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Kind regards,

Team Nexperia



**NPN resistor-equipped transistor;**  $R1 = 22 k\Omega$ ,  $R2 = 22 k\Omega$ Rev. 1 — 16 May 2012 Product data s

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: PDTA124EMB.

#### 1.2 Features and benefits

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

#### **1.3 Applications**

- Low-current peripheral driver
- Control of IC inputs

- Simplifies circuit design
- AEC-Q101 qualified
- Leadless ultra small SMD plastic package
- Low package height of 0.37 mm
- Replaces general-purpose transistors in digital applications
- Mobile applications

#### 1.4 Quick reference data

Table 1.	Quick reference data					
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	50	V
lo	output current		-	-	100	mA
R1	bias resistor 1 (input)	T <sub>amb</sub> = 25 °C	15.4	22	28.6	kΩ
R2/R1	bias resistor ratio		0.8	1	1.2	



NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 

# 2. Pinning information

Table 2.	Pinning	j information		
Pin	Symbol	Description	Simplified outline	Graphic symbol
1	I	input (base)		
2	G	GND (emitter)		3
3	0	output (collector)	2 Transparent top view SOT883B (DFN1006B-3)	1 R1 R2 2 sym007

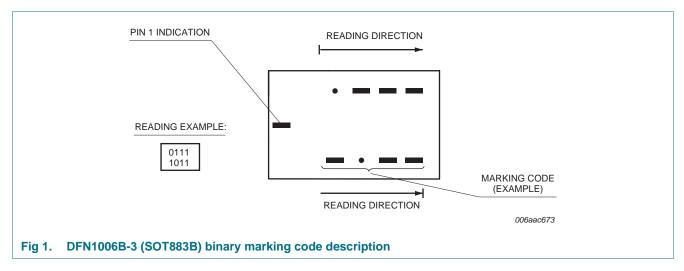
# 3. Ordering information

Table 3. Ordering information						
Type number	Package					
	Name	Description	Version			
PDTC124EMB	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 o	odes
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Type number	Marking code
PDTC124EMB	0011 0111



NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 

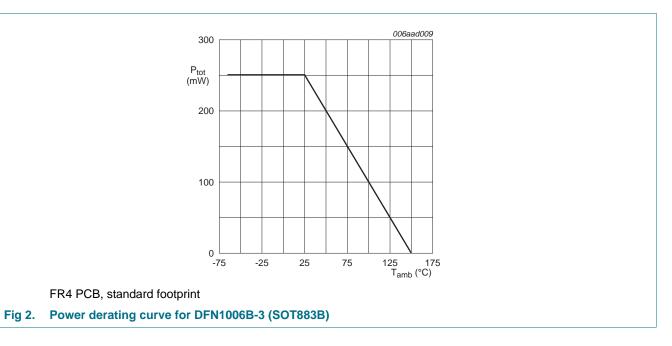
### 5. Limiting values

#### 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		-	10	V
VI	input voltage	positive		-	40	V
		negative		-	-10	V
lo	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	<u>[1]</u>	-	250	mW
Tj	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.

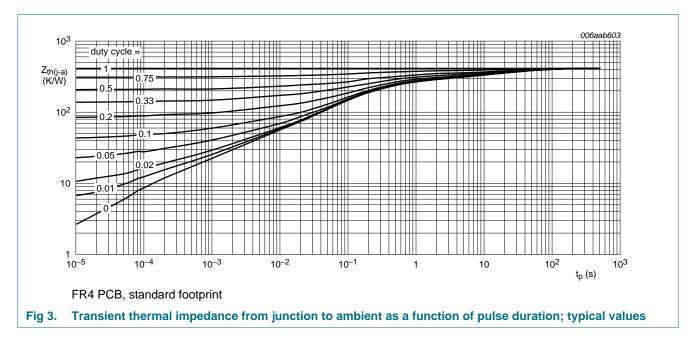


NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 

### 6. Thermal characteristics

Table 6.	Thermal characteristics						
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	<u>[1]</u>	-	-	500	K/W

