

PEMH19; PUMH19

NPN/NPN resistor-equipped transistors;
R1 = 22 k Ω , R2 = open

Rev. 03 — 15 November 2009

Product data sheet

1. Product profile

1.1 General description

NPN/NPN Resistor-Equipped Transistors (RET).

Table 1. Product overview

| Type number | Package | | NPN/PNP complement | PNP/PNP complement |
|-------------|---------|-------|--------------------|--------------------|
| | NXP | JEITA | | |
| PEMH19 | SOT666 | - | PEMD19 | PEMB19 |
| PUMH19 | SOT363 | SC-88 | PUMD19 | PUMB19 |

1.2 Features

- Built-in bias resistor
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs

1.3 Applications

- Low current peripheral driver
- Control of IC inputs
- Replaces general-purpose transistors in digital applications

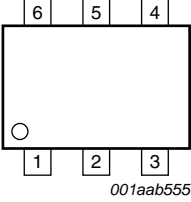
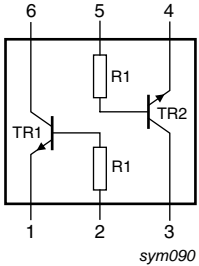
1.4 Quick reference data

Table 2. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|---------------------------|------------|------|-----|------|------------|
| V _{CEO} | collector-emitter voltage | open base | - | - | 50 | V |
| I _O | output current (DC) | | - | - | 100 | mA |
| R1 | bias resistor 1 (input) | | 15.4 | 22 | 28.6 | k Ω |

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 | |
| PEMH19 | - | plastic surface mounted package; 6 leads | SOT666 |
| PUMH19 | SC-88 | plastic surface mounted package; 6 leads | SOT363 |

4. Marking

Table 5. Marking codes

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| PEMH19 | 6F |
| PUMH19 | H6* |

[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 | |
|-----------------------|---------------------------|-----------------------------|--------|------|------|----|
| Per transistor | | | | | | |
| 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 | - | 5 | V | |
| I_O | output current (DC) | | - | 100 | mA | |
| I_{CM} | peak collector current | | - | 100 | mA | |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | | | | |
| | SOT363 | | [1] | - | 200 | mW |
| | SOT666 | | [1][2] | - | 200 | mW |
| T_{stg} | storage temperature | | -65 | +150 | °C | |
| T_j | junction temperature | | - | 150 | °C | |
| T_{amb} | ambient temperature | | -65 | +150 | °C | |
| Per device | | | | | | |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | | | | |
| | SOT363 | | [1] | - | 300 | mW |
| | SOT666 | | [1][2] | - | 300 | mW |

[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 | |
|-----------------------|---|-------------|--------|-----|-----|------|-----|
| Per transistor | | | | | | | |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | | | | | |
| | SOT363 | | [1] | - | - | 625 | K/W |
| | SOT666 | | [1][2] | - | - | 625 | K/W |
| Per device | | | | | | | |
| $R_{th(j-a)}$ | 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.

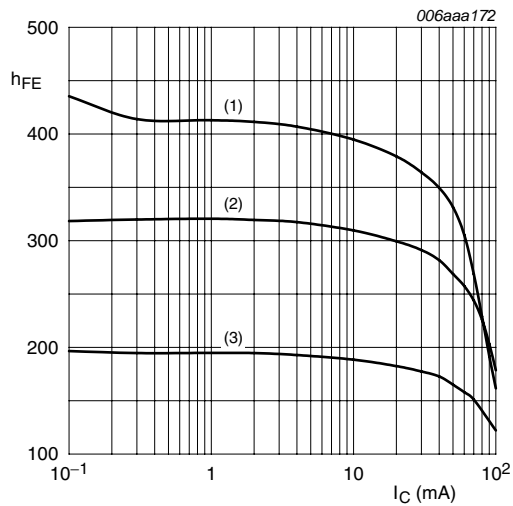
[2] Reflow soldering is the only recommended soldering method.

7. Characteristics

Table 8. Characteristics

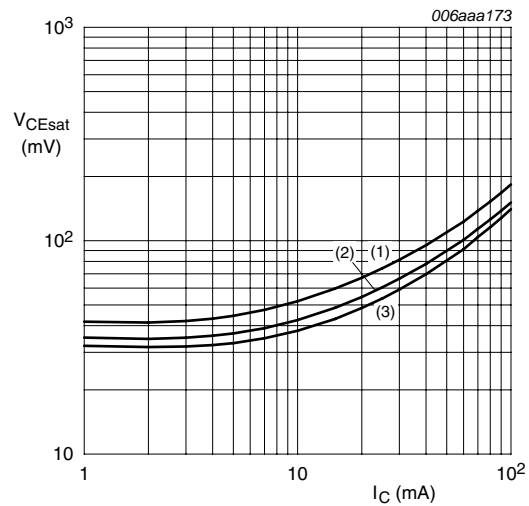
T_{amb} = 25 °C unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------------|--------------------------------------|--|------|-----|------|------|
| Per transistor | | | | | | |
| I _{CBO} | collector-base cut-off current | V _{CB} = 50 V; I _E = 0 A | - | - | 100 | nA |
| I _{CEO} | collector-emitter cut-off current | V _{CE} = 30 V; I _B = 0 A | - | - | 1 | μA |
| | | V _{CE} = 30 V; I _B = 0 A; T _j = 150 °C | - | - | 50 | μA |
| I _{EBO} | emitter-base cut-off current | V _{EB} = 5 V; I _C = 0 A | - | - | 100 | nA |
| h _{FE} | DC current gain | V _{CE} = 5 V; I _C = 1 mA | 100 | - | - | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = 10 mA; I _B = 0.5 mA | - | - | 150 | mV |
| R1 | bias resistor 1 (input) | | 15.4 | 22 | 28.6 | kΩ |
| C _c | collector capacitance | V _{CB} = 10 V; I _E = i _e = 0 A; f = 1 MHz | - | - | 2.5 | pF |



