



PDTA124EMB

PNP resistor-equipped transistor; R1 = 22 k Ω , R2 = 22 k Ω

Rev. 2 — 4 May 2012

Product data sheet

1. Product profile

1.1 General description

PNP Resistor-Equipped Transistor (RET) in a leadless ultra small DFN1006B-3 (SOT883B) Surface-Mounted Device (SMD) plastic package.

NPN complement: PDTC124EMB.

1.2 Features and benefits

- 100 mA output current capability
- Reduces component count
- Built-in bias resistors
- Reduces pick and place costs
- Simplifies circuit design
- AEC-Q101 qualified
- Leadless ultra small SMD plastic package
- Low package height of 0.37 mm

1.3 Applications

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

1.4 Quick reference data

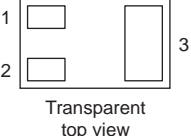
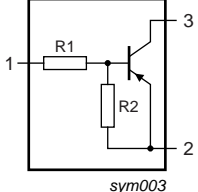
Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|---------------------------|--------------------------|------|-----|------|------------|
| V _{CEO} | collector-emitter voltage | open base | - | - | -50 | V |
| I _O | output current | | - | - | -100 | mA |
| R1 | bias resistor 1 (input) | T _{amb} = 25 °C | 15.4 | 22 | 28.6 | k Ω |
| R2/R1 | bias resistor ratio | | 0.8 | 1 | 1.2 | |



2. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|--------------------|---|---|
| 1 | I | input (base) |  <p>Transparent top view</p> |  <p>sym003</p> |
| 2 | G | GND (emitter) | | |
| 3 | O | output (collector) | | |

SOT883B (DFN1006B-3)

3. Ordering information

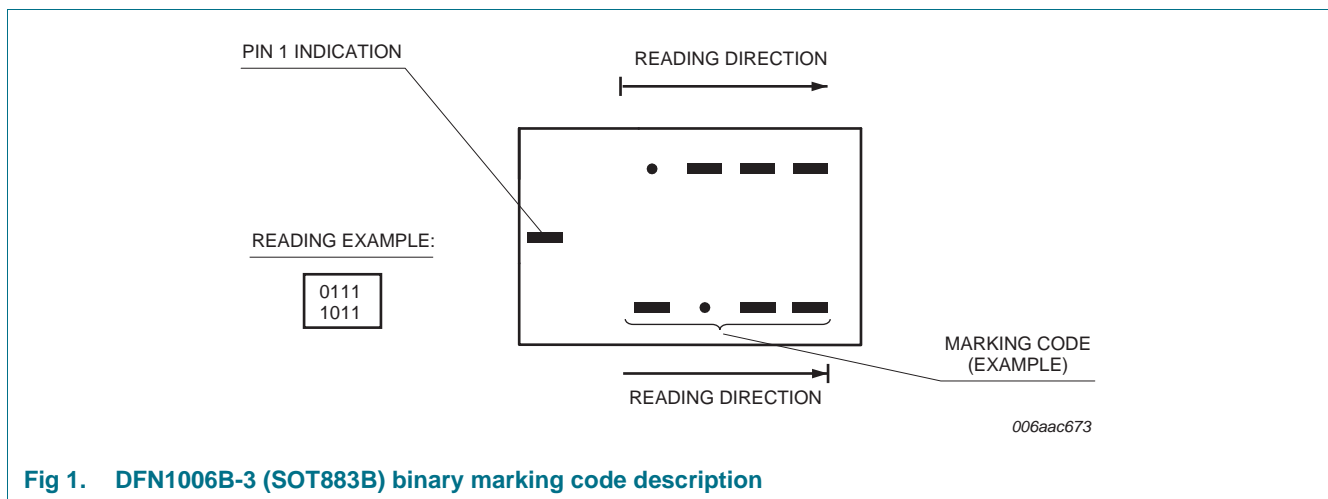
Table 3. Ordering information

| Type number | Package | | |
|-------------|------------|--|---------|
| | Name | Description | Version |
| PDTA124EMB | DFN1006B-3 | Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.37 mm | SOT883B |