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

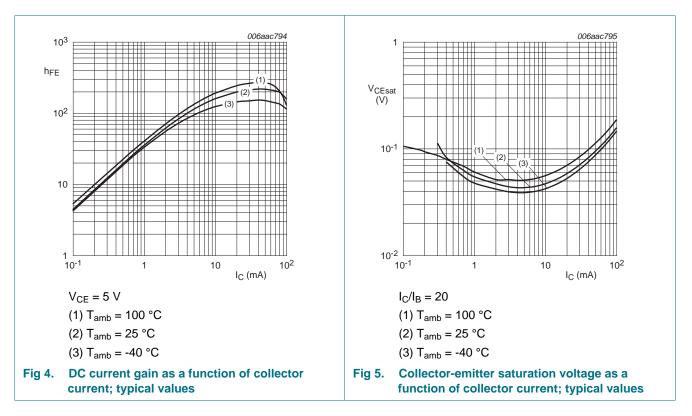


NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 

### 7. Characteristics

Table 7.	Characteristics						
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
I <sub>CBO</sub>	collector-base cut-off current	$V_{CB}$ = 50 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C		-	-	100	nA
I <sub>CEO</sub>	collector-emitter cut-off	$V_{CE} = 30 \text{ V}; \text{ I}_{B} = 0 \text{ A}; \text{ T}_{amb} = 25 \text{ °C}$		-	-	100	nA
	current	$V_{CE} = 30 \text{ V}; I_B = 0 \text{ A}; T_j = 150 \text{ °C}$		-	-	5	μA
I <sub>EBO</sub>	emitter-base cut-off current	$V_{EB}$ = 5 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C		-	-	180	μΑ
h <sub>FE</sub>	DC current gain	$V_{CE}$ = 5 V; I <sub>C</sub> = 5 mA; T <sub>amb</sub> = 25 °C		60	-	-	
V <sub>CEsat</sub>	collector-emitter saturation voltage	$I_C$ = 10 mA; $I_B$ = 0.5 mA; $T_{amb}$ = 25 °C		-	-	150	mV
V <sub>I(off)</sub>	off-state input voltage	$V_{CE} = 5 \text{ V}; \text{ I}_{C} = 100  \mu\text{A}; \text{ T}_{amb} = 25 ^{\circ}\text{C}$		-	1.1	0.8	V
V <sub>I(on)</sub>	on-state input voltage	$V_{CE}$ = 0.3 V; $I_C$ = 5 mA; $T_{amb}$ = 25 °C		2.5	1.7	-	V
R1	bias resistor 1 (input)	T <sub>amb</sub> = 25 °C		15.4	22	28.6	kΩ
R2/R1	bias resistor ratio			0.8	1	1.2	
C <sub>C</sub>	collector capacitance	$V_{CB} = 10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A};$ f = 1 MHz; T <sub>amb</sub> = 25 °C		-	-	2.5	pF
f <sub>T</sub>	transition frequency	$V_{CE}$ = 5 V; I <sub>C</sub> = 10 mA; f = 100 MHz; T <sub>amb</sub> = 25 °C	<u>[1]</u>	-	230	-	MHz

