



# PDTC114YMB

NPN resistor-equipped transistor;  $R1 = 10 \text{ k}\Omega$ ,  $R2 = 47 \text{ k}\Omega$

Rev. 1 — 16 May 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: PDTA114YMB.

### 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

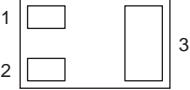
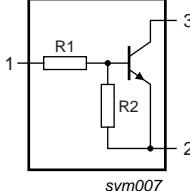
Table 1. Quick reference data

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)	$T_{amb} = 25 \text{ }^\circ\text{C}$	7	10	13	$\text{k}\Omega$
$R2/R1$	bias resistor ratio		3.7	4.7	5.7	



## 2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	I	input (base)		
2	G	GND (emitter)		
3	O	output (collector)	 Transparent top view	 SOT883B (DFN1006B-3) sym007

## 3. Ordering information

Table 3. Ordering information

Type number	Package	Version
Name	Description	
PDTC114YMB	DFN1006B-3	SOT883B
	Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.37 mm	

## 4. Marking

Table 4. Marking codes

Type number	Marking code
PDTC114YMB	0011 0000

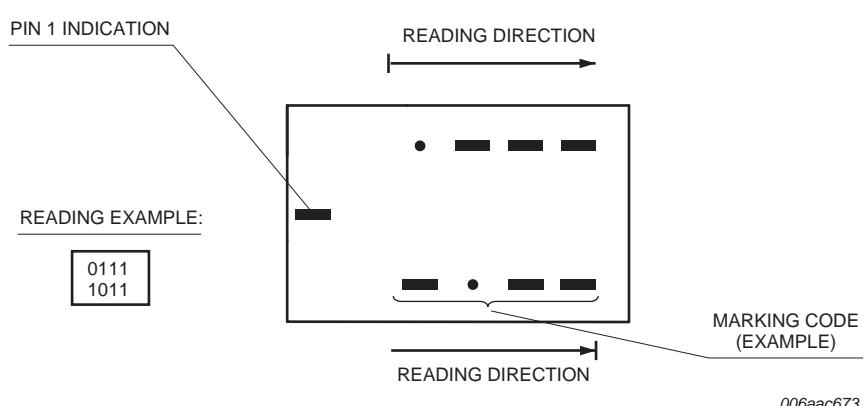


Fig 1. DFN1006B-3 (SOT883B) binary marking code description

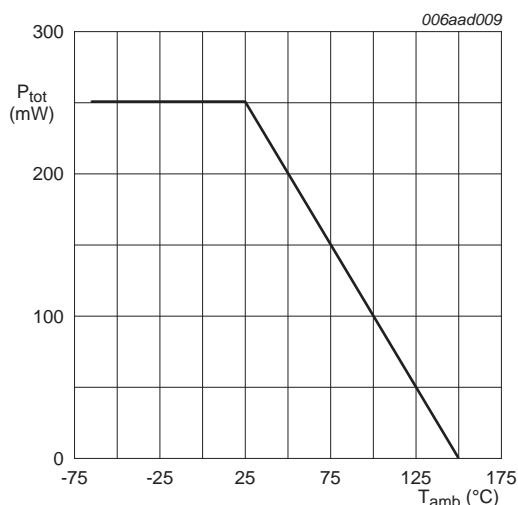
## 5. Limiting values

**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	-	6	V
$V_I$	input voltage	positive	-	40	V
		negative	-	-6	V
$I_o$	output current		-	100	mA
$I_{CM}$	peak collector current	pulsed; $t_p \leq 1 \text{ ms}$	-	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[1]	-	250 mW
$T_j$	junction temperature			-	$150 \text{ }^\circ\text{C}$
$T_{amb}$	ambient temperature		-65	150	$^\circ\text{C}$
$T_{stg}$	storage temperature		-65	150	$^\circ\text{C}$

