

BAP55LX

Silicon PIN diode

Rev. 5 — 12 February 2019 Product data sheet

1 Product profile

1.1 General description

Planar PIN diode in a SOD882D leadless ultra small plastic SMD package.

1.2 Features and benefits

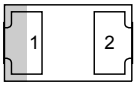
- High-speed switching for RF signals
- Low diode capacitance
- Low forward resistance
- Very low series inductance
- For applications up to 3 GHz
- AEC-Q101 qualified

1.3 Applications

- RF attenuators and switches

2 Pinning information

Table 1. Discrete pinning

Pin	Description		Simplified outline	Symbol
1	cathode	[1]	 Transparent top view	 sym006
2	anode			

[1] The marking bar indicates the cathode.

3 Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BAP55LX	DFN1006D-2	leadless ultra small plastic package; 2 terminals; body 1 × 0.6 × 0.4 mm	SOD882D

4 Marking

Table 3. Marking codes

Type number	Marking code[1]
BAP55LX	1111 1101

[1] For SOD882D binary marking code description (see Figure 1) .

4.1 Binary marking code description

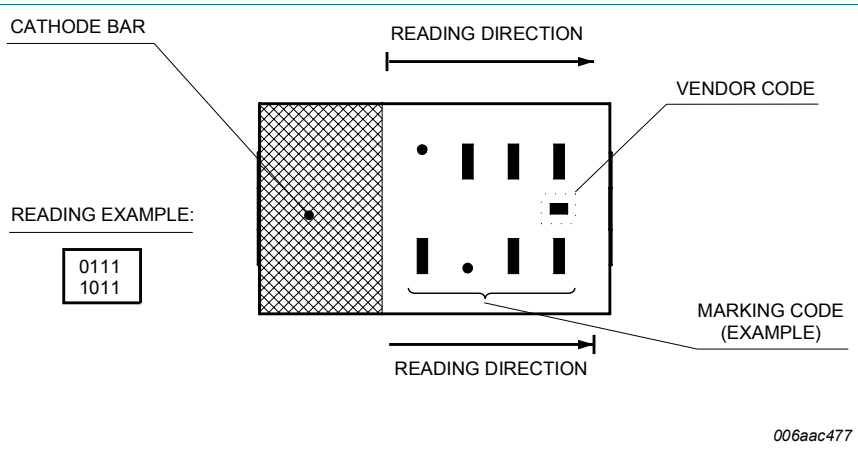


Figure 1. SOD882D binary marking code description example

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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	reverse voltage		-	50	V
I_F	forward current		-	100	mA
P_{tot}	total power dissipation	$T_{sp} \leq 90$ °C	-	135	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
$R_{th(j\text{-}sp)}$	thermal resistance from junction to solder point		78	K/W

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7 Characteristics

Table 6. Characteristics

T_{amb} = 25 °C unless otherwise specified.

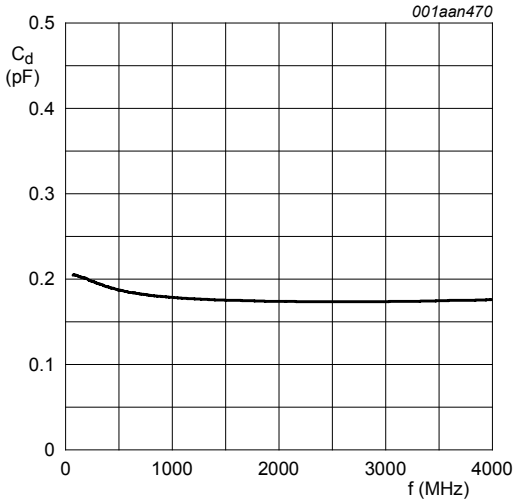
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	I_F = 50 mA	-	0.95	1.1	V
I_R	reverse current	V_R = 20 V	-	-	10	nA
		V_R = 50 V	-	-	100	nA
C_d	diode capacitance	f = 1 MHz (see Figure 3)				
		V_R = 0 V	-	0.28	-	pF
		V_R = 1 V	-	0.23	-	pF
		V_R = 20 V	-	0.18	0.28	pF
r_D	diode forward resistance	f = 100 MHz (see Figure 4)				
		I_F = 0.5 mA	-	3.3	4.5	Ω
		I_F = 1 mA	-	2.2	3.3	Ω
		I_F = 10 mA	-	0.8	1.2	Ω
		I_F = 100 mA	-	0.5	0.8	Ω
ISL	isolation	V_R = 0 V (see Figure 5)				
		f = 900 MHz	-	19	-	dB
		f = 1800 MHz	-	14	-	dB
		f = 2450 MHz	-	12	-	dB
L_{ins}	insertion loss	(See Figure 6)				
		I_F = 0.5 mA				
		f = 900 MHz	-	0.24	-	dB
		f = 1800 MHz	-	0.25	-	dB
		f = 2450 MHz	-	0.26	-	dB
		I_F = 1 mA				
		f = 900 MHz	-	0.17	-	dB
		f = 1800 MHz	-	0.18	-	dB
		f = 2450 MHz	-	0.19	-	dB
		I_F = 10 mA;				
		f = 900 MHz	-	0.08	-	dB
		f = 1800 MHz	-	0.09	-	dB
		f = 2450 MHz	-	0.10	-	dB
		I_F = 100 mA;				
		f = 900 MHz	-	0.05	-	dB
		f = 1800 MHz	-	0.07	-	dB
		f = 2450 MHz	-	0.08	-	dB

