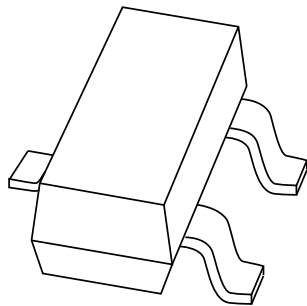


# DATA SHEET



## **BAP1321-04** Silicon PIN diode

Product specification

2001 Apr 17



## Silicon PIN diode

## BAP1321-04

## FEATURES

- High voltage, current controlled
- RF resistor for RF attenuators and switches
- Low diode capacitance
- Low diode forward resistance
- Very low series inductance
- For applications up to 3 GHz.

## APPLICATIONS

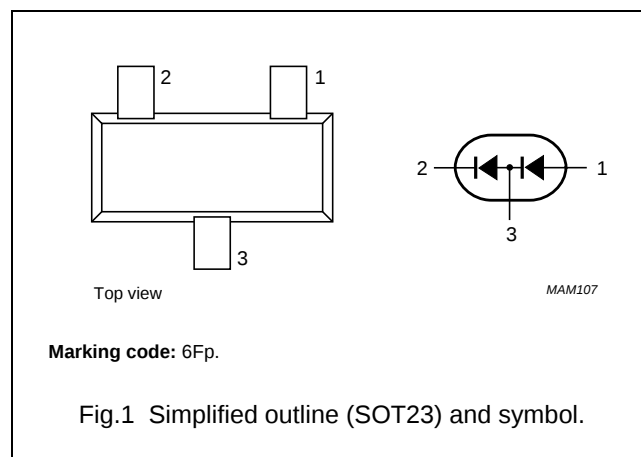
- RF attenuators and switches.

## DESCRIPTION

Two planar PIN diodes in series configuration in a SOT23 small SMD plastic package.

## PINNING

| PIN | DESCRIPTION       |
|-----|-------------------|
| 1   | anode             |
| 2   | cathode           |
| 3   | common connection |



## LIMITING VALUES

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

| SYMBOL           | PARAMETER                  | CONDITIONS              | MIN. | MAX. | UNIT |
|------------------|----------------------------|-------------------------|------|------|------|
| <b>Per diode</b> |                            |                         |      |      |      |
| $V_R$            | continuous reverse voltage |                         | –    | 60   | V    |
| $I_F$            | continuous forward current |                         | –    | 100  | mA   |
| $P_{tot}$        | total power dissipation    | $T_s \leq 90\text{ °C}$ | –    | 250  | mW   |
| $T_{stg}$        | storage temperature        |                         | –65  | +150 | °C   |
| $T_j$            | junction temperature       |                         | –65  | +150 | °C   |

## Silicon PIN diode

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## ELECTRICAL CHARACTERISTICS

