



BAP65-05

Silicon PIN diode

Rev. 2.1 — 28 January 2019

Product data sheet

1 Product profile

1.1 General description

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

1.2 Features and benefits

- Two elements in common cathode configuration
- High voltage, current controlled
- RF resistor for RF switches
- Low diode capacitance
- Low diode forward resistance (low loss)
- AEC-Q101 qualified

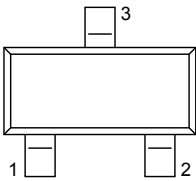
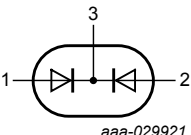
1.3 Applications

- RF attenuators and switches
- Bandswitch for TV tuners
- Series diode for mobile communication transmit/receive switch



2 Pinning information

Table 1. Discrete pinning

Pin	Description	Simplified outline	Graphic symbol
1	anode (a ₁)	 <p>Top view</p>	
2	anode (a ₂)		
3	common cathode		

3 Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BAP65-05	-	plastic surface-mounted package; 3 leads	SOT023

4 Marking

Table 3. Marking

Type number	Marking code
BAP65-05	7K%

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		-	30	V
I _F	continuous forward current		-	100	mA
P _{tot}	total power dissipation	T _{sp} ≤ 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
$R_{th(j-sp)}$	thermal resistance from junction to solder point		220	K/W

7 Characteristics

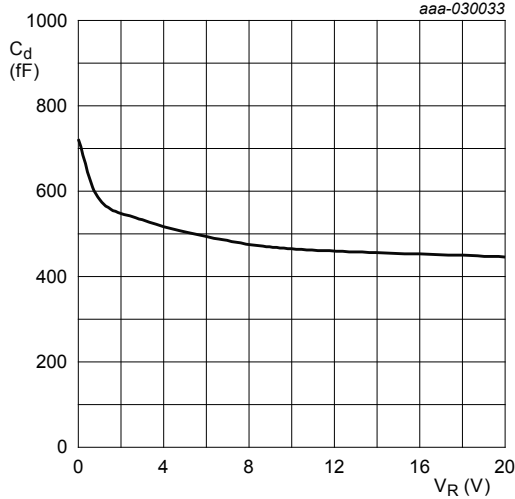
Table 6. Characteristics
 $T_j = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
V_F	forward voltage	$I_F = 50\text{ mA}$	-	0.9	1.1	V	
I_R	reverse leakage current	$V_R = 20\text{ V}$	-	-	20	nA	
C_d	diode capacitance	f = 1 MHz (see Figure 1)					
		$V_R = 0\text{ V}$	-	0.7	-	pF	
		$V_R = 1\text{ V}$	-	0.575	0.9	pF	
		$V_R = 3\text{ V}$	-	0.525	0.8	pF	
		$V_R = 20\text{ V}$	-	0.425	-	pF	
r_D	diode forward resistance	f = 100 MHz (see Figure 2)					
		$I_F = 1\text{ mA}$	-	1	-	Ω	
		$I_F = 5\text{ mA}$	[1]	-	0.65	0.95	Ω
		$I_F = 10\text{ mA}$	[1]	-	0.56	0.9	Ω
		$I_F = 100\text{ mA}$	-	-	0.35	-	Ω
ISL	isolation	$V_R = 0\text{ V}$ (see Figure 4)					
		f = 900 MHz	-	9.4	-	dB	
		f = 1800 MHz	-	4.8	-	dB	
		f = 2450 MHz	-	3.1	-	dB	
L_{ins}	insertion loss	See Figure 3 .					
		$I_F = 1\text{ mA}$					
		f = 900 MHz	-	0.1	-	dB	
		f = 1800 MHz	-	0.18	-	dB	
		f = 2450 MHz	-	0.28	-	dB	
		$I_F = 5\text{ mA}$					
		f = 900 MHz	-	0.08	-	dB	
		f = 1800 MHz	-	0.16	-	dB	
		f = 2450 MHz	-	0.26	-	dB	
		$I_F = 10\text{ mA}$					
		f = 900 MHz	-	0.07	-	dB	
		f = 1800 MHz	-	0.15	-	dB	
		f = 2450 MHz	-	0.25	-	dB	
L_{ins}	insertion loss	$I_F = 100\text{ mA}$					
		f = 900 MHz	-	0.06	-	dB	
		f = 1800 MHz	-	0.14	-	dB	
		f = 2450 MHz	-	0.24	-	dB	

