



# BAP65-05

Silicon PIN diode

Rev. 2.1 — 28 January 2019

Product data sheet

## 1 Product profile

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### 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

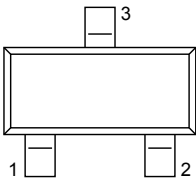
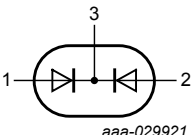
### 1.3 Applications

- 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 <sub>1</sub> ) |  <p>Top view</p> |  |
| 2   | anode (a <sub>2</sub> ) |  |   |
| 3   | common cathode          |  |   |

## 3 Ordering information

Table 2. Ordering information

| Type number | Package |  | Version |
|-------------|---------|--|---------|
|             | Name    | Description                              |         |
| 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 <sub>R</sub>   | continuous reverse voltage |                         | -   | 30   | V    |
| I <sub>F</sub>   | continuous forward current |                         | -   | 100  | mA   |
| P <sub>tot</sub> | total power dissipation    | T <sub>sp</sub> ≤ 90 °C | -   | 250  | mW   |
| T <sub>stg</sub> | storage temperature        |                         | -65 | +150 | °C   |
| T <sub>j</sub>   | 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

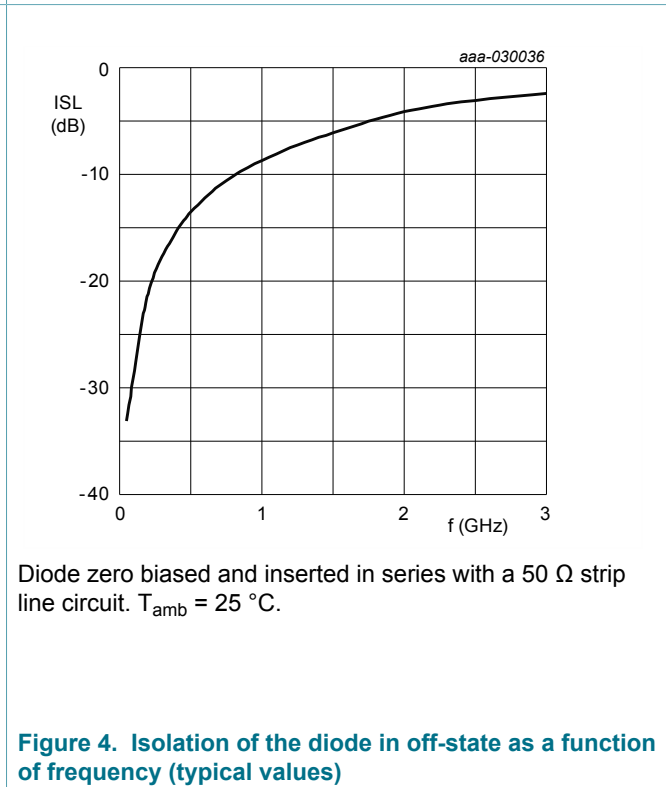
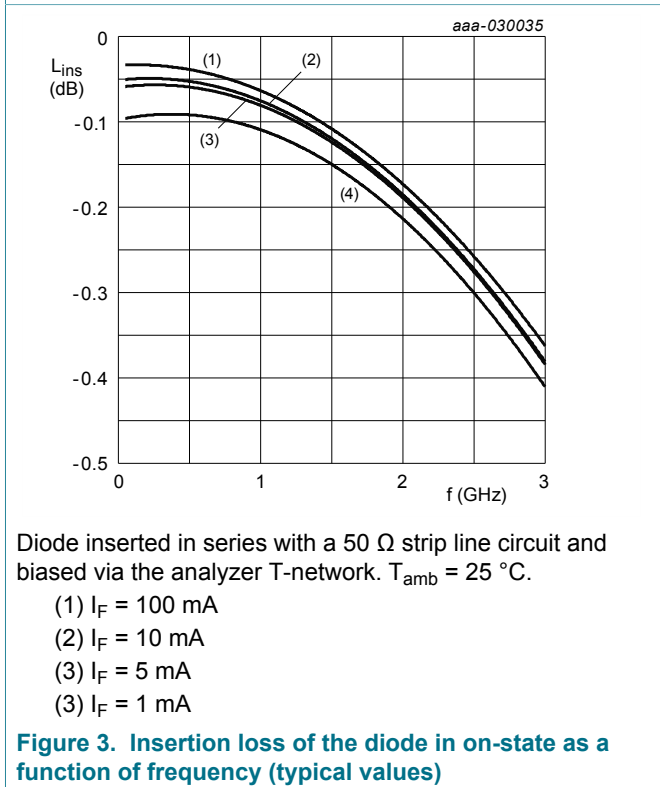
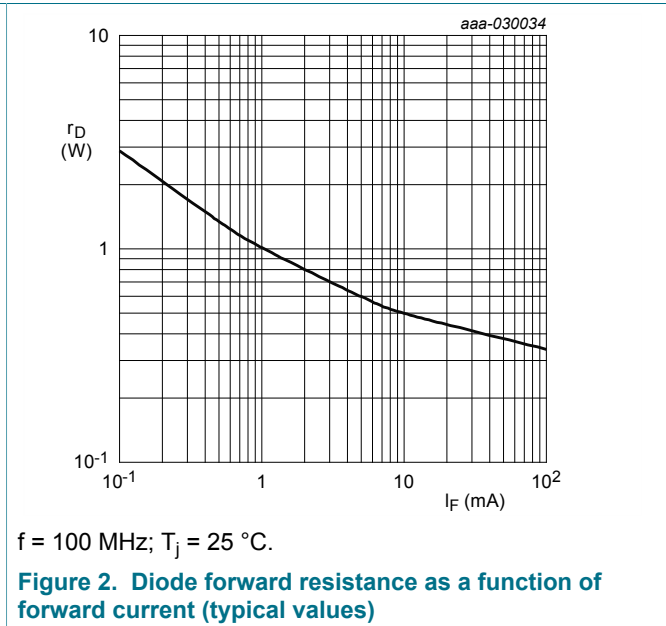
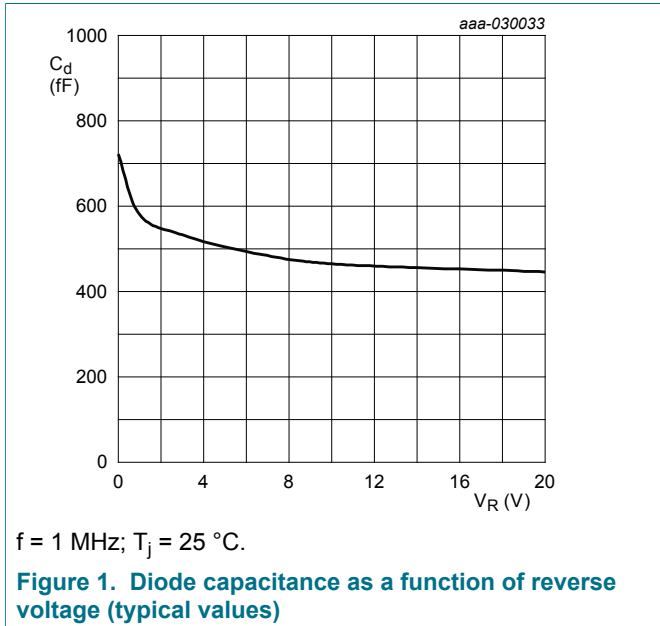
**Table 6. Characteristics**
 $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified.