 $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| SYMBOL           | PARAMETER                | CONDITIONS                                                                                                                   | TYP.  | MAX.  | UNIT          |
|------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------|-------|-------|---------------|
| <b>Per diode</b> |                          |                                                                                                                              |       |       |               |
| $V_F$            | forward voltage          | $I_F = 50\text{ mA}$                                                                                                         | 0.95  | 1.1   | V             |
| $I_R$            | reverse leakage current  | $V_R = 60\text{ V}$                                                                                                          | –     | 100   | nA            |
| $C_d$            | diode capacitance        | $V_R = 0; f = 1\text{ MHz}$                                                                                                  | 0.42  | –     | pF            |
|                  |                          | $V_R = 1\text{ V}; f = 1\text{ MHz}$                                                                                         | 0.375 | 0.45  | pF            |
|                  |                          | $V_R = 20\text{ V}; f = 1\text{ MHz}$                                                                                        | 0.275 | 0.325 | pF            |
| $r_D$            | diode forward resistance | $f = 100\text{ MHz}$ ; note 1                                                                                                |       |       |               |
|                  |                          | $I_F = 0.5\text{ mA}$                                                                                                        | 3.4   | 5.0   | $\Omega$      |
|                  |                          | $I_F = 1\text{ mA}$                                                                                                          | 2.4   | 3.6   | $\Omega$      |
|                  |                          | $I_F = 10\text{ mA}$                                                                                                         | 1.2   | 1.8   | $\Omega$      |
| $ S_{21} ^2$     | isolation                | $V_R = 0; f = 900\text{ MHz}$                                                                                                | 15.7  | –     | dB            |
|                  |                          | $V_R = 0; f = 1800\text{ MHz}$                                                                                               | 10.5  | –     | dB            |
|                  |                          | $V_R = 0; f = 2450\text{ MHz}$                                                                                               | 7.9   | –     | dB            |
| $ S_{21} ^2$     | insertion loss           | $I_F = 0.5\text{ mA}; f = 900\text{ MHz}$                                                                                    | 0.27  | –     | dB            |
|                  |                          | $I_F = 0.5\text{ mA}; f = 1800\text{ MHz}$                                                                                   | 0.35  | –     | dB            |
|                  |                          | $I_F = 0.5\text{ mA}; f = 2450\text{ MHz}$                                                                                   | 0.43  | –     | dB            |
| $ S_{21} ^2$     | insertion loss           | $I_F = 1\text{ mA}; f = 900\text{ MHz}$                                                                                      | 0.21  | –     | dB            |
|                  |                          | $I_F = 1\text{ mA}; f = 1800\text{ MHz}$                                                                                     | 0.29  | –     | dB            |
|                  |                          | $I_F = 1\text{ mA}; f = 2450\text{ MHz}$                                                                                     | 0.37  | –     | dB            |
| $ S_{21} ^2$     | insertion loss           | $I_F = 10\text{ mA}; f = 900\text{ MHz}$                                                                                     | 0.14  | –     | dB            |
|                  |                          | $I_F = 10\text{ mA}; f = 1800\text{ MHz}$                                                                                    | 0.21  | –     | dB            |
|                  |                          | $I_F = 10\text{ mA}; f = 2450\text{ MHz}$                                                                                    | 0.29  | –     | dB            |
| $ S_{21} ^2$     | insertion loss           | $I_F = 100\text{ mA}; f = 900\text{ MHz}$                                                                                    | 0.10  | –     | dB            |
|                  |                          | $I_F = 100\text{ mA}; f = 1800\text{ MHz}$                                                                                   | 0.18  | –     | dB            |
|                  |                          | $I_F = 100\text{ mA}; f = 2450\text{ MHz}$                                                                                   | 0.26  | –     | dB            |
| $\tau_L$         | charge carrier life time | when switched from $I_F = 10\text{ mA}$ to $I_R = 6\text{ mA}$ ; $R_L = 100\text{ }\Omega$ ; measured at $I_R = 3\text{ mA}$ | 0.5   | –     | $\mu\text{s}$ |
| $L_S$            | series inductance        | $I_F = 100\text{ mA}; f = 100\text{ MHz}$                                                                                    | 1.4   | –     | nH            |

