



# PNTC114TMB

NPN resistor-equipped transistor; R1 = 10 k $\Omega$ , R2 = open

Rev. 1 — 21 June 2012

Product data sheet

## 1. Product profile

### 1.1 General description

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

PNP complement: PNTA114TMB.

### 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

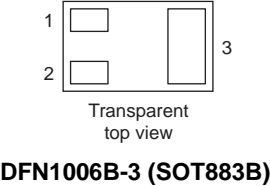
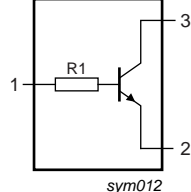
Table 1. Quick reference data

| Symbol           | Parameter                 | Conditions               | Min | Typ | Max | Unit       |
|------------------|---------------------------|--------------------------|-----|-----|-----|------------|
| V <sub>CEO</sub> | collector-emitter voltage | open base                | -   | -   | 50  | V          |
| I <sub>O</sub>   | output current            |                          | -   | -   | 100 | mA         |
| R1               | bias resistor 1 (input)   | T <sub>amb</sub> = 25 °C | 7   | 10  | 13  | k $\Omega$ |



2. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description        | Simplified outline  | Graphic symbol  |
|-----|--------|--------------------|---|---|
| 1   | I      | input (base)       | <br>DFN1006B-3 (SOT883B) | <br>sym012 |
| 2   | G      | GND (emitter)      |   |   |
| 3   | O      | output (collector) |   |   |

3. Ordering information

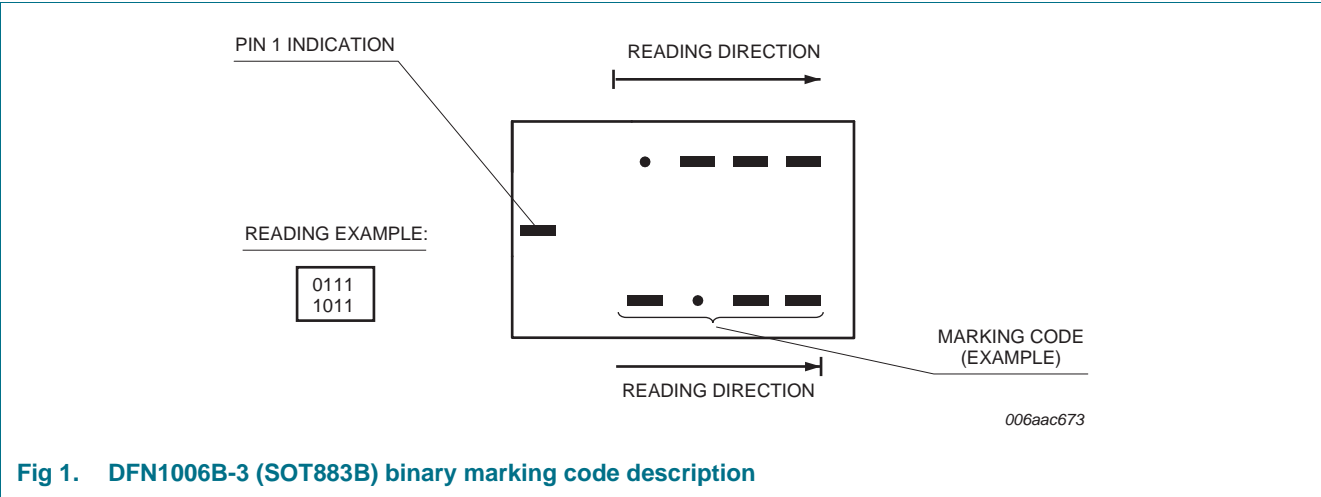
Table 3. Ordering information

| Type number | Package    |  |         |
|-------------|------------|--|---------|
|             | Name       | Description  | Version |
| PDTC114TMB  | 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 |
|-------------|--------------|
| PDTC114TMB  | 0010 1111    |