[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	[1]	-	-	500 K/W

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

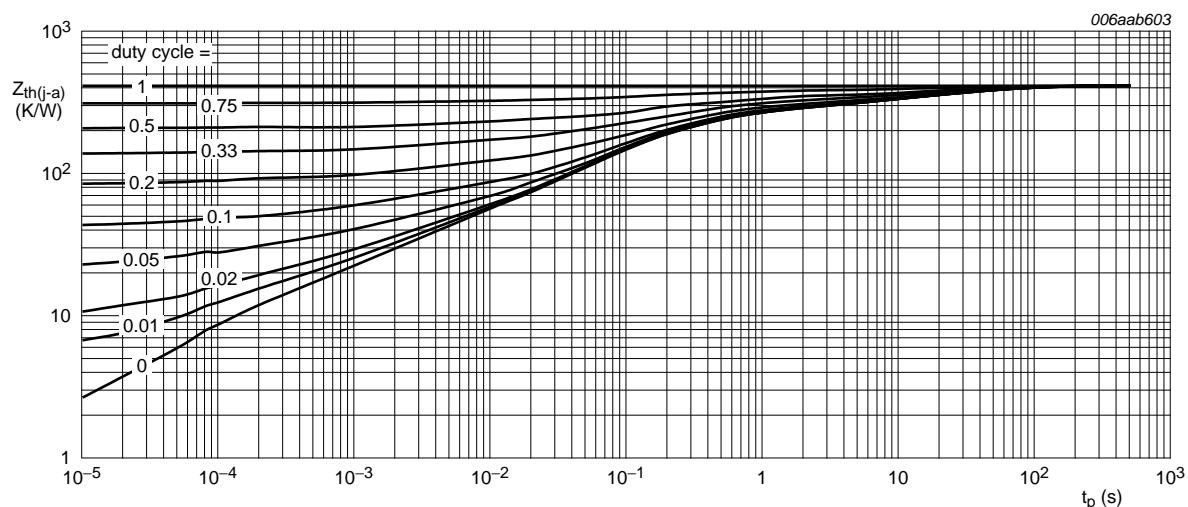


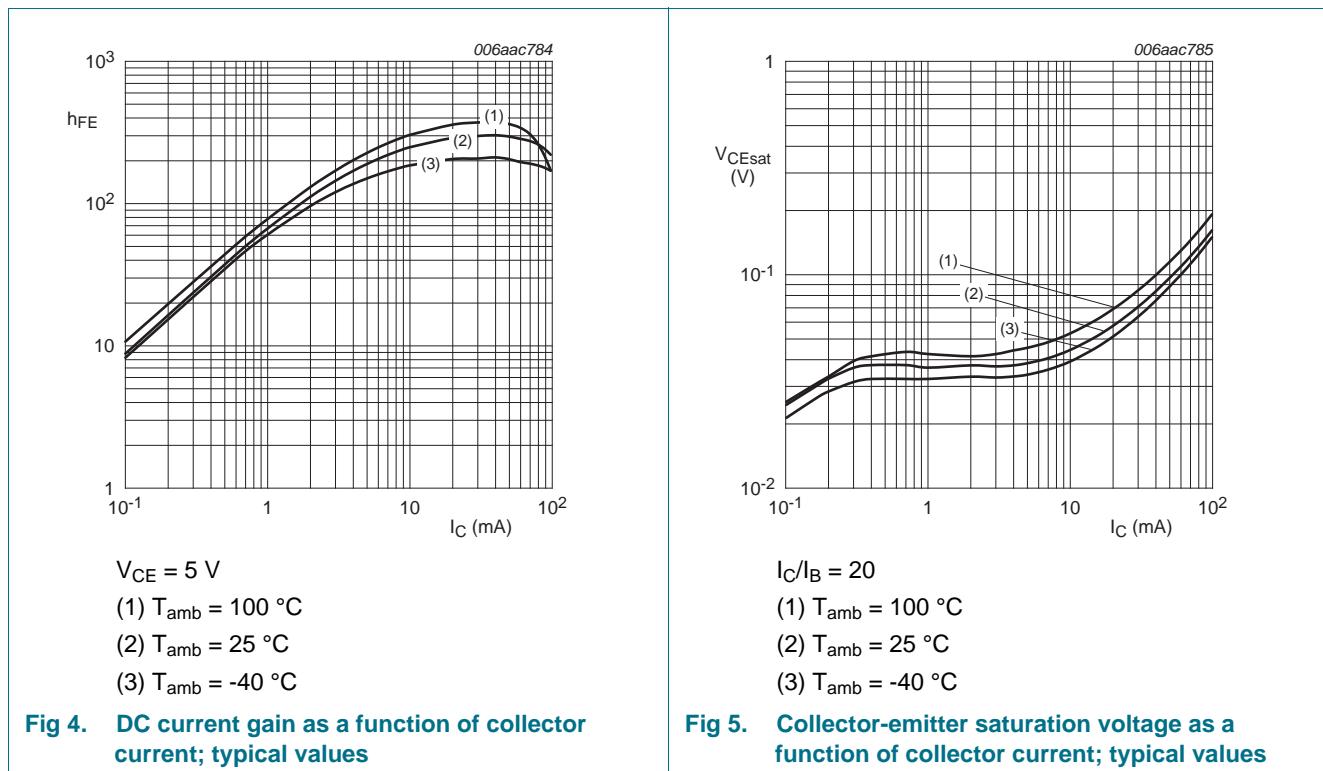
Fig 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

