



# BAP51-02

Silicon PIN diode

Rev. 4.1 — 8 February 2019

Product data sheet

## 1 Product profile

### 1.1 General description

General-purpose PIN diode in an SOD523 ultra-small SMD plastic package.

### 1.2 Features and benefits



- Low diode capacitance
- Low diode forward resistance
- 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	 <i>sym006</i>
2	anode		

## 3 Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BAP51-02	-	plastic surface-mounted package; 2 leads	SOD523

## 4 Marking

Table 3. Marking code

Type number	Marking code
BAP51-02	K1 <sup>[1]</sup>



[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		-	60	V
$I_F$	continuous forward current		-	50	mA
$P_{tot}$	total power dissipation	$T_{sp} \leq 90\text{ °C}$	-	715	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		85	K/W

## 7 Characteristics

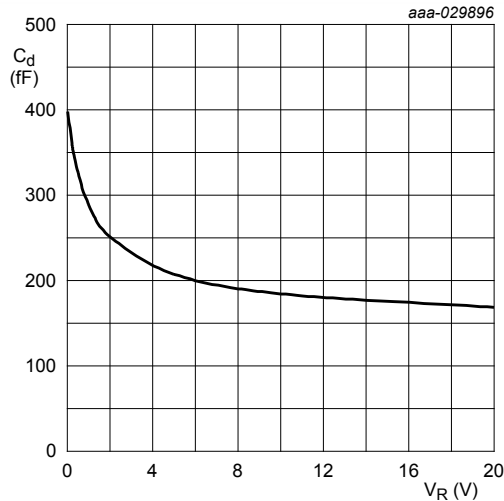
**Table 6. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 50\text{ mA}$	-	0.95	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 <a href="#">Figure 1</a> )				
		$V_R = 0\text{ V}$	-	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 <a href="#">Figure 2</a> )				
		$I_F = 0.5\text{ mA}$	<sup>[1]</sup> -	5.5	9	$\Omega$
		$I_F = 1\text{ mA}$	<sup>[1]</sup> -	3.6	6.5	$\Omega$
		$I_F = 10\text{ mA}$	<sup>[1]</sup> -	1.5	2.5	$\Omega$

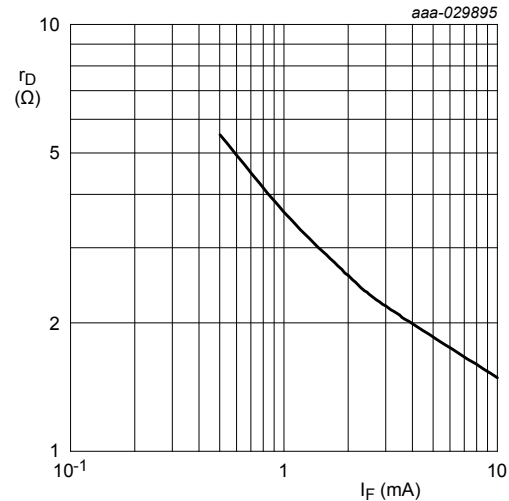
[1] Guaranteed on AQL basis: inspection level S4, AQL 1.0.

## 8 Graphical data



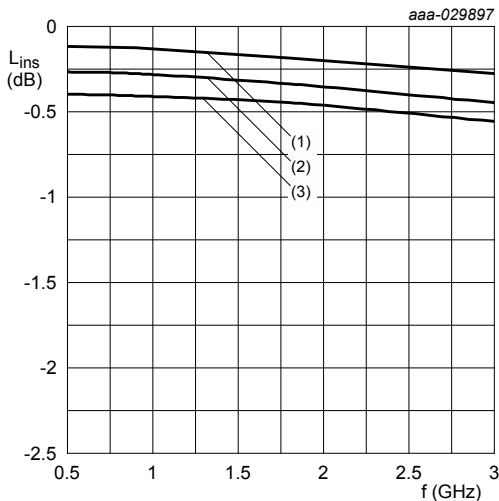
$f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$

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



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

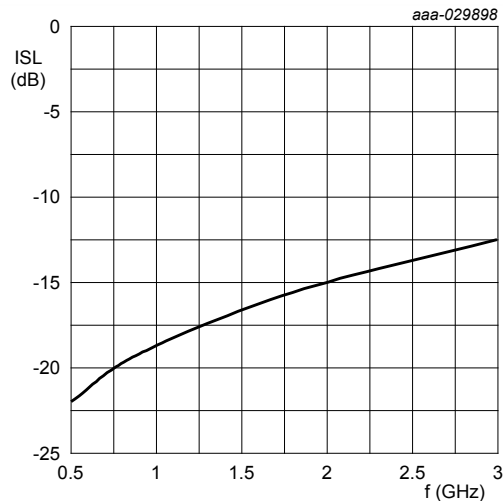
**Figure 2. Diode forward resistance as a function of forward current (typical values)**



