

# BAP142L

Silicon PIN diode

Rev. 01 — 27 May 2004

Preliminary data sheet

## 1. Product profile

### 1.1 General description

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

### 1.2 Features

- High voltage, current controlled RF resistor
- Low losses at very low currents
- Low diode capacitance
- 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	 SOD882 Transparent top view	 sym006
2	anode		

[1] Package marked by a masking bar.

## 3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BAP142L	-	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
BAP142L	E1

## 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		-	50	V
$I_F$	continuous forward current		-	100	mA
$P_{tot}$	total power dissipation	$T_s = 90\text{ °C}$	-	315	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
$R_{th(j-s)}$	thermal resistance from junction to soldering point		190	K/W

## 7. Characteristics

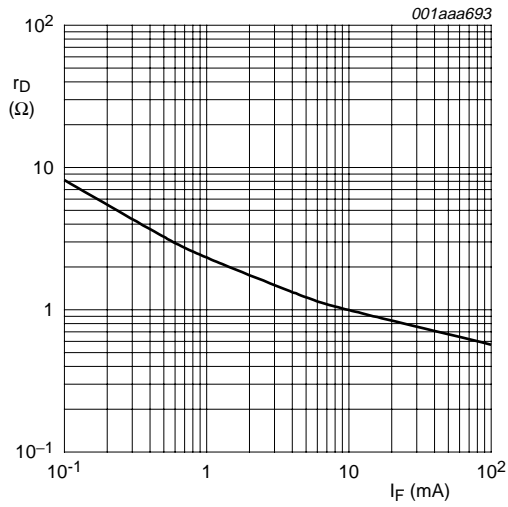
Table 6: Electrical characteristics

$T_j = 25\text{ °C}$  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
		$V_R = 20\text{ V}$	-	-	20	nA
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; see <a href="#">Figure 2</a>				
		$V_R = 0\text{ V}$	-	0.26	-	pF
		$V_R = 1\text{ V}$	-	0.23	0.35	pF
		$V_R = 20\text{ V}$	-	0.17	0.25	pF
$r_D$	diode forward resistance	$f = 100\text{ MHz}$ ; see <a href="#">Figure 1</a>				
		$I_F = 0.5\text{ mA}$	-	3.3	5.0	$\Omega$
		$I_F = 1\text{ mA}$	-	2.4	3.6	$\Omega$
		$I_F = 10\text{ mA}$	-	1.0	1.5	$\Omega$
		$I_F = 100\text{ mA}$	-	0.6	0.9	$\Omega$

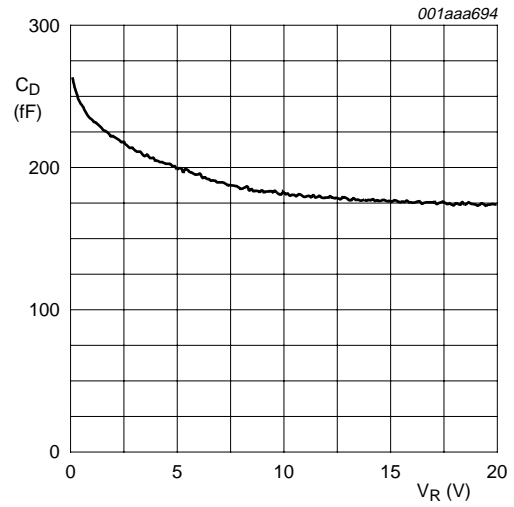
**Table 6: Electrical characteristics ...continued***T<sub>j</sub> = 25 °C unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$ s_{21} ^2$	isolation	$V_R = 0$ V; see <a href="#">Figure 4</a>				
		f = 900 MHz	-	16.0	-	dB
		f = 1800 MHz	-	11.6	-	dB
		f = 2450 MHz	-	9.9	-	dB
$ s_{21} ^2$	insertion loss	$I_F = 0.5$ mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.24	-	dB
		f = 1800 MHz	-	0.25	-	dB
		f = 2450 MHz	-	0.26	-	dB
$ s_{21} ^2$	insertion loss	$I_F = 1$ mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.18	-	dB
		f = 1800 MHz	-	0.19	-	dB
		f = 2450 MHz	-	0.21	-	dB
$ s_{21} ^2$	insertion loss	$I_F = 10$ mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.10	-	dB
		f = 1800 MHz	-	0.11	-	dB
		f = 2450 MHz	-	0.14	-	dB
$ s_{21} ^2$	insertion loss	$I_F = 100$ mA; see <a href="#">Figure 3</a>				
		f = 900 MHz	-	0.07	-	dB
		f = 1800 MHz	-	0.09	-	dB
		f = 2450 MHz	-	0.11	-	dB
$\tau_L$	charge carrier life time	when switched from $I_F = 10$ mA to $I_R = 6$ mA; $R_L = 100 \Omega$ ; measured at $I_R = 3$ mA	-	0.12	-	$\mu$ s
$L_S$	series inductance	$I_F = 100$ mA; f = 100 MHz	-	0.6	-	nH



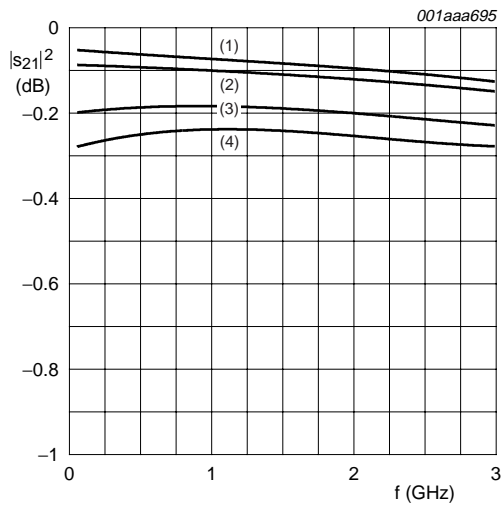
$f = 100 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

