

# BAP63-02

## Silicon PIN diode

Rev. 04 — 8 January 2008

Product data sheet

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NXP Semiconductors

**Silicon PIN diode****BAP63-02****FEATURES**

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

**APPLICATIONS**

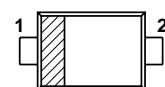
- RF attenuators and switches.

**DESCRIPTION**

Planar PIN diode in a SOD523 ultra small SMD plastic package.

**PINNING**

PIN	DESCRIPTION
1	cathode
2	anode



Top view

MAM405



Marking code: K5.

Fig.1 Simplified outline (SOD523) and symbol.

**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	$T_s \leq 90^\circ\text{C}$	–	715	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–65	+150	°C

## Silicon PIN diode

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## ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$V_F$	forward voltage	$I_F = 50 \text{ mA}$	0.95	1.1	V
$I_R$	reverse leakage current	$V_R = 35 \text{ V}$	—	10	nA
$C_d$	diode capacitance	$V_R = 0; f = 1 \text{ MHz}$	0.36	—	pF
		$V_R = 1 \text{ V}; f = 1 \text{ MHz}$	0.32	—	pF
		$V_R = 20 \text{ V}; f = 1 \text{ MHz}$	0.25	0.32	pF
$r_D$	diode forward resistance	$I_F = 0.5 \text{ mA}; f = 100 \text{ MHz}; \text{note 1}$	2.5	3.5	$\Omega$
		$I_F = 1 \text{ mA}; f = 100 \text{ MHz}; \text{note 1}$	1.95	3	$\Omega$
		$I_F = 10 \text{ mA}; f = 100 \text{ MHz}; \text{note 1}$	1.17	1.8	$\Omega$
		$I_F = 100 \text{ mA}; f = 100 \text{ MHz}; \text{note 1}$	0.9	1.5	$\Omega$
$ S_{21} ^2$	isolation	$V_R = 0; f = 900 \text{ MHz}$	15.6	—	dB
		$V_R = 0; f = 1800 \text{ MHz}$	10.3	—	dB
		$V_R = 0; f = 2450 \text{ MHz}$	8.3	—	dB
$ S_{21} ^2$	insertion loss	$I_F = 0.5 \text{ mA}; f = 900 \text{ MHz}$	0.19	—	dB
		$I_F = 0.5 \text{ mA}; f = 1800 \text{ MHz}$	0.24	—	dB
		$I_F = 0.5 \text{ mA}; f = 2450 \text{ MHz}$	0.28	—	dB
$ S_{21} ^2$	insertion loss	$I_F = 1 \text{ mA}; f = 900 \text{ MHz}$	0.16	—	dB
		$I_F = 1 \text{ mA}; f = 1800 \text{ MHz}$	0.20	—	dB
		$I_F = 1 \text{ mA}; f = 2450 \text{ MHz}$	0.25	—	dB
$ S_{21} ^2$	insertion loss	$I_F = 10 \text{ mA}; f = 900 \text{ MHz}$	0.10	—	dB
		$I_F = 10 \text{ mA}; f = 1800 \text{ MHz}$	0.16	—	dB
		$I_F = 10 \text{ mA}; f = 2450 \text{ MHz}$	0.20	—	dB
$ S_{21} ^2$	insertion loss	$I_F = 100 \text{ mA}; f = 900 \text{ MHz}$	0.09	—	dB
		$I_F = 100 \text{ mA}; f = 1800 \text{ MHz}$	0.14	—	dB
		$I_F = 100 \text{ mA}; f = 2450 \text{ MHz}$	0.18	—	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 $I_R = 3 \text{ mA}$	310	—	ns
$L_S$	series inductance	$I_F = 100 \text{ mA}; f = 100 \text{ MHz}$	0.6	—	nH

## Note

- Guaranteed on AQL basis: inspection level S4, AQL 1.0.

