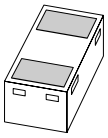


BAP51L

Silicon PIN diode

Rev. 01 — 11 March 2005 Product data sheet

1. Product profile

1.1 General description

Planar PIN diode in a SOD882 leadless ultra small SMD plastic package.

1.2 Features

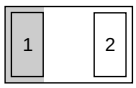
- High speed switching for RF signals
- Low diode capacitance
- Low forward resistance
- Very low series inductance
- For applications up to 3 GHz

1.3 Applications

- RF attenuators and switches

2. Pinning information

Table 1: Pinning

Pin	Description	Simplified outline	Symbol
1	cathode [1]	 Transparent top view	 sym006
2	anode		

[1] The marking bar indicates the cathode

3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BAP51L	-	leadless ultra small plastic package; 2 terminals; body 1.0 × 0.6 × 0.5 mm	SOD882

PHILIPS

4. Marking

Table 3: Marking

Type number	Marking code
BAP51L	E2

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		-	60	V
I_F	forward current		-	100	mA
P_{tot}	total power dissipation	T_{sp} = 90 °C	-	500	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C

6. Thermal characteristics

Table 5: Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point		100	K/W

7. Characteristics

Table 6: Electrical characteristics

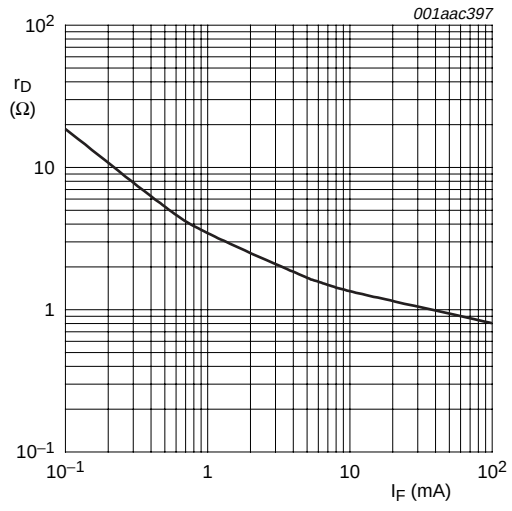
T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	I_F = 50 mA	-	0.95	1.1	V
I_R	reverse current	V_R = 50 V	-	-	100	nA
C_d	diode capacitance	f = 1 MHz; see Figure 2				
		V_R = 0 V	-	0.30	-	pF
		V_R = 1 V	-	0.23	0.4	pF
		V_R = 5 V	-	0.17	0.3	pF
r_D	diode forward resistance	f = 100 MHz; see Figure 1				
		I_F = 0.5 mA	-	5.3	9	Ω
		I_F = 1 mA	-	3.5	6.5	Ω
		I_F = 10 mA	-	1.4	2.5	Ω
		I_F = 100 mA	-	0.9	1.5	Ω
$\lvert s_{21} \rvert^2$	isolation	V_R = 0 V; see Figure 4				
		f = 900 MHz	-	19	-	dB
		f = 1800 MHz	-	15	-	dB
		f = 2450 MHz	-	13	-	dB