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



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

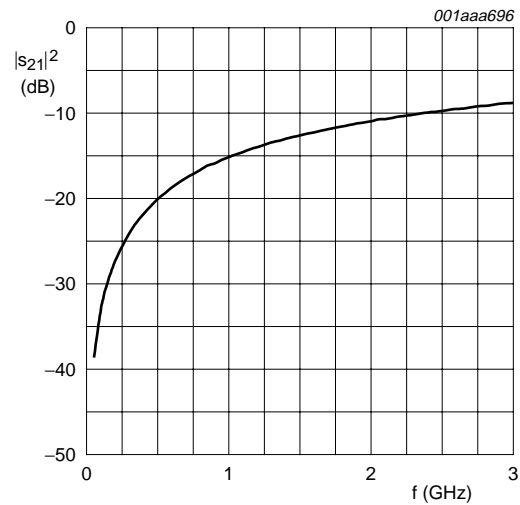
**Fig 2. Diode capacitance as a function of reverse voltage; typical values.**



- (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  $50 \text{ } \Omega$  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 a  $50 \text{ } \Omega$  microstrip circuit;  $T_{\text{amb}} = 25 \text{ }^\circ\text{C}.$

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

**8. Package outline**

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

SOD882

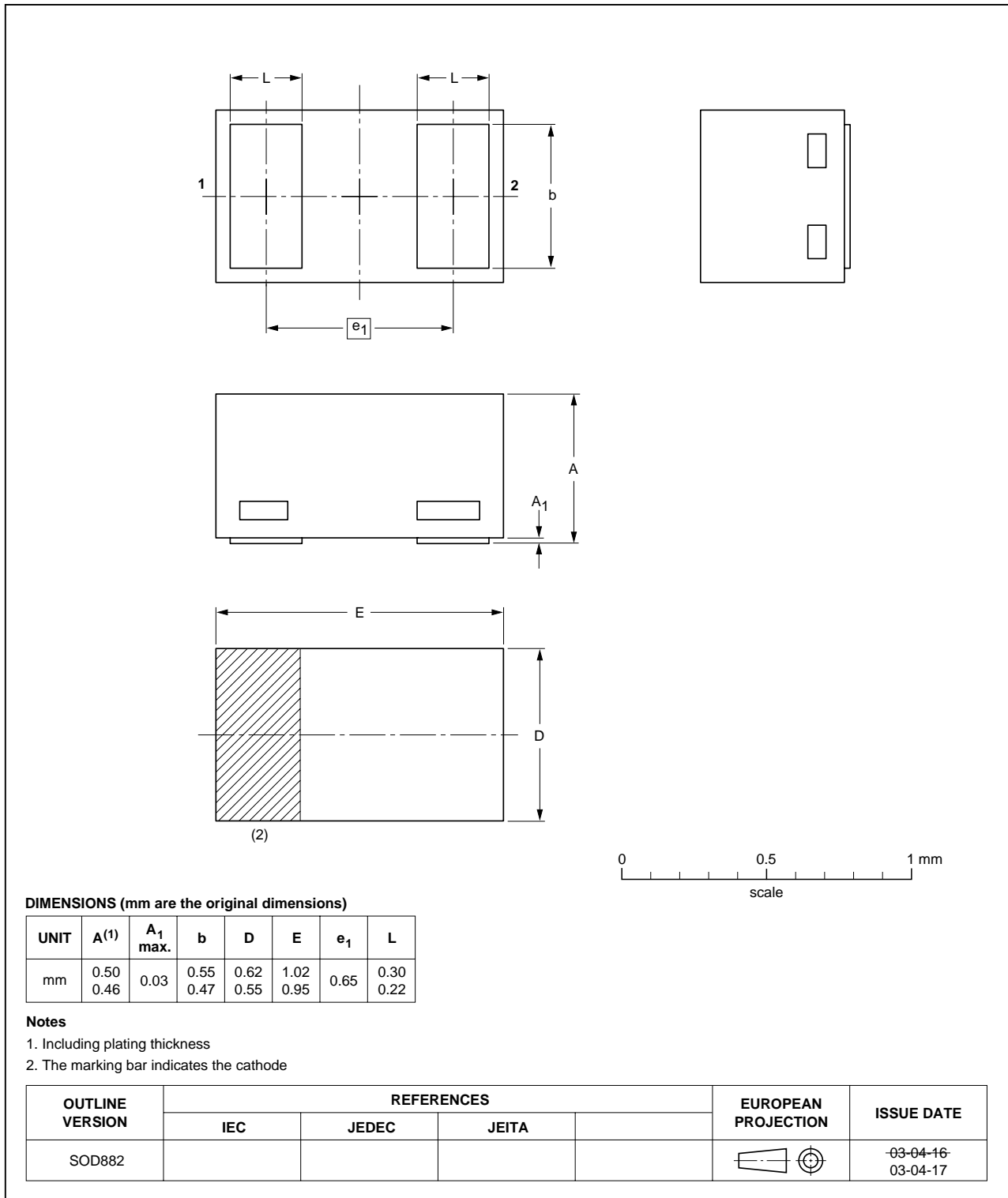


Fig 5. Package outline.



## 9. Revision history

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**Table 7: Revision history**

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
BAP142L_1	20040527	Preliminary data	-	9397 750 13056	-

## 10. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2]</sup> <sup>[3]</sup>	Definition
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