
# BAP64-05W

## Silicon PIN diode

Rev. 2 — 28 April 2015 Product data sheet

## 1. Product profile

### 1.1 General description

Two planar PIN diodes in common cathode configuration in a SOT323 small plastic SMD package.

### 1.2 Features and benefits

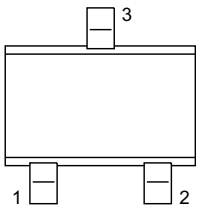
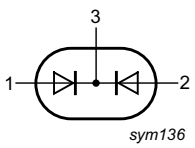
- High voltage, current controlled
- RF resistor for RF attenuators and switches
- Low diode capacitance
- Low diode forward resistance
- Low series inductance
- For applications up to 3 GHz
- AEC-Q101 qualified

### 1.3 Applications

- RF attenuators and switches

## 2. Pinning information

**Table 1. Discrete pinning**

| Pin | Description | Simplified outline | Symbol |
|---|---|---|---|
| 1 | anode (a1) |  top view |  |
| 2 | anode (a2) | | |
| 3 | common cathode | | |





## 3. Ordering information

**Table 2. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BAP64-05W | - | plastic surface-mounted package; 3 leads | SOT323 |

## 4. Marking

**Table 3. Marking**

| Type number | Marking | Description |
|---|---|---|
| BAP64-05W | 5W* | * = t : made in Malaysia |
| | | * = W : made in China |

**Table 4. Marking**

| Type number | Marking code |
|---|---|
| BAP64-05W | 5W- |

## 5. Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*
*Values are specified per diode.*

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_R$ | reverse voltage | | - | 100 | V |
| $I_F$ | forward current | | - | 100 | mA |
| $P_{tot}$ | total power dissipation | $T_{sp}$ = 90 °C | - | 240 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | –65 | +150 | °C |

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol | Parameter | Conditions | Typ | Unit |
|---|---|---|---|---|
| $R_{th(j\text{-}sp)}$ | thermal resistance from junction to solder point | | 250 | K/W |

## 7. Characteristics

**Table 7. Characteristics**

*Values are specified per diode; $T_j$ = 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 | $V_R$ = 175 V | - | - | 10 | µA |
| | | $V_R$ = 20 V | - | - | 1 | µA |
| $C_d$ | diode capacitance | see Figure 1; f = 1 MHz; | | | | |
| | | $V_R$ = 0 V | - | 0.52 | - | pF |
| | | $V_R$ = 1 V | - | 0.37 | - | pF |
| | | $V_R$ = 20 V | - | 0.23 | 0.35 | pF |

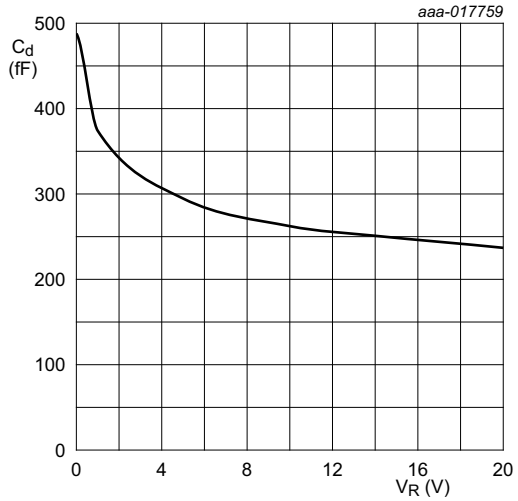
**Table 7. Characteristics** *...continued*

*Values are specified per diode; $T_j$ = 25 °C unless otherwise specified.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $r_D$ | diode forward resistance | see Figure 2; f = 100 MHz; [1] | | | | |
| | | $I_F$ = 0.5 mA | - | 20 | 40 | Ω |
| | | $I_F$ = 1 mA | - | 10 | 20 | Ω |
| | | $I_F$ = 10 mA | - | 2.0 | 3.8 | Ω |
| | | $I_F$ = 100 mA | - | 0.7 | 1.35 | Ω |
| $\tau_L$ | 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 | - | 1.55 | - | µs |
| $L_S$ | series inductance | | - | 1.2 | - | nH |

