



BAP50-04

Silicon PIN diode

Rev. 3.1 — 8 February 2019

Product data sheet

1 Product profile

1.1 General description

Two planar PIN diodes in series configuration in an SOT23 small plastic SMD package.

1.2 Features and benefits

- Two elements in series configuration in a small-sized plastic SMD package
- Low diode capacitance
- Low diode forward resistance

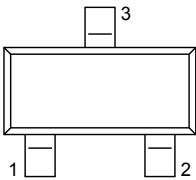
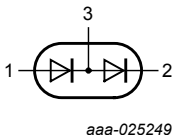
1.3 Applications

- General RF application



2 Pinning information

Table 1. Discrete pinning

Pin	Description	Simplified outline	Graphic symbol
1	anode	 Top view	 aaa-025249
2	cathode		
3	common connection		

3 Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BAP50-04	-	plastic surface-mounted package; 3 leads	SOT23

4 Marking

Table 3. Marking code

Type number	Marking code
BAP50-04	4L%

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		-	50	mA
P_{tot}	total power dissipation	$T_{sp} \leq 90\text{ °C}$	-	250	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		220	K/W

7 Characteristics

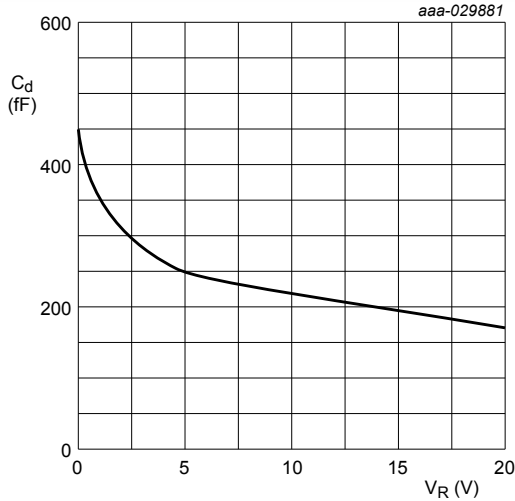
Table 6. Characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	$I_F = 50\text{ mA}$		-	0.95	1.1	V
V_R	reverse voltage	$I_R = 10\text{ }\mu\text{A}$		50	-	-	V
I_R	reverse current	$V_R = 50\text{ V}$		-	-	100	nA
C_d	diode capacitance	$f = 1\text{ MHz}$ (see Figure 1)					
		$V_R = 0\text{ V}$		-	0.45	-	pF
		$V_R = 1\text{ V}$		-	0.35	0.6	pF
		$V_R = 5\text{ V}$		-	0.3	0.5	pF
r_D	diode forward resistance	$f = 100\text{ MHz}$ (see Figure 2)					
		$I_F = 0.5\text{ mA}$	[1]	-	25	40	Ω
		$I_F = 1\text{ mA}$	[1]	-	14	25	Ω
		$I_F = 10\text{ mA}$	[1]	-	3	5	Ω
τ_L	charge carrier life time	when switched from $I_F = 10\text{ mA}$ to $I_R 6\text{ mA}$; $R_L = 100\text{ }\Omega$; measured at $I_R 3\text{ mA}$		-	1.05	-	μs
L_S	series inductance			-	1.4	-	nH

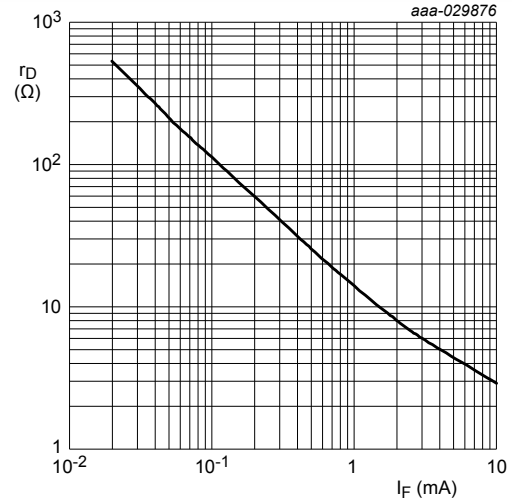
[1] Guaranteed on AQL basis: inspection level S4, AQL 1.0.

8 Graphical data



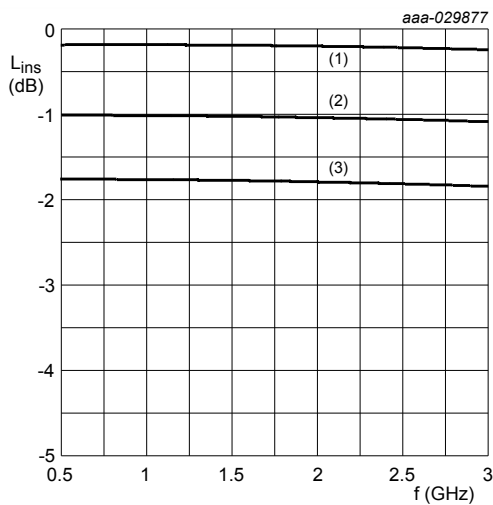
$f = 1 \text{ MHz}$; $T_j = 25^\circ\text{C}$.