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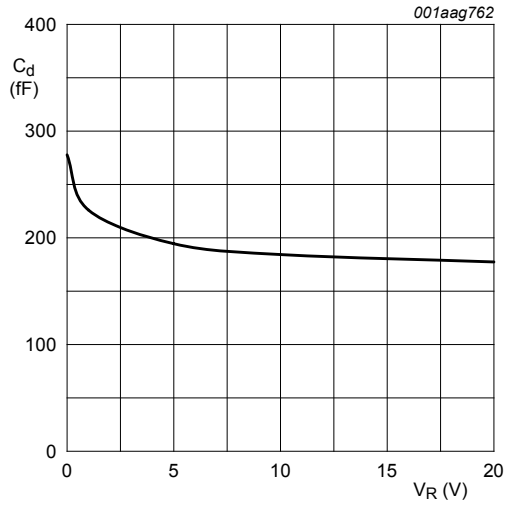
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
τ_L	charge carrier life time	when switched from I_F = 10 mA to I_R = 6 mA; R_L = 100 Ω; measured at I_R = 3 mA	0.225	0.27	-	µs
L_S	series inductance	I_F = 100 mA; f = 100 MHz	-	0.4	-	nH

7.1 Graphical data



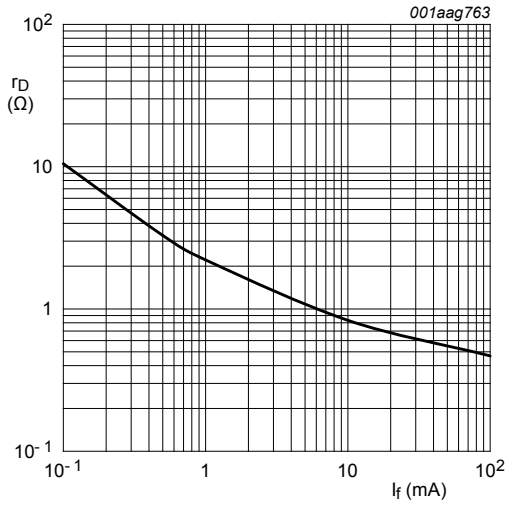
V_R = 0 V; T_j = 25 °C.

Figure 2. Diode capacitance as a function of frequency (typical values)



f = 1 MHz; T_j = 25 °C.

Figure 3. Diode capacitance as a function of reverse voltage (typical values)

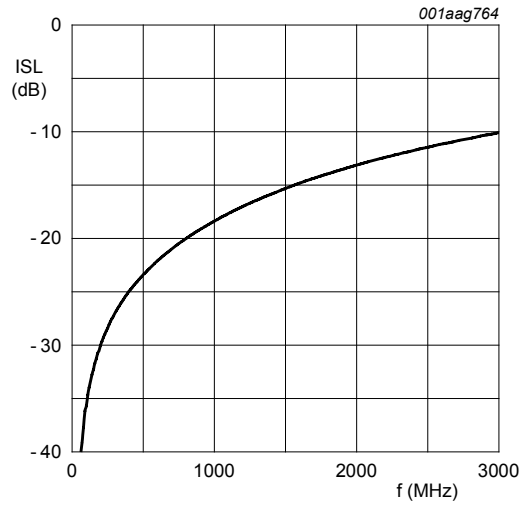


f = 100 MHz; T_j = 25 °C.