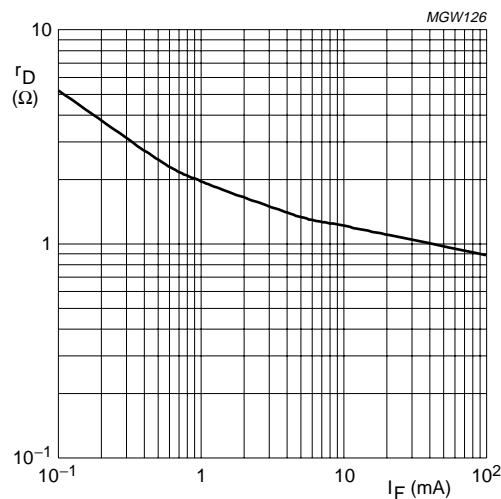
## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th,j-s}$	thermal resistance from junction to soldering point	85	K/W

## Silicon PIN diode

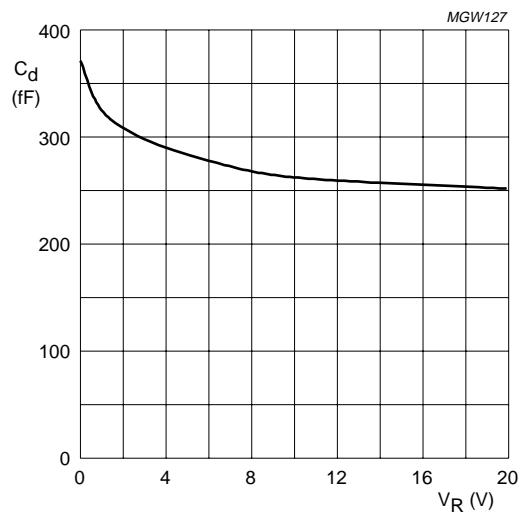
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## GRAPHICAL DATA



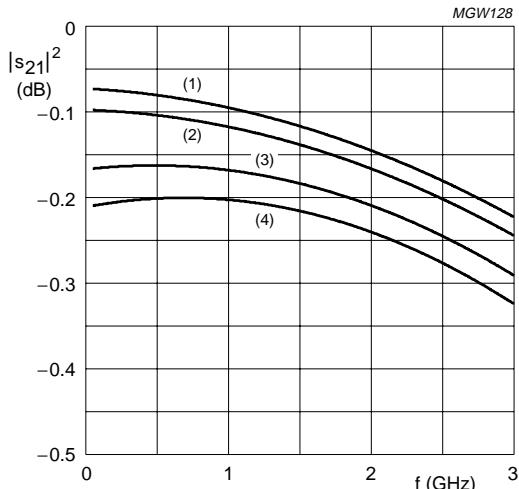
$f = 100$  MHz;  $T_j = 25$  °C.

Fig.2 Forward resistance as a function of forward current; typical values.



$f = 1$  MHz;  $T_j = 25$  °C.

Fig.3 Diode capacitance as a function of reverse voltage; typical values.

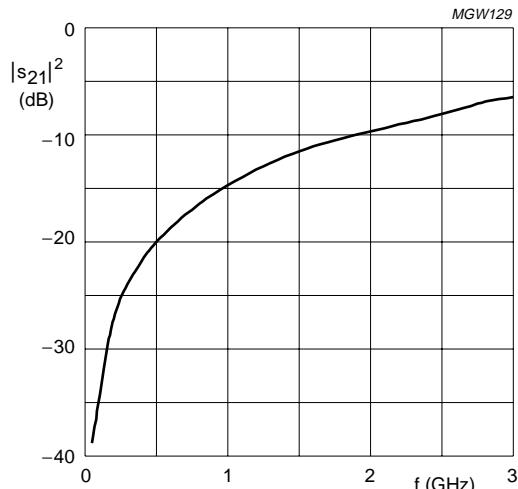


(1)  $I_F = 100$  mA. (3)  $I_F = 1$  mA.  
 (2)  $I_F = 10$  mA. (4)  $I_F = 0.5$  mA.

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

$T_{amb} = 25$  °C.

