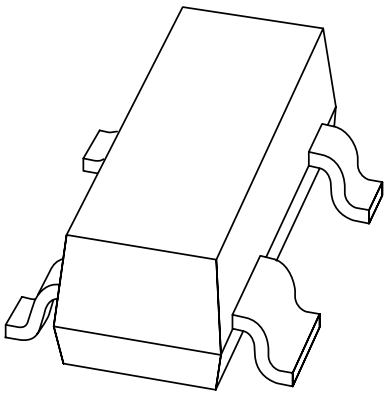
# DATA SHEET



# BAW101
## High voltage double diode

Product specification

2003 May 13

Philips
Semiconductors

PHILIPS

# High voltage double diode BAW101

## FEATURES

- Small plastic SMD package
- High switching speed: max. 50 ns
- High continuous reverse voltage: 300 V
- Electrically insulated diodes.

## APPLICATIONS

- High voltage switching
- Automotive
- Communication.

## DESCRIPTION

The BAW101 is a high-speed switching diode array with two separate dice, fabricated in planar technology and encapsulated in a small SOT143B plastic SMD package.

## MARKING

| TYPE NUMBER | MARKING CODE(1) |
|---|---|
| BAW101 | ∗AB |

**Note**

1. ∗ = p: Made in Hong Kong.
   ∗ = t: Made in Malaysia.
   ∗ = W: Made in China.

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | cathode 1 |
| 2 | cathode 2 |
| 3 | anode 2 |
| 4 | anode 1 |

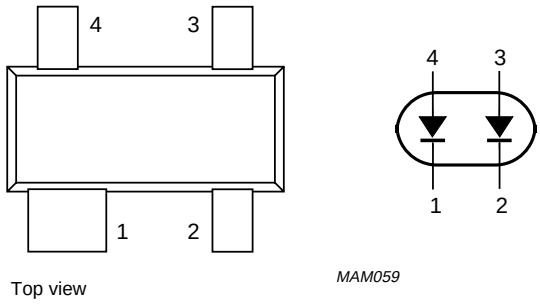



Fig.1 Simplified outline (SOT143B) and symbol.

## LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| **Per diode** | | | | | |
| $V_R$ | continuous reverse voltage | | – | 300 | V |
| | | series connection | – | 600 | V |
| $V_{RRM}$ | repetitive peak reverse voltage | | – | 300 | V |
| | | series connection | – | 600 | V |
| $I_F$ | continuous forward current | single diode loaded; note 1; see Fig.2 | – | 250 | mA |
| | | double diode loaded; note 1; see Fig.2 | – | 140 | mA |
| $I_{FRM}$ | repetitive peak forward current | | – | 625 | mA |
| $I_{FSM}$ | non-repetitive peak forward current | square wave; $T_j$ = 25 °C prior to surge; t = 1 μs | – | 4.5 | A |
| $P_{tot}$ | total power dissipation | $T_{amb}$ = 25 °C; note 1 | – | 350 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |
| $T_{amb}$ | operating ambient temperature | | –65 | +150 | °C |

**Note**

1. Device mounted on an FR4 printed-circuit board, cathode-lead mounting pad = 1 $cm^2$.

## ELECTRICAL CHARACTERISTICS

$T_j$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| **Per diode** | | | | | |
| $V_{BR(R)}$ | reverse breakdown voltage | $I_R$ = 100 μA | 300 | – | V |
| $V_F$ | forward voltage | $I_F$ = 100 mA; note 1 | – | 1.1 | V |
| $I_R$ | reverse current | $V_R$ = 250 V | – | 150 | nA |
| | | $V_R$ = 250 V; $T_{amb}$ = 150 °C | – | 50 | 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 | – | 50 | ns |
| $C_d$ | diode capacitance | $V_R$ = 0 V; f = 1 MHz | – | 2 | pF |