V_{CE} = 5 V
 (1) T_{amb} = 100 °C
 (2) T_{amb} = 25 °C
 (3) T_{amb} = -40 °C

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



I_C/I_B = 20
 (1) T_{amb} = 100 °C
 (2) T_{amb} = 25 °C
 (3) T_{amb} = -40 °C

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

8. Package outline

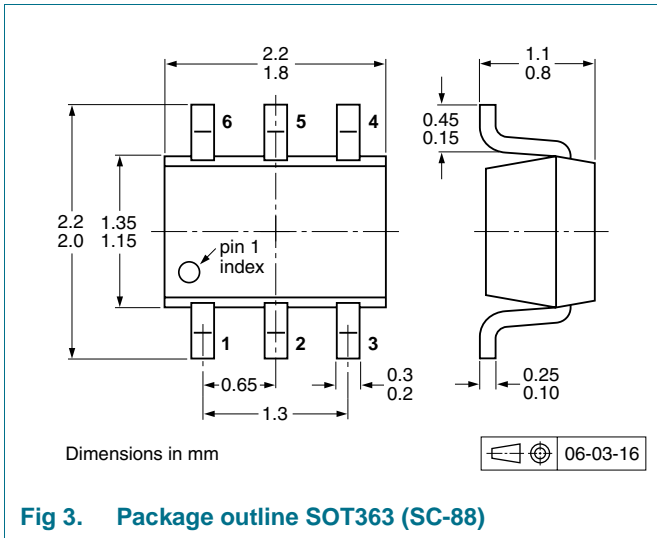


Fig 3. Package outline SOT363 (SC-88)

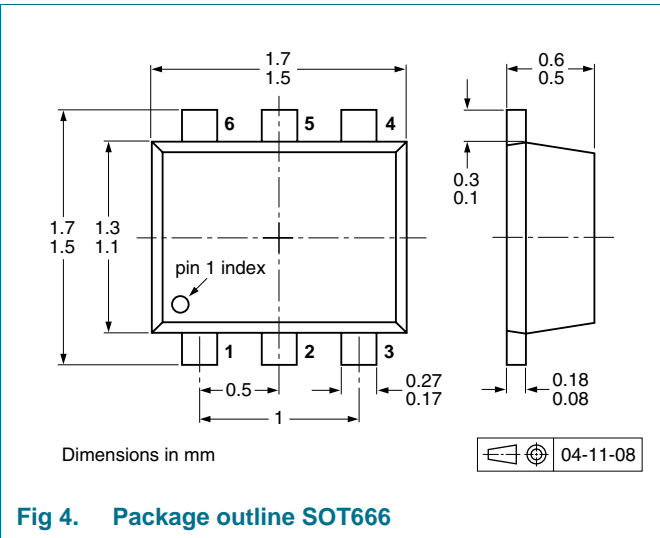


Fig 4. Package outline SOT666

9. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.^[1]

| Type number | Package | Description | Packing quantity | | | |
|-------------|---------|---|------------------|------|------|-------|
| | | | 3000 | 4000 | 8000 | 10000 |
| PEMH19 | SOT666 | 2 mm pitch, 8 mm tape and reel | - | - | -315 | - |
| | | 4 mm pitch, 8 mm tape and reel | - | -115 | - | - |
| PUMH19 | SOT363 | 4 mm pitch, 8 mm tape and reel; T1 ^[2] | -115 | - | - | -135 |
| | | 4 mm pitch, 8 mm tape and reel; T2 ^[3] | -125 | - | - | -165 |

[1] For further information and the availability of packing methods, see [Section 12](#).

[2] T1: normal taping

[3] T2: reverse taping

10. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|--|-----------------------|---------------|-----------------|
| PEMH19_PUMH19_3 | 20091115 | Product data sheet | - | PEMH19_PUMH19_2 |
| Modifications: | <ul style="list-style-type: none">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.Figure 3 "Package outline SOT363 (SC-88)"; updated | | | |
| PEMH19_PUMH19_2 | 20050502 | Product data sheet | - | PUMH19_1 |
| PUMH19_1 | 20031016 | Product specification | - | - |

11. Legal information

11.1 Data sheet status

| 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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