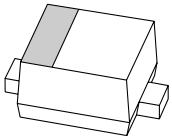

# BAP50-02

## General purpose PIN diode

Rev. 02 — 3 January 2008 Product data sheet

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NXP Semiconductors

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# General purpose PIN diode BAP50-02

## FEATURES

- Low diode capacitance
- Low diode forward resistance.

## APPLICATIONS

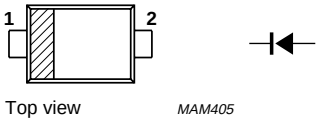
- General RF applications.

## DESCRIPTION

General purpose PIN diode in a SOD523 small SMD plastic package.

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | cathode |
| 2 | anode |




**Marking code:** K4.

Fig.1 Simplified outline (SOD523) and symbol.

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $V_R$ | continuous reverse voltage | | – | 50 | V |
| $I_F$ | continuous forward current | | – | 50 | mA |
| $P_{tot}$ | total power dissipation | $T_s$ = 90 °C | – | 715 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | –65 | +150 | °C |

## ELECTRICAL 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 |
| $V_R$ | reverse voltage | $I_R$ = 10 μA | 50 | – | – | V |
| $I_R$ | reverse current | $V_R$ = 50 V | – | – | 100 | nA |
| $C_d$ | diode capacitance | $V_R$ = 0; f = 1 MHz | – | 0.4 | – | pF |
| | | $V_R$ = 1 V; f = 1 MHz | – | 0.3 | 0.55 | pF |
| | | $V_R$ = 5 V; f = 1 MHz | – | 0.22 | 0.35 | pF |
| $r_D$ | diode forward resistance | $I_F$ = 0.5 mA; f = 100 MHz; note 1 | – | 25 | 40 | Ω |
| | | $I_F$ = 1 mA; f = 100 MHz; note 1 | – | 14 | 25 | Ω |
| | | $I_F$ = 10 mA; f = 100 MHz; note 1 | – | 3 | 5 | Ω |
| $\|s_{21}\|^2$ | isolation | $V_R$ = 0; f = 900 MHz | – | 20.4 | – | dB |
| | | $V_R$ = 0; f = 1800 MHz | – | 17.3 | – | dB |
| | | $V_R$ = 0; f = 2450 MHz | – | 15.5 | – | dB |
| $\|s_{21}\|^2$ | insertion loss | $I_F$ = 0.5 mA; f = 900 MHz | – | 1.74 | – | dB |
| | | $I_F$ = 0.5 mA; f = 1800 MHz | – | 1.79 | – | dB |
| | | $I_F$ = 0.5 mA; f = 2450 MHz | – | 1.88 | – | dB |
| $\|s_{21}\|^2$ | insertion loss | $I_F$ = 1 mA; f = 900 MHz | – | 1.03 | – | dB |
| | | $I_F$ = 1 mA; f = 1800 MHz | – | 1.09 | – | dB |
| | | $I_F$ = 1 mA; f = 2450 MHz | – | 1.15 | – | dB |
| $\|s_{21}\|^2$ | insertion loss | $I_F$ = 10 mA; f = 900 MHz | – | 0.26 | – | dB |
| | | $I_F$ = 10 mA; f = 1800 MHz | – | 0.32 | – | dB |
| | | $I_F$ = 10 mA; f = 2450 MHz | – | 0.34 | – | 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 | – | 1.05 | – | μs |
| $L_S$ | series inductance | $I_F$ = 100 mA; f = 100 MHz | – | 0.6 | – | nH |