4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PDTA124EMB | 0010 0101 |



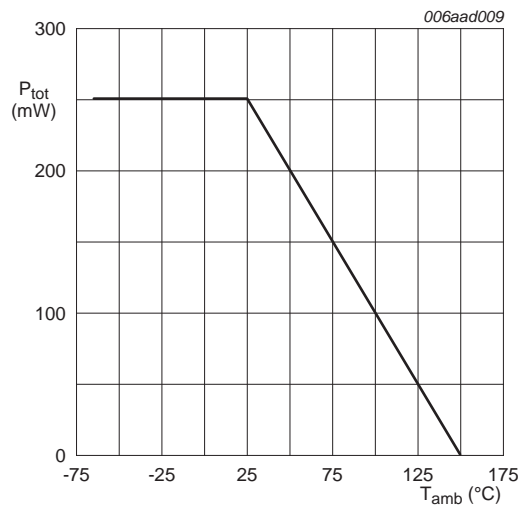
5. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|------------------|---------------------------|-------------------------------|-----|------|------|
| 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 | - | 10 | V |
| | | negative | - | -40 | V |
| I _O | output current | | - | -100 | mA |
| I _{CM} | peak collector current | pulsed; t _p ≤ 1 ms | - | -100 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | [1] | 250 | mW |
| T _j | junction temperature | | - | 150 | °C |
| T _{amb} | ambient temperature | | -65 | 150 | °C |
| T _{stg} | storage temperature | | -65 | 150 | °C |

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



FR4 PCB, standard footprint

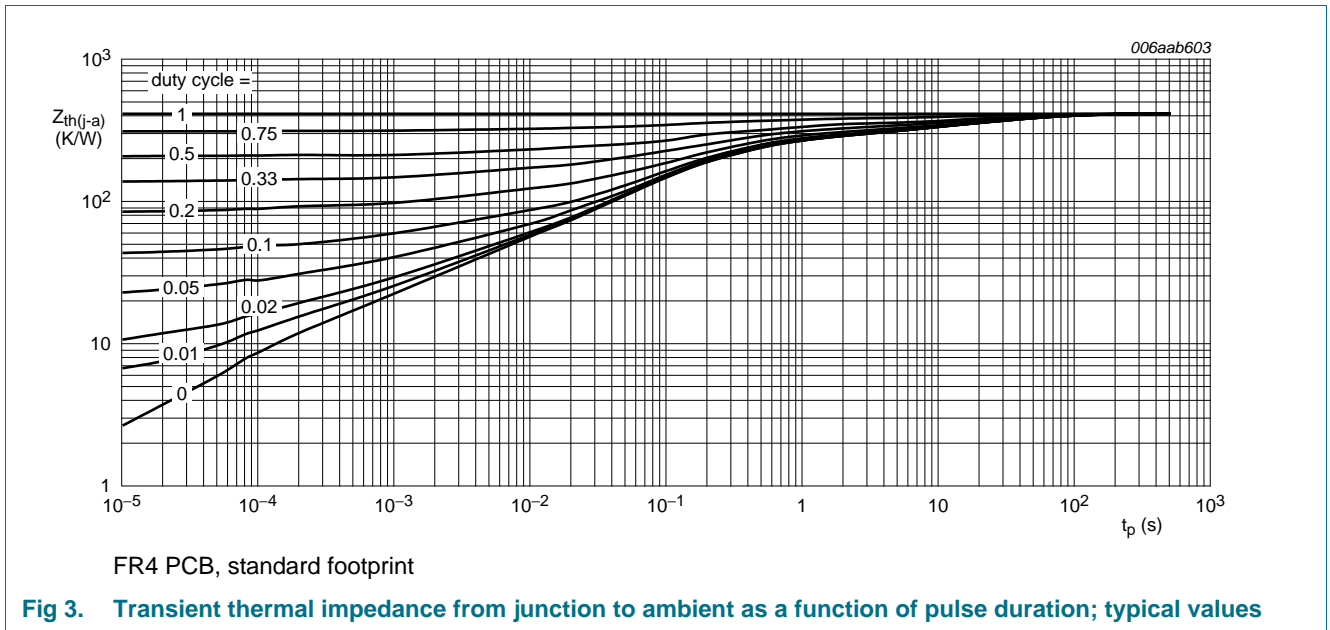
Fig 2. Power derating curve for DFN1006B-3 (SOT883B)

6. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|---|-------------|-----|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | - | - | 500 | K/W |

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

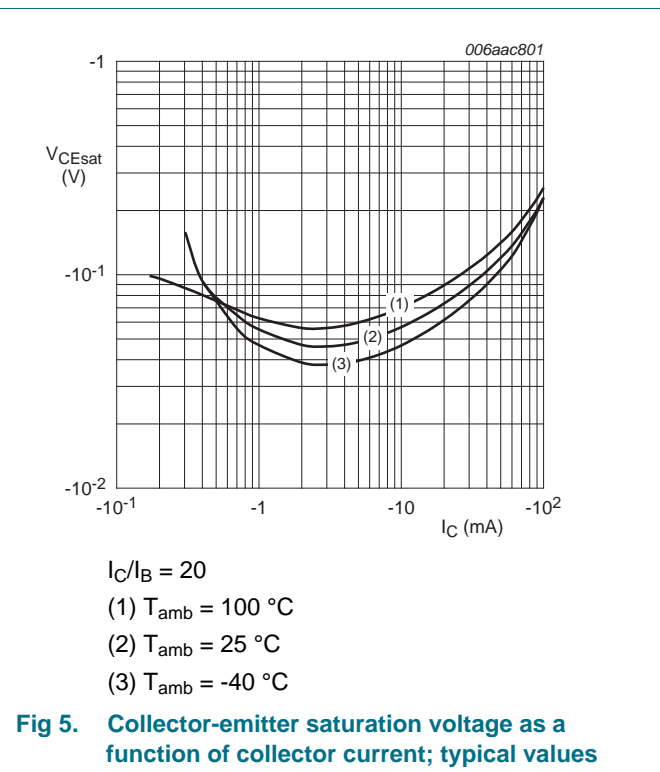
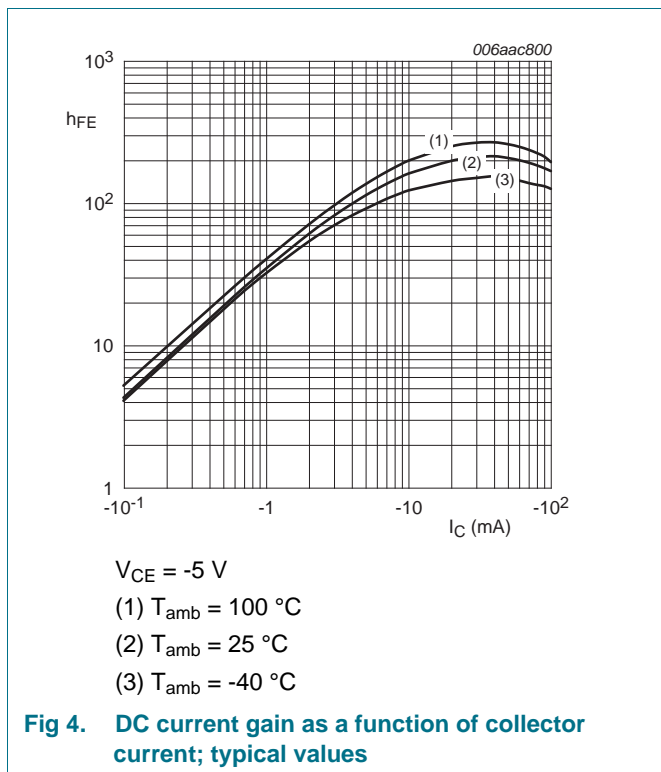


