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Kind regards,

Team Nexperia

# PEMB30; PUMB30

PNP/PNP double resistor-equipped transistors;  
R1 = 2.2 k $\Omega$ , R2 = open

Rev. 02 — 2 September 2009

Product data sheet

## 1. Product profile

### 1.1 General description

PNP/PNP double Resistor-Equipped Transistors (RET) in Surface-Mounted Device (SMD) plastic packages

Table 1. Product overview

| Type number | Package |       | NPN/PNP complement | NPN/PNP complement |
|-------------|---------|-------|--------------------|--------------------|
|             | NXP     | JEITA |                    |                    |
| PEMB30      | SOT666  | -     | PEMD30             | PEMH30             |
| PUMB30      | SOT363  | SC-88 | PUMD30             | PUMH30             |

### 1.2 Features

- 100 mA output current capability
- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs

### 1.3 Applications

- Low current peripheral driver
- Control of IC inputs
- Cost-saving alternative for BC857BS and BC857BV

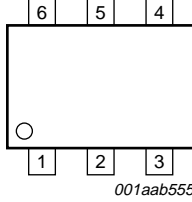
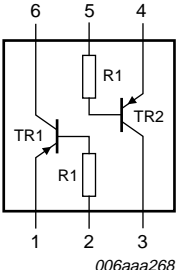
### 1.4 Quick reference data

Table 2. Quick reference data

| Symbol                | Parameter                 | Conditions | Min  | Typ | Max  | Unit       |
|-----------------------|---------------------------|------------|------|-----|------|------------|
| <b>Per transistor</b> |                           |            |      |     |      |            |
| V <sub>CEO</sub>      | collector-emitter voltage | open base  | -    | -   | -50  | V          |
| I <sub>O</sub>        | output current            |            | -    | -   | -100 | mA         |
| R1                    | bias resistor 1 (input)   |            | 1.54 | 2.2 | 2.86 | k $\Omega$ |

## 2. Pinning information

Table 3. Pinning

| Pin | Description            | Simplified outline   | Symbol  |
|-----|------------------------|--|---|
| 1   | GND (emitter) TR1      |  |  |
| 2   | input (base) TR1       |  |   |
| 3   | output (collector) TR2 |  |   |
| 4   | GND (emitter) TR2      |  |   |
| 5   | input (base) TR2       |  |   |
| 6   | output (collector) TR1 |  |   |

## 3. Ordering information

Table 4. Ordering information

| Type number | Package |  | Version |
|-------------|---------|--|---------|
|             | Name    | Description                              |         |
| PEMB30      | -       | plastic surface-mounted package; 6 leads | SOT666  |
| PUMB30      | SC-88   | plastic surface-mounted package; 6 leads | SOT363  |

## 4. Marking

Table 5. Marking codes

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| PEMB30      | 2T                          |
| PUMB30      | *B2                         |

- [1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

## 5. Limiting values

**Table 6. Limiting values**

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

| Symbol                | Parameter                 | Conditions                             | Min    | Max  | Unit |    |
|-----------------------|---------------------------|--|--------|------|------|----|
| <b>Per transistor</b> |                           |  |        |      |      |    |
| V <sub>CBO</sub>      | collector-base voltage    | open emitter                           | -      | -50  | V    |    |
| V <sub>CEO</sub>      | collector-emitter voltage | open base                              | -      | -50  | V    |    |
| V <sub>EBO</sub>      | emitter-base voltage      | open collector                         | -      | -5   | V    |    |
| I <sub>O</sub>        | output current            |  | -      | -100 | mA   |    |
| I <sub>CM</sub>       | peak collector current    | single pulse;<br>t <sub>p</sub> ≤ 1 ms | -      | -100 | mA   |    |
| P <sub>tot</sub>      | total power dissipation   | T <sub>amb</sub> ≤ 25 °C               |        |      |      |    |
|                       | SOT363                    |  | [1]    | -    | 200  | mW |
|                       | SOT666                    |  | [1][2] | -    | 200  | mW |
| <b>Per device</b>     |                           |  |        |      |      |    |
| P <sub>tot</sub>      | total power dissipation   | T <sub>amb</sub> ≤ 25 °C               |        |      |      |    |
|                       | SOT363                    |  | [1]    | -    | 300  | mW |
|                       | SOT666                    |  | [1][2] | -    | 300  | mW |
| T <sub>stg</sub>      | storage temperature       |  | -65    | +150 | °C   |    |
| T <sub>j</sub>        | junction temperature      |  | -      | 150  | °C   |    |
| T <sub>amb</sub>      | ambient temperature       |  | -65    | +150 | °C   |    |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Reflow soldering is the only recommended soldering method.

