

# PDT323TK

NPN 500 mA, 15 V resistor-equipped transistor;  
R1 = 2.2 k $\Omega$ , R2 = open

Rev. 01 — 3 June 2005

Product data sheet

## 1. Product profile

### 1.1 General description

500 mA NPN Resistor-Equipped Transistor (RET) in a small SOT346 (SC-59A) SMD plastic package.

PNP complement: PDTA323TK.

### 1.2 Features

- Built-in bias resistors
- Simplifies circuit design
- 500 mA output current capability
- Reduces component count
- Reduces pick and place costs

### 1.3 Applications

- Digital application in automotive and industrial segments
- Controlling IC inputs
- Cost saving alternative for BC817 series in digital applications
- Switching loads

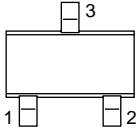
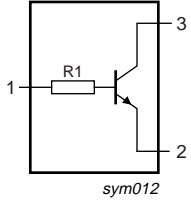
### 1.4 Quick reference data

Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	15	V
I <sub>O</sub>	output current		-	-	500	mA
R1	bias resistor 1 (input)		1.54	2.2	2.86	k $\Omega$

## 2. Pinning information

**Table 2: Pinning**

Pin	Description	Simplified outline	Symbol
1	input (base)		 sym012
2	GND (emitter)		
3	output (collector)		

## 3. Ordering information

**Table 3: Ordering information**

Type number	Package		
	Name	Description	Version
PDTC323TK	SC-59A	plastic surface mounted package; 3 leads	SOT346

## 4. Marking

**Table 4: Marking codes**

Type number	Marking code
PDTC323TK	57

## 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	-	30	V
$V_{CEO}$	collector-emitter voltage	open base	-	15	V
$V_{EBO}$	emitter-base voltage	open collector	-	5	V
$V_I$	input voltage				
	positive		-	+12	V
	negative		-	-5	V
$I_O$	output current		-	500	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	250	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
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	-	500	K/W

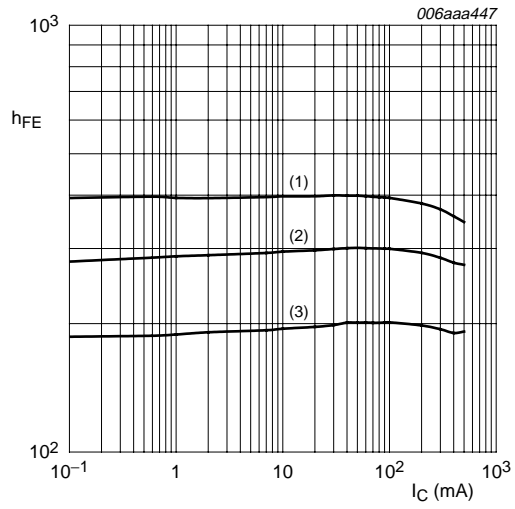
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

## 7. Characteristics

**Table 7: Characteristics**

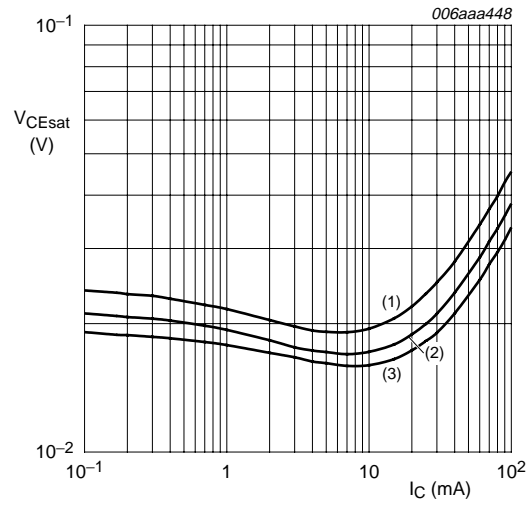
$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}$	-	-	100	nA
$I_{CEO}$	collector-emitter cut-off current	$V_{CE} = 15\text{ V}; I_B = 0\text{ A}$	-	-	0.5	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}; I_C = 50\text{ mA}$	100	300	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 50\text{ mA}; I_B = 2.5\text{ mA}$	-	25	80	V
R1	bias resistor 1 (input)		1.54	2.2	2.86	k $\Omega$
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = i_e = 0\text{ A};$ $f = 1\text{ MHz}$	-	7	-	pF



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

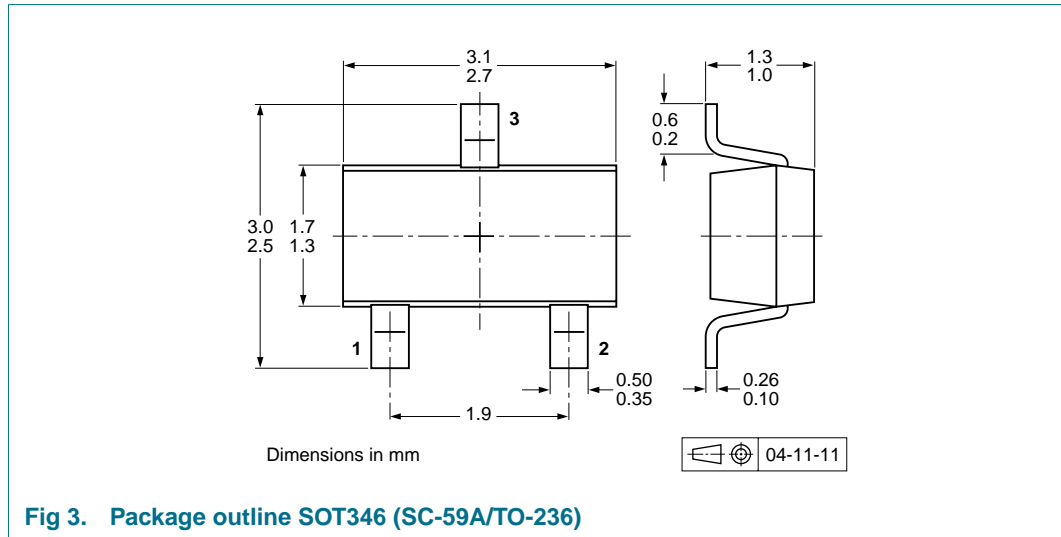
**Fig 1. DC current gain as a function of collector current; typical values**



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

**Fig 2. Collector-emitter saturation voltage as a function of collector current; typical values**

## 8. Package outline



## 9. Packing information

**Table 8: Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code. [\[1\]](#)

Type number	Package	Description	Packing quantity	
			3000	10000
PDTC323TK	SOT346	4 mm pitch, 8 mm tape and reel	-115	-135

[1] For further information and the availability of packing methods, see [Section 15](#).

## 10. Revision history

Table 9: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PDTC323TK_1	20050603	Product data sheet	-	9397 750 14946	-

## 11. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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