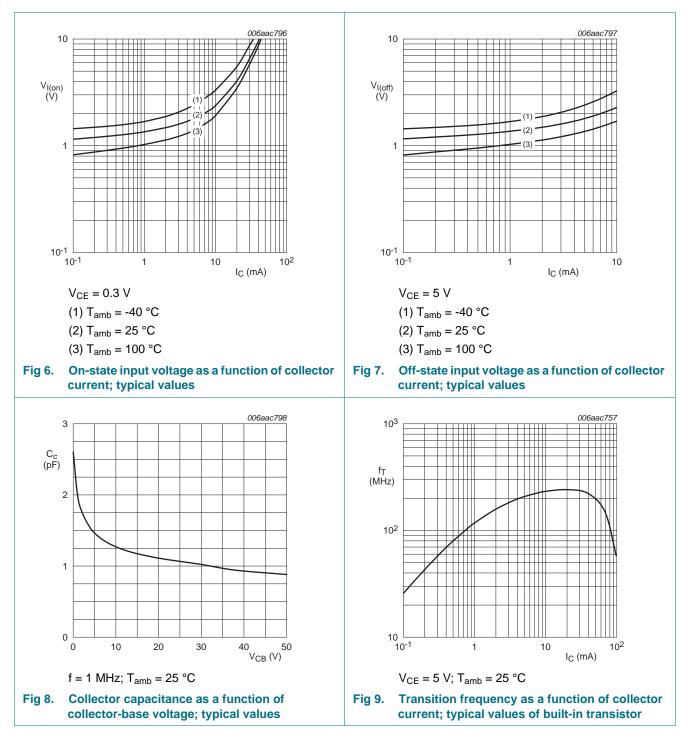
[1] Characteristics of built-in transistor.



#### **NXP Semiconductors**

# PDTC124EMB

NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 



### 8. Test information

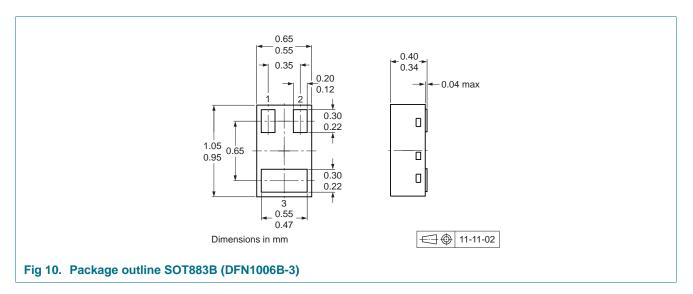
#### 8.1 Quality information

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.

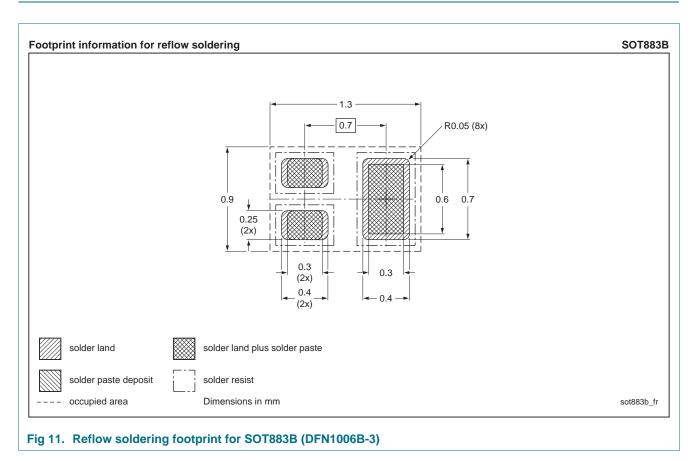
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NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 

### 9. Package outline



### 10. Soldering



PDTC124EMB Product data sheet

NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 

# **11. Revision history**

Table 8. Revision h	istory			
Document ID	Release date	Data sheet status	Change notice	Supersedes
PDTC124EMB v.1	20120516	Product data sheet	-	-

NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 

### 12. Legal information

#### 12.1 Data sheet status

Document status[1] [2]	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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Product data sheet

PDTC124EMB

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# PDTC124EMB

NPN resistor-equipped transistor; R1 = 22 k $\Omega$ , R2 = 22 k $\Omega$ 

#### 14. Contents

1	Product profile1
1.1	General description1
1.2	Features and benefits1
1.3	Applications1
1.4	Quick reference data1
2	Pinning information2
3	Ordering information2
4	Marking2
5	Limiting values
6	Thermal characteristics4
7	Characteristics5
8	Test information6
8.1	Quality information6
9	Package outline7
10	Soldering
11	Revision history8
12	Legal information9
12.1	Data sheet status9
12.2	Definitions9
12.3	Disclaimers
12.4	Trademarks
13	Contact information10

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