

BAP51-03

Silicon PIN diode

Rev. 5.1 — 8 February 2019

Product data sheet

1 Product profile

1.1 General description

General-purpose pin diode in an SOD323 small plastic SMD package.

1.2 Features and benefits

- Low diode capacitance: maximum 1.05 pF
- Low diode forward resistance: max. 0.7 Ω
- AEC-Q101 qualified

1.3 Applications

- General RF applications

2 Pinning information

Table 1. Discrete pinning

Pin	Description	Simplified outline	Graphic symbol
1	cathode	 Top view	 sym006
2	anode		

3 Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BAP51-03	-	plastic surface-mounted package; 2 leads	SOD323

4 Marking

Table 3. Marking code

Type number	Marking code
BAP51-03	A5 ^[1]

[1] The marking bar indicates the cathode (see simplified outline graphic in [Table 1](#)).



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		-	50	mA
P_{tot}	total power dissipation	$T_{sp} \leq 90\text{ }^{\circ}\text{C}$	-	500	mW
T_{stg}	storage temperature		-65	+150	$^{\circ}\text{C}$
T_j	junction temperature		-65	+150	$^{\circ}\text{C}$

6 Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point		120	K/W

7 Characteristics

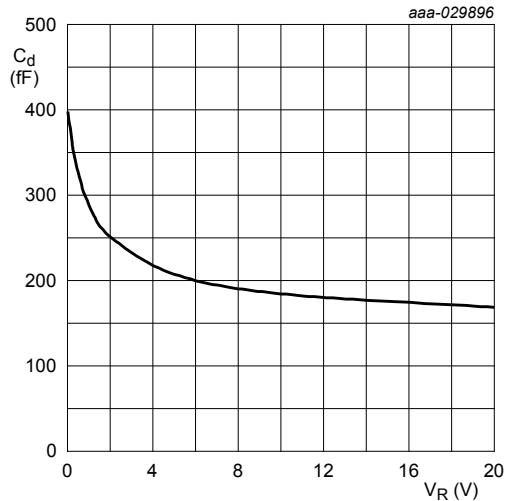
Table 6. Characteristics

$T_j = 25\text{ }^{\circ}\text{C}$ 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)				
		$V_R = 0\text{ V}$	-	0.4	-	pF
		$V_R = 1\text{ V}$	-	0.3	0.55	pF
		$V_R = 5\text{ V}$	-	0.2	0.35	pF
r_D	diode forward resistance	$f = 100\text{ MHz}$ (see Figure 2)				
		$I_F = 0.5\text{ mA}$	[1] -	5.5	9	Ω
		$I_F = 1\text{ mA}$	[1] -	3.6	6.5	Ω
		$I_F = 10\text{ mA}$	[1] -	1.5	2.5	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 $I_R = 3\text{ mA}$	-	550	-	ns

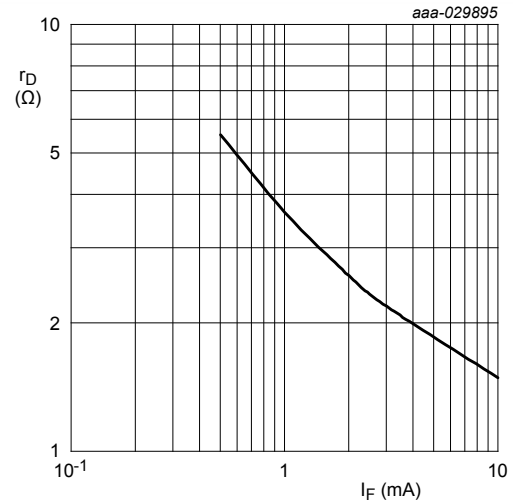
[1] Guaranteed on AQL basis; inspection level S4, AQL 1.0

8 Graphical data



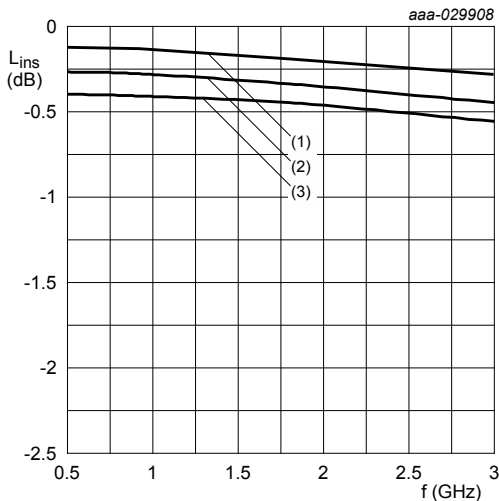
$T_j = 25\text{ }^{\circ}\text{C}$; $f = 1\text{ MHz}$