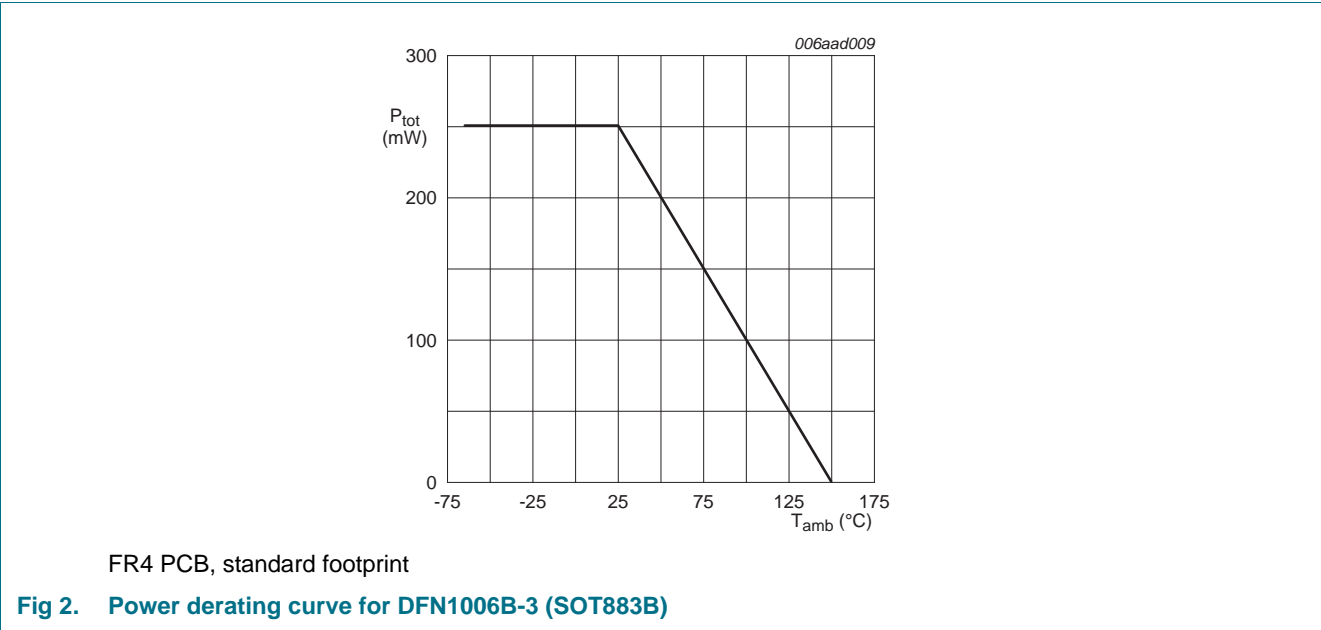


5. Limiting values

Table 5. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol           | Parameter                 | Conditions                    | Min | Max | Unit |
|------------------|---------------------------|-------------------------------|-----|-----|------|
| 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    | pulsed; t <sub>p</sub> ≤ 1 ms | -   | 100 | mA   |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C      | [1] | 250 | mW   |
| T <sub>j</sub>   | junction temperature      |                               | -   | 150 | °C   |
| T <sub>amb</sub> | ambient temperature       |                               | -65 | 150 | °C   |
| T <sub>stg</sub> | storage temperature       |                               | -65 | 150 | °C   |