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
τ_L	charge carrier life time	when switched from $I_F = 10$ mA to $I_R = 6$ mA; $R_L = 100$ Ω ; measured at $I_R = 3$ mA	-	0.17	-	μ s
L_S	series inductance	$I_F = 100$ mA; $f = 100$ MHz	-	1.4	-	nH

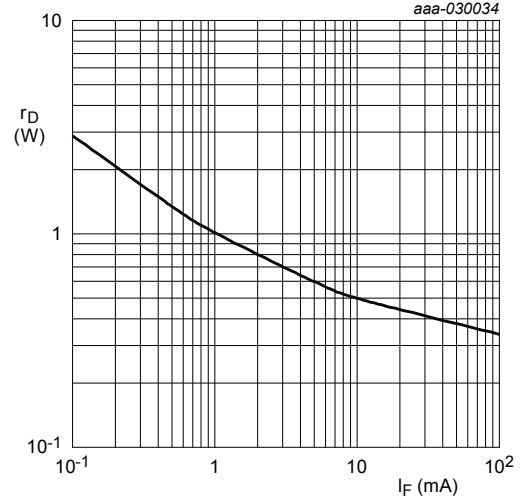
[1] Guaranteed on AQL basis; inspection level S4, AQL 1.0

8 Graphical data



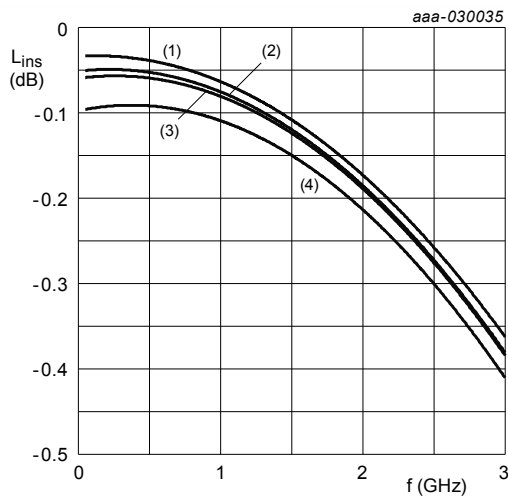
f = 1 MHz; T_j = 25 °C.

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



f = 100 MHz; T_j = 25 °C.

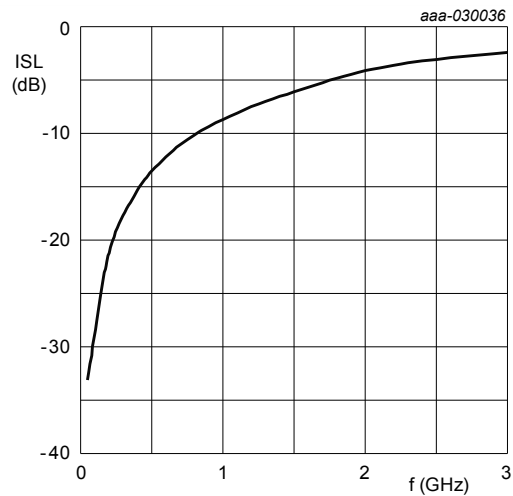
Figure 2. Diode forward resistance as a function of forward current (typical values)



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 = 100 mA
- (2) I_F = 10 mA
- (3) I_F = 5 mA
- (3) I_F = 1 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 Ω strip line circuit. T_{amb} = 25 °C.

