

# BAP65-05W

Silicon PIN diode

Rev. 2 — 27 September 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Two planar PIN diodes in a SOT323 small SMD plastic package.

### 1.2 Features and benefits

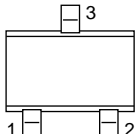
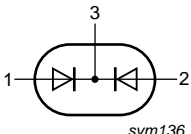
- Two elements in common cathode configuration
- High voltage, current controlled
- RF resistor for RF switches
- Low diode capacitance
- Low diode forward resistance (low loss)

### 1.3 Applications

- RF attenuators and switches
- Bandswitch for TV tuners
- Series diode for mobile communication transmit/receive switch

## 2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	anode (a <sub>1</sub> )		 <i>sym136</i>
2	anode (a <sub>2</sub> )		
3	common cathode		

## 3. Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BAP65-05W	-	plastic surface-mounted package; 3 leads	SOT323



## 4. Marking

**Table 3. Marking codes**

Type number	Marking code
BAP65-05W	V6-

## 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		-	30	V
$I_F$	continuous forward current		-	100	mA
$P_{tot}$	total power dissipation	$T_s \leq 90\text{ °C}$	-	240	mW
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-65	+150	°C
$T_{amb}$	ambient temperature		-40	+85	°C

## 6. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Typ	Unit
$R_{th\ j-s}$	thermal resistance from junction to soldering point		250	K/W

## 7. Characteristics

**Table 6. Characteristics**

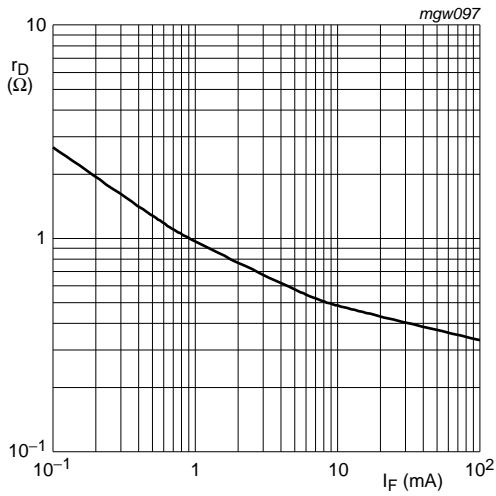
$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_F$	forward voltage	$I_F = 50\text{ mA}$	-	0.9	1.1	V	
$I_R$	reverse leakage current	$V_R = 20\text{ V}$	-	-	20	nA	
$C_d$	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}$	-	0.7	-	pF	
		$V_R = 1\text{ V}; f = 1\text{ MHz}$	-	0.575	0.9	pF	
		$V_R = 3\text{ V}; f = 1\text{ MHz}$	-	0.525	0.8	pF	
		$V_R = 20\text{ V}; f = 1\text{ MHz}$	-	0.425	-	pF	
$r_D$	diode forward resistance	$I_F = 1\text{ mA}; f = 100\text{ MHz}$	-	1	-	$\Omega$	
		$I_F = 5\text{ mA}; f = 100\text{ MHz}$	[1]	-	0.65	0.95	$\Omega$
		$I_F = 10\text{ mA}; f = 100\text{ MHz}$	[1]	-	0.56	0.9	$\Omega$
		$I_F = 100\text{ mA}; f = 100\text{ MHz}$	-	-	0.35	-	$\Omega$
$ S_{21} ^2$	isolation	$V_R = 0; f = 900\text{ MHz}$	-	9.3	-	dB	
		$V_R = 0; f = 1800\text{ MHz}$	-	5.3	-	dB	
		$V_R = 0; f = 2450\text{ MHz}$	-	3.5	-	dB	