Table 6: Electrical characteristics *…continued*

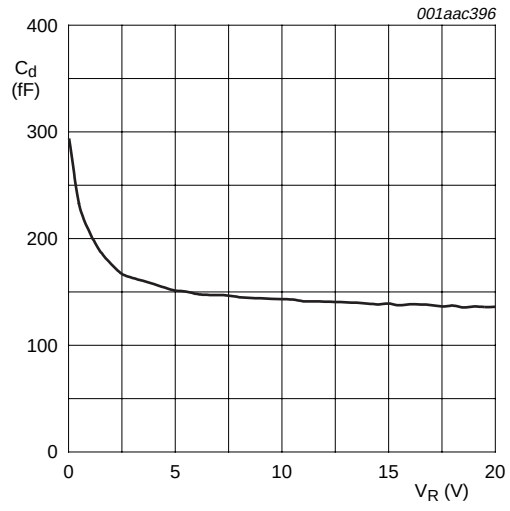
T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\|s_{21}\|^2$	insertion loss	I_F = 0.5 mA; see Figure 3				
		f = 900 MHz	-	0.4	-	dB
		f = 1800 MHz	-	0.39	-	dB
		f = 2450 MHz	-	0.4	-	dB
$\|s_{21}\|^2$	insertion loss	I_F = 1 mA; see Figure 3				
		f = 900 MHz	-	0.26	-	dB
		f = 1800 MHz	-	0.26	-	dB
		f = 2450 MHz	-	0.27	-	dB
$\|s_{21}\|^2$	insertion loss	I_F = 10 mA; see Figure 3				
		f = 900 MHz	-	0.11	-	dB
		f = 1800 MHz	-	0.11	-	dB
		f = 2450 MHz	-	0.12	-	dB
$\|s_{21}\|^2$	insertion loss	I_F = 100 mA; see Figure 3				
		f = 900 MHz	-	0.07	-	dB
		f = 1800 MHz	-	0.07	-	dB
		f = 2450 MHz	-	0.09	-	dB
τ_L	charge carrier life time	when switched from I_F = 10 mA to I_R = 6 mA; R_L = 100 Ω; measured at I_R = 3 mA	-	0.55	-	µs
L_S	series inductance	I_F = 100 mA; f = 100 MHz	-	0.6	-	nH



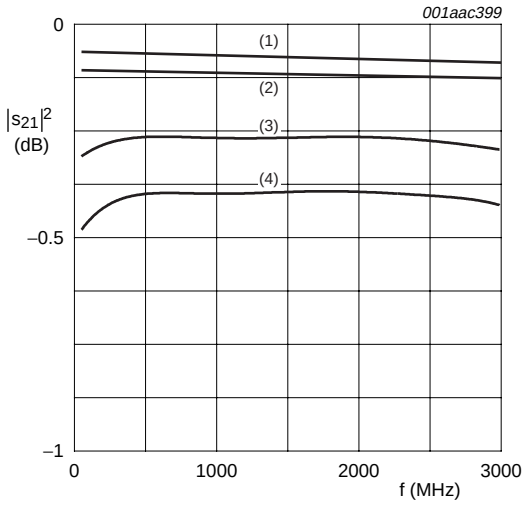
f = 100 MHz; T_j = 25 °C

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



T_{amb} = 25 °C

(1) I_F = 100 mA

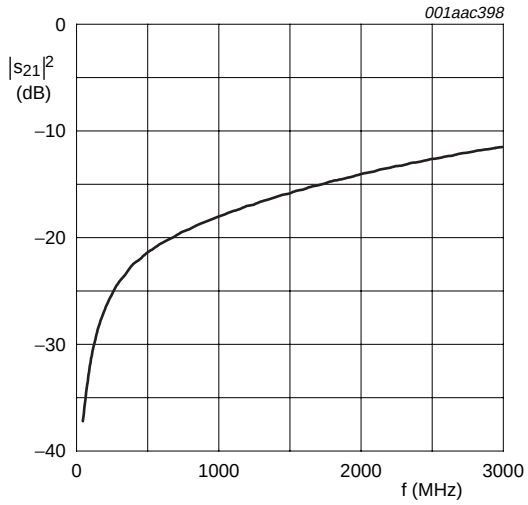
(2) I_F = 10 mA

(3) I_F = 1 mA

(4) I_F = 0.5 mA

Diode inserted in series with a 50 Ω stripline circuit and biased via the analyzer Tee network