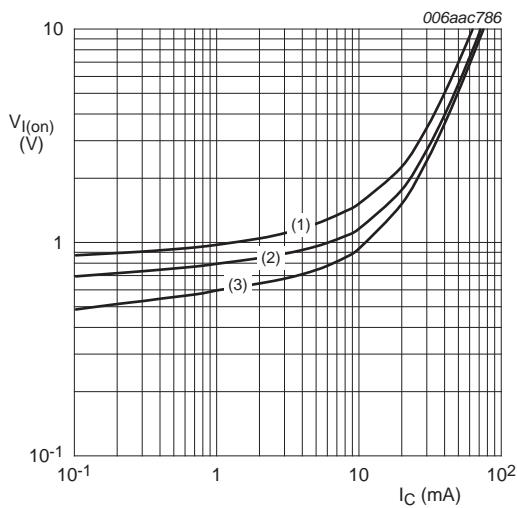
## 7. Characteristics

**Table 7. Characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 50 \text{ V}$ ; $I_E = 0 \text{ A}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	100	nA	
$I_{CEO}$	collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$ ; $I_B = 0 \text{ A}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	1	$\mu\text{A}$	
		$V_{CE} = 30 \text{ V}$ ; $I_B = 0 \text{ A}$ ; $T_j = 150 \text{ }^\circ\text{C}$	-	-	5	$\mu\text{A}$	
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5 \text{ V}$ ; $I_C = 0 \text{ A}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	150	$\mu\text{A}$	
$h_{FE}$	DC current gain	$V_{CE} = 5 \text{ V}$ ; $I_C = 5 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	100	-	-		
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 5 \text{ mA}$ ; $I_B = 0.25 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	100	mV	
$V_{I(off)}$	off-state input voltage	$V_{CE} = 5 \text{ V}$ ; $I_C = 100 \mu\text{A}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	-	0.7	0.5	V	
$V_{I(on)}$	on-state input voltage	$V_{CE} = 0.3 \text{ V}$ ; $I_C = 1 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	1.4	0.8	-	V	
$R1$	bias resistor 1 (input)	$T_{amb} = 25 \text{ }^\circ\text{C}$	7	10	13	$\text{k}\Omega$	
$R2/R1$	bias resistor ratio		3.7	4.7	5.7		
$C_C$	collector capacitance	$V_{CB} = 10 \text{ V}$ ; $I_E = 0 \text{ A}$ ; $i_e = 0 \text{ A}$ ; $f = 1 \text{ MHz}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	2.5	pF	
$f_T$	transition frequency	$V_{CE} = 5 \text{ V}$ ; $I_C = 10 \text{ mA}$ ; $f = 100 \text{ MHz}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	-	230	-	MHz