**Note**

1. Pulse test: pulse width = 300 μs; δ = 0.02.

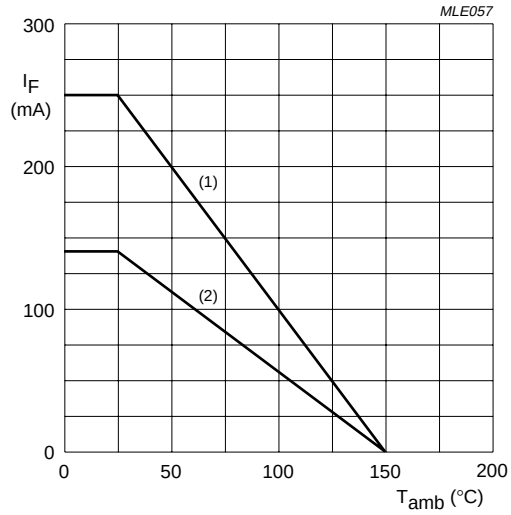
## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th\ j\text{-}s}$ | thermal resistance from junction to soldering point | note 1 | 255 | K/W |
| $R_{th\ j\text{-}a}$ | thermal resistance from junction to ambient | note 2 | 357 | K/W |

**Notes**

1. One or more diodes loaded.
2. Device mounted on an FR4 printed-circuit board, cathode-lead mounting pad = 1 $cm^2$.

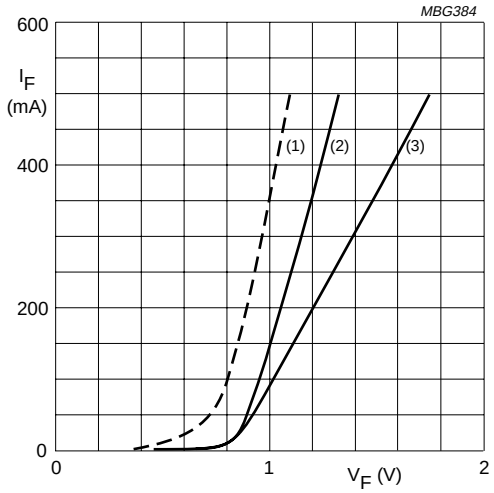
## GRAPHICAL DATA




(1) Single diode loaded. (2) Double diode loaded.

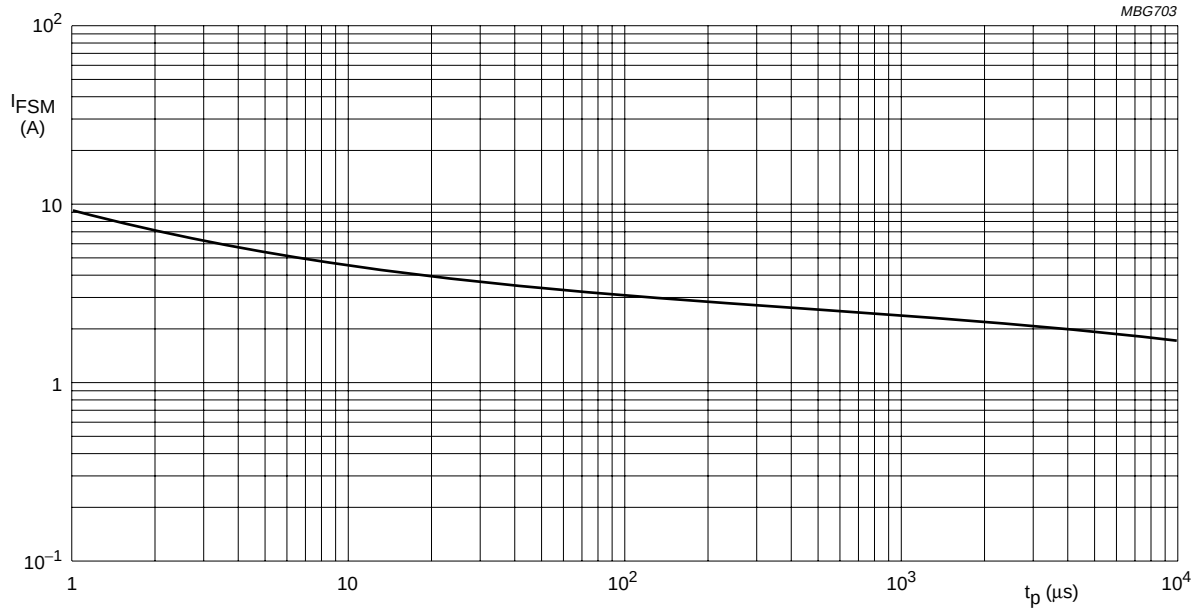
Device mounted on an FR4 printed-circuit board.
Cathode-lead mounting pad = 1 $cm^2$.