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

| Symbol                | Parameter                                   | Conditions  | Min    | Typ | Max | Unit |
|-----------------------|---|-------------|--------|-----|-----|------|
| <b>Per transistor</b> |   |             |        |     |     |      |
| R <sub>th(j-a)</sub>  | thermal resistance from junction to ambient | in free air |        |     |     |      |
|                       | SOT363                                      |             | [1]    | -   | 625 | K/W  |
|                       | SOT666                                      |             | [1][2] | -   | 625 | K/W  |
| <b>Per device</b>     |   |             |        |     |     |      |
| R <sub>th(j-a)</sub>  | thermal resistance from junction to ambient | in free air |        |     |     |      |
|                       | SOT363                                      |             | [1]    | -   | 416 | K/W  |
|                       | SOT666                                      |             | [1][2] | -   | 416 | K/W  |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

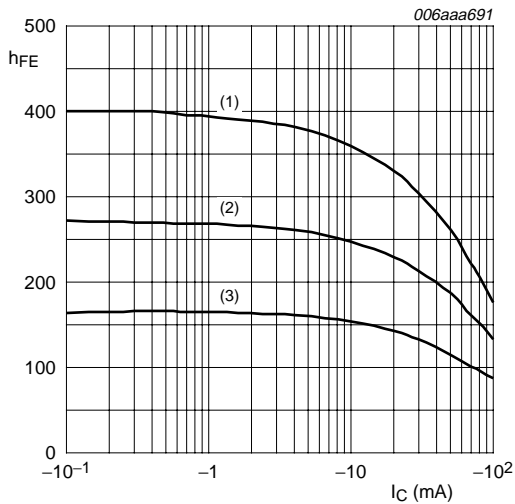
[2] Reflow soldering is the only recommended soldering method.

**7. Characteristics**

**Table 8. Characteristics**

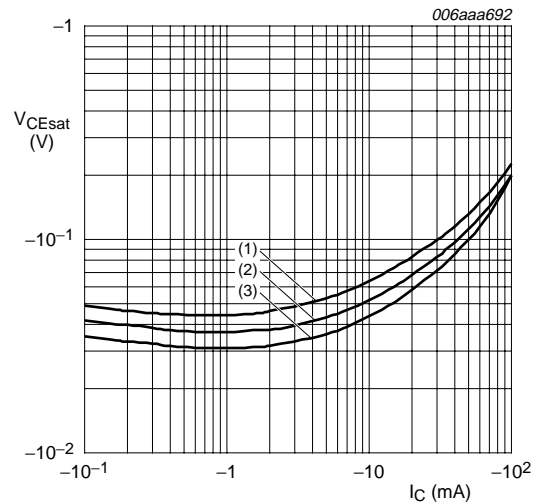
*T<sub>amb</sub> = 25 °C unless otherwise specified.*