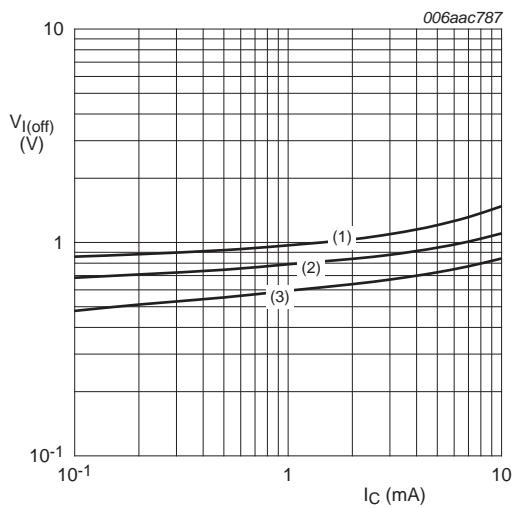
[1] Characteristics of built-in transistor.





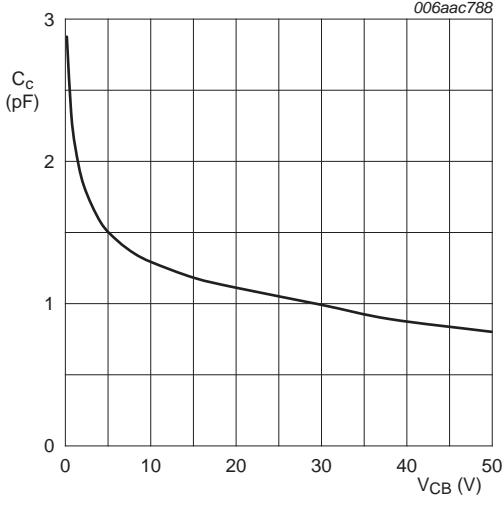
$V_{CE} = 0.3 \text{ V}$   
 (1)  $T_{amb} = -40 \text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25 \text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 100 \text{ }^{\circ}\text{C}$

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



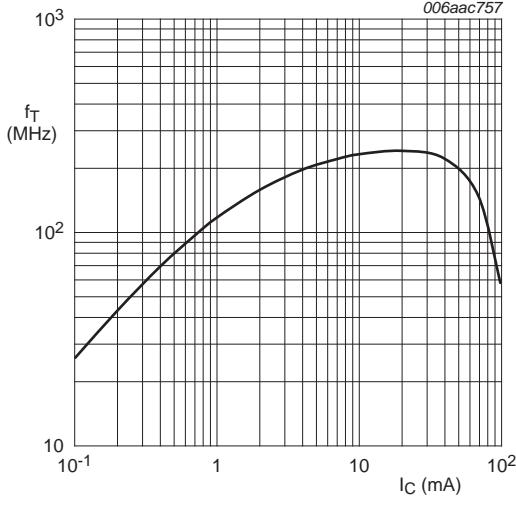
$V_{CE} = 5 \text{ V}$   
 (1)  $T_{amb} = -40 \text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25 \text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 100 \text{ }^{\circ}\text{C}$

**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**



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

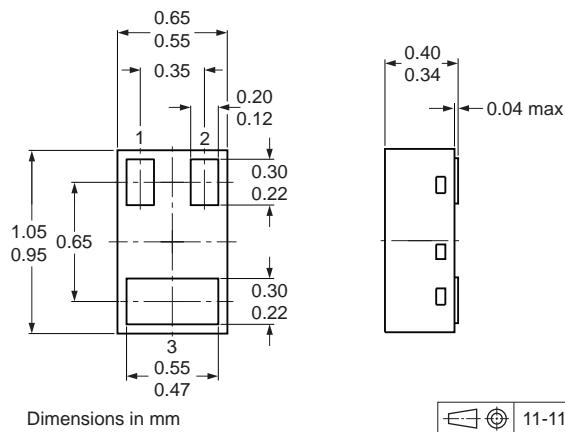
**Fig 9. Transition frequency as a function of collector current; typical values of built-in transistor**

