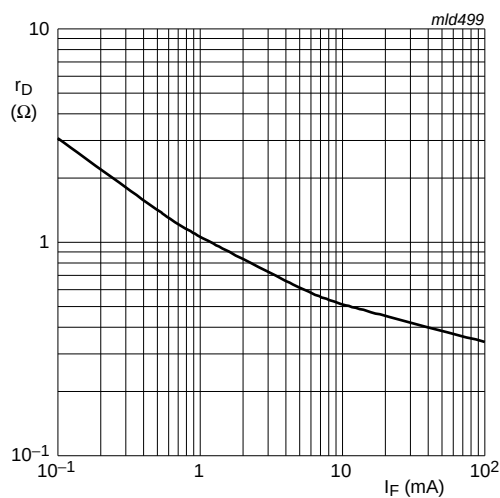
$T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

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

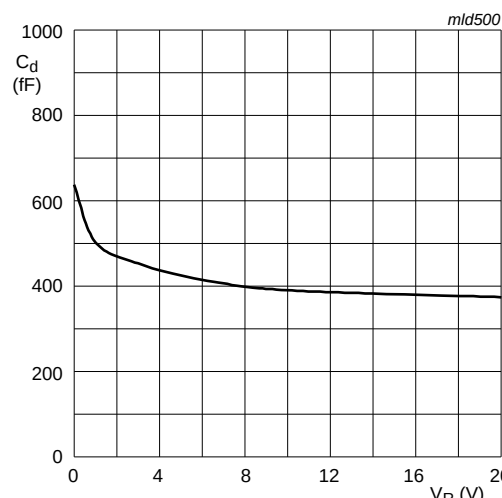
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$ S_{21} ^2$	insertion loss	$I_F = 10\text{ mA}$; $f = 900\text{ MHz}$	-	0.07	-	dB
		$I_F = 10\text{ mA}$; $f = 1800\text{ MHz}$	-	0.1	-	dB
		$I_F = 10\text{ mA}$; $f = 2450\text{ MHz}$	-	0.13	-	dB
$ S_{21} ^2$	insertion loss	$I_F = 100\text{ mA}$; $f = 900\text{ MHz}$	-	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.



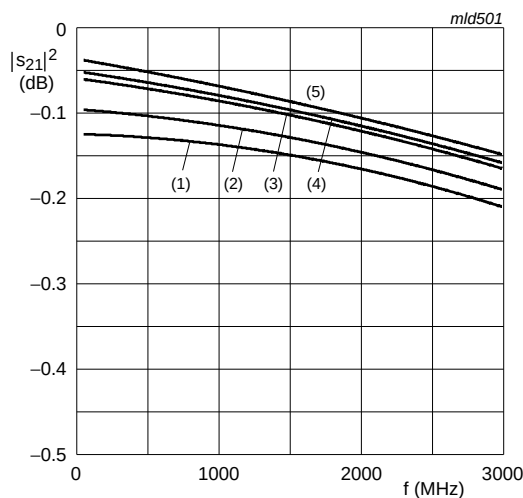
$f = 100\text{ MHz}; T_j = 25\text{ }^{\circ}\text{C}$

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



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

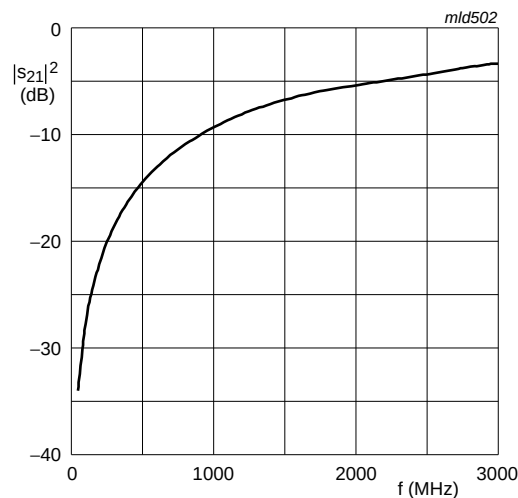
Fig 2. Diode capacitance as a function of reverse voltage; typical values



- (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. $T_{amb} = 25\text{ }^{\circ}\text{C}$.

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. $T_{amb} = 25\text{ }^{\circ}\text{C}$.

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

8. Package outline

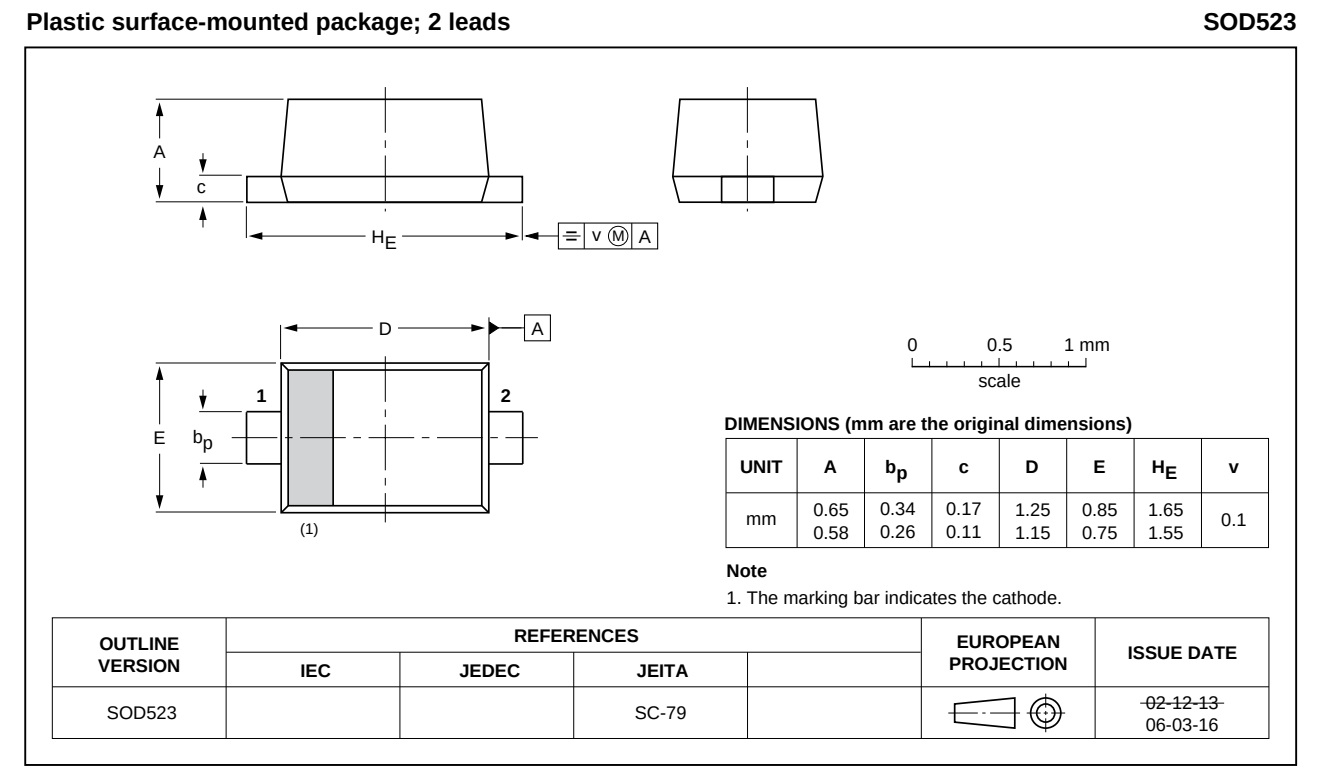


Fig 5. Package outline SOD523

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".

[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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