

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

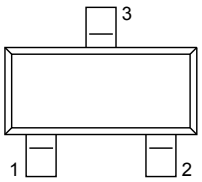
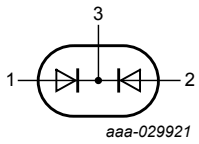
- Two elements in common cathode configuration
- High voltage, current controlled
- RF resistor for RF switches
- Low diode capacitance
- Low diode forward resistance (low loss)
- AEC-Q101 qualified

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)	 Top view	
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	$T_{sp} \leq 90$ °C	-	250	mW
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		-65	+150	°C

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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

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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	-	0.9	1.1	V
I_R	reverse leakage current	V_R = 20 V	-	-	20	nA
C_d	diode capacitance	f = 1 MHz (see Figure 1)				
		V_R = 0 V	-	0.7	-	pF
		V_R = 1 V	-	0.575	0.9	pF
		V_R = 3 V	-	0.525	0.8	pF
		V_R = 20 V	-	0.425	-	pF
r_D	diode forward resistance	f = 100 MHz (see Figure 2)				
		I_F = 1 mA	-	1	-	Ω
		I_F = 5 mA [1]	-	0.65	0.95	Ω
		I_F = 10 mA [1]	-	0.56	0.9	Ω
		I_F = 100 mA	-	0.35	-	Ω
ISL	isolation	V_R = 0 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 mA				
		f = 900 MHz	-	0.1	-	dB
		f = 1800 MHz	-	0.18	-	dB
		f = 2450 MHz	-	0.28	-	dB
		I_F = 5 mA				
		f = 900 MHz	-	0.08	-	dB
		f = 1800 MHz	-	0.16	-	dB
		f = 2450 MHz	-	0.26	-	dB
		I_F = 10 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 mA				
		f = 900 MHz	-	0.06	-	dB
		f = 1800 MHz	-	0.14	-	dB
		f = 2450 MHz	-	0.24	-	dB

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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	-	µs
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

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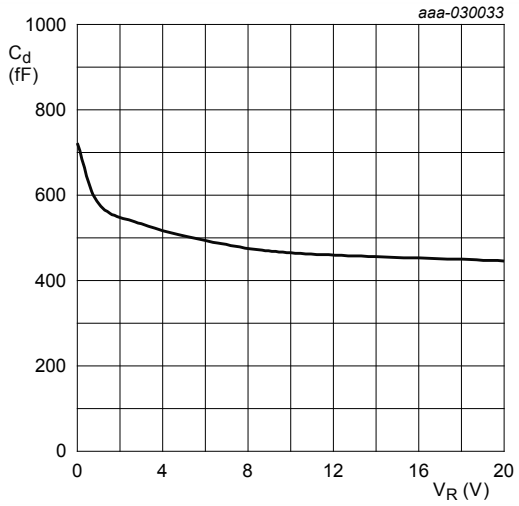
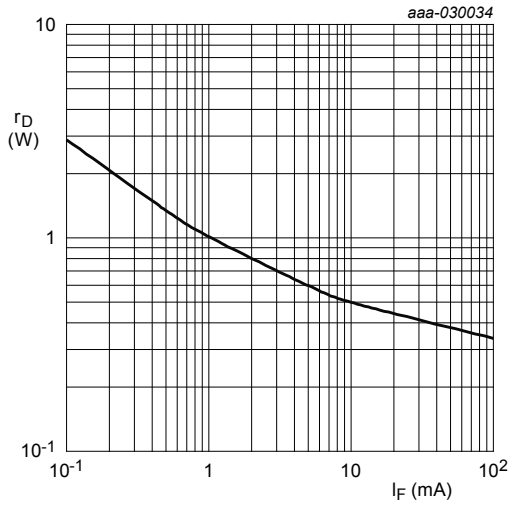
8 Graphical data



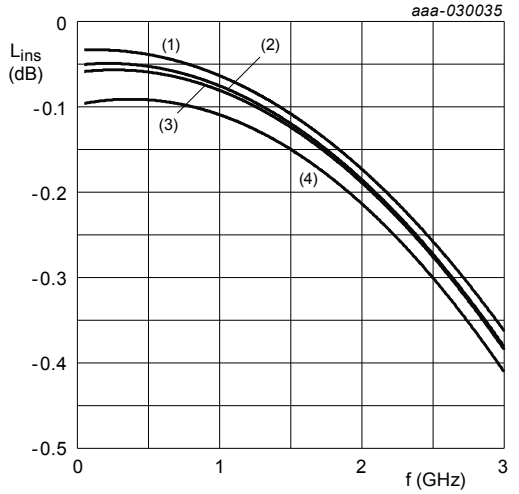
f = 1 MHz; T_j = 25 °C.

