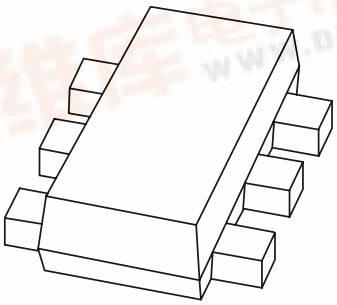
# DATA SHEET



# PEMB1
## PNP resistor-equipped transistors; R1 = 22 kΩ, R2 = 22 kΩ

Preliminary specification

2001 Sep 13

# PNP resistor-equipped transistors; R1 = 22 kΩ, R2 = 22 kΩ

# PEMB1

## FEATURES

- 300 mW total power dissipation
- Very small 1.6 mm x 1.2 mm ultra thin package
- Excellent coplanarity due to straight leads
- Replaces two SC-75/SC-89 packaged transistors on same PCB area
- Reduces required PCB area
- Reduced pick and place costs.

## APPLICATIONS

- General purpose switching and amplification
- Inverter and interface circuits
- Circuit driver.

## DESCRIPTION

PNP resistor-equipped transistors in a SOT666 plastic package.

## MARKING

| TYPE NUMBER | MARKING CODE |
|---|---|
| PEMB1 | Z4 |

## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | –50 | V |
| $I_{CM}$ | peak collector current | –100 | mA |
| TR1 | PNP | – | – |
| TR2 | PNP | – | – |
| R1 | bias resistor | 22 | kΩ |
| R2 | bias resistor | 22 | kΩ |

## PINNING

| PIN | DESCRIPTION | |
|---|---|---|
| 1, 4 | emitter | TR1; TR2 |
| 2, 5 | base | TR1; TR2 |
| 6, 3 | collector | TR1; TR2 |

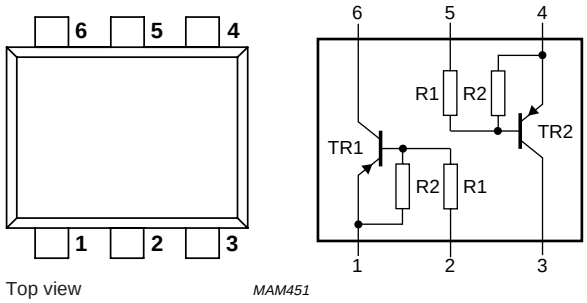



Fig.1 Simplified outline (SOT666) and symbol.

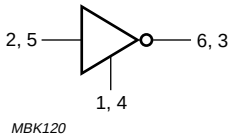



Fig.2 Equivalent inverter symbol.

## LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| **Per transistor unless otherwise specified** | | | | | |
| $V_{CBO}$ | collector-base voltage | open emitter | – | –50 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | – | –50 | V |
| $V_{EBO}$ | emitter-base voltage | open collector | – | –10 | V |
| $V_I$ | input voltage | | | | |
| | positive | | – | +12 | V |
| | negative | | – | –5 | V |
| $I_O$ | output current (DC) | | – | –100 | mA |
| $I_{CM}$ | peak collector current | | – | –100 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C; note 1 | – | 200 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |
| $T_{amb}$ | operating ambient temperature | | –65 | +150 | °C |
| **Per device** | | | | | |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C; note 1 | – | 300 | mW |

**Note**

1. Transistor mounted on a FR4 printed-circuit board.

## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th\ j\text{-}a}$ | thermal resistance from junction to ambient | notes 1 and 2 | 416 | K/W |