## Note

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

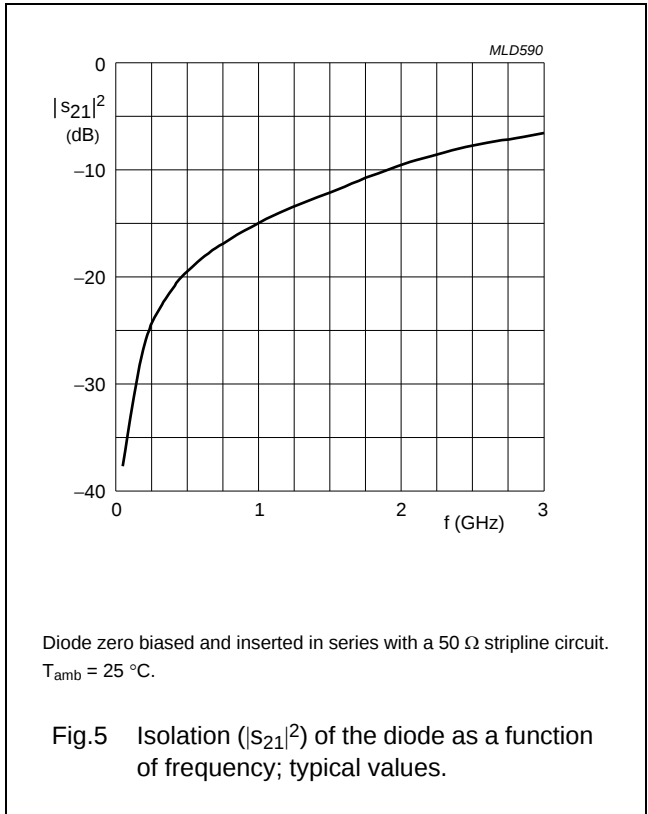
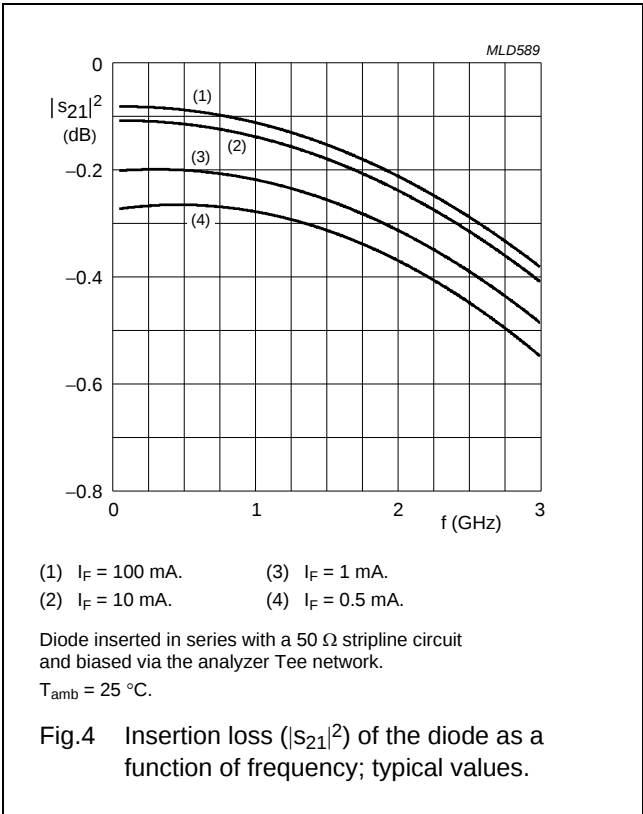
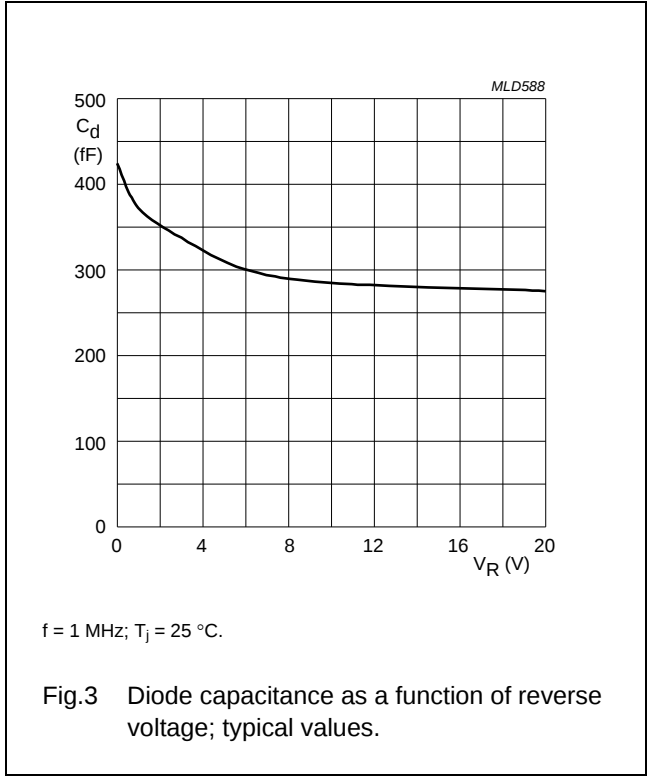
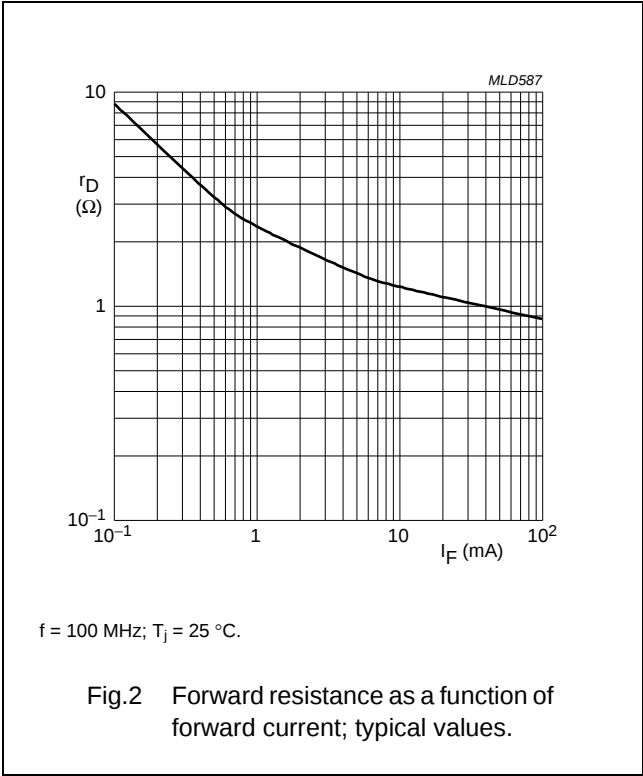
## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER                                           | VALUE | UNIT |
|---------------|-----------------------------------------------------|-------|------|
| $R_{th\ j-s}$ | thermal resistance from junction to soldering point | 220   | K/W  |