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



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

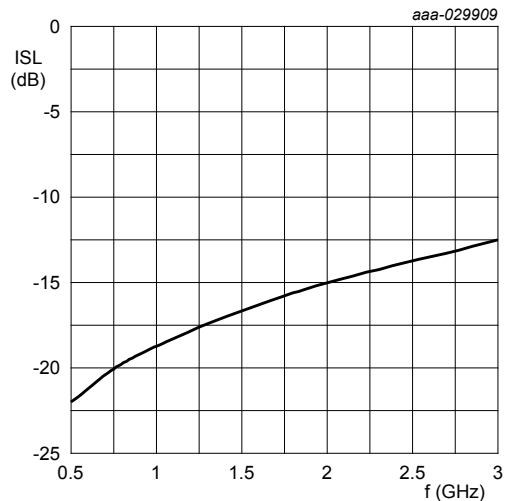
Figure 2. Diode forward resistance as a function of forward current (typical values)



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

- (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 $50\text{ }\Omega$ strip line circuit and biased via the analyzer T-network; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$; $f = 100\text{ MHz}$

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

9 Package outline

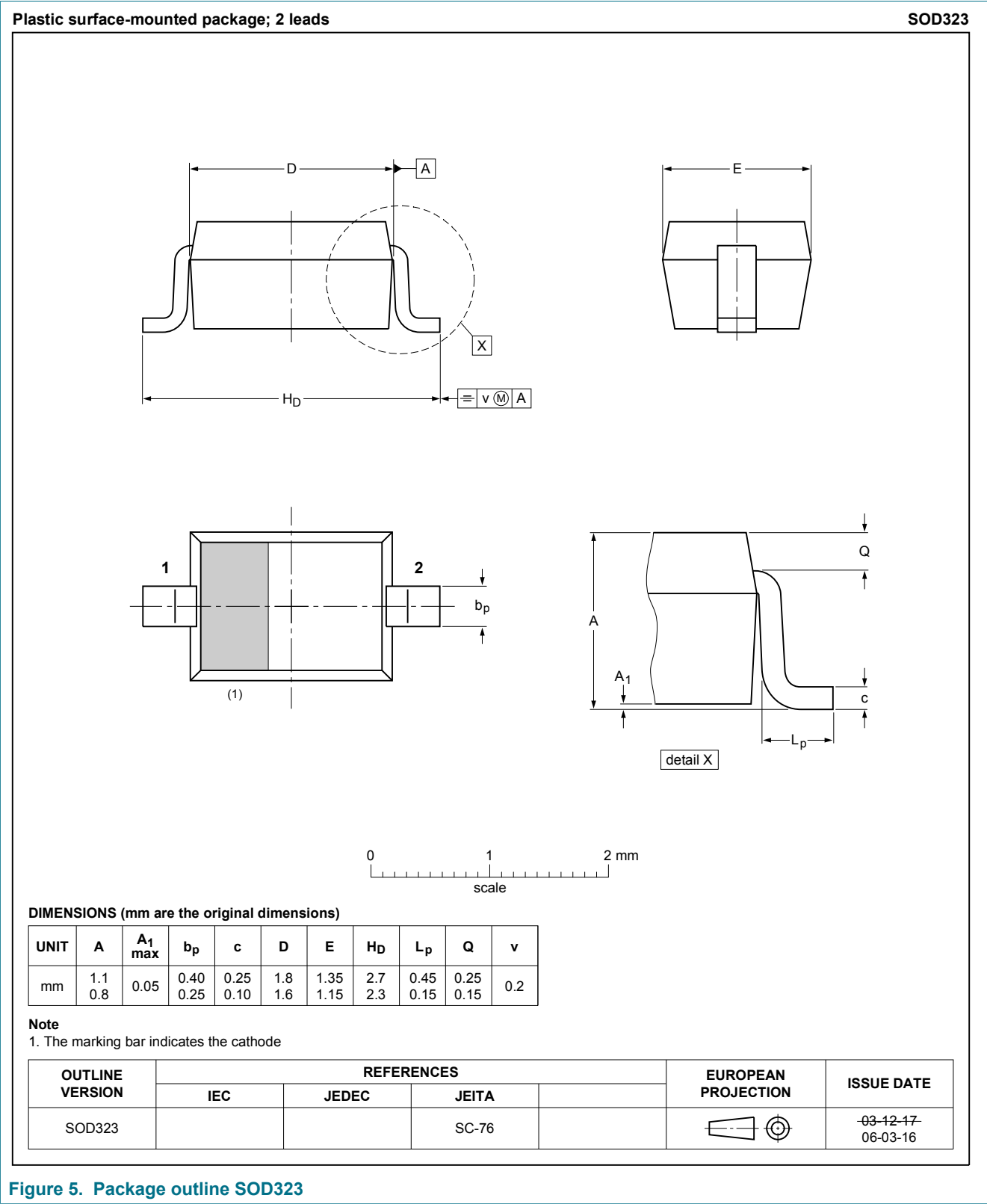


Figure 5. Package outline SOD323

10 Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAP51-03 v.5.1	20190208	Product data sheet	-	BAP51-03 v.5
Modifications:	• aligned the title of the data sheet with the description on the Internet			
BAP51-03 v.5	20181126	Product data sheet	-	BAP51-03 v.3.1
Modifications:	• AEC-Q101 qualification added to the features and benefits • Section 1.2 "Features and benefits" has been updated. • The "Legal information" pages have been updated to automotive version			
BAP51-03 v.4.1	20040211	Product data sheet	-	-

11 Legal information

11.1 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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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А