## 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

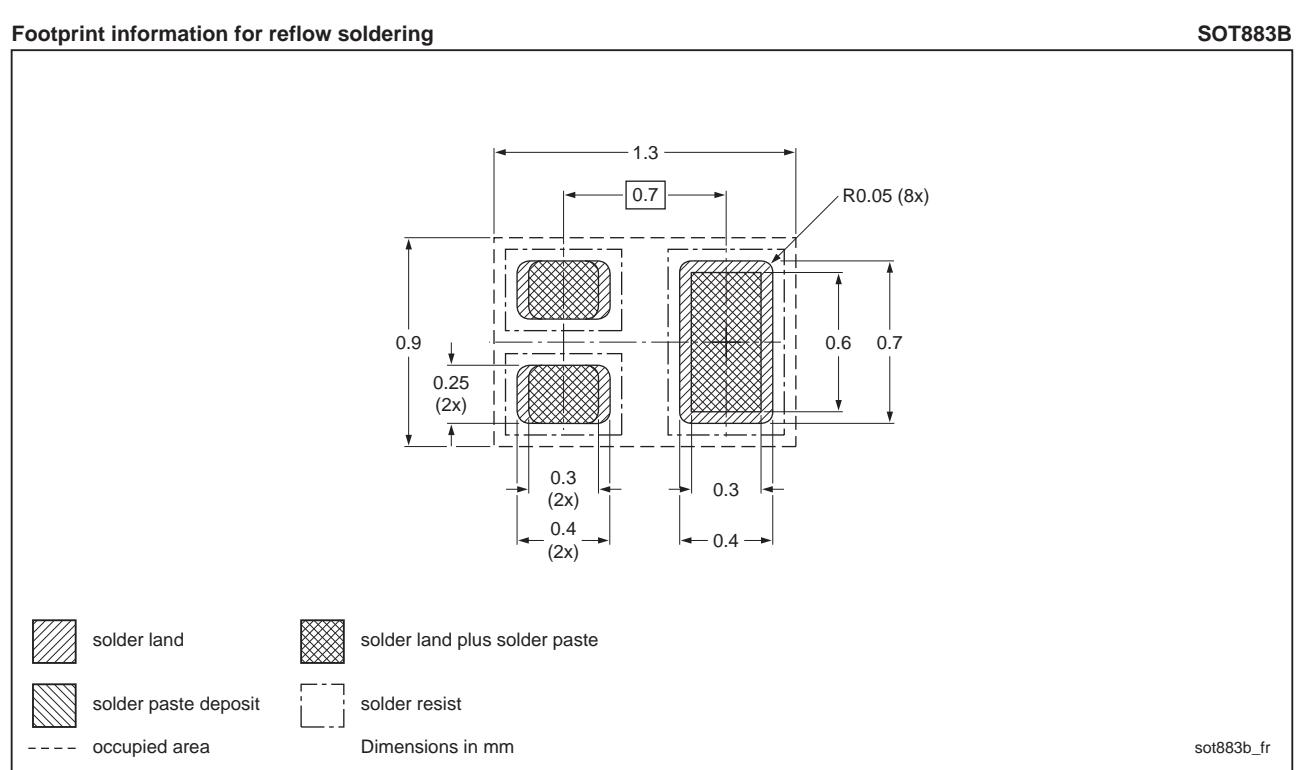


Fig 11. Reflow soldering footprint for SOT883B (DFN1006B-3)

## 11. Revision history

**Table 8. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
PDTC114YMB v.1	20120516	Product data sheet	-	-

## 12. Legal information

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Document status <sup>[1]</sup> [2]	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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Product [short] data sheet	Production	This document contains the product specification.

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