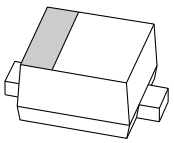


# BAP65-02

## Silicon PIN diode

Rev. 5 — 28 September 2010 Product data sheet

## 1. Product profile

### 1.1 General description

Planar PIN diode in a SOD523 ultra small SMD plastic package.

### 1.2 Features and benefits

- High voltage, current controlled
- RF resistor for RF switches
- Low diode capacitance
- Low diode forward resistance (low loss)
- Very low series inductance

### 1.3 Applications

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

## 2. Pinning information

**Table 1. Pinning**

| Pin | Description | Simplified outline | Graphic symbol |
|---|---|---|---|
| 1 | cathode |   |  sym006 |
| 2 | anode | | |

## 3. Ordering information

**Table 2. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BAP65-02 | - | plastic surface-mounted package; 2 leads | SOD523 |

## 4. Marking

**Table 3. Marking codes**

| Type number | Marking code |
|---|---|
| BAP65-02 | K6 |

## 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 | $T_s \leq 90$ °C | - | 715 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | –65 | +150 | °C |
| $T_{amb}$ | ambient temperature | | –40 | +85 | °C |

## 6. Thermal characteristics

**Table 5. Thermal characteristics**

| Symbol | Parameter | Conditions | Typ | Unit |
|---|---|---|---|---|
| $R_{th\ j\text{-}s}$ | thermal resistance from junction to soldering point | | 85 | K/W |

## 7. Characteristics

**Table 6. Characteristics**

*$T_j$ = 25 °C unless otherwise specified.*

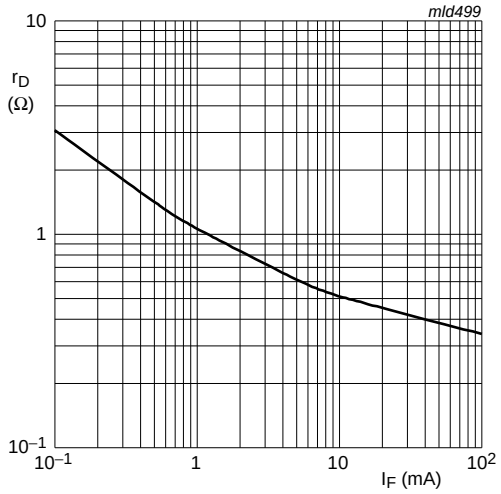
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 50 mA | | - | 0.9 | 1.1 | V |
| $I_R$ | reverse leakage current | $V_R$ = 20 V | | - | - | 20 | nA |
| $C_d$ | diode capacitance | $V_R$ = 0 V; f = 1 MHz | | - | 0.65 | - | pF |
| | | $V_R$ = 1 V; f = 1 MHz | | - | 0.55 | 0.9 | pF |
| | | $V_R$ = 3 V; f = 1 MHz | | - | 0.5 | 0.8 | pF |
| | | $V_R$ = 20 V; f = 1 MHz | | - | 0.375 | - | pF |
| $r_D$ | diode forward resistance | $I_F$ = 1 mA; f = 100 MHz | | - | 1 | - | Ω |
| | | $I_F$ = 5 mA; f = 100 MHz | [1] | - | 0.65 | 0.95 | Ω |
| | | $I_F$ = 10 mA; f = 100 MHz | [1] | - | 0.56 | 0.9 | Ω |
| | | $I_F$ = 100 mA; f = 100 MHz | | - | 0.35 | - | Ω |
| $\lvert s_{21}\rvert^2$ | isolation | $V_R$ = 0; f = 900 MHz | | - | 10 | - | dB |
| | | $V_R$ = 0; f = 1800 MHz | | - | 5.8 | - | dB |
| | | $V_R$ = 0; f = 2450 MHz | | - | 4.4 | - | dB |
| $\lvert s_{21}\rvert^2$ | insertion loss | $I_F$ = 1 mA; f = 900 MHz | | - | 0.11 | - | dB |
| | | $I_F$ = 1 mA; f = 1800 MHz | | - | 0.13 | - | dB |
| | | $I_F$ = 1 mA; f = 2450 MHz | | - | 0.16 | - | dB |
| $\lvert s_{21}\rvert^2$ | insertion loss | $I_F$ = 5 mA; f = 900 MHz | | - | 0.08 | - | dB |
| | | $I_F$ = 5 mA; f = 1800 MHz | | - | 0.11 | - | dB |
| | | $I_F$ = 5 mA; f = 2450 MHz | | - | 0.13 | - | dB |

**Table 6. Characteristics** *...continued*

*$T_j$ = 25 °C unless otherwise specified.*

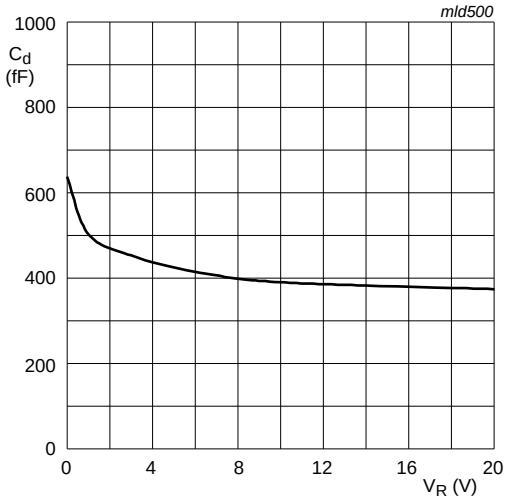
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $\|s_{21}\|^2$ | insertion loss | $I_F$ = 10 mA; f = 900 MHz | - | 0.07 | - | dB |
| | | $I_F$ = 10 mA; f = 1800 MHz | - | 0.1 | - | dB |
| | | $I_F$ = 10 mA; f = 2450 MHz | - | 0.13 | - | dB |
| $\|s_{21}\|^2$ | insertion loss | $I_F$ = 100 mA; f = 900 MHz | - | 0.07 | - | dB |
| | | $I_F$ = 100 mA; f = 1800 MHz | - | 0.1 | - | dB |
| | | $I_F$ = 100 mA; f = 2450 MHz | - | 0.128 | - | dB |
| $\tau_L$ | 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 | - | 0.6 | - | nH |