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

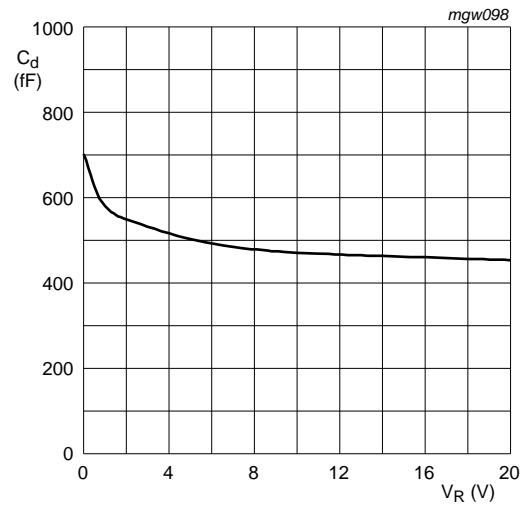
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$ S_{21} ^2$	insertion loss	$I_F = 1\text{ mA}; f = 900\text{ MHz}$	-	0.11	-	dB
		$I_F = 1\text{ mA}; f = 1800\text{ MHz}$	-	0.17	-	dB
		$I_F = 1\text{ mA}; f = 2450\text{ MHz}$	-	0.24	-	dB
$ S_{21} ^2$	insertion loss	$I_F = 5\text{ mA}; f = 900\text{ MHz}$	-	0.08	-	dB
		$I_F = 5\text{ mA}; f = 1800\text{ MHz}$	-	0.14	-	dB
		$I_F = 5\text{ mA}; f = 2450\text{ MHz}$	-	0.21	-	dB
$ S_{21} ^2$	insertion loss	$I_F = 10\text{ mA}; f = 900\text{ MHz}$	-	0.08	-	dB
		$I_F = 10\text{ mA}; f = 1800\text{ MHz}$	-	0.14	-	dB
		$I_F = 10\text{ mA}; f = 2450\text{ MHz}$	-	0.21	-	dB
$ S_{21} ^2$	insertion loss	$I_F = 100\text{ mA}; f = 900\text{ MHz}$	-	0.06	-	dB
		$I_F = 100\text{ mA}; f = 1800\text{ MHz}$	-	0.13	-	dB
		$I_F = 100\text{ mA}; f = 2450\text{ MHz}$	-	0.2	-	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 $I_R = 3\text{ mA}$	-	0.17	-	$\mu\text{s}$
$L_S$	series inductance	$I_F = 100\text{ mA}; f = 100\text{ MHz}$	-	1.4	-	nH

[1] Guaranteed on AQL basis: inspection level S4, AQL 1.0.



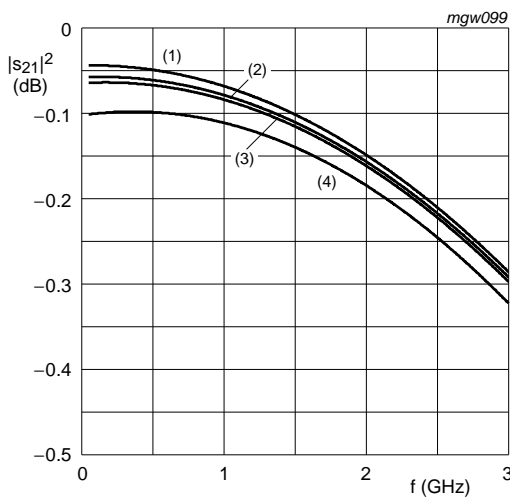
f = 100 MHz; T<sub>j</sub> = 25 °C

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



f = 1 MHz; T<sub>j</sub> = 25 °C

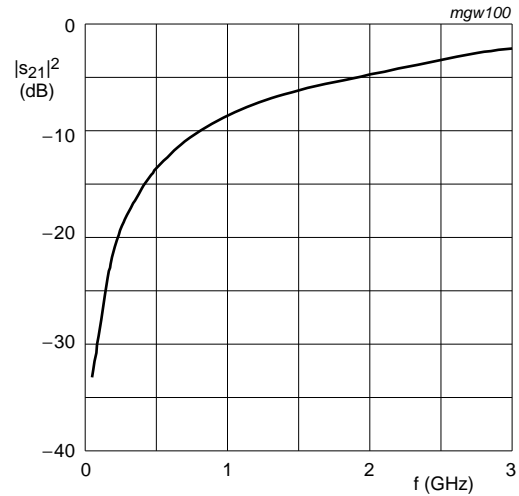
**Fig. 2. Diode capacitance as a function of reverse voltage; typical values**



- (1) I<sub>F</sub> = 100 mA
- (2) I<sub>F</sub> = 10 mA
- (3) I<sub>F</sub> = 5 mA
- (4) I<sub>F</sub> = 1 mA

Diode inserted in series with a 50 Ω stripline circuit and biased via the analyzer Tee network. T<sub>amb</sub> = 25 °C.