**Notes**

1. Transistor mounted on an FR4 printed-circuit board.
2. The only recommended soldering method is reflow soldering.

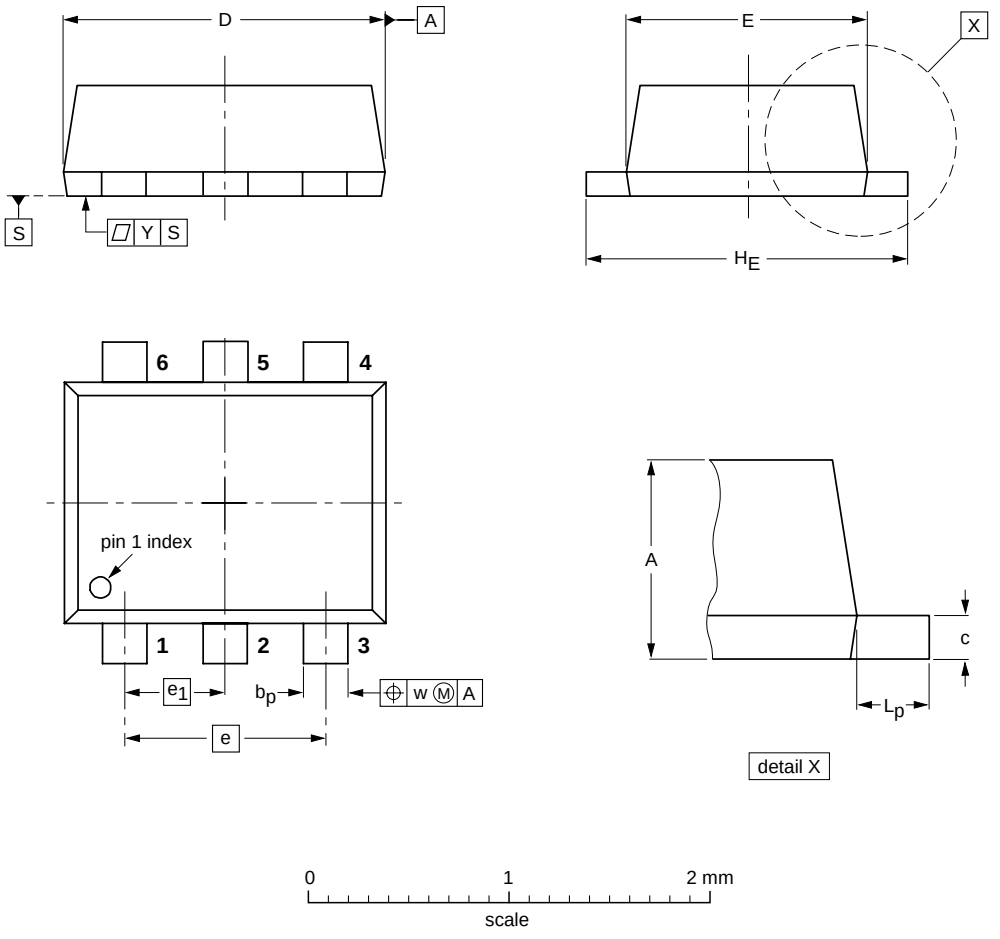
## CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| **Per transistor unless otherwise specified** | | | | | | |
| $I_{CBO}$ | collector-base cut-off current | $V_{CB}$ = –50 V; $I_C$ = 0 | – | – | –100 | nA |
| $I_{CEO}$ | collector-emitter cut-off current | $V_{CE}$ = –50 V; $I_B$ = 0 | – | – | –1 | µA |
| | | $V_{CE}$ = –30 V; $I_B$ = 0; $T_j$ = 150 °C | – | – | –50 | µA |
| $I_{EBO}$ | emitter-base cut-off current | $V_{EB}$ = –5 V; $I_C$ = 0 | – | – | –180 | µA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = –5 V; $I_C$ = –5 mA | 60 | – | – | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = –10 mA; $I_B$ = –0.5 mA | – | – | –150 | mV |
| $V_{i(off)}$ | input off voltage | $V_{CE}$ = –5 V; $I_C$ = –100 µA | – | –1.1 | –0.8 | V |
| $V_{i(on)}$ | input on voltage | $V_{CE}$ = –0.3 V; $I_C$ = –10 mA | –2.5 | –1.7 | – | V |
| R1 | input resistor | | 15.4 | 22 | 28.6 | kΩ |
| $\frac{R2}{R1}$ | resistor ratio | | 0.8 | 1 | 1.2 | kΩ |
| $C_c$ | collector capacitance | $I_E = I_e$ = 0; $V_{CB}$ = –10 V; f = 1 MHz | – | – | 3 | pF |

## PACKAGE OUTLINE

**Plastic surface mounted package; 6 leads** **SOT666**




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

| UNIT | A | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | w | y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 0.6<br>0.5 | 0.27<br>0.17 | 0.18<br>0.08 | 1.7<br>1.5 | 1.3<br>1.1 | 1.0 | 0.5 | 1.7<br>1.5 | 0.3<br>0.1 | 0.1 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOT666 | | | | | | ~~01-01-04~~<br>01-08-27 |

**DATA SHEET STATUS**

| DATA SHEET STATUS[1] | PRODUCT STATUS[2] | DEFINITIONS |
|---|---|---|
| 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. |
| 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. |
| 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. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A. |

**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.

**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, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. 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.

**NOTES**

# *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**.



Printed in The Netherlands 613514/01/pp8 Date of release: 2001 Sep 13 Document order number: 9397 750 08595

*Let's make things better.*

Philips