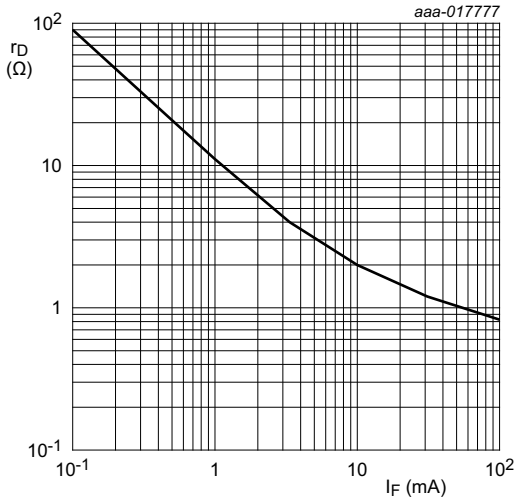
[1] Guaranteed on AQL basis: inspection level S4, AQL 1.0.

## 7.1 Graphical data



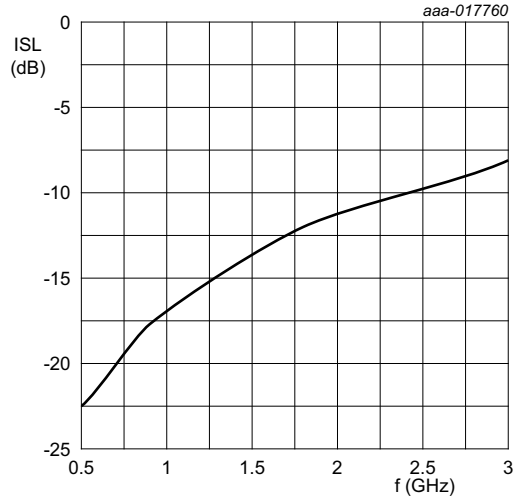

f = 1 MHz; $T_j$ = 25 °C.

**Fig 1. Diode capacitance as a function of reverse voltage; typical values**




f = 100 MHz; $T_j$ = 25 °C.

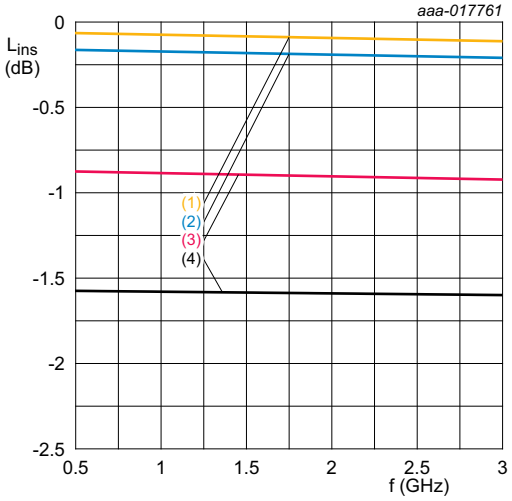
**Fig 2. Forward resistance as a function of forward current; typical values**