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



f = 100 MHz; T_j = 25 °C.

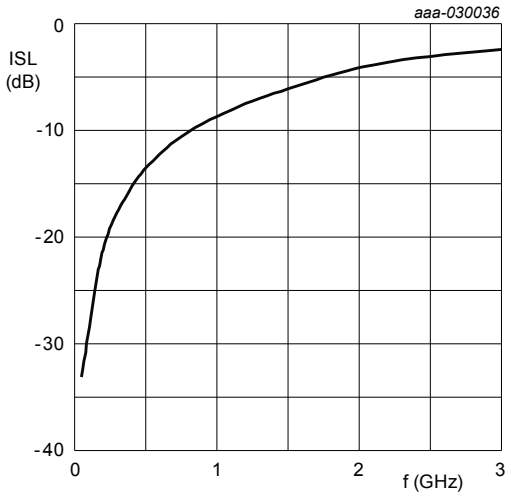
Figure 2. Diode forward resistance as a function of forward current (typical values)



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)

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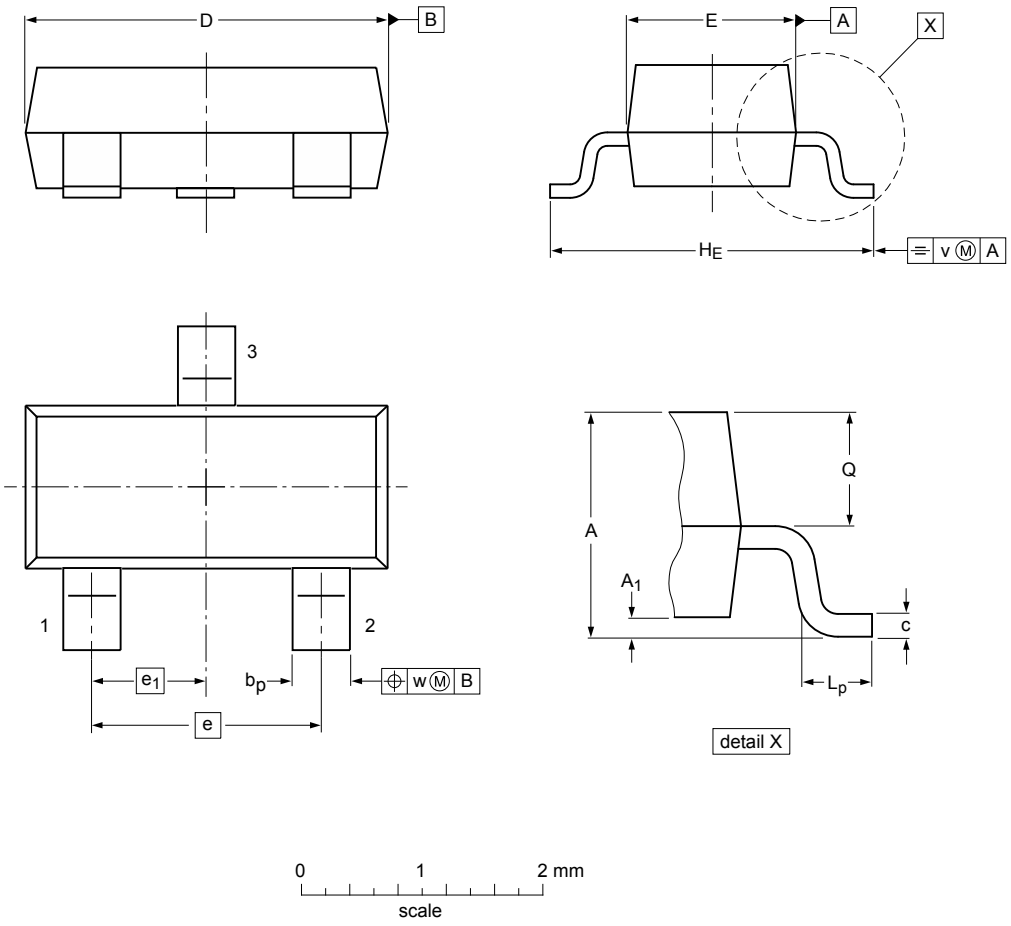
9 Package outline

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

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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	-	-

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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.
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