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

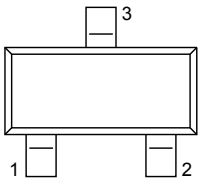
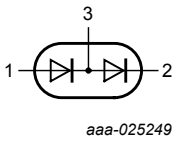
- Two elements in series configuration in a small-sized plastic SMD package
- Low diode capacitance
- Low diode forward resistance

1.3 Applications

- General RF application

2 Pinning information

Table 1. Discrete pinning

Pin	Description	Simplified outline	Graphic symbol
1	anode	 Top view	
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	$T_{sp} \leq 90$ °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
$R_{th(j\text{-}sp)}$	thermal resistance from junction to solder point		220	K/W

7 Characteristics

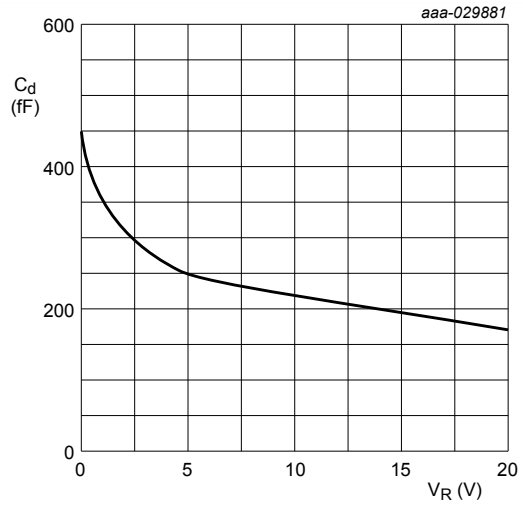
Table 6. Characteristics

T_j = 25 °C unless otherwise specified.

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

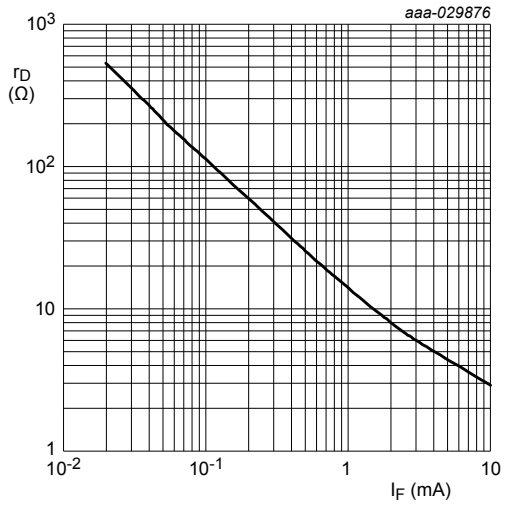
[1] Guaranteed on AQL basis: inspection level S4, AQL 1.0.

8 Graphical data



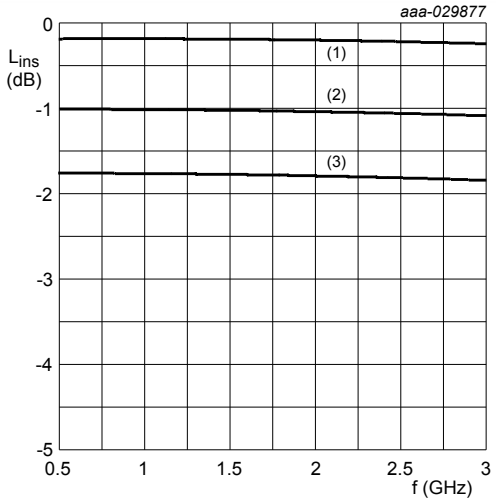
f = 1 MHz; T_j = 25 °C.

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



f = 100 MHz; T_j = 25 °C.

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



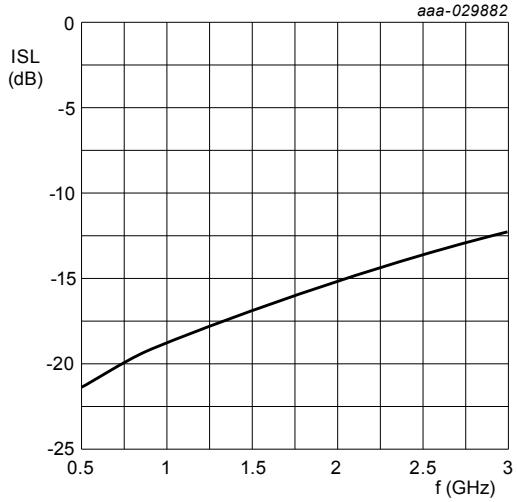
Diode inserted in series with a 50 Ω strip line circuit and biased via the analyzer T-network. T_{amb} = 25 °C.

