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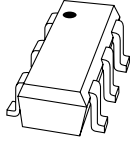
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Kind regards,

Team Nexperia



# PUMX2

## NPN/NPN general-purpose double transistors

Rev. 02 — 17 November 2009

Product data sheet

## 1. Product profile

### 1.1 General description

NPN/NPN general-purpose double transistors in a small SOT363 (SC-88) Surface Mounted Device (SMD) plastic package.

### 1.2 Features

- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs

### 1.3 Applications

- General-purpose switching and amplification

### 1.4 Quick reference data

Table 1. Quick reference data

| Symbol                | Parameter                 | Conditions                               | Min | Typ | Max | Unit |
|-----------------------|---------------------------|------------------------------------------|-----|-----|-----|------|
| <b>Per transistor</b> |                           |                                          |     |     |     |      |
| $V_{CEO}$             | collector-emitter voltage | open base                                | -   | -   | 50  | V    |
| $I_C$                 | collector current         |                                          | -   | -   | 150 | mA   |
| $h_{FE}$              | DC current gain           | $V_{CE} = 6\text{ V}; I_C = 1\text{ mA}$ | 120 | 250 | 560 |      |

## 2. Pinning information

Table 2. Pinning

| Pin | Description   | Simplified outline | Symbol |
|-----|---------------|--------------------|--------|
| 1   | emitter TR1   |                    |        |
| 2   | emitter TR2   |                    |        |
| 3   | base TR2      |                    |        |
| 4   | collector TR2 |                    |        |
| 5   | base TR1      |                    |        |
| 6   | collector TR1 |                    |        |

### 3. Ordering information

Table 3. Ordering information

| Type number | Package |                                          |         |
|-------------|---------|------------------------------------------|---------|
|             | Name    | Description                              | Version |
| PUMX2       | SC-88   | plastic surface mounted package; 6 leads | SOT363  |

### 4. Marking

Table 4. Marking codes

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| PUMX2       | Z1*                         |

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

### 5. Limiting values

Table 5. Limiting values

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

| Symbol                | Parameter                 | Conditions                       | Min              | Max  | Unit |
|-----------------------|---------------------------|----------------------------------|------------------|------|------|
| <b>Per transistor</b> |                           |                                  |                  |      |      |
| $V_{CBO}$             | collector-base voltage    | open emitter                     | -                | 60   | V    |
| $V_{CEO}$             | collector-emitter voltage | open base                        | -                | 50   | V    |
| $V_{EBO}$             | emitter-base voltage      | open collector                   | -                | 7    | V    |
| $I_C$                 | collector current         |                                  | -                | 150  | mA   |
| $I_{CM}$              | peak collector current    | single pulse;<br>$t_p \leq 1$ ms | -                | 200  | mA   |
| $I_{BM}$              | peak base current         | single pulse;<br>$t_p \leq 1$ ms | -                | 100  | mA   |
| $P_{tot}$             | total power dissipation   | $T_{amb} \leq 25$ °C             | <sup>[1]</sup> - | 180  | mW   |
| <b>Per device</b>     |                           |                                  |                  |      |      |
| $P_{tot}$             | total power dissipation   | $T_{amb} \leq 25$ °C             | <sup>[1]</sup> - | 300  | mW   |
| $T_{stg}$             | storage temperature       |                                  | -65              | +150 | °C   |
| $T_j$                 | junction temperature      |                                  | -                | 150  | °C   |
| $T_{amb}$             | ambient temperature       |                                  | -65              | +150 | °C   |

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

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol                | Parameter                                   | Conditions  | Min   | Typ | Max | Unit |
|-----------------------|---------------------------------------------|-------------|-------|-----|-----|------|
| <b>Per transistor</b> |                                             |             |       |     |     |      |
| $R_{th(j-a)}$         | thermal resistance from junction to ambient | in free air | [1] - | -   | 694 | K/W  |
| <b>Per device</b>     |                                             |             |       |     |     |      |
| $R_{th(j-a)}$         | thermal resistance from junction to ambient | in free air | [1] - | -   | 417 | K/W  |

