

# 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	<a href="#">[1]</a>	 <i>sym006</i>
2	anode	 Transparent top view	

[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

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## 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	$T_{sp} = 90\text{ °C}$	-	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

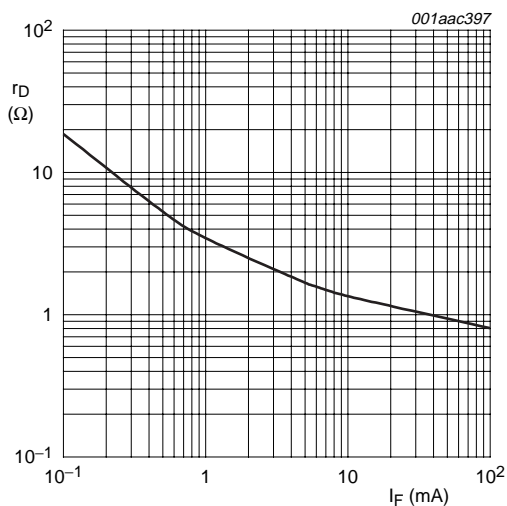
Table 6: Electrical characteristics

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

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

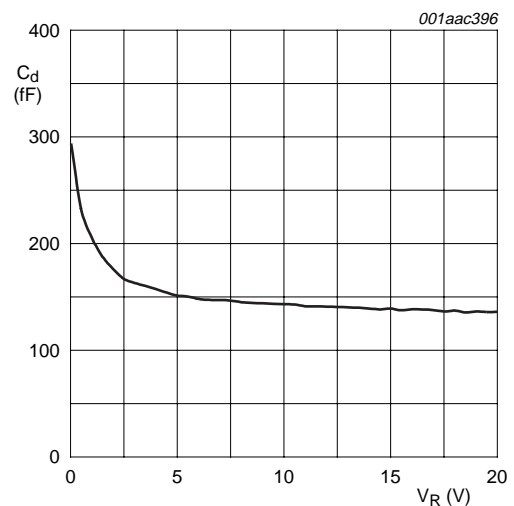
**Table 6: Electrical characteristics ...continued**  
*T<sub>j</sub> = 25 °C unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
s <sub>21</sub>   <sup>2</sup>	insertion loss	I <sub>F</sub> = 0.5 mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.4	-	dB
		f = 1800 MHz	-	0.39	-	dB
s <sub>21</sub>   <sup>2</sup>	insertion loss	I <sub>F</sub> = 1 mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.26	-	dB
		f = 1800 MHz	-	0.26	-	dB
s <sub>21</sub>   <sup>2</sup>	insertion loss	I <sub>F</sub> = 10 mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.11	-	dB
		f = 1800 MHz	-	0.11	-	dB
s <sub>21</sub>   <sup>2</sup>	insertion loss	I <sub>F</sub> = 100 mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.07	-	dB
		f = 1800 MHz	-	0.07	-	dB
τ <sub>L</sub>	charge carrier life time	I <sub>F</sub> = 100 mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.07	-	dB
		f = 1800 MHz	-	0.07	-	dB
L <sub>S</sub>	series inductance	I <sub>F</sub> = 100 mA; f = 100 MHz				
		f = 900 MHz	-	0.07	-	dB
		f = 1800 MHz	-	0.07	-	dB
τ <sub>L</sub>	charge carrier life time	when switched from I <sub>F</sub> = 10 mA to I <sub>R</sub> = 6 mA; R <sub>L</sub> = 100 Ω; measured at I <sub>R</sub> = 3 mA	-	0.55	-	μs
		f = 900 MHz	-	0.07	-	dB
		f = 1800 MHz	-	0.07	-	dB
L <sub>S</sub>	series inductance	I <sub>F</sub> = 100 mA; f = 100 MHz	-	0.6	-	nH
		f = 900 MHz	-	0.07	-	dB
		f = 1800 MHz	-	0.07	-	dB