| 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 <a href="#">Figure 1</a> )          |     |       |      |          |          |
|           |                          | $V_R = 0\text{ V}$                                 | -   | 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 <a href="#">Figure 2</a> )        |     |       |      |          |          |
|           |                          | $I_F = 1\text{ mA}$                                | -   | 1     | -    | $\Omega$ |          |
|           |                          | $I_F = 5\text{ mA}$                                | [1] | -     | 0.65 | 0.95     | $\Omega$ |
|           |                          | $I_F = 10\text{ mA}$                               | [1] | -     | 0.56 | 0.9      | $\Omega$ |
|           |                          | $I_F = 100\text{ mA}$                              | -   | -     | 0.35 | -        | $\Omega$ |
| ISL       | isolation                | $V_R = 0\text{ V}$ (see <a href="#">Figure 4</a> ) |     |       |      |          |          |
|           |                          | f = 900 MHz  | -   | 9.4   | -    | dB       |          |
|           |                          | f = 1800 MHz                                       | -   | 4.8   | -    | dB       |          |
|           |                          | f = 2450 MHz                                       | -   | 3.1   | -    | dB       |          |
| $L_{ins}$ | insertion loss           | See <a href="#">Figure 3</a> .                     |     |       |      |          |          |
|           |                          | $I_F = 1\text{ mA}$                                |     |       |      |          |          |
|           |                          | 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       |          |