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

9 Package outline

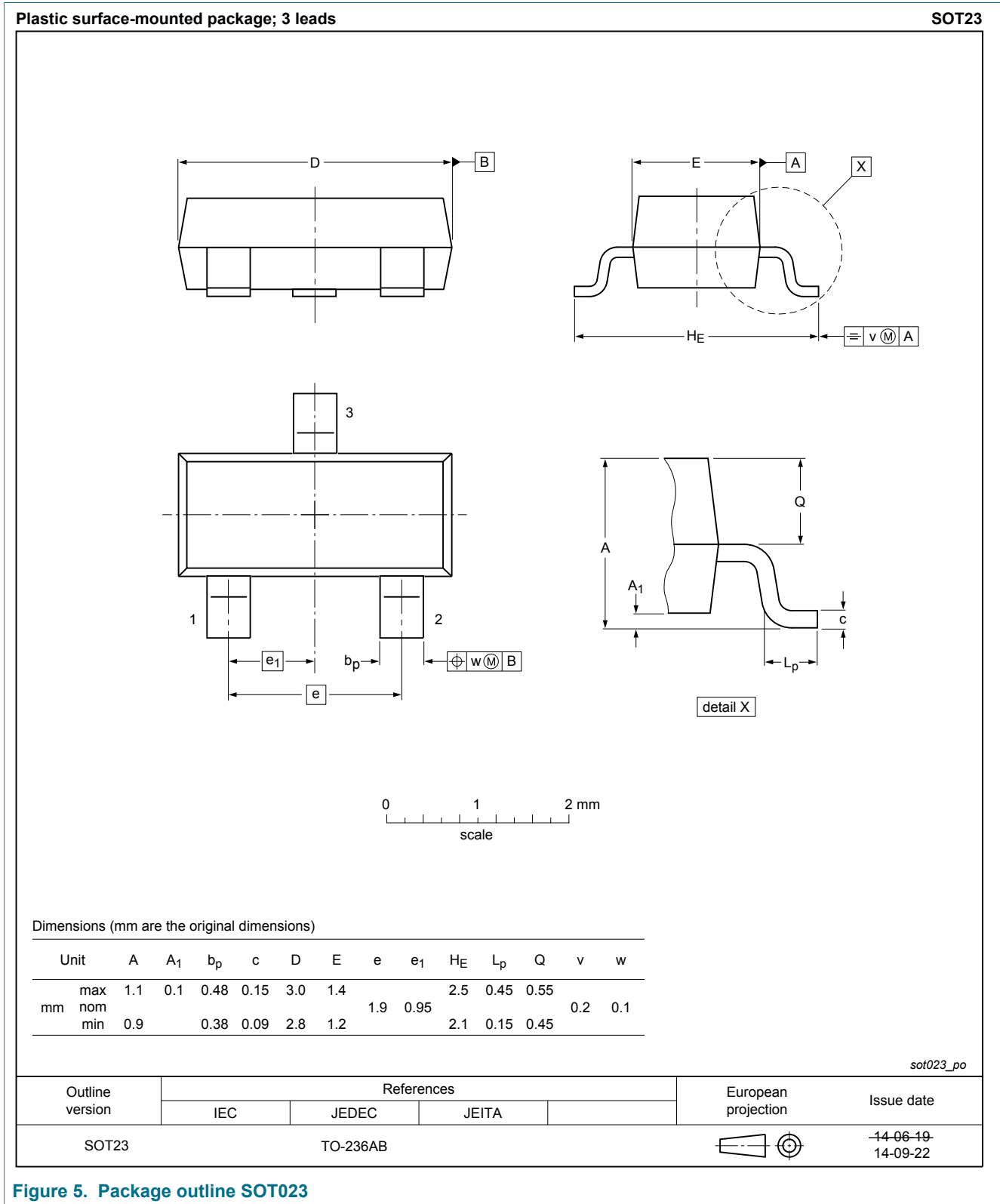


Figure 5. Package outline SOT023

10 Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAP65-05 v.2.1	20190128	Product data sheet	-	BAP65-05 v.2
Modifications:	• Changed title to Silicon PIN diode			
BAP65-05 v.2	20181211	Product data sheet	-	BAP65-05 v.1
Modifications:	• Section 1.2 "Features and benefits" has been updated. • The "Legal information" pages have been updated.			
BAP65-05 v.1	20010507	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".

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