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



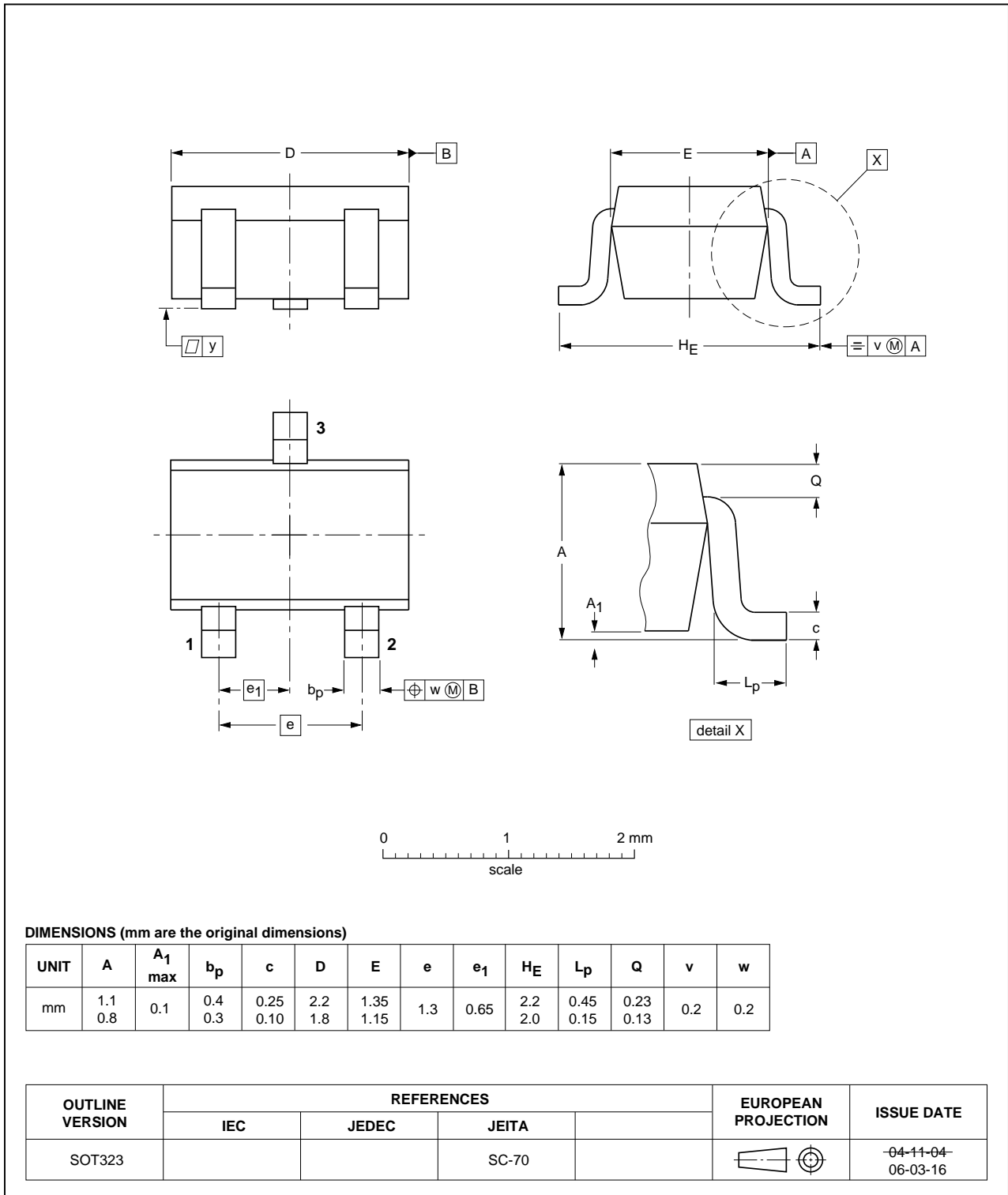
Diode zero biased and inserted in series with a 50 Ω stripline circuit. T<sub>amb</sub> = 25 °C.

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

**8. Package outline**

Plastic surface-mounted package; 3 leads

SOT323



**Fig 5. Package outline SOT323**

## 9. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAP65-05W v.2	20100927	Product data sheet	-	BAP65-05W v.1
Modifications:		<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been updated.</li><li>• <a href="#">Figure 5</a>: package outline drawing has been updated to the latest version.</li><li>• <a href="#">Table 4 “Limiting values”</a>: added T<sub>amb</sub> (ambient temperature).</li></ul>		
BAP65-05W v.1 (9397 750 08115)	20010507	Product specification	-	-

## 10. Legal information

### 10.1 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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