Diode inserted in series with a  $50\ \Omega$  stripline 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 in on-state as a function of frequency (typical values)**



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

**Figure 4. Isolation of the diode in off-state as a function of frequency (typical values)**

9 Package outline

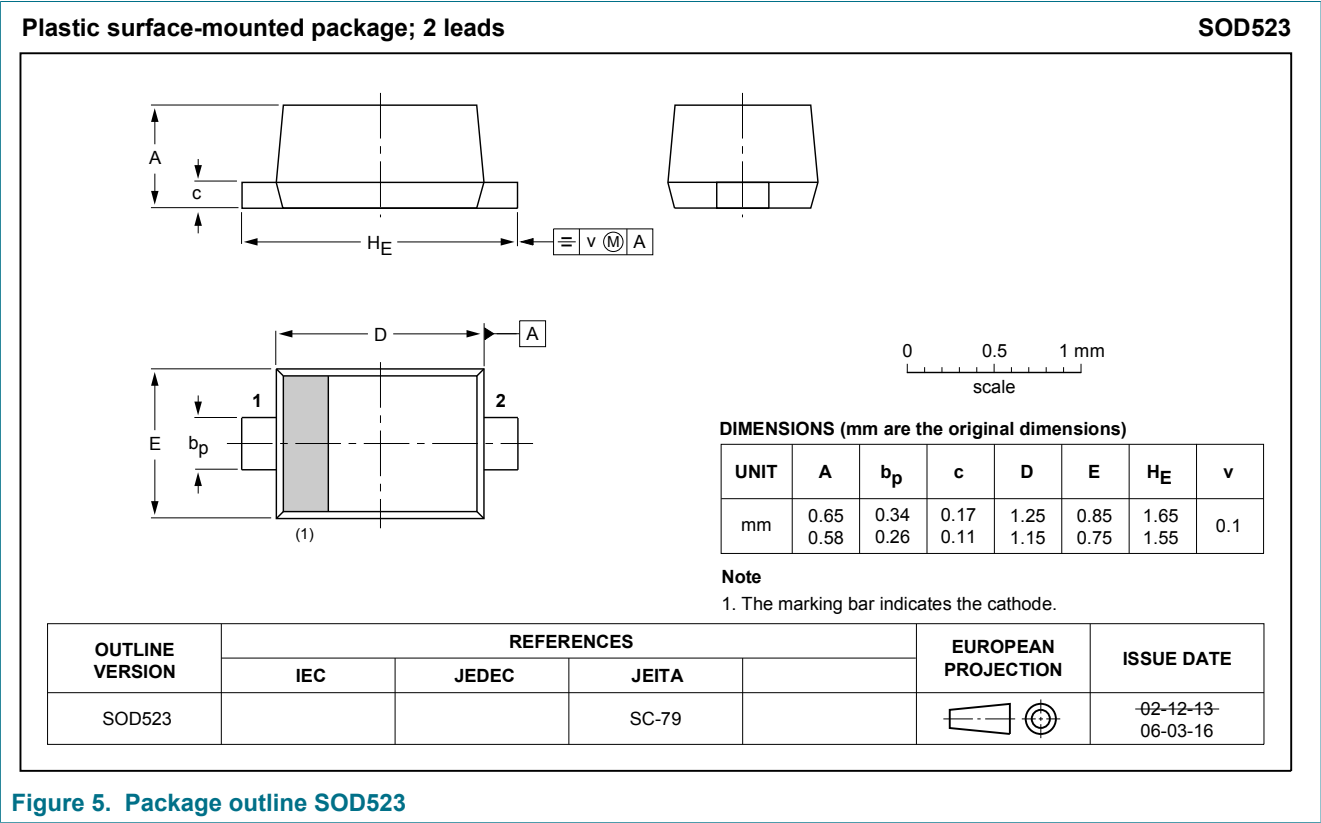


Figure 5. Package outline SOD523

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
BAP51-02 v.4.1	20190208	Product data sheet	-	BAP51-02 v.4
Modifications:	• aligned the title of the data sheet with the description on the Internet			
BAP51-02 v.4	20181126	Product data sheet	-	BAP51-02 v.3
Modifications:	<ul style="list-style-type: none"><li>• <a href="#">Section 1.2</a> "Features and benefits" has been updated.</li><li>• The "Legal information" pages have been updated.</li><li>• In table Limiting values description with <math>V_R</math> is changed from forward into reverse</li></ul>			
BAP51-02 v.3	20080102	Product data sheet	-	-

## 12 Legal information

### 12.1 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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