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



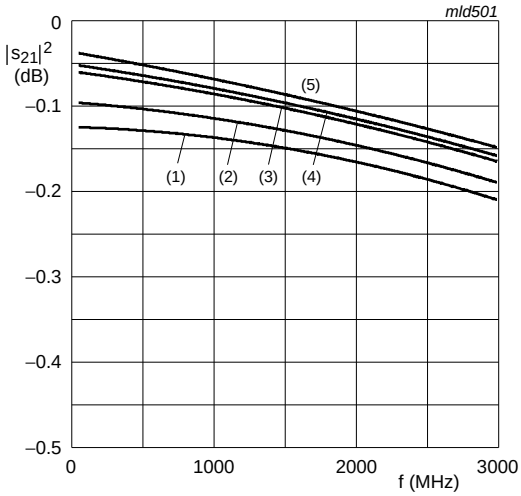

f = 100 MHz; $T_j$ = 25 °C

**Fig 1. Forward resistance as a function of forward current; typical values**




f = 1 MHz; $T_j$ = 25 °C

**Fig 2. Diode capacitance as a function of reverse voltage; typical values**




(1) $I_F$ = 0.5 mA

(2) $I_F$ = 1 mA

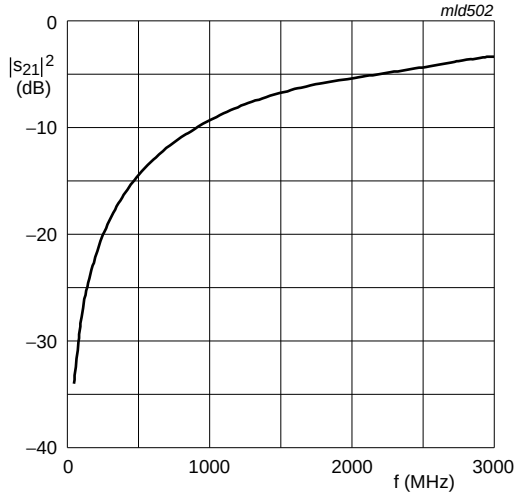
(3) $I_F$ = 5 mA

(4) $I_F$ = 10 mA

(5) $I_F$ = 100 mA

Diode inserted in series with a 50 Ω stripline circuit and biased via the analyzer Tee network. $T_{amb}$ = 25 °C.

**Fig 3. Insertion loss ($|s_{21}|^2$) of the diode as a function of frequency; typical values**

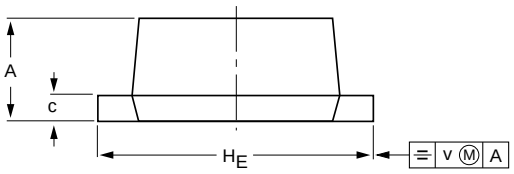


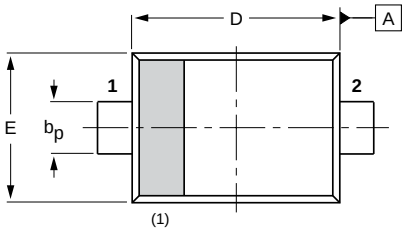

Diode zero biased and inserted in series with a 50 Ω stripline circuit. $T_{amb}$ = 25 °C.

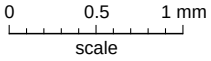
**Fig 4. Isolation ($|s_{21}|^2$) of the diode as a function of frequency; typical values**

## 8. Package outline

**Plastic surface-mounted package; 2 leads** **SOD523**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $b_p$ | c | D | E | $H_E$ | v |
|---|---|---|---|---|---|---|---|
| mm | 0.65<br>0.58 | 0.34<br>0.26 | 0.17<br>0.11 | 1.25<br>1.15 | 0.85<br>0.75 | 1.65<br>1.55 | 0.1 |

**Note**

1. The marking bar indicates the cathode.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOD523 | | | SC-79 | | | ~~02-12-13~~<br>06-03-16 |

**Fig 5. Package outline SOD523**

## 9. Revision history

**Table 7. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BAP65-02 v.5 | 20100928 | Product data sheet | - | BAP65-02_N v.4 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.<br>• Legal texts have been updated.<br>• Table 4 “Limiting values”: added $T_{amb}$ (ambient temperature). | | | |
| BAP65-02_N v.4 | 20080108 | Product data sheet | - | BAP65-02 v.3 |
| BAP65-02 v.3 (9397 750 08364) | 20010511 | Product specification | - | BAP65-02 v.2 |
| BAP65-02 v.2 (9397 750 08237) | 20010507 | Product specification | - | BAP65-02 v.1 |
| BAP65-02 v.1 (9397 750 07724) | 20001220 | Product specification | - | - |

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## 10.1 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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## 12. Contents





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