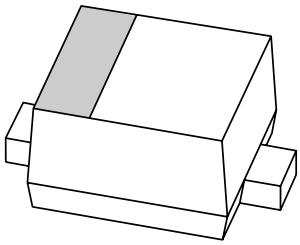
# DATA SHEET



# BAS521
## High voltage switching diode

Product specification

2003 Aug 12

Philips
Semiconductors


PHILIPS

# High voltage switching diode BAS521

## FEATURES

- High switching speed: max. 50 ns
- High continuous reverse voltage: 300 V
- Repetitive peak forward current: 625 mA
- Ultra small plastic SMD package.

## APPLICATIONS

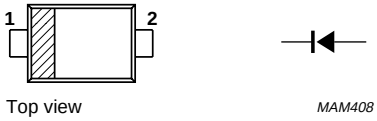
- High speed switching
- High voltage switching.

## DESCRIPTION

The BAS521 is a high-voltage switching diode fabricated in planar technology and encapsulated in an ultra small SOD523 (SC-79) plastic SMD package.

## PINNING

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




**Marking code:** L4.
The marking bar indicates the cathode.

Fig.1 Simplified outline (SOD523; SC-79), 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 | | – | 300 | V |
| $V_{RRM}$ | repetitive peak reverse voltage | | – | 300 | V |
| $I_F$ | continuous forward current | $T_s \leq 90$ °C; note 1 | – | 250 | mA |
| $I_{FRM}$ | repetitive peak forward current | $t_p = 1$ ms; $\delta = 0.25$ | – | 1 | A |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p = 1$ µs; square wave; $T_j = 25$ °C prior to surge | – | 4.5 | A |
| $P_{tot}$ | total power dissipation | $T_s \leq 90$ °C; note 1 | – | 500 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |
| $T_{amb}$ | operating ambient temperature | | –65 | +150 | °C |

**Note**

1. $T_s$ is the temperature at the soldering point of the cathode tab.

# High voltage switching diode BAS521

## ELECTRICAL CHARACTERISTICS

$T_{amb}$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{BR}$ | breakdown voltage | $I_R$ = 100 μA | 300 | 340 | – | V |
| $V_F$ | forward voltage | $I_F$ = 100 mA; note 1 | – | 0.95 | 1.1 | V |
| $I_R$ | reverse current | $V_R$ = 250 V | – | 30 | 150 | nA |
| | | $V_R$ = 250 V; $T_a$ = 150 °C | – | 40 | 100 | μA |
| $t_{rr}$ | reverse recovery time | when switched from $I_F$ = 30 mA to $I_R$ = 30 mA; $R_L$ = 100 Ω; measured at $I_R$ = 3 mA | – | 16 | 50 | ns |
| $C_d$ | diode capacitance | $V_R$ = 0 V; f = 1 MHz | – | 0.4 | 5 | pF |

**Note**

1. Pulse test: $t_p$ = 300 μs; δ = 0.02.

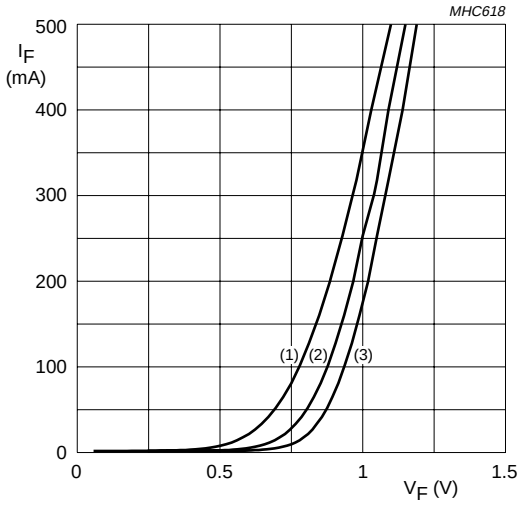
## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th\ j\text{-}s}$ | thermal resistance from junction to solder point | note 1 | 120 | K/W |
| $R_{th\ j\text{-}a}$ | thermal resistance from junction to ambient | note 2 | 500 | K/W |