Fig.2 Maximum permissible continuous forward current as a function of ambient temperature.



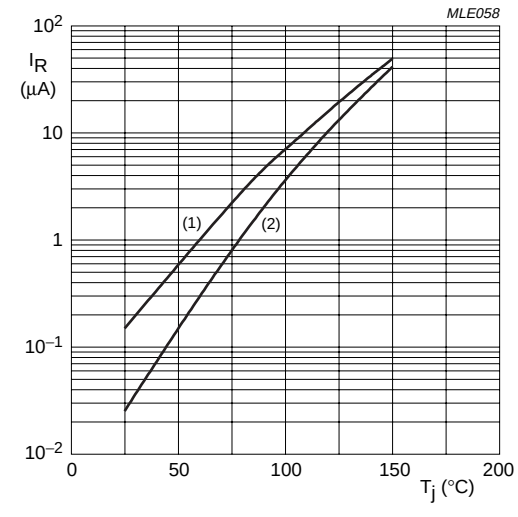

(1) $T_j$ = 150 °C; typical values.
(2) $T_j$ = 25 °C; typical values.
(3) $T_j$ = 25 °C; maximum values.

Fig.3 Forward current as a function of forward voltage.



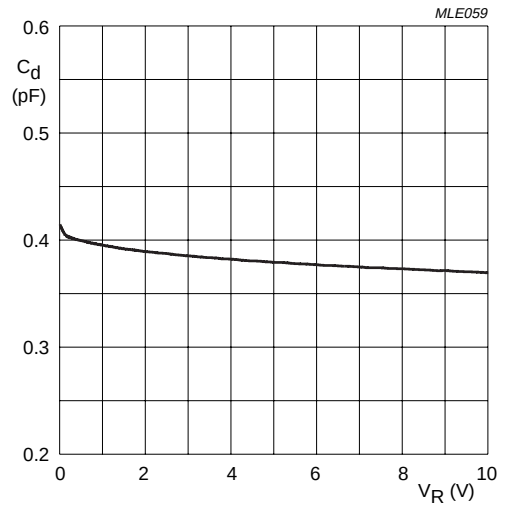

Based on square wave currents.
$T_j$ = 25 °C prior to surge.

Fig.4 Maximum permissible non-repetitive peak forward current as a function of pulse duration.




(1) $V_R = V_{RMAX}$: maximum values.
(2) $V_R = V_{RMAX}$: typical values.

Fig.5 Reverse current as a function of junction temperature.




f = 1 MHz; $T_j$ = 25 °C.

Fig.6 Diode capacitance as a function of reverse voltage; typical values.