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

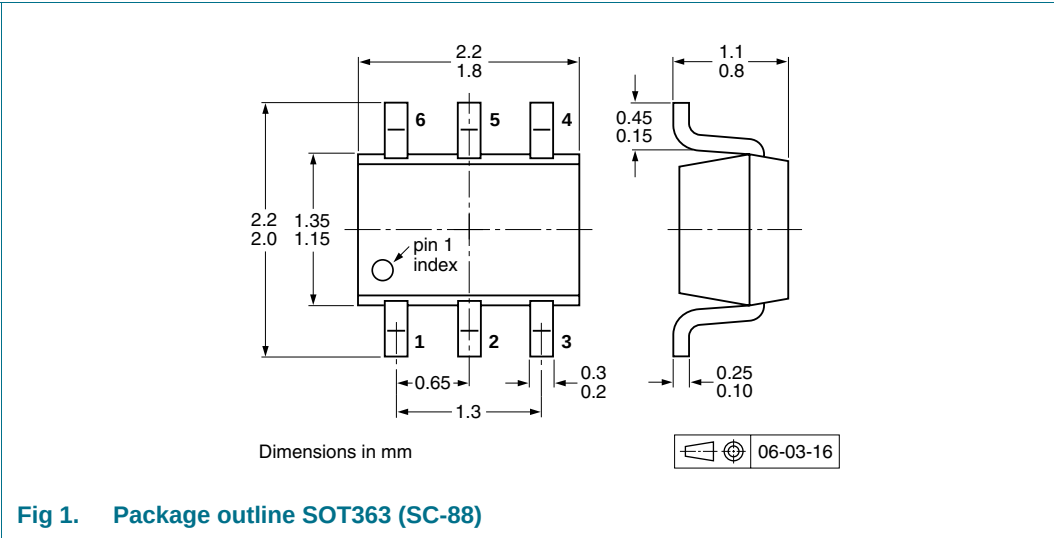
## 7. Characteristics

**Table 7. Characteristics**

$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| Symbol                | Parameter                            | Conditions                                                                  | Min | Typ | Max | Unit          |
|-----------------------|--------------------------------------|-----------------------------------------------------------------------------|-----|-----|-----|---------------|
| <b>Per transistor</b> |                                      |                                                                             |     |     |     |               |
| $I_{CBO}$             | collector-base cut-off current       | $V_{CB} = 60\text{ V}; I_E = 0\text{ A}$                                    | -   | -   | 100 | nA            |
|                       |                                      | $V_{CB} = 60\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^{\circ}\text{C}$ | -   | -   | 50  | $\mu\text{A}$ |
| $I_{EBO}$             | emitter-base cut-off current         | $V_{EB} = 7\text{ V}; I_C = 0\text{ A}$                                     | -   | -   | 100 | nA            |
| $h_{FE}$              | DC current gain                      | $V_{CE} = 6\text{ V}; I_C = 1\text{ mA}$                                    | 120 | 250 | 560 |               |
| $V_{CEsat}$           | collector-emitter saturation voltage | $I_C = 50\text{ mA}; I_B = 5\text{ mA}$                                     | -   | -   | 250 | mV            |
| $f_T$                 | transition frequency                 | $V_{CE} = 12\text{ V}; I_E = 2\text{ mA}; f = 100\text{ MHz}$               | 100 | -   | -   | MHz           |
| $C_c$                 | collector capacitance                | $V_{CB} = 12\text{ V}; I_E = I_e = 0\text{ A}; f = 1\text{ MHz}$            | -   | -   | 3   | pF            |

