



BAP50-02

General purpose PIN diode

Rev. 3 — 26 November 2018

Product data sheet

1 Product profile

1.1 General description

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

1.2 Features and benefits

- Low diode capacitance
- Low diode forward resistance



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
BAP50-02	-	plastic surface-mounted package; 2 leads	SOD523

4 Marking

Table 3. Marking code

Type number	Marking code
BAP50-02	K4

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

7 Characteristics

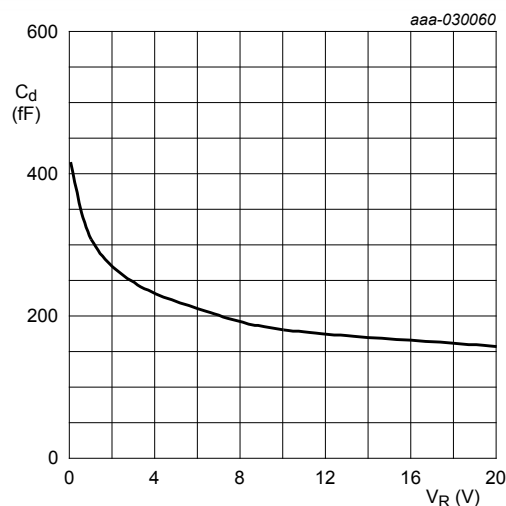
Table 6. Characteristics

$T_j = 25\text{ }^{\circ}\text{C}$ 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
		$V_R = 5\text{ V}$	-	0.22	0.35	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
ISL	isolation	$V_R = 0\text{ V}$ (see Figure 4)				
		$f = 900\text{ MHz}$	-	20.4	-	dB
		$f = 1800\text{ MHz}$	-	17.3	-	dB
		$f = 2450\text{ MHz}$	-	15.5	-	dB
L_{ins}	insertion loss	See Figure 3				
		$I_F = 0.5\text{ mA}$				
		$f = 900\text{ MHz}$	-	1.74	-	dB
		$f = 1800\text{ MHz}$	-	1.79	-	dB
		$f = 2450\text{ MHz}$	-	1.88	-	dB
		$I_F = 1\text{ mA}$				
		$f = 900\text{ MHz}$	-	1.03	-	dB
		$f = 1800\text{ MHz}$	-	1.09	-	dB
		$f = 2450\text{ MHz}$	-	1.15	-	dB
		$I_F = 10\text{ mA}$				
		$f = 900\text{ MHz}$	-	0.26	-	dB
		$f = 1800\text{ MHz}$	-	0.32	-	dB
		$f = 2450\text{ MHz}$	-	0.34	-	dB
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	$I_F = 100\text{ mA}$; $f = 100\text{ MHz}$	-	0.6	-	nH

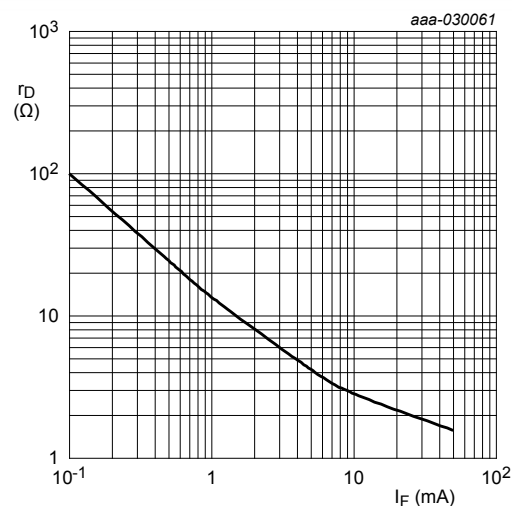
[1] Guaranteed on AQL basis: inspection level S4, AQL 1.0.

8 Graphical data



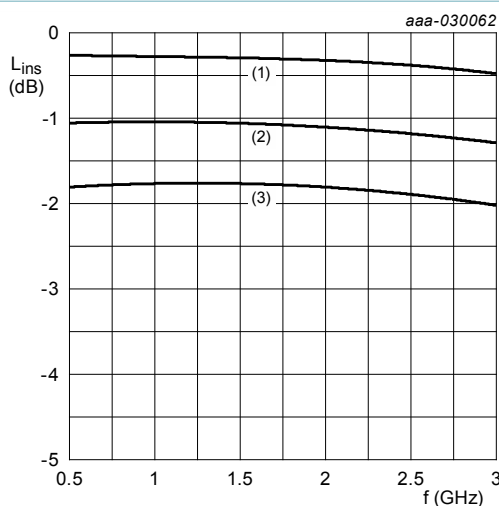
$f = 1 \text{ MHz}$; $T_j = 25 \text{ }^{\circ}\text{C}$

