



BAP51-06W

Silicon PIN diode

Rev. 2.1 — 8 February 2019

Product data sheet

1 Product profile

1.1 General description

Two planar PIN diodes in common anode configuration in an SOT323 small SMD plastic package.

1.2 Features and benefits

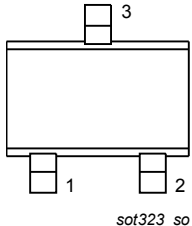
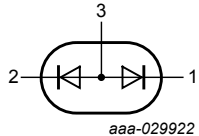
- Two elements in common anode configuration in a small SMD plastic package
- Low diode capacitance
- Low diode forward resistance
- AEC-Q101 qualified

1.3 Applications

- General RF applications

2 Pinning information

Table 1. Discrete pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|----------------|---|---|
| 1 | cathode 1 |  sot323_so |  aaa-029922 |
| 2 | cathode 2 | | |
| 3 | common cathode | | |

3 Ordering information

Table 2. Ordering information

| Type number | Package | | Version |
|-------------|---------|--|---------|
| | Name | Description | |
| BAP51-06W | - | plastic surface-mounted package; 3 leads | SOT323 |



4 Marking

Table 3. Marking

| Type number | Marking code | Description |
|-------------|--------------|--------------------------|
| BAP51-06W | W7% | % = p: made in Hong Kong |
| | | % = t: made in Malaysia |

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 | | - | 50 | mA |
| P_{tot} | total power dissipation | $T_{sp} \leq 90\text{ °C}$ | - | 240 | 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 | | 250 | K/W |

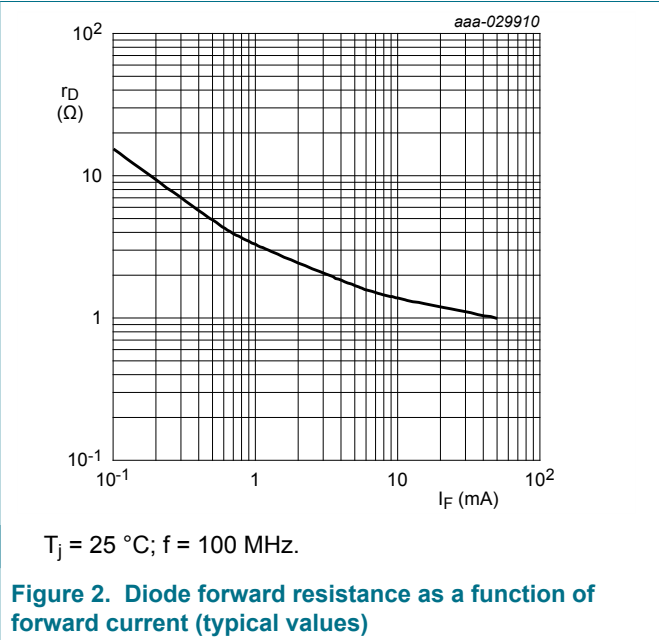
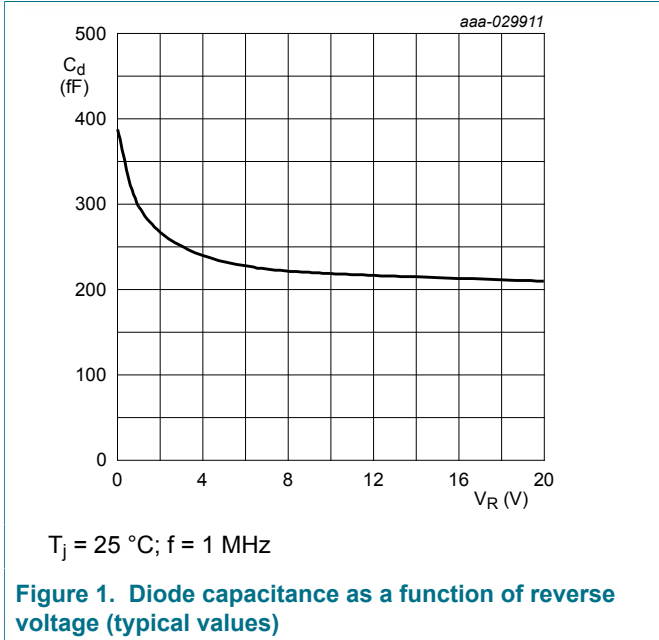
7 Characteristics