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



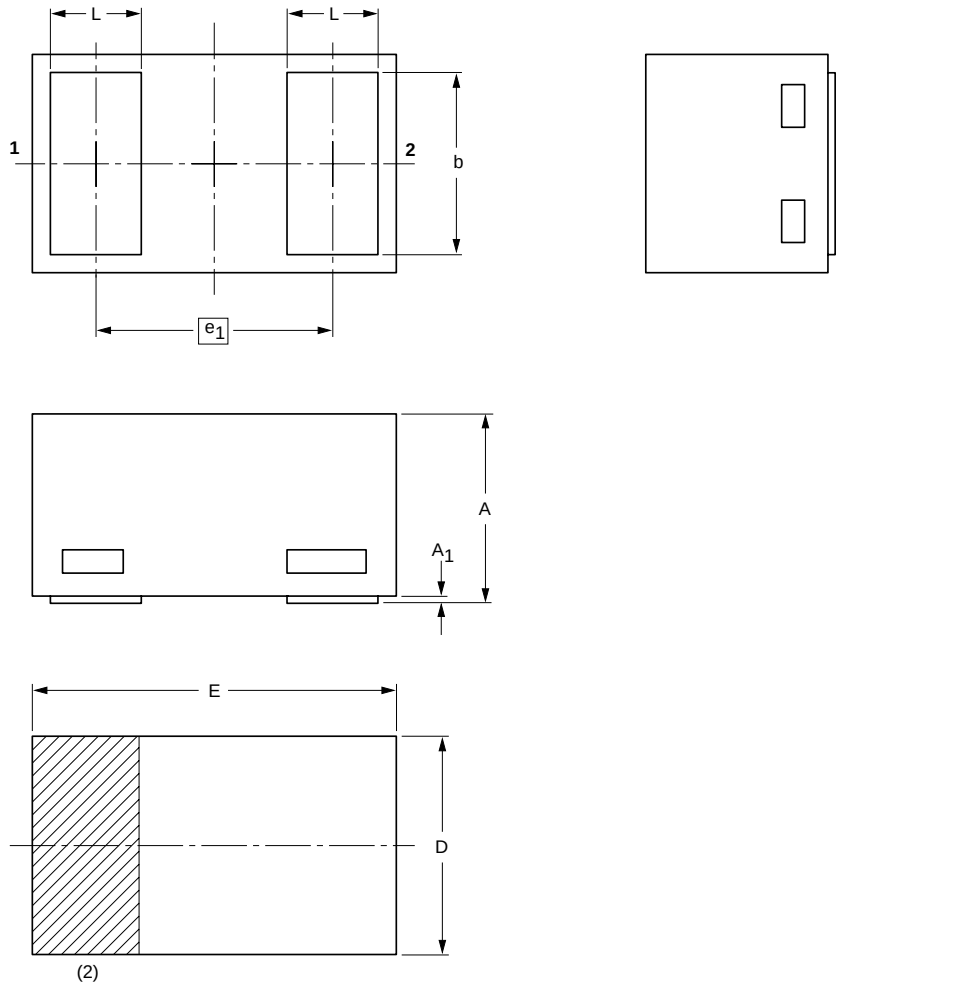
T_{amb} = 25 °C

Diode zero biased and inserted in series with a 50 Ω stripline circuit

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

8. Package outline

Leadless ultra small plastic package; 2 terminals; body 1.0 x 0.6 x 0.5 mm **SOD882**



DIMENSIONS (mm are the original dimensions)

UNIT	A(1)	A_1 max.	b	D	E	e_1	L
mm	0.50 0.46	0.03	0.55 0.47	0.62 0.55	1.02 0.95	0.65	0.30 0.22

Notes

1. Including plating thickness
2. The marking bar indicates the cathode

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD882						~~03-04-16~~ 03-04-17

Fig 5. Package outline SOD882

9. Revision history

Table 7: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BAP51L_1	20050311	Product data sheet	-	9397 750 14554	-

10. 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.

11. 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.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

12. Disclaimers

Life support — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status ‘Production’), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

13. Contact information

For additional information, please visit: **http://www.semiconductors.philips.com**

For sales office addresses, send an email to: **sales.addresses@www.semiconductors.philips.com**

14. Contents

Date of release: 11 March 2005
Document number: 9397 750 14554

Published in The Netherlands