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

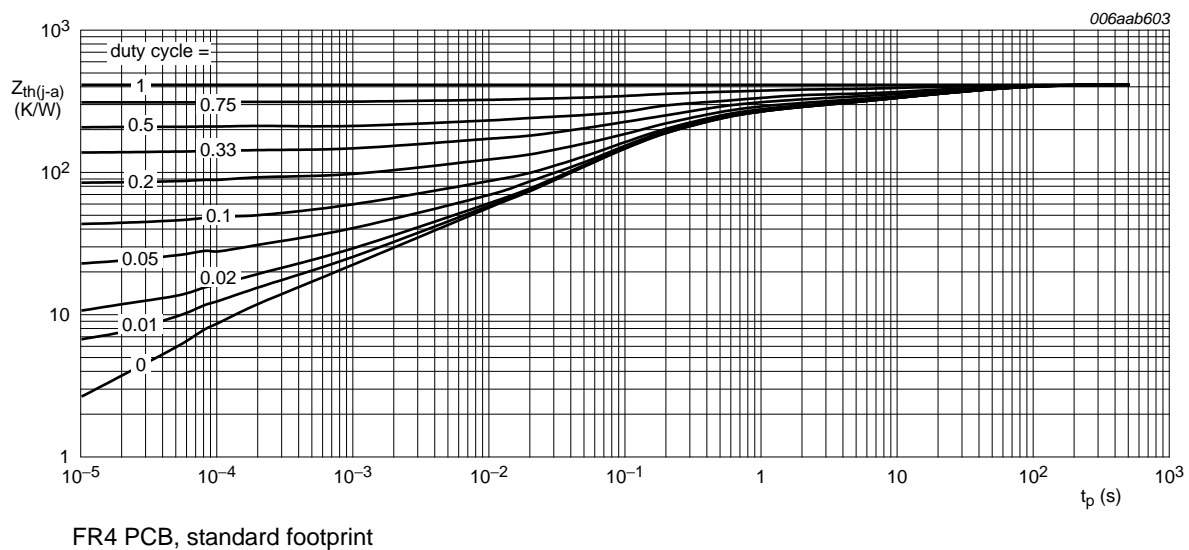


## 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol        | Parameter                                   | Conditions                      | Min | Typ | Max | Unit |
|---------------|---|---------------------------------|-----|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air <a href="#">[1]</a> | -   | -   | 500 | K/W  |

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



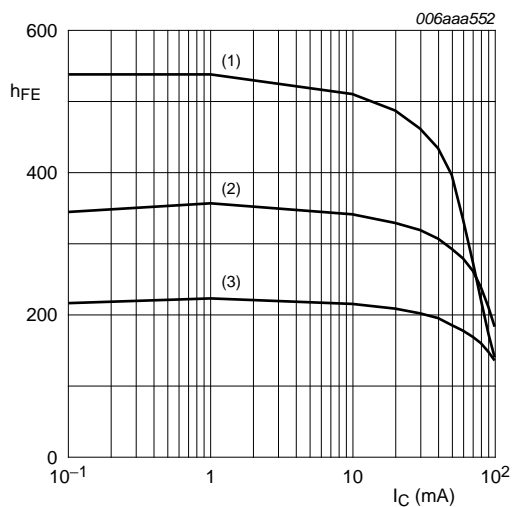
**Fig 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

## 7. Characteristics

**Table 7. Characteristics**

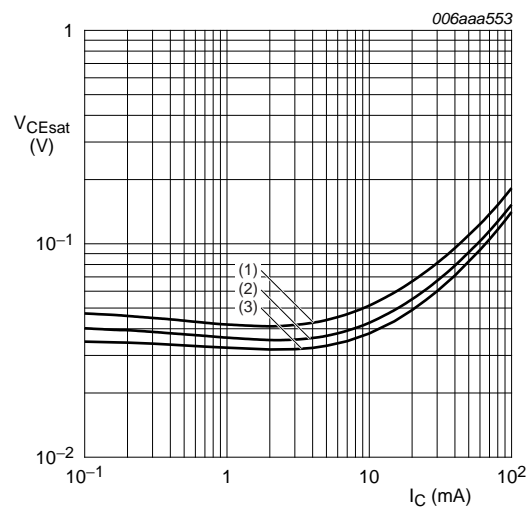
| Symbol      | Parameter                            | Conditions   | Min | Typ | Max | Unit |
|-------------|--------------------------------------|--|-----|-----|-----|------|
| $I_{CBO}$   | collector-base cut-off current       | $V_{CB} = 50\text{ V}$ ; $I_E = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$   | -   | -   | 100 | nA   |
| $I_{CEO}$   | collector-emitter cut-off current    | $V_{CE} = 30\text{ V}$ ; $I_B = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$   | -   | -   | 1   | μA   |
|             |                                      | $V_{CE} = 30\text{ V}$ ; $I_B = 0\text{ A}$ ; $T_j = 150\text{ °C}$  | -   | -   | 5   | μA   |
| $I_{EBO}$   | emitter-base cut-off current         | $V_{EB} = 5\text{ V}$ ; $I_C = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$  | -   | -   | 100 | nA   |
| $h_{FE}$    | DC current gain                      | $V_{CE} = 5\text{ V}$ ; $I_C = 1\text{ mA}$ ; $T_{amb} = 25\text{ °C}$   | 200 | -   | -   |      |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = 10\text{ mA}$ ; $I_B = 0.5\text{ mA}$ ; $T_{amb} = 25\text{ °C}$  | -   | -   | 150 | mV   |
| R1          | bias resistor 1 (input)              | $T_{amb} = 25\text{ °C}$   | 7   | 10  | 13  | kΩ   |
| $C_C$       | collector capacitance                | $V_{CB} = 10\text{ V}$ ; $I_E = 0\text{ A}$ ; $i_e = 0\text{ A}$ ; $f = 1\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$   | -   | -   | 2.5 | pF   |
| $f_T$       | transition frequency                 | $V_{CE} = 5\text{ V}$ ; $I_C = 10\text{ mA}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$ <a href="#">[1]</a> | -   | 230 | -   | MHz  |