Figure 4. Forward resistance as a function of forward current (typical values)

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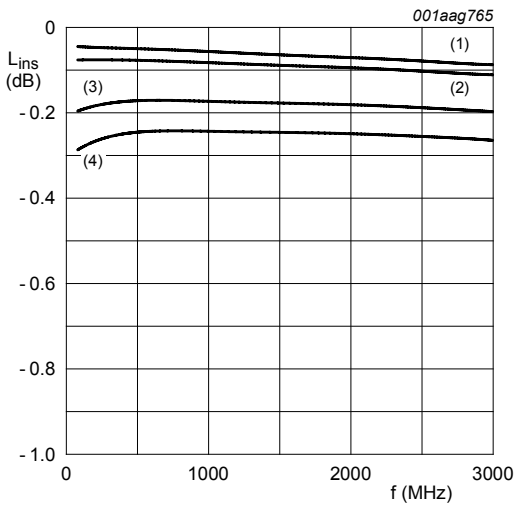
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T_{amb} = 25 °C

Diode zero biased and inserted in series with a 50 Ω stripline circuit

Figure 5. Isolation of the diode as a function of frequency (typical values)



T_{amb} = 25 °C

Diode inserted in series with a 50 Ω stripline circuit and biased via the analyzer T-network

(1) I_F = 100 mA

(2) I_F = 10 mA

(3) I_F = 1 mA

(4) I_F = 0.5 mA

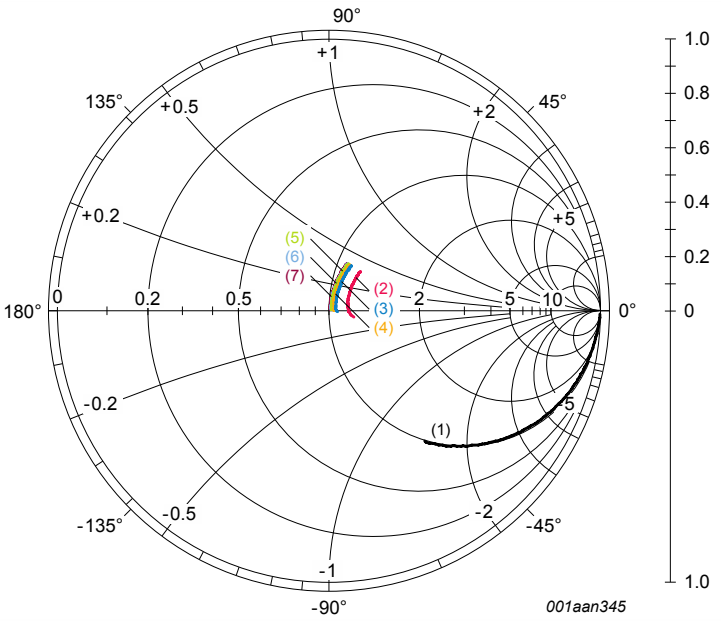
Figure 6. Insertion loss of the diode as a function of frequency (typical values)

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7.2 S-parameters

7.2.1 Diode in series configuration



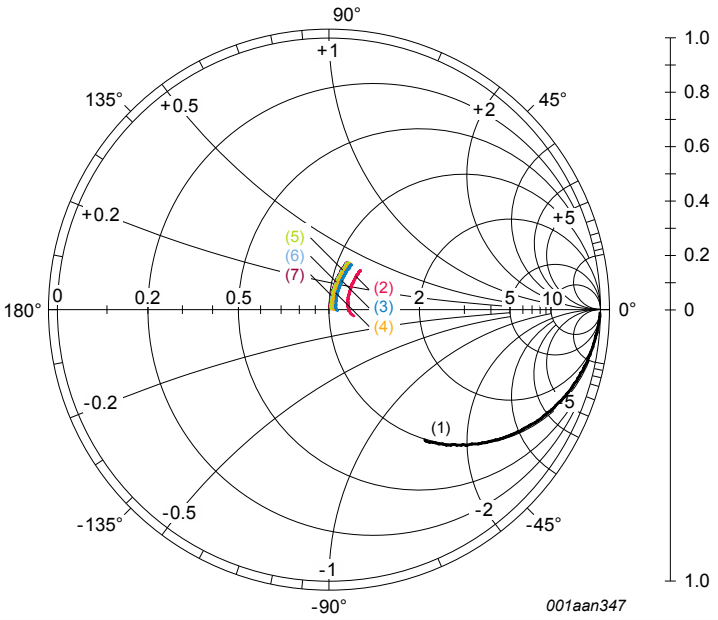
Z_0 = 50 Ω; f = 100 MHz to 10 GHz.