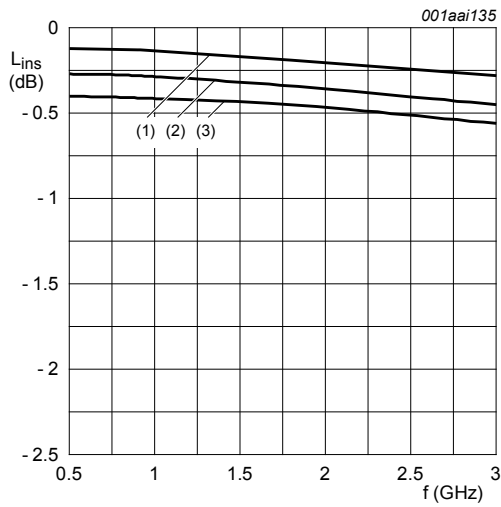
Table 6. Characteristics
T_j = 25 °C unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit | |
|------------------|--------------------------|---|--------------------------|---|------|------|---|
| V _F | forward voltage | I _F = 50 mA | - | 0.95 | 1.1 | V | |
| I _R | reverse current | V _R = 50 V | - | - | 100 | nA | |
| C _d | diode capacitance | f = 1 MHz (see Figure 1) | | | | | |
| | | V _R = 0 V | - | 0.4 | - | pF | |
| | | V _R = 1 V | - | 0.3 | 0.55 | pF | |
| | | V _R = 5 V | - | 0.2 | 0.35 | pF | |
| r _D | diode forward resistance | f = 100 MHz (see Figure 2) | | | | | |
| | | I _F = 0.5 mA | [1] | - | 5.3 | 9 | Ω |
| | | I _F = 1 mA | [1] | - | 3.5 | 6.5 | Ω |
| | | I _F = 10 mA | [1] | - | 1.5 | 2.5 | Ω |
| ISL | isolation | V _R = 0 V (see Figure 4) | | | | | |
| | | f = 900 MHz | - | 17 | - | dB | |
| | | f = 1800 MHz | - | 13 | - | dB | |
| | | f = 2450 MHz | - | 12 | - | dB | |
| L _{ins} | insertion loss | I _F = 0.5 mA (see Figure 3) | | | | | |
| | | f = 900 MHz | - | 0.44 | - | dB | |
| | | f = 1800 MHz | - | 0.50 | - | dB | |
| | | f = 2450 MHz | - | 0.54 | - | dB | |
| | | I _F = 1 mA | | | | | |
| | | f = 900 MHz | - | 0.33 | - | dB | |
| | | f = 1800 MHz | - | 0.39 | - | dB | |
| | | f = 2450 MHz | - | 0.43 | - | dB | |
| | | I _F = 10 mA | | | | | |
| | | f = 900 MHz | - | 0.19 | - | dB | |
| | | f = 1800 MHz | - | 0.24 | - | dB | |
| | | f = 2450 MHz | - | 0.28 | - | dB | |
| | | 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 | - | 0.55 | - |
| L _S | series inductance | I _F = 100 mA; f = 100 MHz | - | 1.6 | - | nH | |

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

8 Graphical data



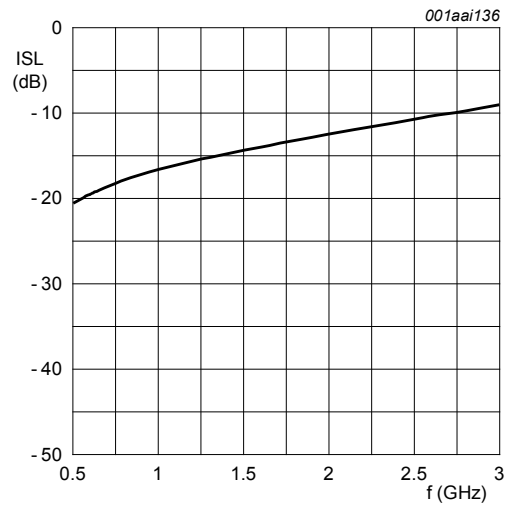


Diode inserted in series with a 50 Ω strip line circuit and biased via the analyzer T-network.

$T_{amb} = 25\text{ °C}$; $f = 1\text{ MHz}$

- (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 as a function of frequency (typical values)



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

Figure 4. Isolation of the diode as a function of frequency (typical values)