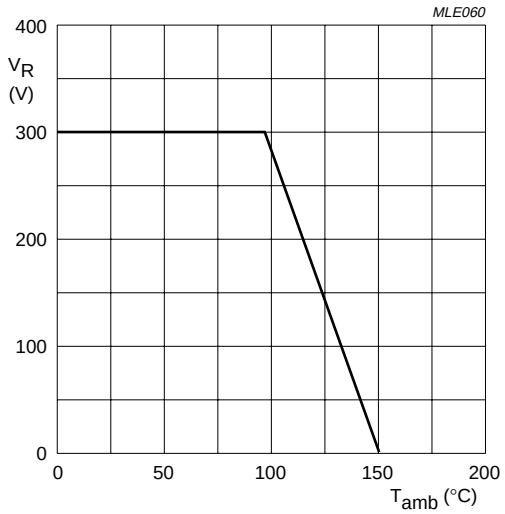
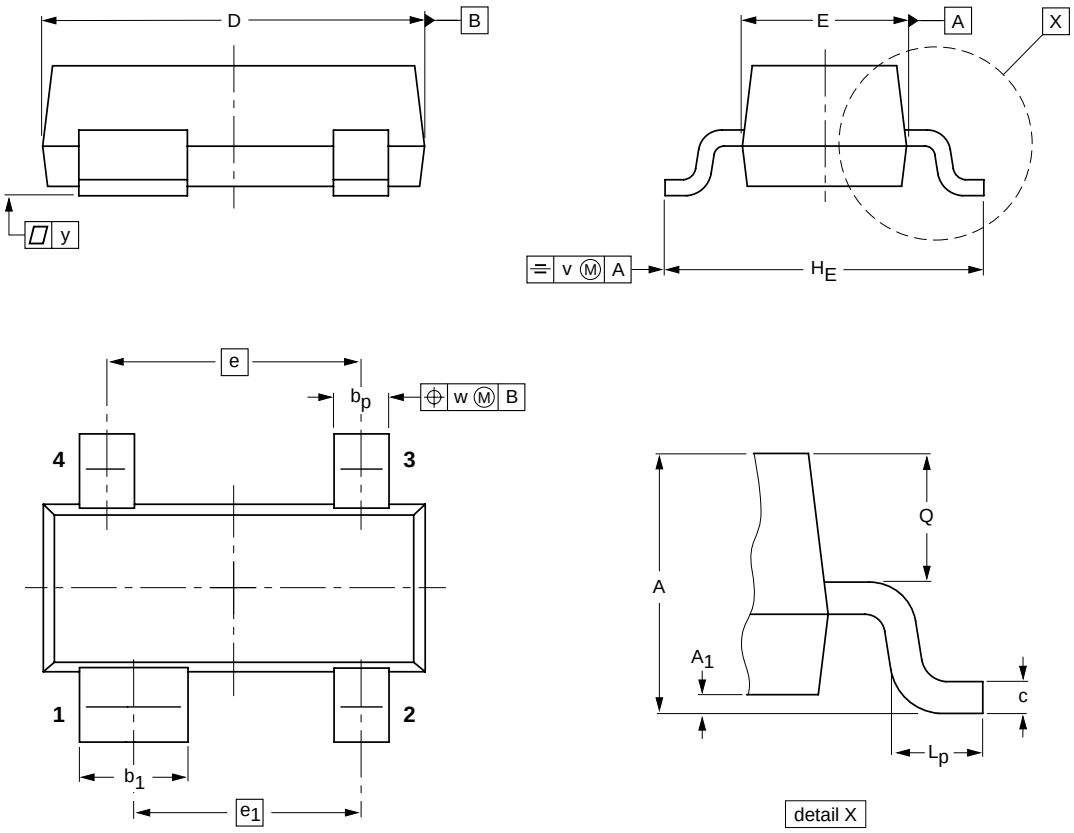



Fig.7 Maximum permissible continuous reverse voltage as a function of ambient temperature.

## PACKAGE OUTLINE

**Plastic surface mounted package; 4 leads** **SOT143B**




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

| UNIT | A | $A_1$ max | $b_p$ | $b_1$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w | y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.9 | 0.1 | 0.48<br>0.38 | 0.88<br>0.78 | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 1.7 | 2.5<br>2.1 | 0.45<br>0.15 | 0.55<br>0.45 | 0.2 | 0.1 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOT143B | | | | | | 97-02-28 |

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| 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. |
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**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.

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