(1) I_F = 0 mA
(2) I_F = 0.1 mA
(3) I_F = 0.5 mA
(4) I_F = 1 mA
(5) I_F = 5 mA
(6) I_F = 10 mA
(7) I_F = 100 mA

Figure 7. Input reflection coefficient (S_{11}; typical values)

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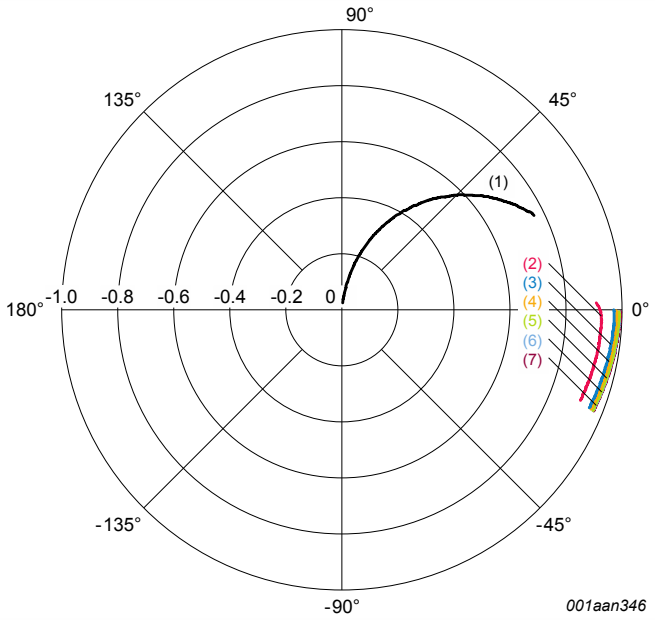
Z_0 = 50 Ω; f = 100 MHz to 10 GHz.

(1) I_F = 0 mA
(2) I_F = 0.1 mA
(3) I_F = 0.5 mA
(4) I_F = 1 mA
(5) I_F = 5 mA
(6) I_F = 10 mA
(7) I_F = 100 mA

Figure 8. Output reflection coefficient (S_{22}; typical values)

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Z_0 = 50 Ω; f = 100 MHz to 10 GHz.

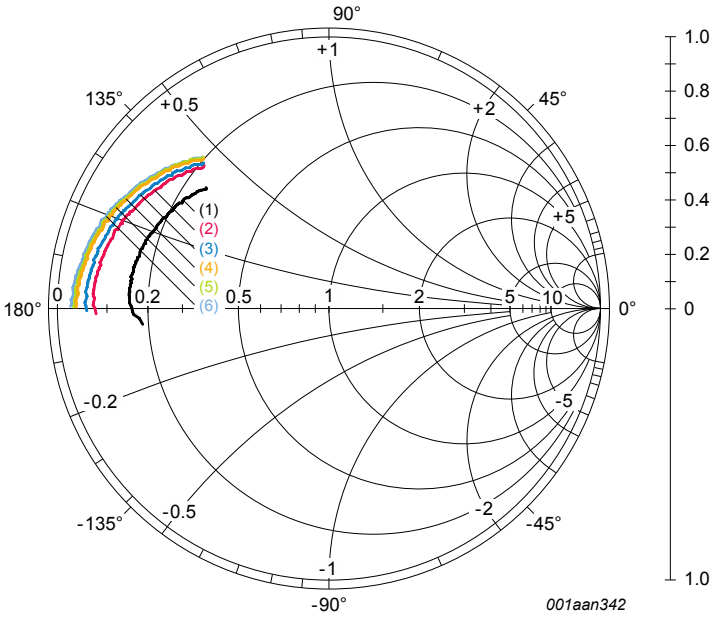
(1) I_F = 0 mA
(2) I_F = 0.1 mA
(3) I_F = 0.5 mA
(4) I_F = 1 mA
(5) I_F = 5 mA
(6) I_F = 10 mA
(7) I_F = 100 mA