**Notes**

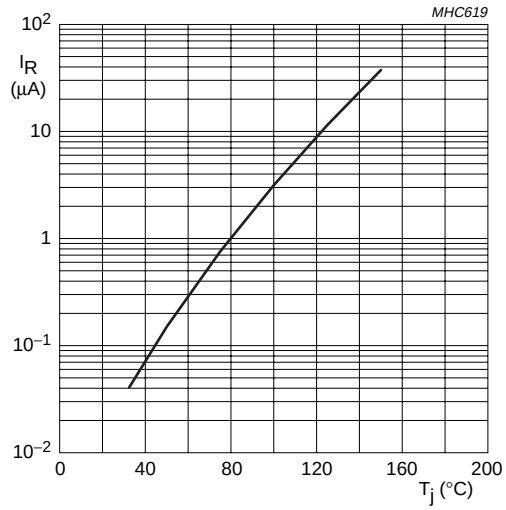
1. Soldering point of the cathode tab.
2. Refer to SOD523 (SC-79) standard mounting conditions.

## GRAPHICAL DATA




(1) $T_{amb}$ = 150 °C.
(2) $T_{amb}$ = 75 °C.
(3) $T_{amb}$ =25 °C.

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




$V_R = V_{Rmax}$; typical values.

Fig.3 Reverse current as a function of junction temperature.

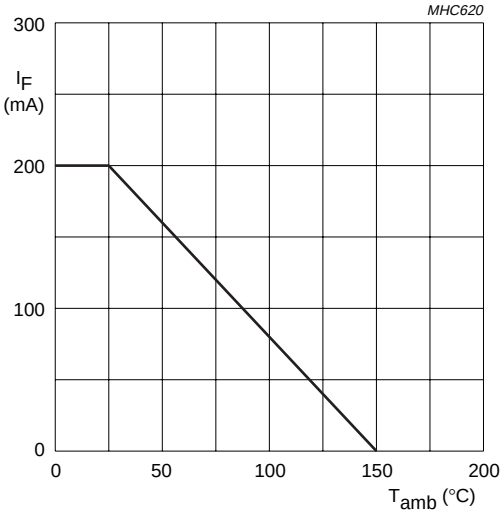



Fig.4 Maximum permissible continuous forward current as a function of ambient temperature.