$T_{amb}$ = 25 °C

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

**Fig 3. Isolation of the diode as a function of frequency; typical values**




$T_{amb}$ = 25 °C

(1) $I_F$ = 100 mA

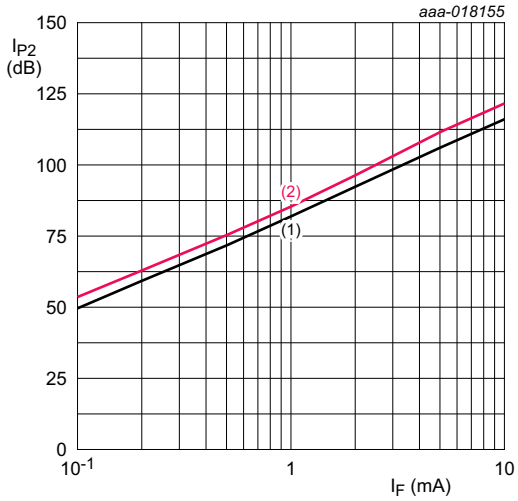
(2) $I_F$ = 10 mA

(3) $I_F$ = 1 mA

(4) $I_F$ = 0.5 mA

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

**Fig 4. Insertion loss of the diode as a function of frequency; typical values**




$T_{amb}$ = 25 °C

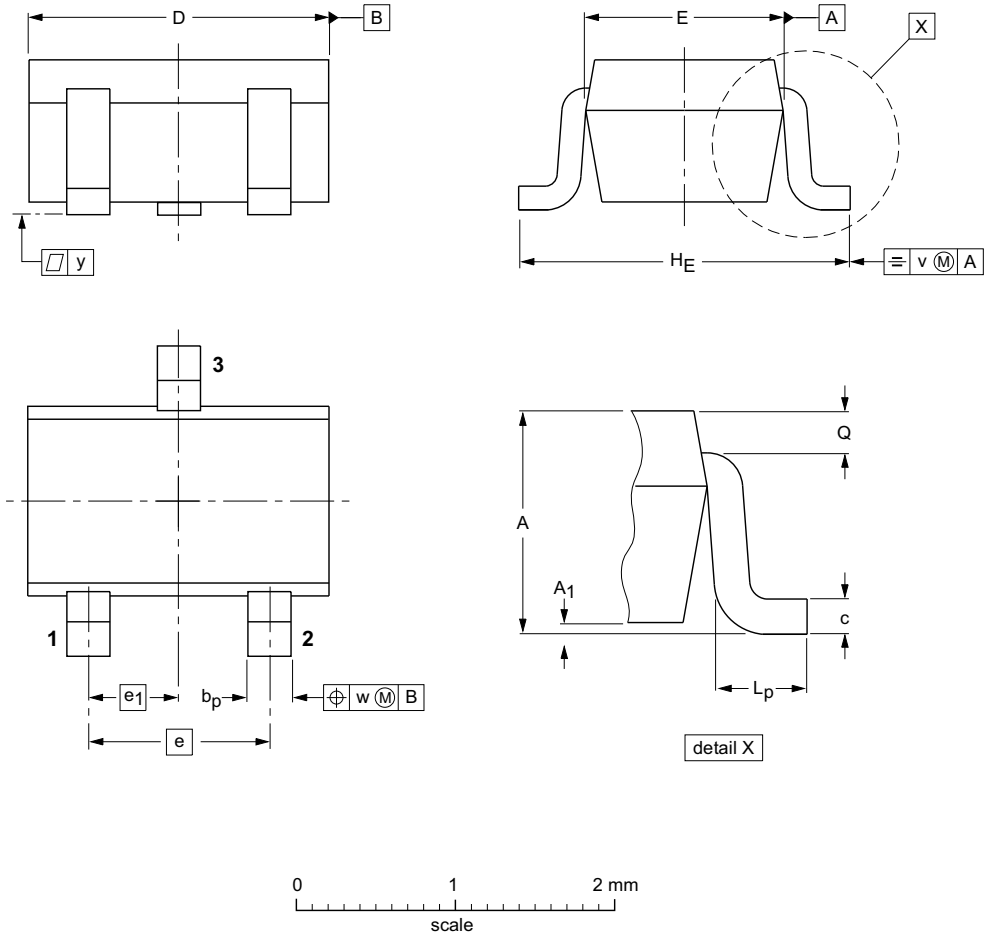
(1) f = 900 MHz

(2) f = 1800 MHz

**Fig 5. Second-order intercept point as a function of forward current; typical values**

## 8. Package outline

**Plastic surface-mounted package; 3 leads** **SOT323**




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

| UNIT | A | $A_1$ max | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.8 | 0.1 | 0.4<br>0.3 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.23<br>0.13 | 0.2 | 0.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT323 | | | SC-70 | | | ~~04-11-04~~<br>06-03-16 |

**Fig 6. Package outline SOT323**

## 9. Abbreviations

**Table 8. Abbreviations**

| Acronym | Description |
|---|---|
| AQL | Acceptable Quality Level |
| PIN | P-type, Intrinsic, N-type |
| SMD | Surface Mounted Device |
| S4 | Special inspection level 4 |

## 10. Revision history

**Table 9. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BAP64-05W v.2 | 20150428 | Product data sheet | - | BAP64-05W v.1 |
| 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 adapted to the new company name where appropriate.<br>• AEC-Q101 qualified | | | |
| BAP64-05W v.1 (9397 750 07192) | 20000713 | Product specification | - | - |

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| 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".

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