Figure 9. Forward transmission coefficient (S_{21}; typical values)

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7.2.2 Diode in parallel configuration



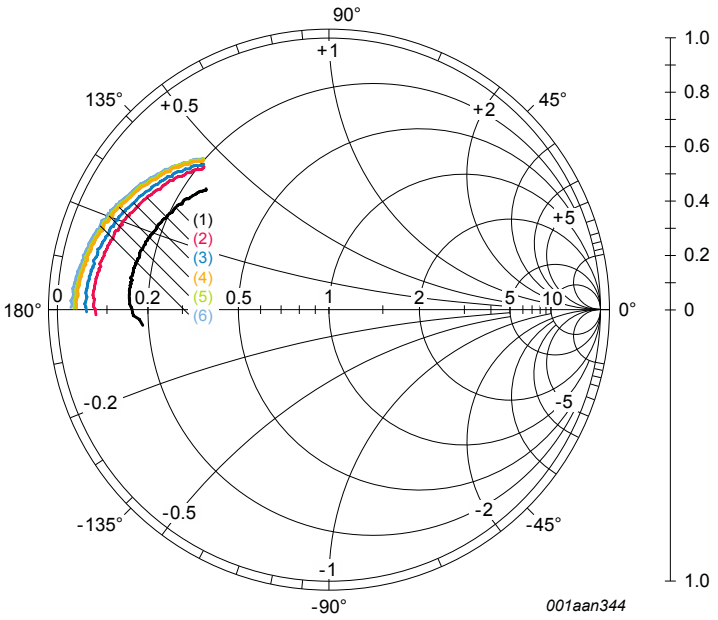
Z_0 = 50 Ω; f = 100 MHz to 10 GHz.

(1) I_F = 0.1 mA
(2) I_F = 0.5 mA
(3) I_F = 1 mA
(4) I_F = 5 mA
(5) I_F = 10 mA
(6) I_F = 100 mA

Figure 10. Input reflection coefficient (S_{11}; typical values)

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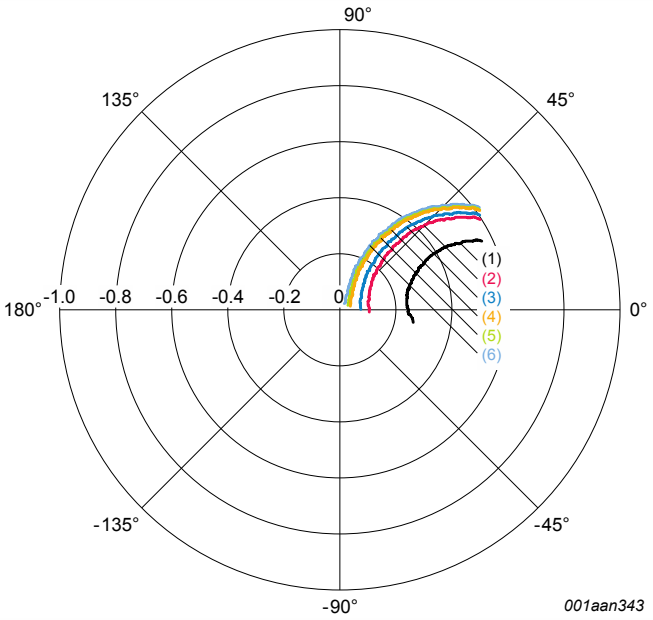
Z_0 = 50 Ω; f = 100 MHz to 10 GHz.

(1) I_F = 0.1 mA
(2) I_F = 0.5 mA
(3) I_F = 1 mA
(4) I_F = 5 mA
(5) I_F = 10 mA
(6) I_F = 100 mA

Figure 11. Output reflection coefficient (S_{22}; typical values)

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Z_0 = 50 Ω; f = 100 MHz to 10 GHz.