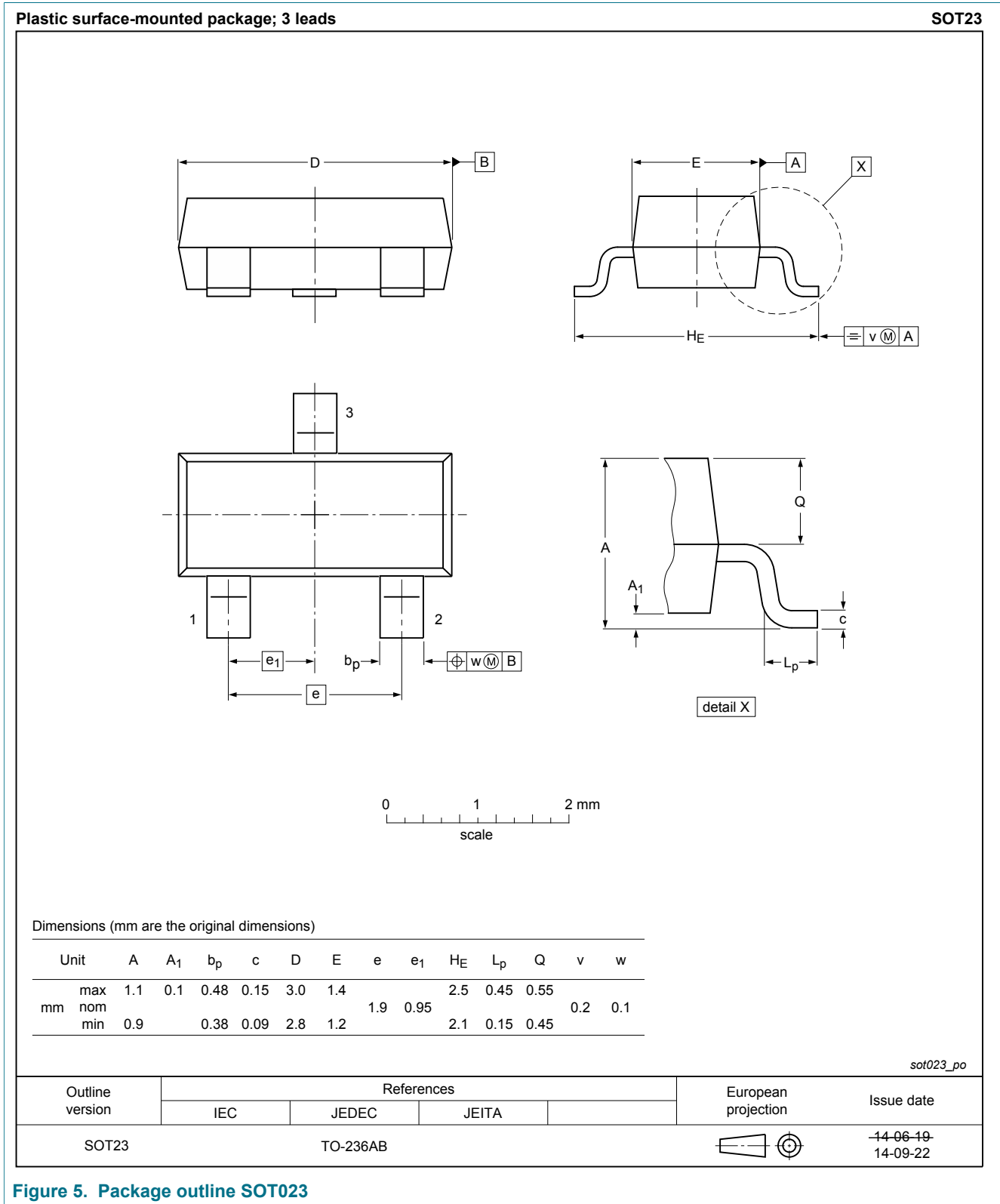
| Symbol   | Parameter                | Conditions  | Min | Typ  | Max | Unit    |
|----------|--------------------------|---|-----|------|-----|---------|
| $\tau_L$ | charge carrier life time | when switched from $I_F = 10$ mA to $I_R = 6$ mA; $R_L = 100 \Omega$ ; measured at $I_R = 3$ mA | -   | 0.17 | -   | $\mu$ 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**



**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: | • <a href="#">Section 1.2</a> "Features and benefits" has been updated.<br>• 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 <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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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