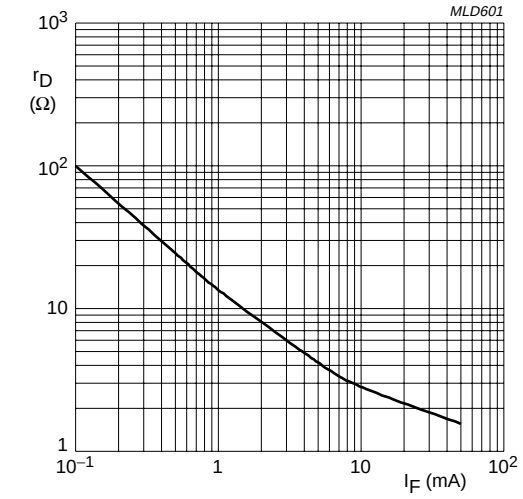
**Note**

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

## THERMAL CHARACTERISTICS

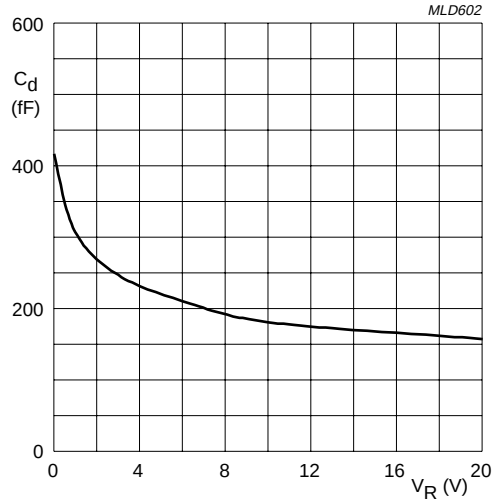
| SYMBOL | PARAMETER | VALUE | UNIT |
|---|---|---|---|
| $R_{th\ j\text{-}s}$ | thermal resistance from junction to soldering point | 85 | K/W |

## GRAPHICAL DATA



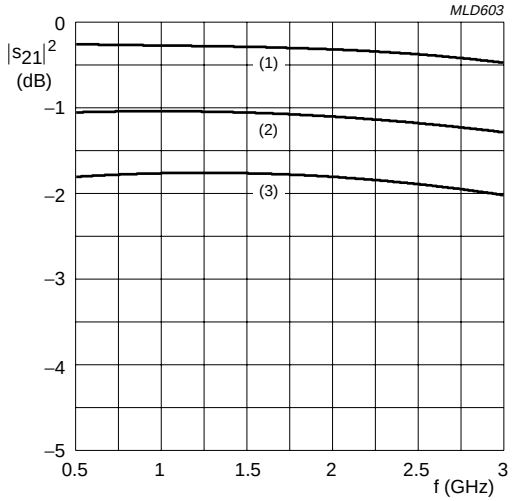

f = 100 MHz; $T_j$ = 25 °C.

Fig.2 Forward resistance as a function of forward current; typical values.




f = 1 MHz; $T_j$ = 25 °C.

Fig.3 Diode capacitance as a function of reverse voltage; typical values.

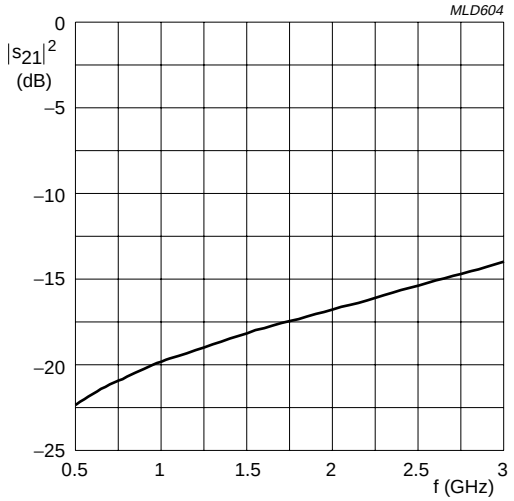



(1) $I_F$ = 10 mA. (2) $I_F$ = 1 mA. (3) $I_F$ = 0.5 mA.

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

$T_{amb}$ = 25 °C.

Fig.4 Insertion loss $|s_{21}|^2$ of the diode in on-state as a function of frequency; typical values.



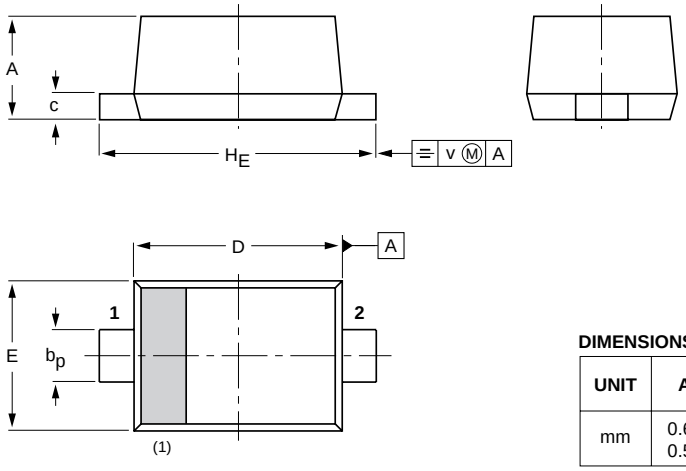

Diode zero biased and inserted in series with a 50 Ω stripline circuit.

$T_{amb}$ = 25 °C.

Fig.5 Isolation ($|s_{21}|^2$) of the diode in off-state as a function of frequency; typical values.

## 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 |

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## 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. |
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[2] The term 'short data sheet' is explained in section "Definitions".

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# Revision history

## Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BAP50-02_N_2 | 20080103 | Product data sheet | - | BAP50-02_1 |
| Modifications: | • Package outline drawing on page 5 changed | | | |
| BAP50-02_1<br>(9397 750 08113) | 20010417 | Product specification | - | - |



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