Fig.4 Insertion loss ( $|s_{21}|^2$ ) of the diode in on-state as a function of frequency; typical values.



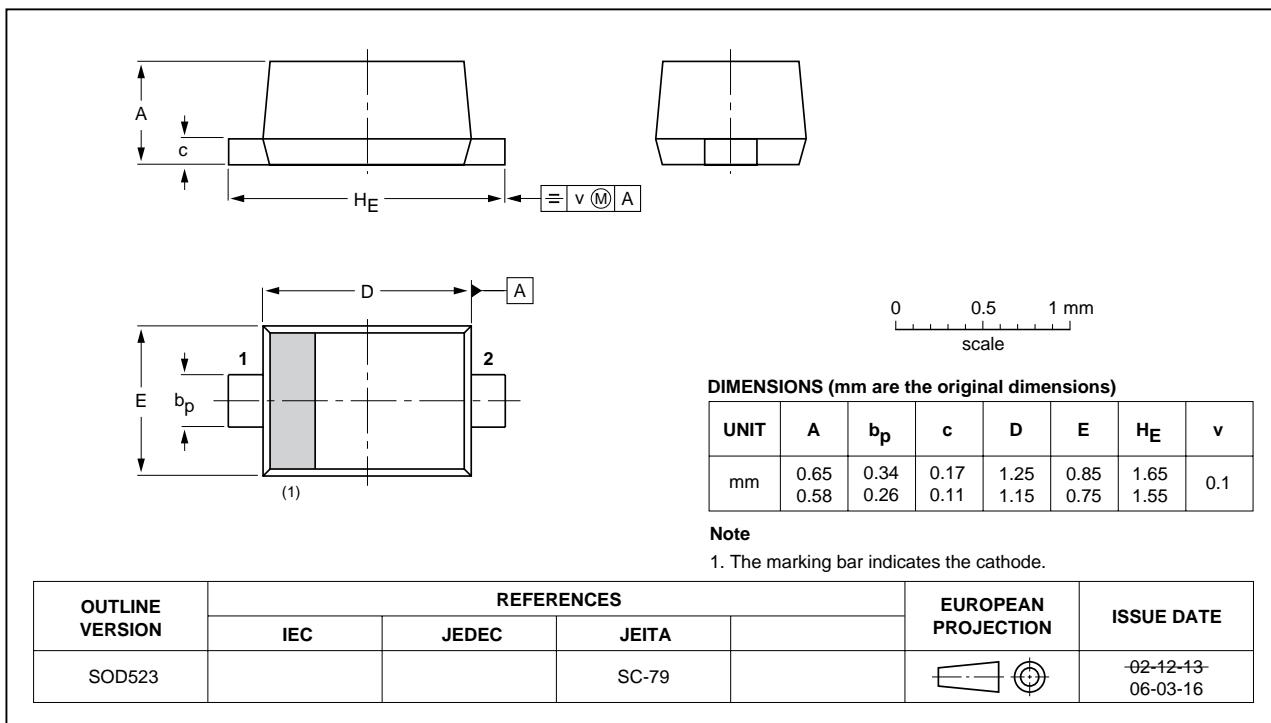
Diode zero biased and inserted in series with a  $50 \Omega$  stripline circuit.  $T_{amb} = 25$  °C.

Fig.5 Isolation ( $|s_{21}|^2$ ) of the diode in off-state as a function of frequency; typical values.

## Silicon PIN diode

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## PACKAGE OUTLINE

Plastic surface-mounted package; 2 leads SOD523

## Legal information

### Data sheet status

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

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## Revision history

### Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAP63-02_N_4	20080108	Product data sheet	-	BAP63-02_3
Modifications:		• Package outline drawing on page 5 changed		
BAP63-02_3 (9397 750 08261)	20010518	Product specification	-	BAP63-02_N_2
BAP63-02_N_2 (9397 750 08141)	20010320	Preliminary specification	-	BAP63-02_N_1
BAP63-02_N_1 (9397 750 08051)	20010220	Preliminary specification	-	-

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