(1) I_F = 0.1 mA
(2) I_F = 0.5 mA
(3) I_F = 1 mA
(4) I_F = 5 mA
(5) I_F = 10 mA
(6) I_F = 100 mA

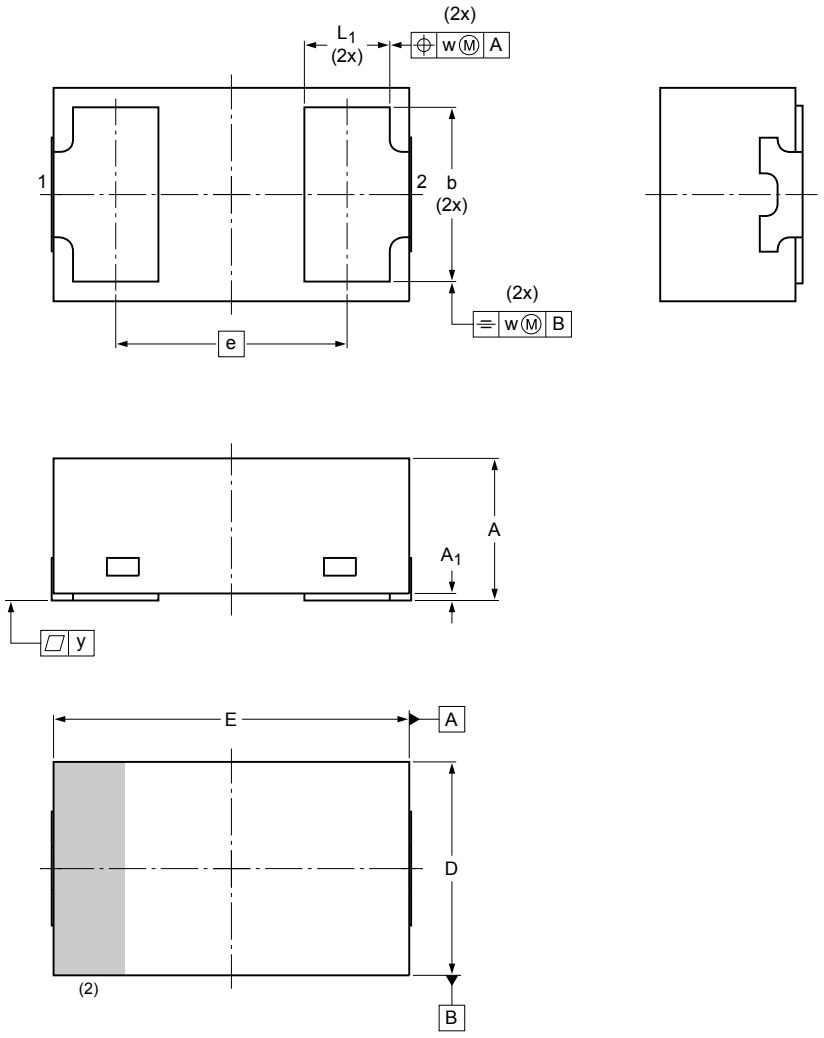
Figure 12. Forward transmission coefficient (S_{21}); typical values

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8 Package outline

DFN1006D-2: Leadless ultra small plastic package; 2 terminals; body 1 x 0.6 x 0.4 mm **SOD882D**



Dimensions

Unit		$A^{(1)}$	A_1	b	D	E	e	L_1	w	y
mm	max	0.4	0.04	0.55	0.65	1.05		0.30	0.1	0.03
	nom			0.50	0.60	1.00	0.65	0.25		
	min			0.45	0.55	0.95		0.22		

0 0.5 1 mm
scale

Note
1. Dimension including plating thickness.
2. The marking bar indicates the cathode (if applicable).

sod882d_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOD882D						~~10-09-27~~ 12-05-01

Figure 13. Package outline SOD882D (DFN1006D-2)

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9 Abbreviations

Table 7. Abbreviations

Acronym	Description
PIN	P-type, intrinsic, N-type
SMD	surface-mounted device
RF	radio frequency

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10 Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAP55LX v.5	20190212	Product data sheet	-	BAP55LX v.4
Modifications:	• Section 1.2 "Features and benefits" has been updated. • The "Legal information" pages have been updated.			
BAP55LX v.4	20130806	Product data sheet	-	BAP55LX v.3
BAP55LX v.3	20110113	Product data sheet	-	BAP55LX v.2
BAP55LX v.2	20101216	Product data sheet	-	BAP55LX v.1
BAP55LX v.1	20070730	Product data sheet	-	-

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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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