Silicon PIN diode

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GRAPHICAL DATA



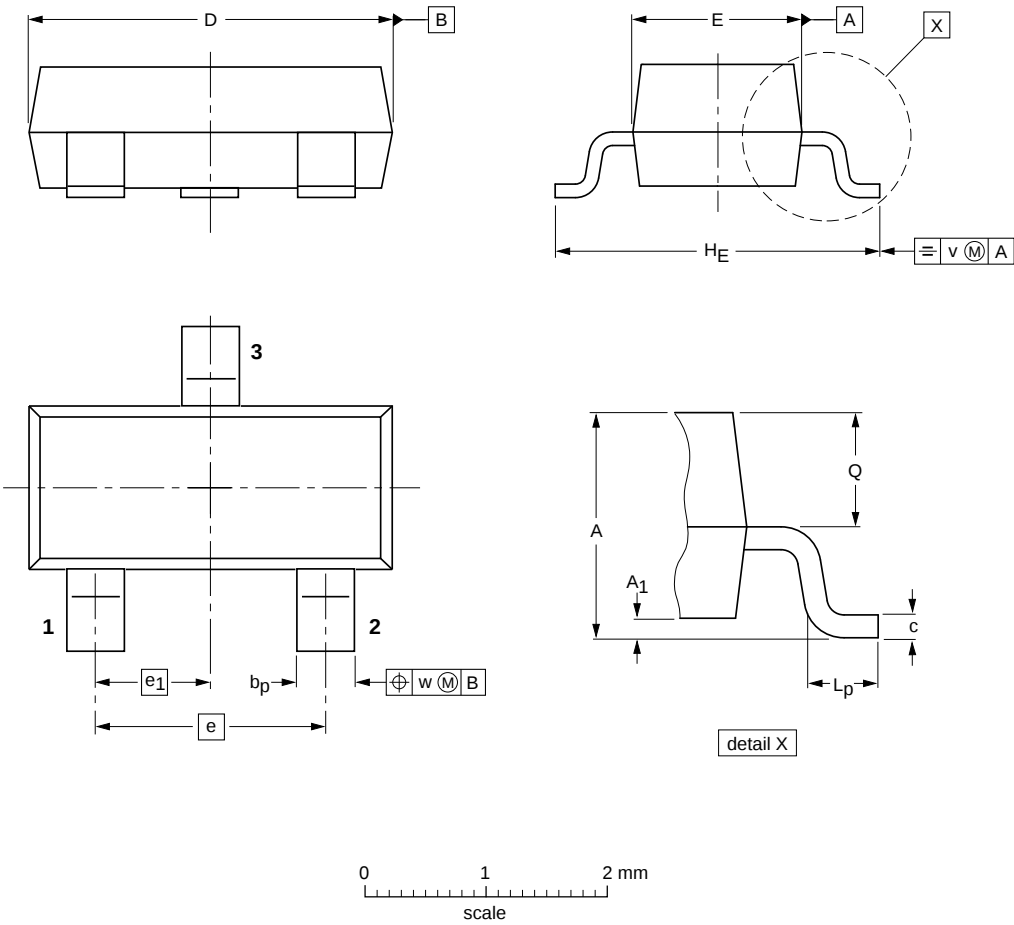
Silicon PIN diode

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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub><br>max. | b <sub>p</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   |
|------|------------|------------------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm   | 1.1<br>0.9 | 0.1                    | 0.48<br>0.38   | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95           | 2.5<br>2.1     | 0.45<br>0.15   | 0.55<br>0.45 | 0.2 | 0.1 |

| OUTLINE<br>VERSION | REFERENCES |          |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE                      |
|--------------------|------------|----------|-------|--|------------------------|---------------------------------|
|                    | IEC        | JEDEC    | JEITA |  |                        |                                 |
| SOT23              |            | TO-236AB |       |  |                        | <del>04-11-04</del><br>06-03-16 |

## Silicon PIN diode

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## DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION                                                                            |
|--------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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