[1] Characteristics of built-in transistor.



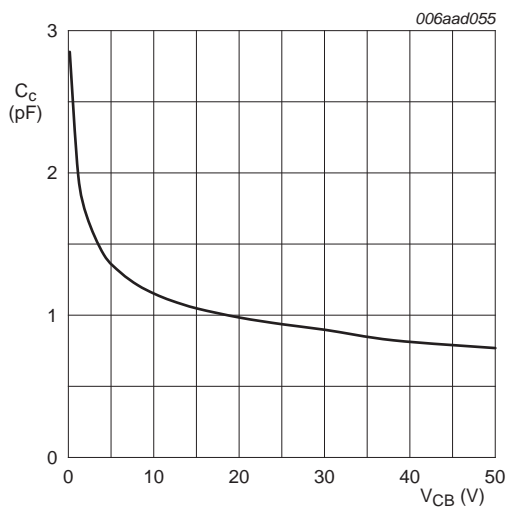
$V_{CE} = 5\text{ V}$   
(1)  $T_{amb} = 100\text{ }^{\circ}\text{C}$   
(2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
(3)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

Fig 4. DC current gain as a function of collector current; typical values



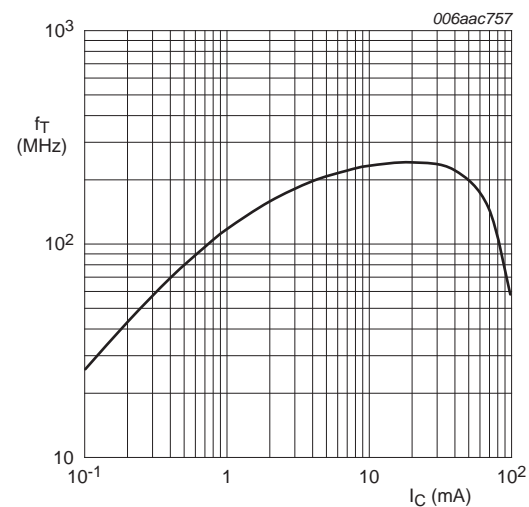
$I_C/I_B = 20$   
(1)  $T_{amb} = 100\text{ }^{\circ}\text{C}$   
(2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
(3)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

Fig 5. Collector-emitter saturation voltage as a function of collector current; typical values



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

Fig 6. Collector capacitance as a function of collector-base voltage; typical values of built-in transistor