Figure 1. Diode capacitance as a function of reverse voltage (typical values)



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

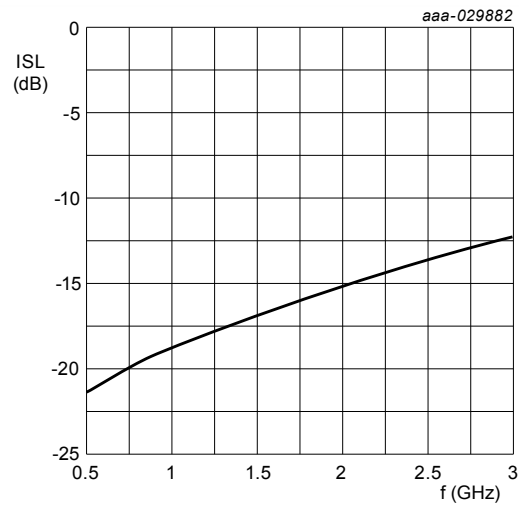
Figure 2. Diode forward resistance as a function of forward current (typical values)



Diode inserted in series with a 50Ω strip line circuit and biased via the analyzer T-network. $T_{\text{amb}} = 25^\circ\text{C}$.

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

Figure 3. Insertion loss of the diode as a function of frequency (typical values)



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

Figure 4. Isolation of the diode as a function of frequency (typical values)

9 Package outline

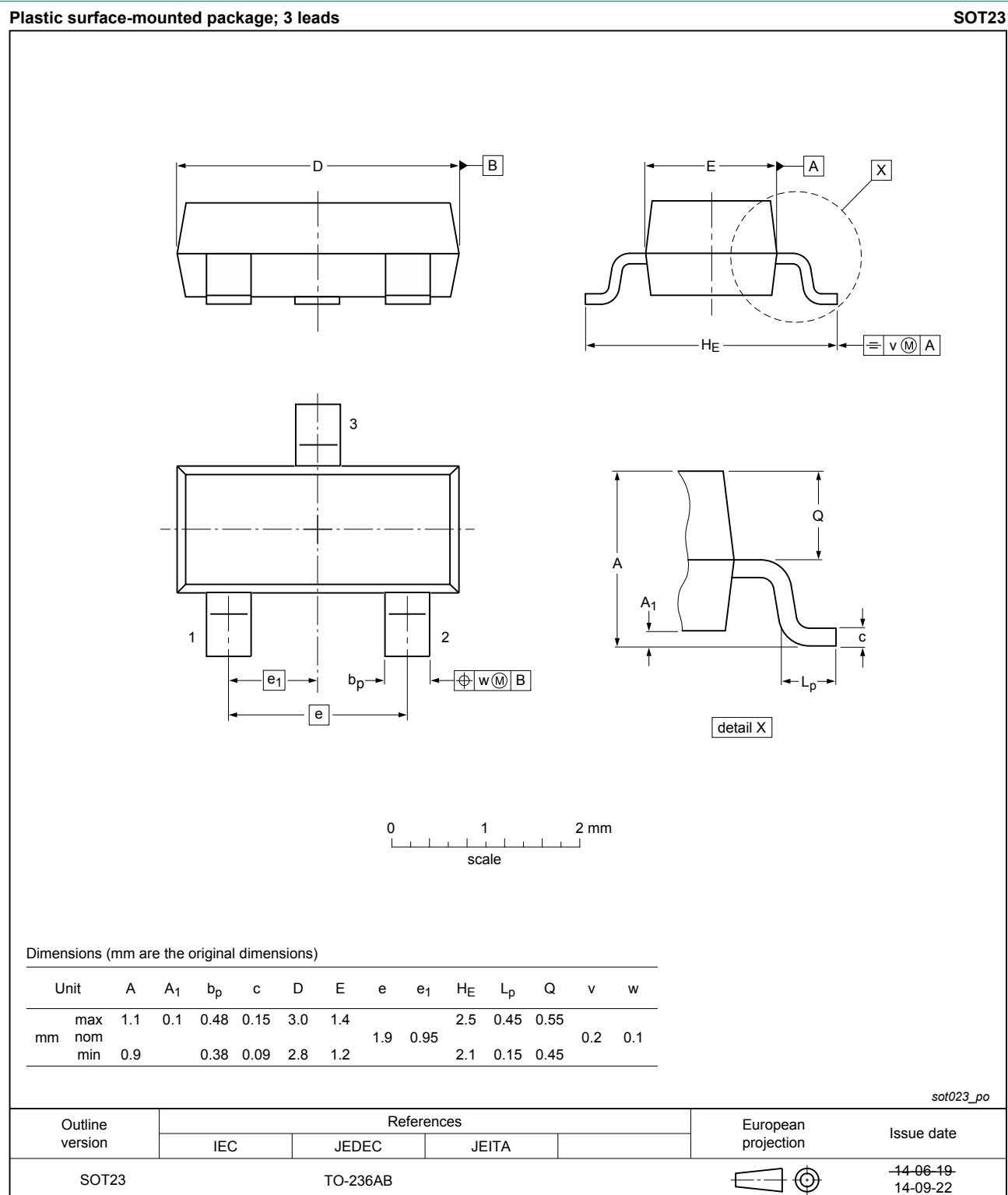


Figure 5. Package outline SOT023

10 Abbreviations

Table 7. Abbreviations

Acronym	Description
AQL	acceptable quality level
PIN	P-type, intrinsic, N-type
RF	radio frequency
S4	special inspection level 4
SMD	surface-mounted device

11 Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAP50-04 v.3.1	20190208	Product data sheet	-	BAP50-04 v.3
Modifications:	• aligned the title of the data sheet with the description on the Internet			
BAP50-04 v.3	20181126	Product data sheet	-	BAP50-04 v.2.1
Modifications:	• Section 1.2 "Features and benefits" has been updated. • The "Legal information" pages have been updated.			
BAP50-04 v.2.1	19991203	Product data sheet	-	BAP50-04 v.1

12 Legal information

12.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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