

PDT323TK

NPN 500 mA, 15 V resistor-equipped transistor;
R1 = 2.2 k Ω , 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

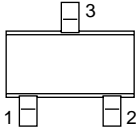
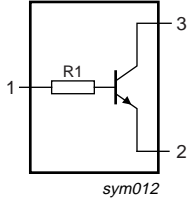
1.4 Quick reference data

Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	15	V
I _O	output current		-	-	500	mA
R1	bias resistor 1 (input)		1.54	2.2	2.86	k Ω

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	$T_{amb} \leq 25\text{ }^\circ\text{C}$	[1]	250	mW
T_{stg}	storage temperature		-65	+150	$^\circ\text{C}$
T_j	junction temperature		-	150	$^\circ\text{C}$
T_{amb}	ambient temperature		-65	+150	$^\circ\text{C}$

[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

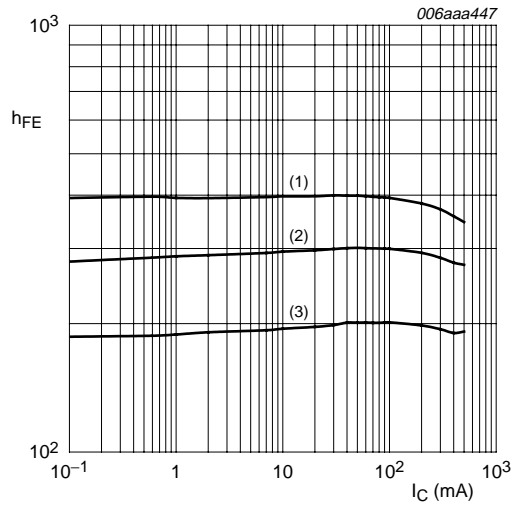
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

7. Characteristics

Table 7: Characteristics

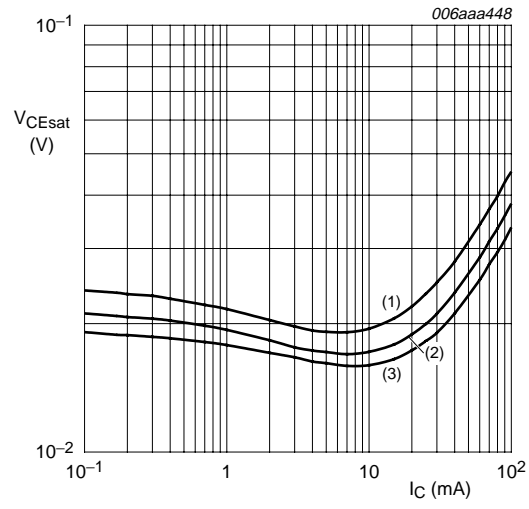
$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

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	μA
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 Ω
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) $T_{amb} = -40\text{ °C}$

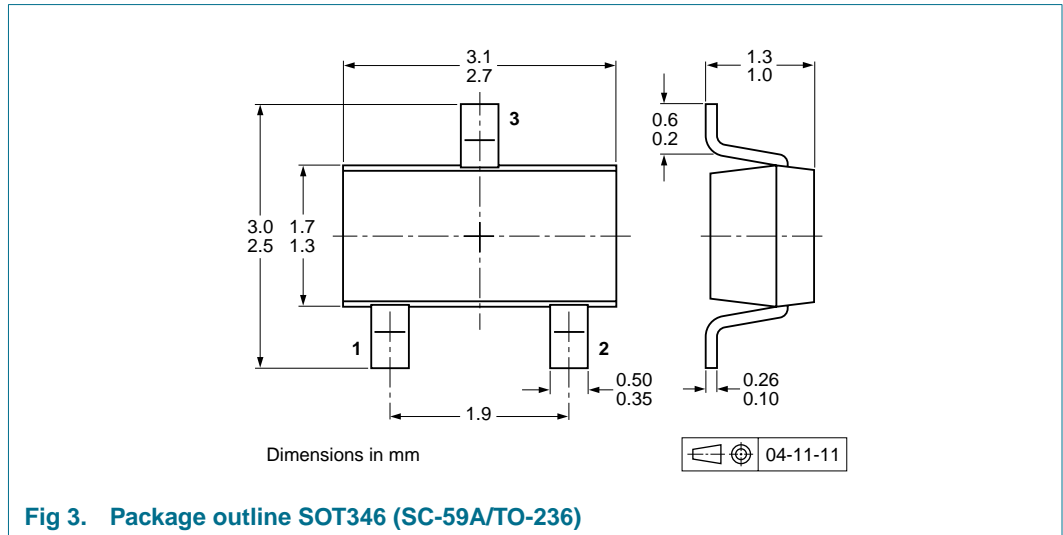
Fig 1. DC current gain as a function of collector current; typical values



$I_C/I_B = 20$
 (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 ^[1]	Product status ^{[2] [3]}	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.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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