9 Package outline

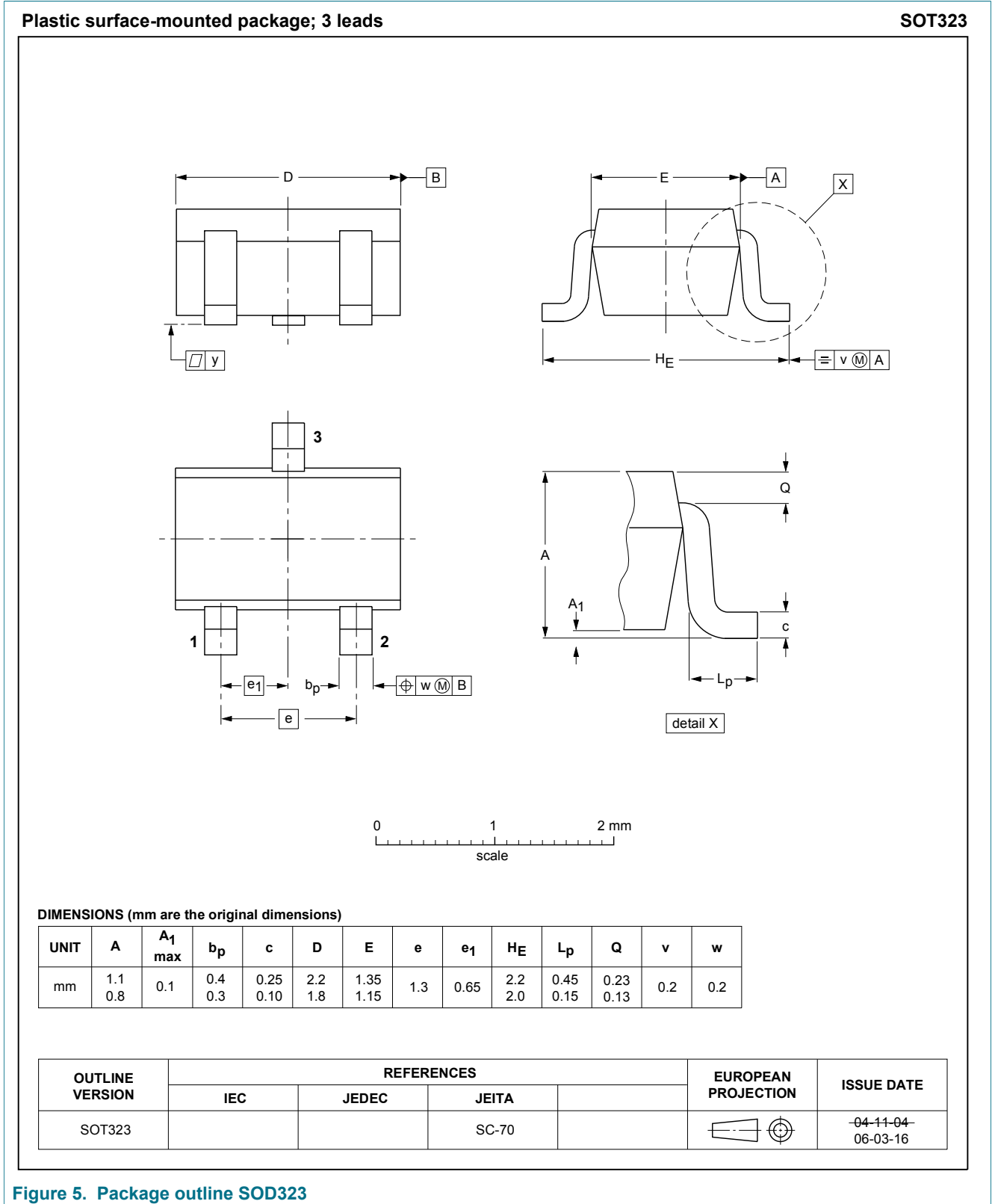


Figure 5. Package outline SOT323

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 |
|-----------------|---|--------------------|---------------|---------------|
| BAP51-06W v.2.1 | 20190208 | Product data sheet | - | BAP51-06W v.2 |
| Modifications: | <ul style="list-style-type: none"> aligned the title of the data sheet with the description on the Internet | | | |
| BAP51-06W v.2 | 20181126 | Product data sheet | - | BAP51-06W v.1 |
| Modifications: | <ul style="list-style-type: none"> Section 1.2 "Features and benefits" has been updated. The "Legal information" pages have been updated. | | | |
| BAP51-06W v.1 | 20080526 | 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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Contents

| | | |
|-----------|--------------------------------------|----------|
| 1 | Product profile | 1 |
| 1.1 | General description | 1 |
| 1.2 | Features and benefits | 1 |
| 1.3 | Applications | 1 |
| 2 | Pinning information | 1 |
| 3 | Ordering information | 1 |
| 4 | Marking | 2 |
| 5 | Limiting values | 2 |
| 6 | Thermal characteristics | 2 |
| 7 | Characteristics | 3 |
| 8 | Graphical data | 4 |
| 9 | Package outline | 6 |
| 10 | Abbreviations | 7 |
| 11 | Revision history | 7 |
| 12 | Legal information | 8 |

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