8. Package outline



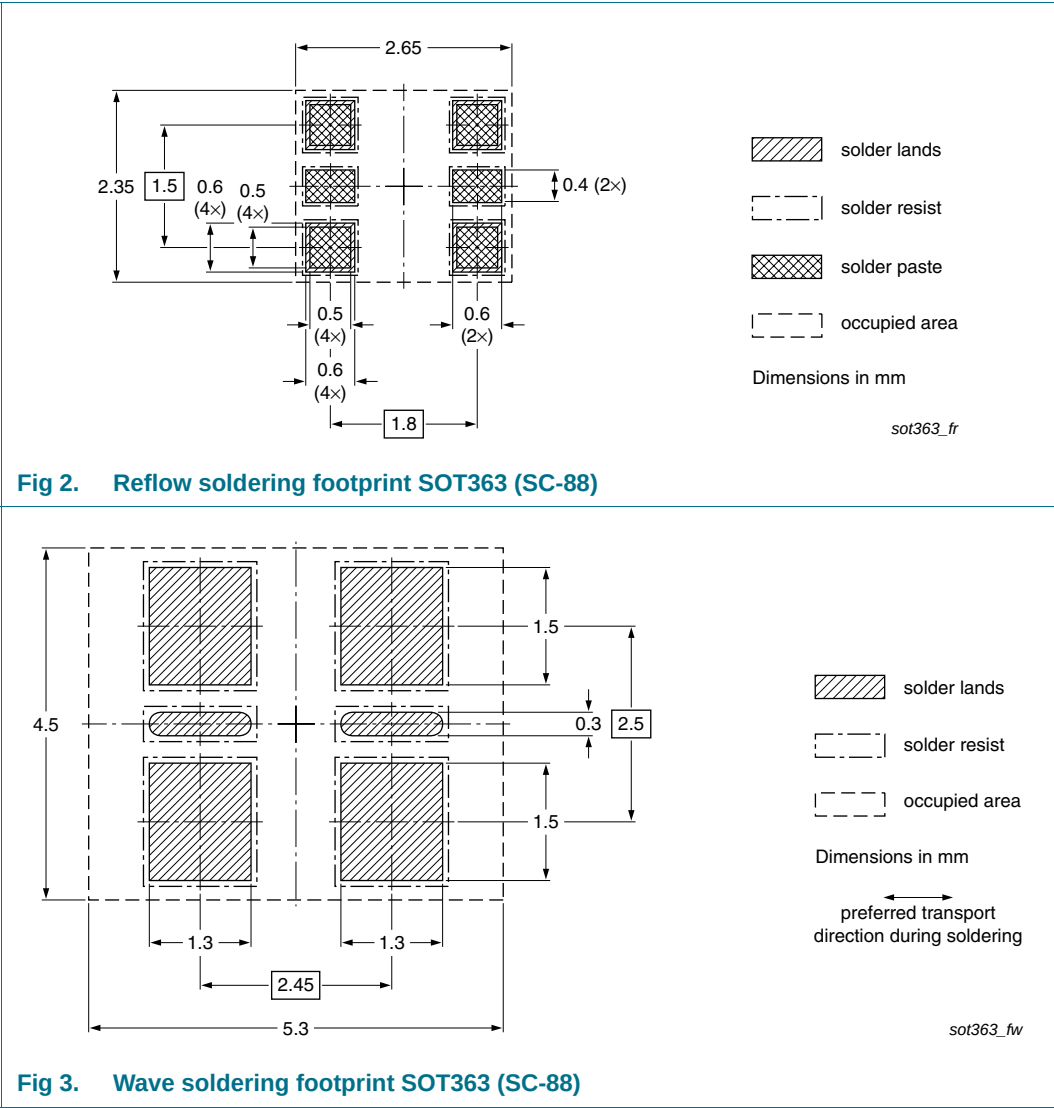
9. Packing information

Table 8. 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             | 10000 |
| PUMX2       | 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



## 11. Revision history

Table 9. Revision history

| Document ID    | Release date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Data sheet status  | Change notice | Supersedes |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|------------|
| PUMX2_2        | 20091117                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Product data sheet | -             | PUMX2_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 1 “Package outline SOT363 (SC-88)”</a>: updated</li><li>• <a href="#">Figure 2 “Reflow soldering footprint SOT363 (SC-88)”</a>: updated</li><li>• <a href="#">Figure 3 “Wave soldering footprint SOT363 (SC-88)”</a>: updated</li></ul> |                    |               |            |
| PUMX2_1        | 20051110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 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".

[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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