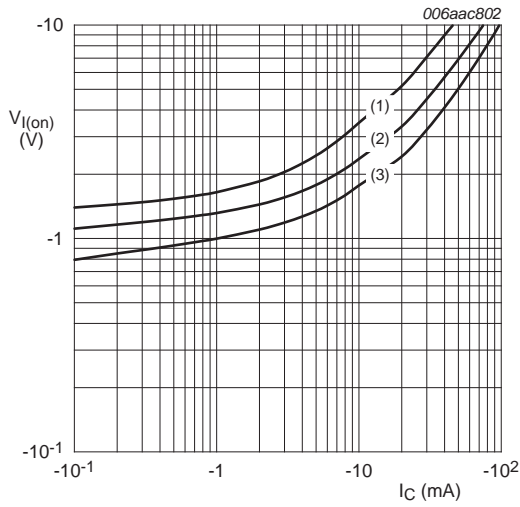
7. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------|--------------------------------------|---|------|------|------|------|
| I_{CBO} | collector-base cut-off current | $V_{CB} = -50\text{ V}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ °C}$ | - | - | -100 | nA |
| I_{CEO} | collector-emitter cut-off current | $V_{CE} = -30\text{ V}$; $I_B = 0\text{ A}$; $T_{amb} = 25\text{ °C}$ | - | - | -100 | nA |
| | | $V_{CE} = -30\text{ V}$; $I_B = 0\text{ A}$; $T_j = 150\text{ °C}$ | - | - | -5 | μA |
| I_{EBO} | emitter-base cut-off current | $V_{EB} = -5\text{ V}$; $I_C = 0\text{ A}$; $T_{amb} = 25\text{ °C}$ | - | - | -180 | μA |
| h_{FE} | DC current gain | $V_{CE} = -5\text{ V}$; $I_C = -5\text{ mA}$; $T_{amb} = 25\text{ °C}$ | 60 | - | - | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = -10\text{ mA}$; $I_B = -0.5\text{ mA}$; $T_{amb} = 25\text{ °C}$ | - | - | -150 | mV |
| $V_{I(off)}$ | off-state input voltage | $V_{CE} = -5\text{ V}$; $I_C = -100\text{ μA}$; $T_{amb} = 25\text{ °C}$ | - | -1.1 | -0.8 | V |
| $V_{I(on)}$ | on-state input voltage | $V_{CE} = -0.3\text{ V}$; $I_C = -5\text{ mA}$; $T_{amb} = 25\text{ °C}$ | -2.5 | -1.7 | - | V |
| R1 | bias resistor 1 (input) | $T_{amb} = 25\text{ °C}$ | 15.4 | 22 | 28.6 | kΩ |
| R2/R1 | bias resistor ratio | | 0.8 | 1 | 1.2 | |
| C_C | collector capacitance | $V_{CB} = -10\text{ V}$; $I_E = 0\text{ A}$; $i_e = 0\text{ A}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ °C}$ | - | - | 3 | pF |
| f_T | transition frequency | $V_{CE} = -5\text{ V}$; $I_C = -10\text{ mA}$; $f = 100\text{ MHz}$; $T_{amb} = 25\text{ °C}$ | - | 180 | - | MHz |

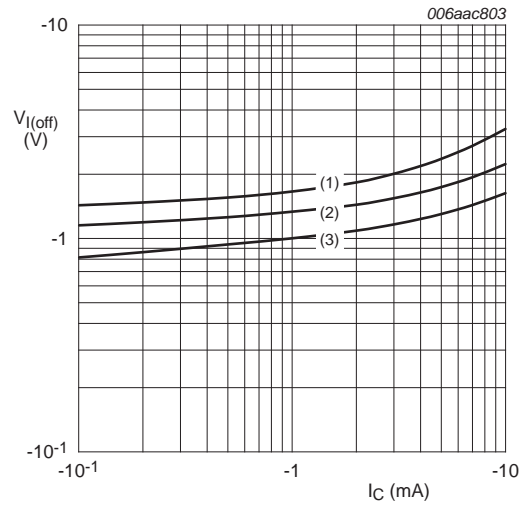
[1] Characteristics of built-in transistor.





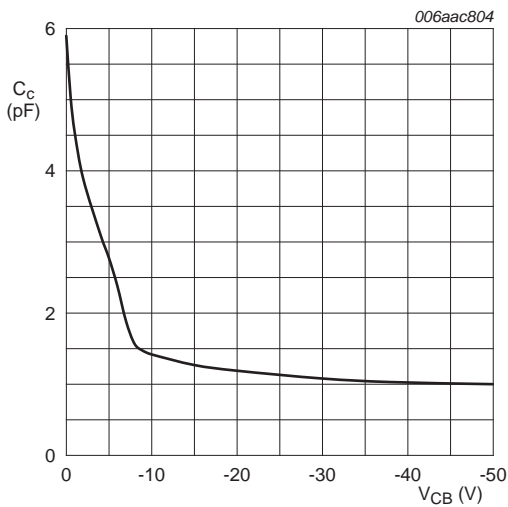
$V_{CE} = -0.3 \text{ V}$
 (1) $T_{amb} = -40 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 100 \text{ }^\circ\text{C}$

