

# BAP55L

## Silicon PIN diode

Rev. 01 — 5 April 2005

Preliminary data sheet

## 1. Product profile

### 1.1 General description

Planar PIN diode in a SOD882 leadless ultra small plastic SMD 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: Discrete pinning

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

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 2: Ordering information

Type number	Package			Version
	Name	Description		
BAP55L	-	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
BAP55L	E6

## 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		-	50	V
$I_F$	forward current		-	100	mA
$P_{tot}$	total power dissipation	$T_s = 90^\circ\text{C}$	-	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 soldering point		100	K/W

## 7. Characteristics

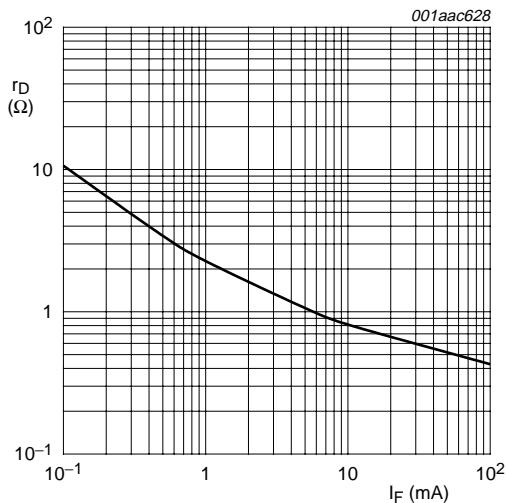
Table 6: Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 50\text{ mA}$	-	0.95	1.1	V
$I_R$	reverse current	$V_R = 20\text{ V}$	-	-	10	nA
		$V_R = 50\text{ V}$	-	-	0.1	μA
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; <a href="#">Figure 2</a>				
		$V_R = 0\text{ V}$	-	0.27	-	pF
		$V_R = 1\text{ V}$	-	0.23	-	pF
		$V_R = 20\text{ V}$	-	0.18	0.28	pF
$r_D$	diode forward resistance	$f = 100\text{ MHz}$ ; <a href="#">Figure 1</a>				
		$I_F = 0.5\text{ mA}$	-	3.4	4.5	Ω
		$I_F = 1\text{ mA}$	-	2.3	3.3	Ω
		$I_F = 10\text{ mA}$	-	0.8	1.2	Ω
		$I_F = 100\text{ mA}$	-	0.4	0.7	Ω

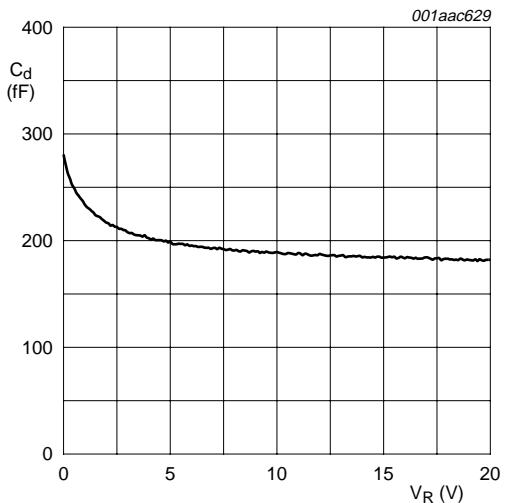
**Table 6: Characteristics ...continued**  
 $T_j = 25^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$ S_{12} ^2$	isolation	$V_R = 0 \text{ V}$ ; <a href="#">Figure 4</a>				
		$f = 900 \text{ MHz}$	-	17.6	-	dB
		$f = 1800 \text{ MHz}$	-	13	-	dB
		$f = 2450 \text{ MHz}$	-	11.1	-	dB
$ S_{21} ^2$	insertion loss	$I_F = 0.5 \text{ mA}$ ; <a href="#">Figure 3</a>				
		$f = 900 \text{ MHz}$	-	0.25	-	dB
		$f = 1800 \text{ MHz}$	-	0.27	-	dB
		$f = 2450 \text{ MHz}$	-	0.29	-	dB
	$I_F = 1 \text{ mA}$ ; <a href="#">Figure 3</a>					
		$f = 900 \text{ MHz}$	-	0.17	-	dB
		$f = 1800 \text{ MHz}$	-	0.19	-	dB
		$f = 2450 \text{ MHz}$	-	0.21	-	dB
	$I_F = 10 \text{ mA}$ ; <a href="#">Figure 3</a>					
		$f = 900 \text{ MHz}$	-	0.07	-	dB
		$f = 1800 \text{ MHz}$	-	0.09	-	dB
		$f = 2450 \text{ MHz}$	-	0.12	-	dB
	$I_F = 100 \text{ mA}$ ; <a href="#">Figure 3</a>					
		$f = 900 \text{ MHz}$	-	0.05	-	dB
		$f = 1800 \text{ MHz}$	-	0.07	-	dB
		$f = 2450 \text{ MHz}$	-	0.09	-	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 $I_R = 3 \text{ mA}$	-	0.28	-	$\mu\text{s}$
$L_S$	series inductance		-	0.6	-	nH



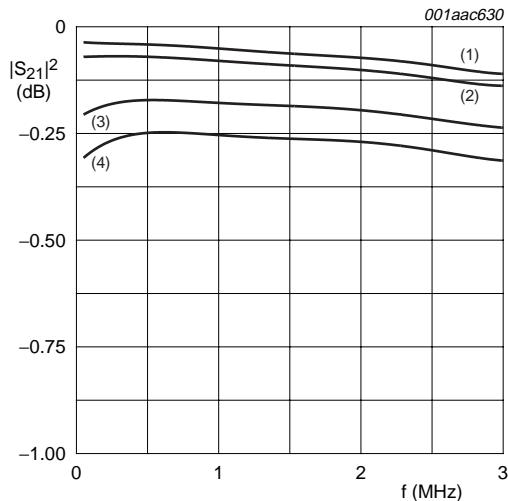
$f = 100 \text{ MHz}$ ;  $T_j = 25 \text{ }^\circ\text{C}$ .