| Symbol                | Parameter                            | Conditions  | Min  | Typ | Max  | Unit |
|-----------------------|--------------------------------------|---|------|-----|------|------|
| <b>Per transistor</b> |                                      |   |      |     |      |      |
| I <sub>CBO</sub>      | collector-base cut-off current       | V <sub>CB</sub> = -50 V; I <sub>E</sub> = 0 A                             | -    | -   | -100 | nA   |
| I <sub>CEO</sub>      | collector-emitter cut-off current    | V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0 A                             | -    | -   | -1   | μA   |
|                       |                                      | V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0 A; T <sub>j</sub> = 150 °C    | -    | -   | -50  | μA   |
| I <sub>EBO</sub>      | emitter-base cut-off current         | V <sub>EB</sub> = -5 V; I <sub>C</sub> = 0 A                              | -    | -   | -100 | nA   |
| h <sub>FE</sub>       | DC current gain                      | V <sub>CE</sub> = -5 V; I <sub>C</sub> = -20 mA                           | 30   | -   | -    |      |
| V <sub>CEsat</sub>    | collector-emitter saturation voltage | I <sub>C</sub> = -10 mA; I <sub>B</sub> = -0.5 mA                         | -    | -   | -150 | mV   |
| R1                    | bias resistor 1 (input)              |   | 1.54 | 2.2 | 2.86 | kΩ   |
| C <sub>c</sub>        | collector capacitance                | V <sub>CB</sub> = -10 V; I <sub>E</sub> = i <sub>e</sub> = 0 A; f = 1 MHz | -    | -   | 3    | pF   |



V<sub>CE</sub> = -5 V  
 (1) T<sub>amb</sub> = 100 °C  
 (2) T<sub>amb</sub> = 25 °C  
 (3) T<sub>amb</sub> = -40 °C

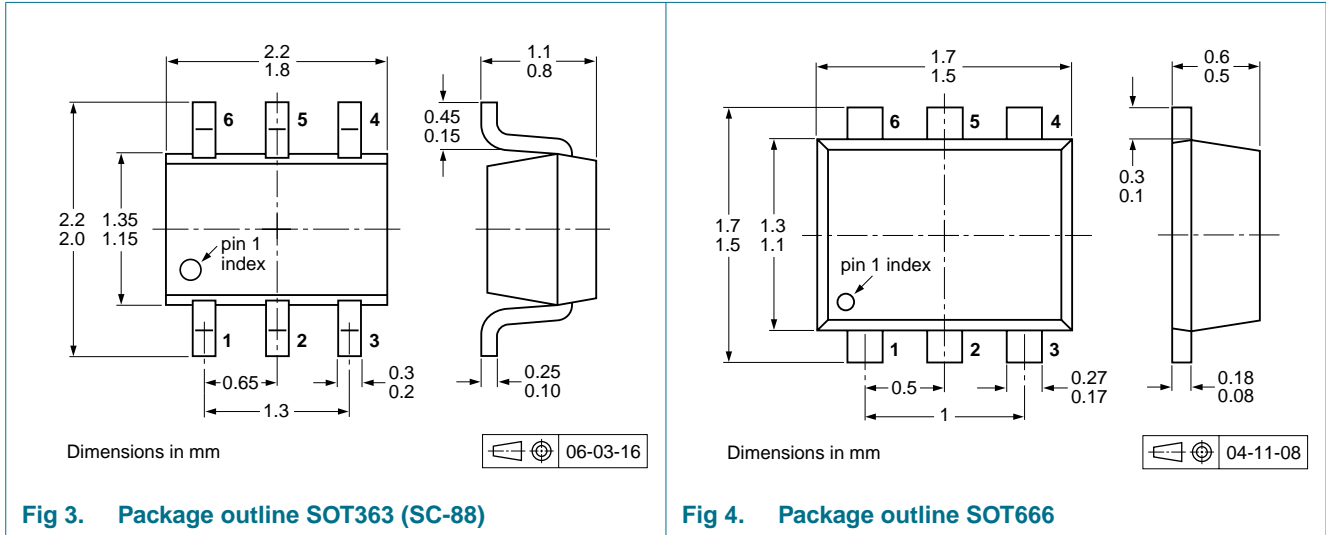
**Fig 1. DC current gain as a function of collector current; typical values**



I<sub>C</sub>/I<sub>B</sub> = 20  
 (1) T<sub>amb</sub> = 100 °C  
 (2) T<sub>amb</sub> = 25 °C  
 (3) T<sub>amb</sub> = -40 °C