Fig 6. On-state input voltage as a function of collector current; typical values



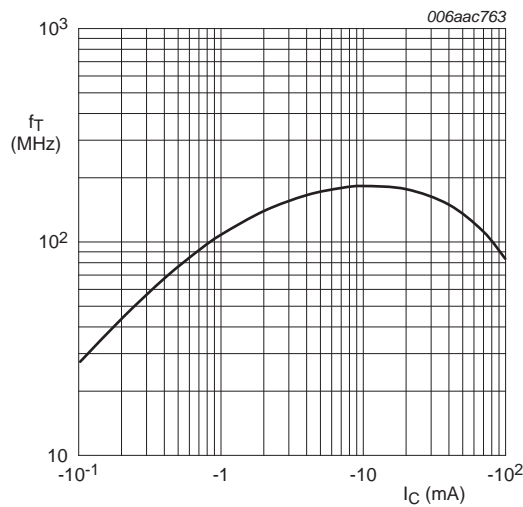
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = -40 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 100 \text{ }^\circ\text{C}$

Fig 7. Off-state input voltage as a function of collector current; typical values



$f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$

Fig 8. Collector capacitance as a function of collector-base voltage; typical values



$V_{CE} = -5 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$

Fig 9. Transition frequency as a function of collector current; typical values of built-in transistor

8. Test information

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

9. Package outline

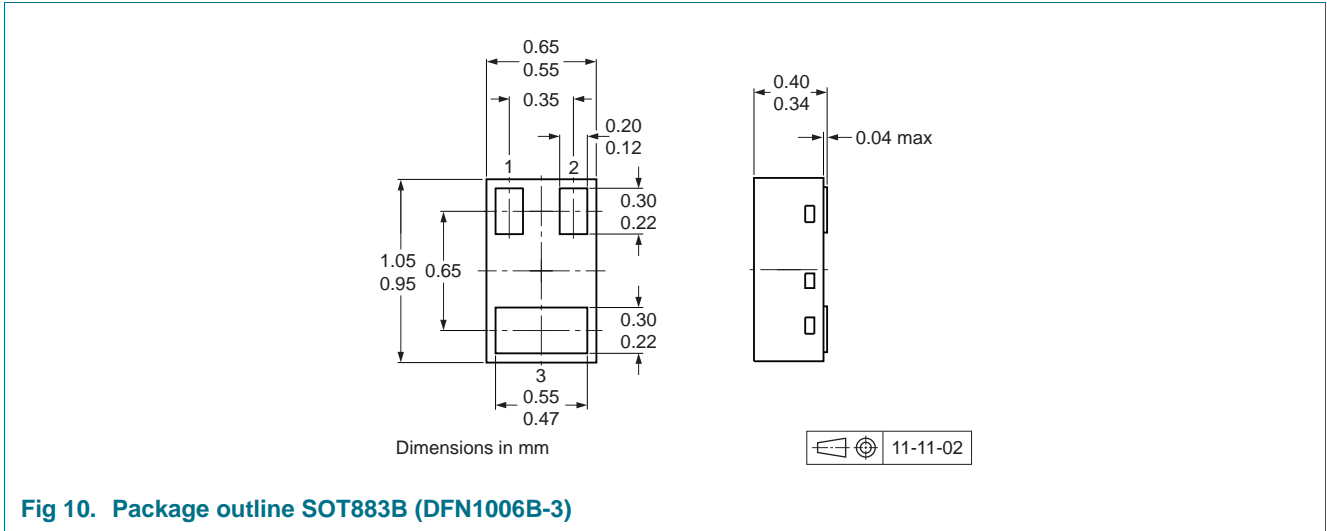


Fig 10. Package outline SOT883B (DFN1006B-3)