**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**

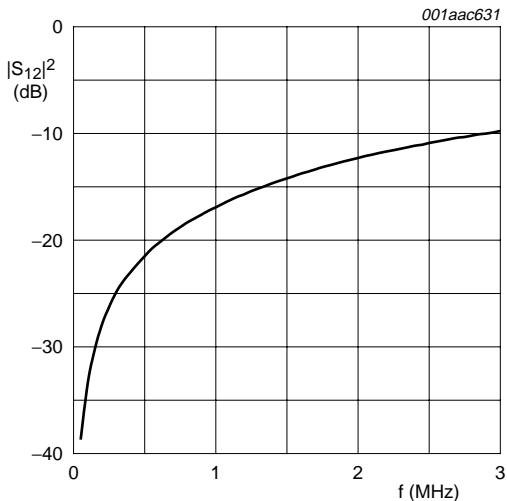


- (1)  $I_F = 100 \text{ mA}$ .
- (2)  $I_F = 10 \text{ mA}$ .
- (3)  $I_F = 1 \text{ mA}$ .
- (4)  $I_F = 0.5 \text{ mA}$ .

Diode inserted in series with a  $50 \Omega$  stripline circuit and biased via the analyzer Tee network.

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

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



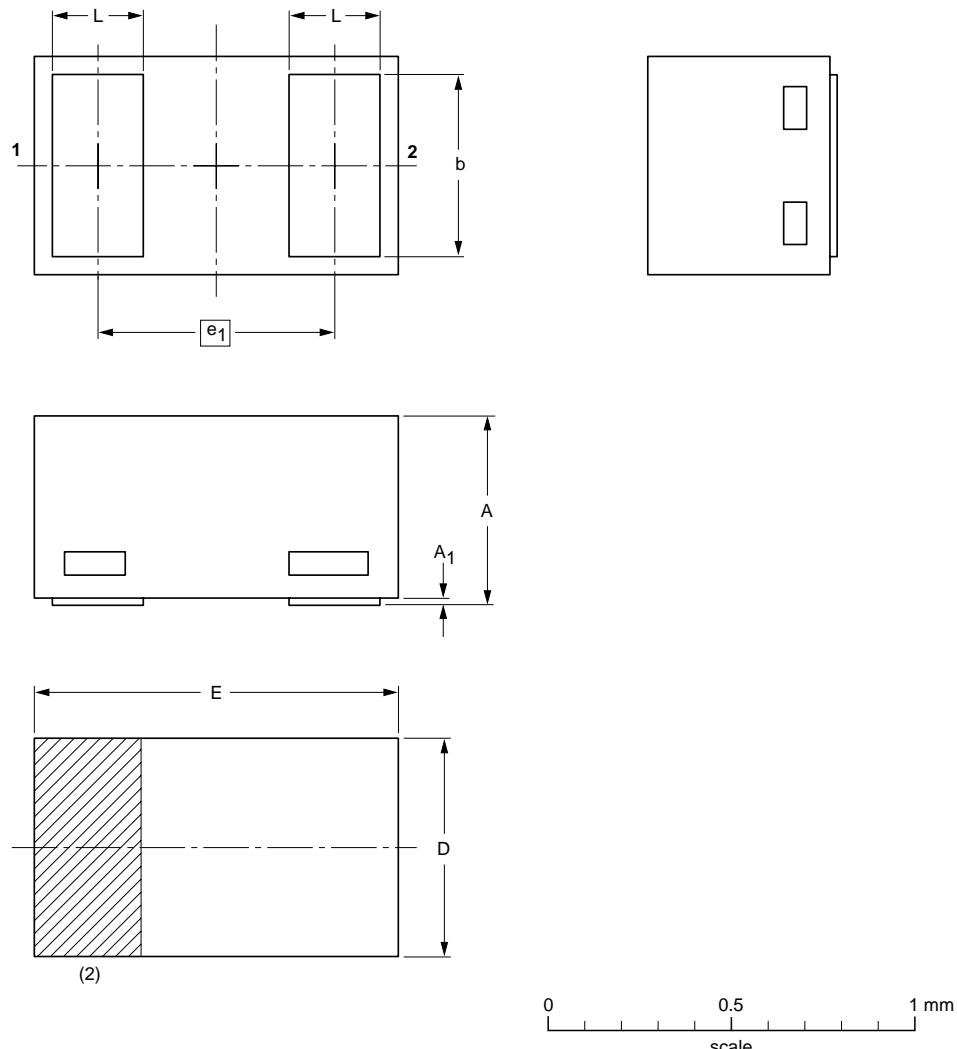
Diode zero biased and inserted in series with a  $50 \Omega$  stripline circuit.  
 $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ .

**Fig 4. Isolation ( $|S_{12}|^2$ ) 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 <sup>(1)</sup>	A <sub>1</sub> 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
BAP55L_1	20050405	Preliminary data sheet	-	9397 750 14811	-

## 10. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2][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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