**Fig 2. Collector-emitter saturation voltage as a function of collector current; typical values**

**8. Package outline**



**Fig 3. Package outline SOT363 (SC-88)**

**Fig 4. Package outline SOT666**

**9. Packing information**

**Table 9. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

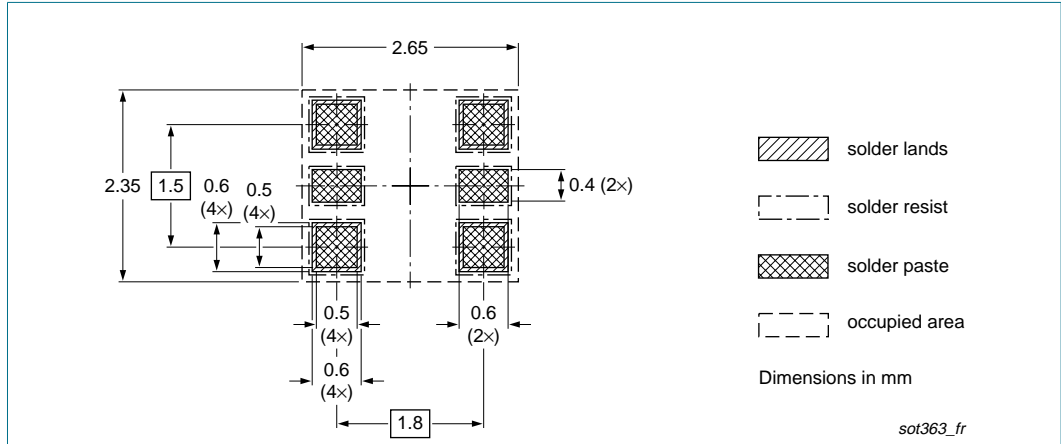
| Type number | Package | Description                                       | Packing quantity |      |      |       |
|-------------|---------|---|------------------|------|------|-------|
|             |         |   | 3000             | 4000 | 8000 | 10000 |
| PEMB30      | SOT666  | 2 mm pitch, 8 mm tape and reel                    | -                | -    | -315 | -     |
|             |         | 4 mm pitch, 8 mm tape and reel                    | -                | -115 | -    | -     |
| PUMB30      | SOT363  | 4 mm pitch, 8 mm tape and reel; T1 <sup>[2]</sup> | -115             | -    | -    | -135  |
|             |         | 4 mm pitch, 8 mm tape and reel; T2 <sup>[3]</sup> | -125             | -    | -    | -165  |

[1] For further information and the availability of packing methods, see [Section 13](#).