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

Fig 7. 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

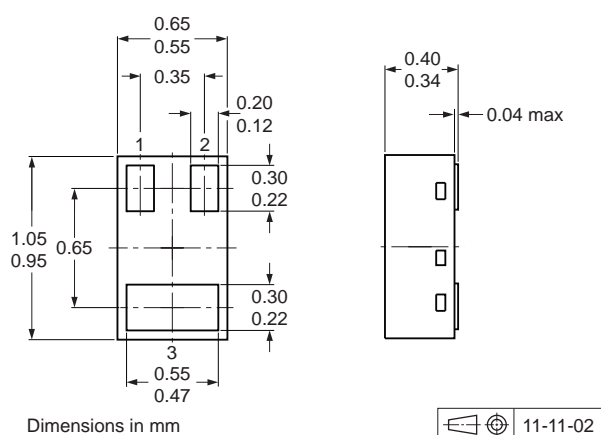
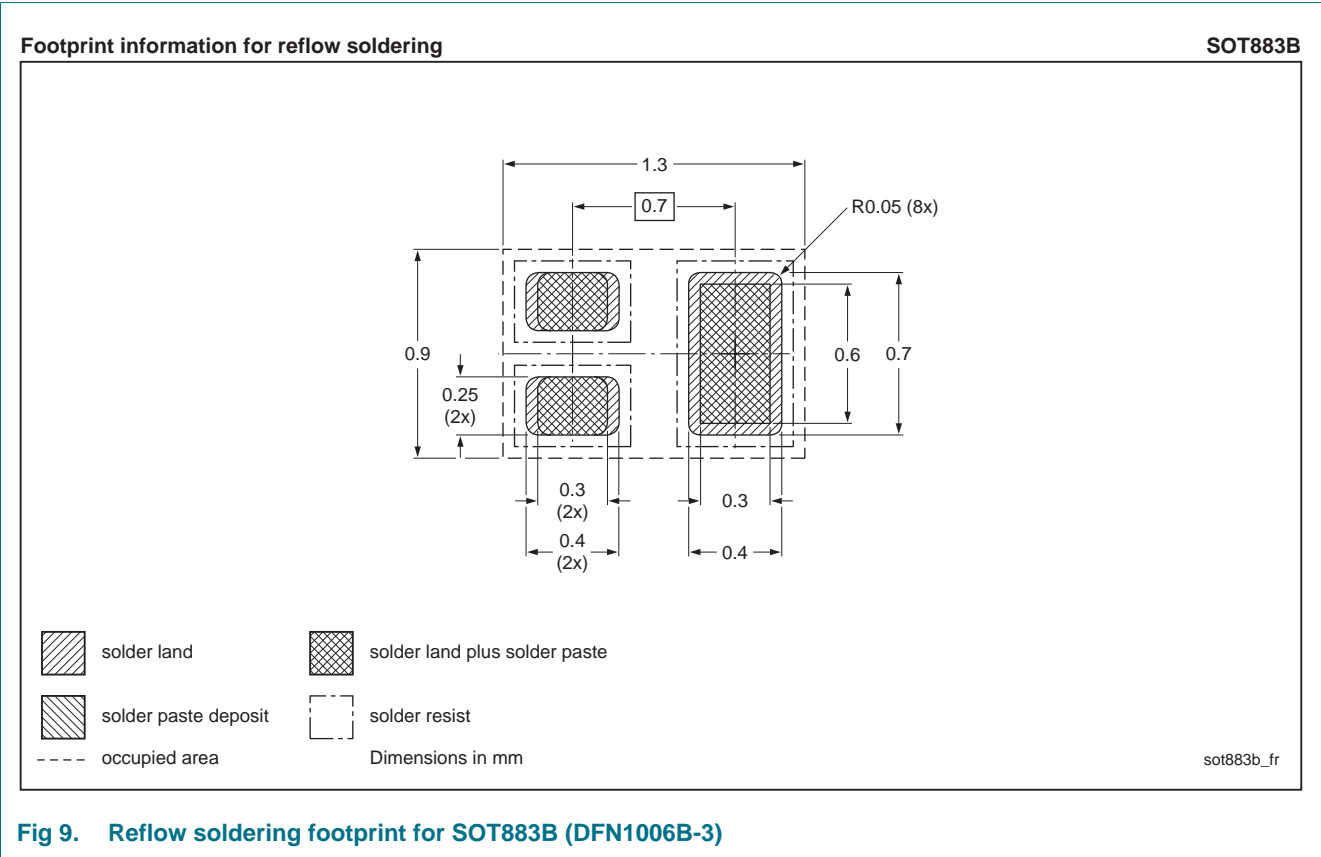


Fig 8. DFN1006B-3 (SOT883B)

10. Soldering



## 11. Revision history

Table 8. Revision history

| Document ID    | Release date | Data sheet status  | Change notice | Supersedes |
|----------------|--------------|--------------------|---------------|------------|
| PDTC114TMB v.1 | 20120621     | 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.                                     |

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[2] The term 'short data sheet' is explained in section "Definitions".

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