10. Soldering

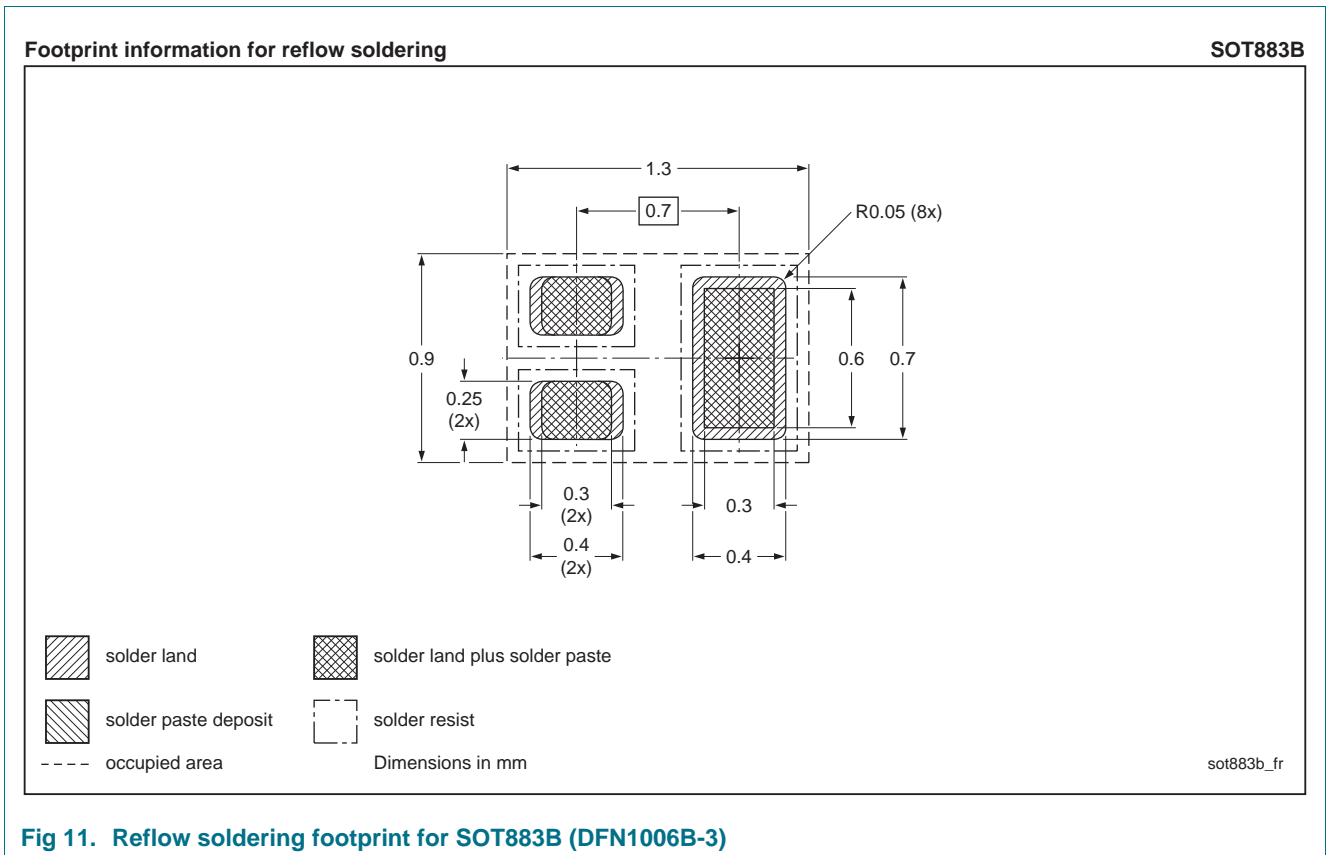


Fig 11. Reflow soldering footprint for SOT883B (DFN1006B-3)

11. Revision history

Table 8. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|--------------------|---------------|----------------|
| PDTA124EMB v.2 | 20120504 | Product data sheet | - | PDTA124EMB v.1 |
| Modifications: | • 7 "Characteristics" : parameter name corrected | | | |
| PDTA124EMB v.1 | 20120426 | Product data sheet | - | - |

12. Legal information

12.1 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".

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