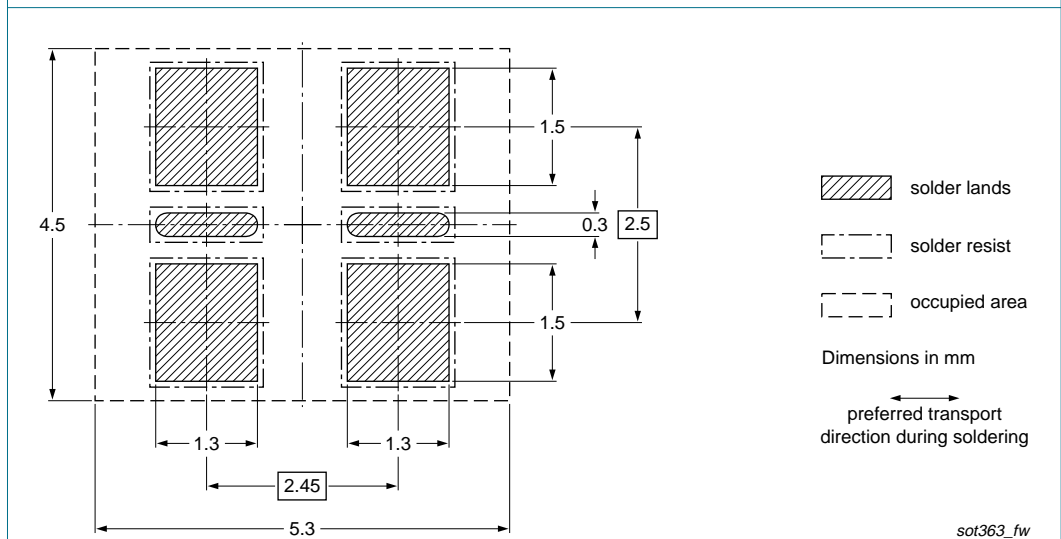
[2] T1: normal taping

[3] T2: reverse taping

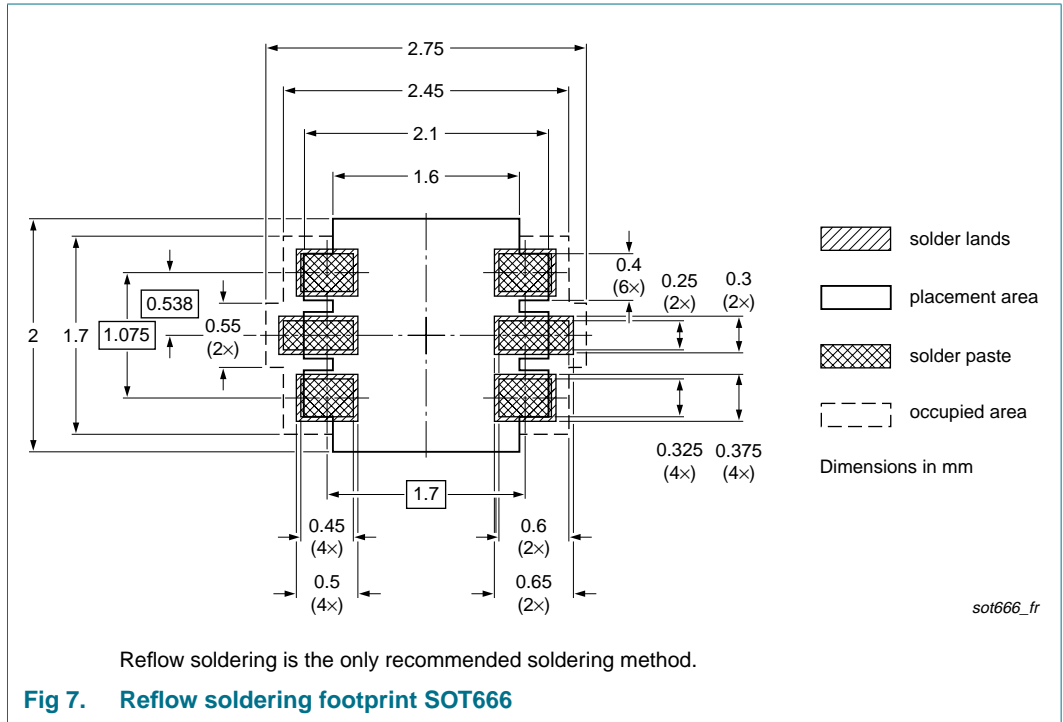
**10. Soldering**



**Fig 5. Reflow soldering footprint SOT363 (SC-88)**



**Fig 6. Wave soldering footprint SOT363 (SC-88)**





## 11. Revision history

**Table 10. Revision history**

| Document ID     | Release date   | Data sheet status  | Change notice | Supersedes      |
|-----------------|--|--------------------|---------------|-----------------|
| PEMB30_PUMB30_2 | 20090902   | Product data sheet | -             | PEMB30_PUMB30_1 |
| Modifications:  | <ul style="list-style-type: none"> <li>• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content.</li> <li>• <a href="#">Figure 3 “Package outline SOT363 (SC-88)”</a>: updated</li> <li>• <a href="#">Figure 5 “Reflow soldering footprint SOT363 (SC-88)”</a>: updated</li> <li>• <a href="#">Figure 6 “Wave soldering footprint SOT363 (SC-88)”</a>: updated</li> <li>• <a href="#">Figure 7 “Reflow soldering footprint SOT666”</a>: updated</li> </ul> |                    |               |                 |
| PEMB30_PUMB30_1 | 20060331   | Product data sheet | -             | -               |

## 12. Legal information

### 12.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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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