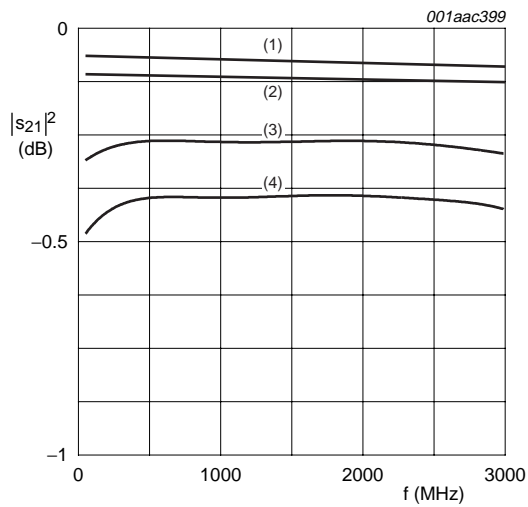
f = 100 MHz; T<sub>j</sub> = 25 °C

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



f = 1 MHz; T<sub>j</sub> = 25 °C

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

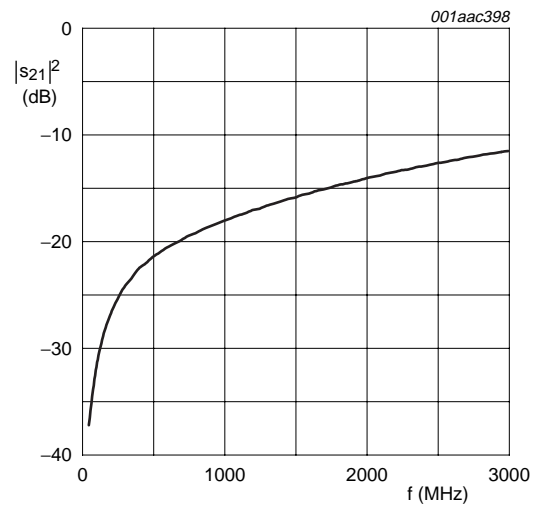


$T_{amb} = 25\text{ }^{\circ}\text{C}$

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

Diode inserted in series with a  $50\text{ }\Omega$  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**



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

Diode zero biased and inserted in series with a  $50\text{ }\Omega$  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

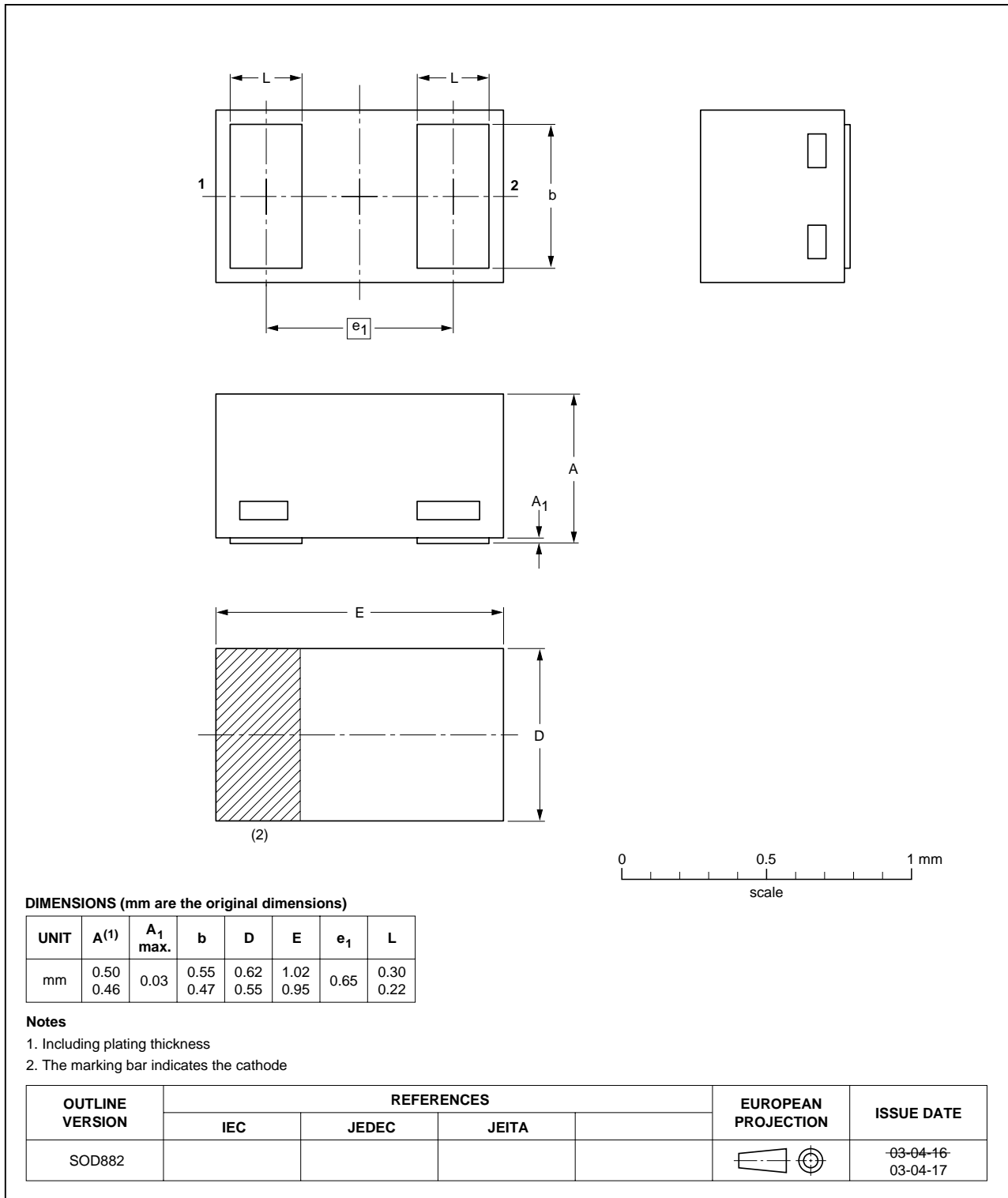


Fig 5. Package outline SOD882



## 9. Revision history

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**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 <sup>[1]</sup>	Product status <sup>[2]</sup> <sup>[3]</sup>	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.
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