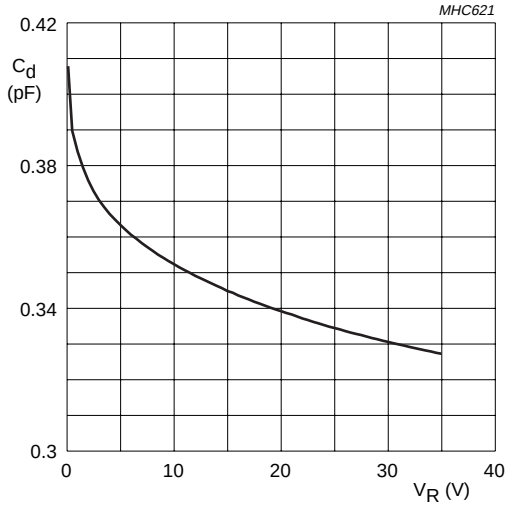
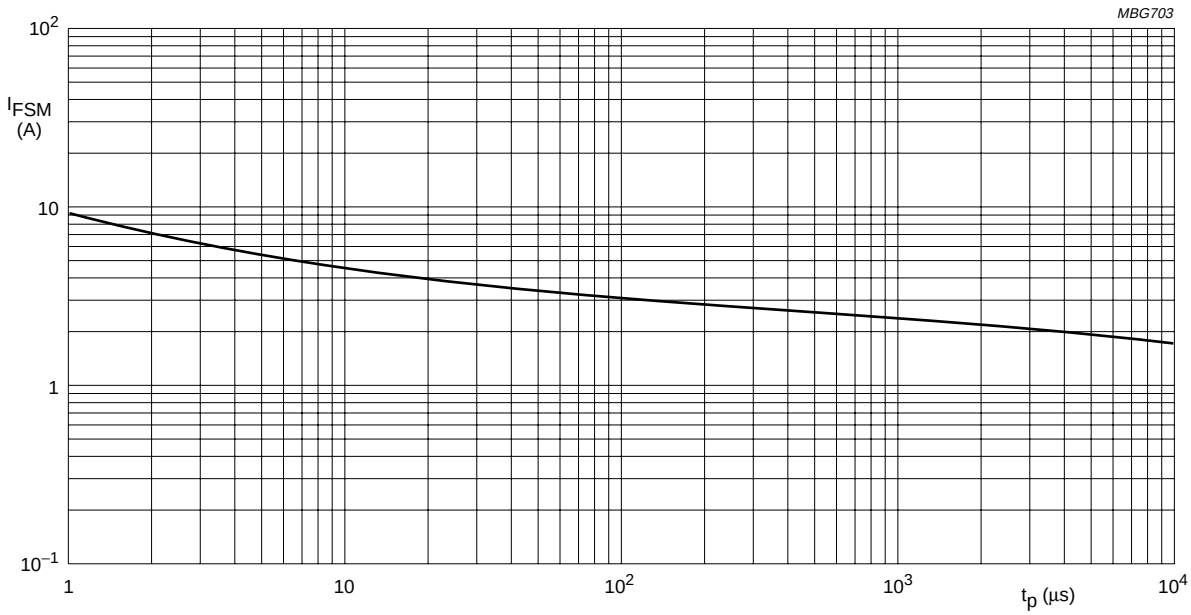



Fig.5 Diode capacitance as a function of reverse voltage; typical values.



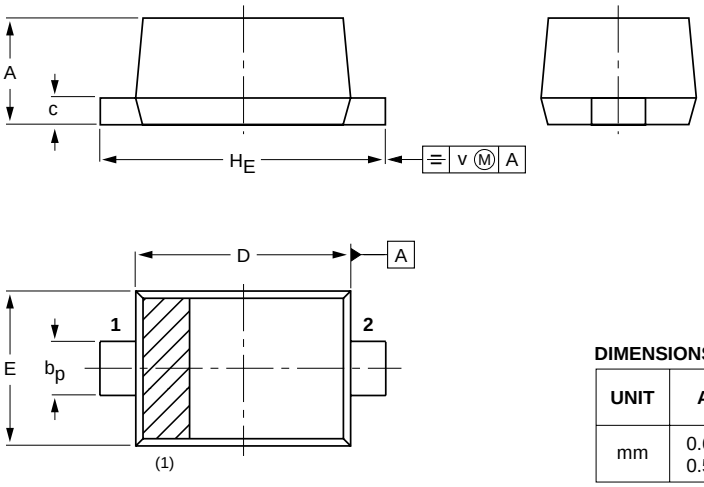

Based on square wave currents.
$T_j$ = 25°C prior to surge.

Fig.6 Maximum permissible non-repetitive peak forward current as a function of pulse duration.

# High voltage switching diode BAS521

## 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 | | | ~~98-11-25~~<br>02-12-13 |

**DATA SHEET STATUS**

| LEVEL | DATA SHEET STATUS(1) | PRODUCT STATUS(2)(3) | DEFINITION |
|---|---|---|---|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
| II | Preliminary data | Qualification | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product. |
| III | Product data | Production | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). |

**Notes**

1. Please consult the most recently issued data sheet before initiating or completing a design.
2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.
3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

**DEFINITIONS**

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

**Application information** — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

**DISCLAIMERS**

**Life support applications** — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

**Right to make changes** — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status ‘Production’), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

# *Philips Semiconductors – a worldwide company*

**Contact information**

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.



SCA75



Printed in The Netherlands 613514/01/pp8 Date of release: 2003 Aug 12 Document order number: 9397 750 11448

*Let's make things better.*

Philips Semiconductors



PHILIPS