(1) I_F = 10 mA

(2) I_F = 1 mA

(3) I_F = 0.5 mA

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

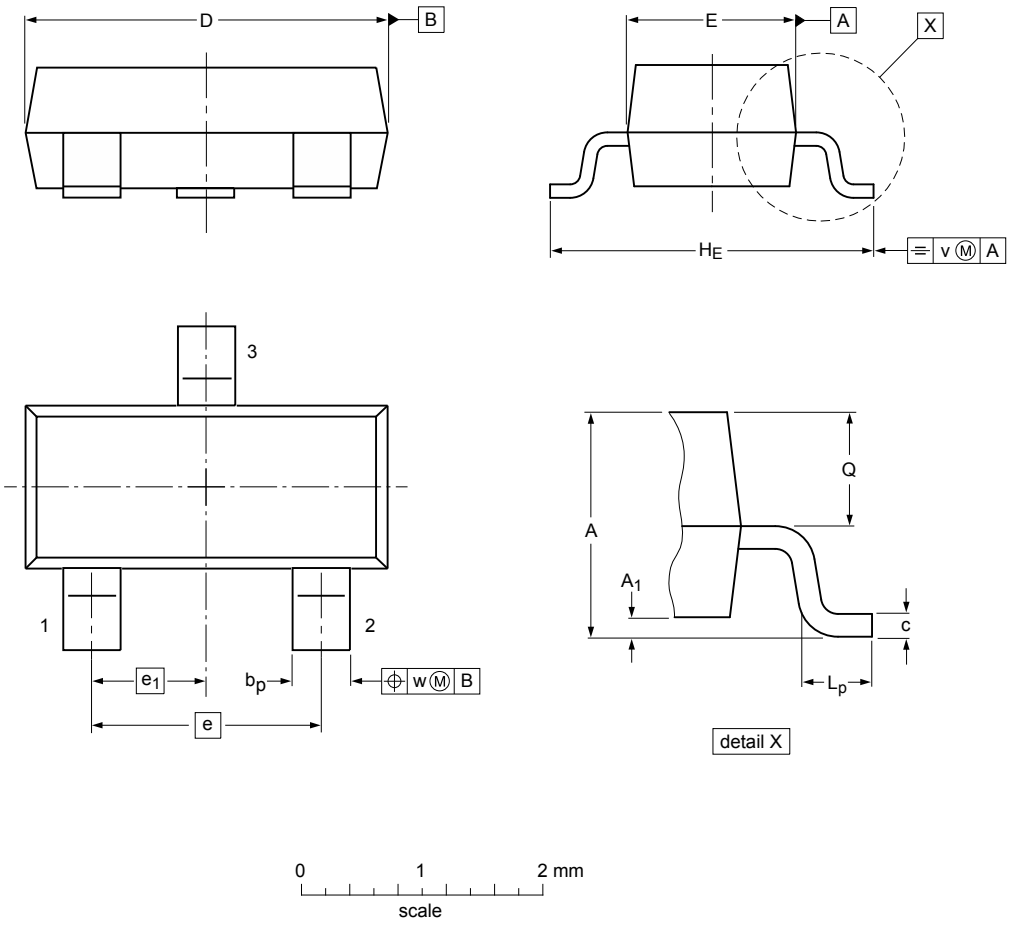


Diode zero biased and inserted in series with a 50 Ω strip line circuit. T_{amb} = 25 °C.

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

9 Package outline

Plastic surface-mounted package; 3 leads **SOT23**



Dimensions (mm are the original dimensions)

Unit		A	A_1	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	max	1.1	0.1	0.48	0.15	3.0	1.4			2.5	0.45	0.55		
	nom							1.9	0.95				0.2	0.1
	min	0.9		0.38	0.09	2.8	1.2			2.1	0.15	0.45		

sot023_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT23		TO-236AB				~~14-06-19~~ 14-09-22

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".
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