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



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

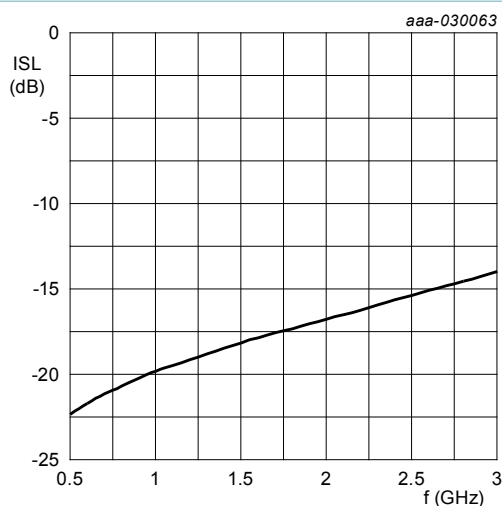
Figure 2. Diode forward resistance as a function of forward current (typical values)



Diode inserted in series with a $50 \text{ } \Omega$ stripline 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) $I_F = 0.5 \text{ mA}$

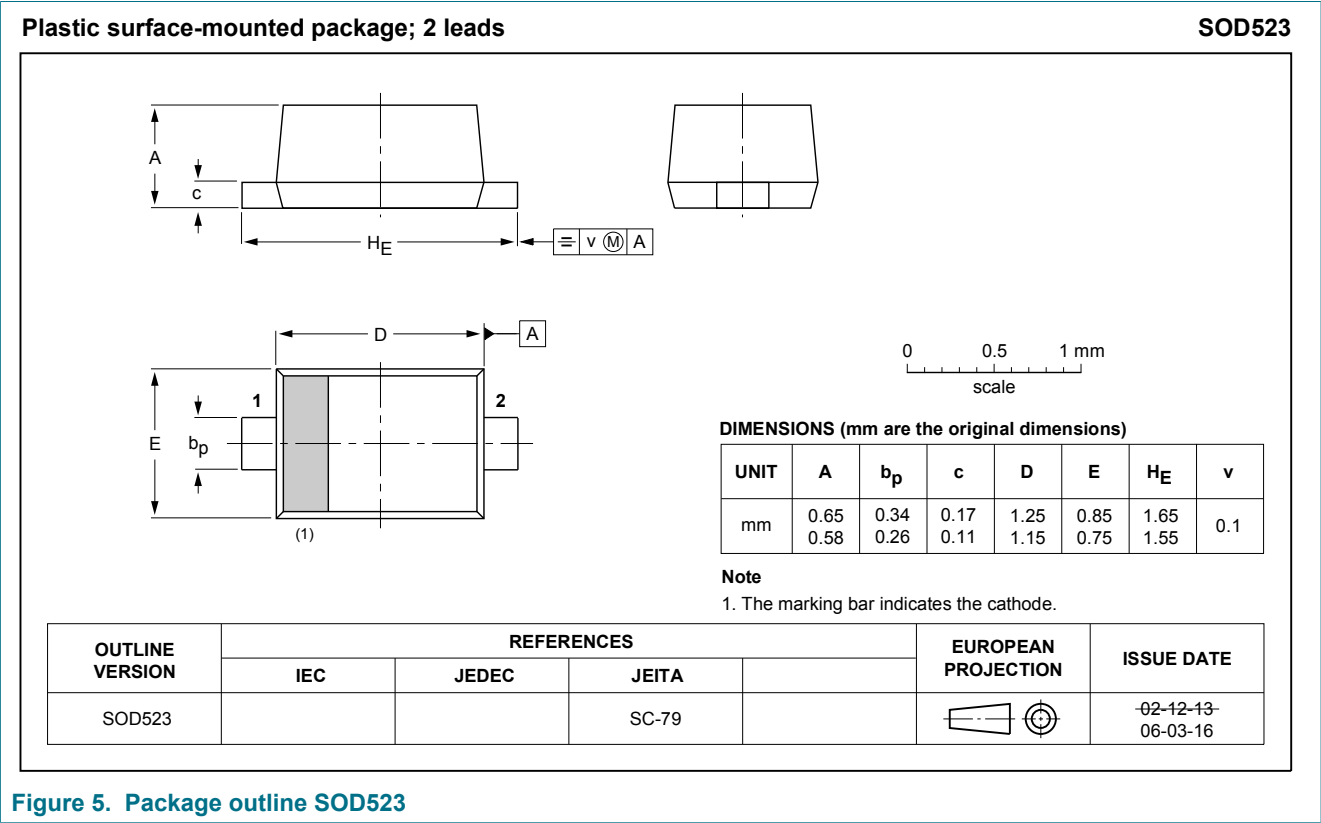
Figure 3. Insertion loss of the diode in on-state as a function of frequency (typical values)



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

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

9 Package outline



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
BAP50-02 v.3	20181126	Product data sheet	-	BAP50-02 v.2
Modifications:	<ul style="list-style-type: none">• Section 1.2 "Features and benefits" has been updated.• The "Legal information" pages have been updated.			
BAP50-02 v.2	20080103	Product data sheet	-	-

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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