

PDTA123T series

PNP resistor-equipped transistors;
R1 = 2.2 k Ω , R2 = open

Rev. 01 — 7 March 2006

Product data sheet

1. Product profile

1.1 General description

PNP Resistor-Equipped Transistors (RET) family.

Table 1: Product overview

Type number	Package			NPN complement
	Philips	JEITA	JEDEC	
PDTA123TE	SOT416	SC-75	-	PDTC123TE
PDTA123TK	SOT346	SC-59A	TO-236	PDTC123TK
PDTA123TM	SOT883	SC-101	-	PDTC123TM
PDTA123TS ^[1]	SOT54	SC-43A	TO-92	PDTC123TS
PDTA123TT	SOT23	-	TO-236AB	PDTC123TT
PDTA123TU	SOT323	SC-70	-	PDTC123TU

[1] Also available in SOT54A and SOT54 variant packages (see [Section 2](#)).

1.2 Features

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

1.3 Applications

- Digital applications
- Controlling IC inputs
- Cost-saving alternative for BC857 series in digital applications
- Switching loads

1.4 Quick reference data

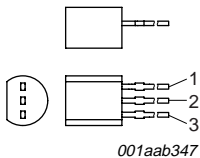
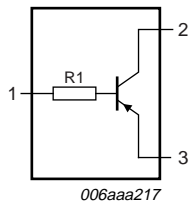
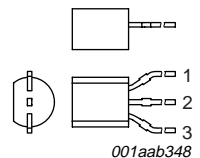
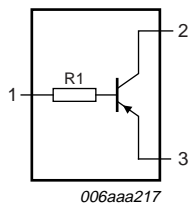
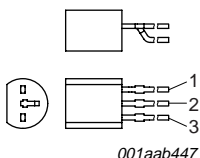
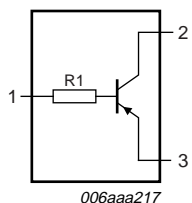
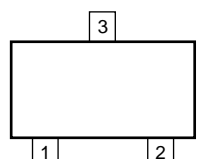
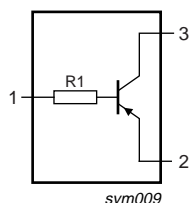
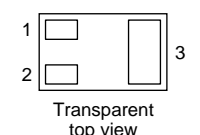
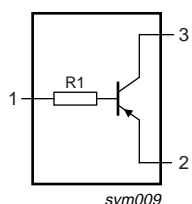
Table 2: Quick reference data

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)		1.54	2.2	2.86	k Ω

PHILIPS

2. Pinning information

Table 3: Pinning

Pin	Description	Simplified outline	Symbol
SOT54			
1	input (base)	 <p>001aab347</p>	 <p>006aaa217</p>
2	output (collector)		
3	GND (emitter)		
SOT54A			
1	input (base)	 <p>001aab348</p>	 <p>006aaa217</p>
2	output (collector)		
3	GND (emitter)		
SOT54 variant			
1	input (base)	 <p>001aab447</p>	 <p>006aaa217</p>
2	output (collector)		
3	GND (emitter)		
SOT23; SOT323; SOT346; SOT416			
1	input (base)	 <p>006aaa144</p>	 <p>sym009</p>
2	GND (emitter)		
3	output (collector)		
SOT883			
1	input (base)	 <p>Transparent top view</p>	 <p>sym009</p>
2	GND (emitter)		
3	output (collector)		

3. Ordering information

Table 4: Ordering information

Type number	Package		
	Name	Description	Version
PDTA123TE	SC-75	plastic surface mounted package; 3 leads	SOT416
PDTA123TK	SC-59A	plastic surface mounted package; 3 leads	SOT346
PDTA123TM	SC-101	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTA123TS ^[1]	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTA123TT	-	plastic surface mounted package; 3 leads	SOT23
PDTA123TU	SC-70	plastic surface mounted package; 3 leads	SOT323

[1] Also available in SOT54A and SOT54 variant packages (see [Section 2](#) and [Section 9](#)).

4. Marking

Table 5: Marking codes

Type number	Marking code ^[1]
PDTA123TE	2A
PDTA123TK	GA
PDTA123TM	FA
PDTA123TS	TA123T
PDTA123TT	ZL*
PDTA123TU	*1S

[1] * = -: made in Hong Kong
 * = p: made in Hong Kong
 * = t: made in Malaysia
 * = W: made in China

5. Limiting values

Table 6: 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	-	-5	V	
I_O	output current		-	-100	mA	
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-100	mA	
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C				
	SOT416		[1]	-	150	mW
	SOT346		[1]	-	250	mW
	SOT883		[2] [3]	-	250	mW
	SOT54		[1]	-	500	mW
	SOT23		[1]	-	250	mW
	SOT323		[1]	-	200	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.

[2] Reflow soldering is the only recommended soldering method.

[3] Device mounted on an FR4 PCB with 60 μm copper strip line, standard footprint.

6. Thermal characteristics

Table 7: Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air					
	SOT416		[1]	-	-	833	K/W
	SOT346		[1]	-	-	500	K/W
	SOT883		[2] [3]	-	-	500	K/W
	SOT54		[1]	-	-	250	K/W
	SOT23		[1]	-	-	500	K/W
	SOT323		[1]	-	-	625	K/W

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

[2] Reflow soldering is the only recommended soldering method.

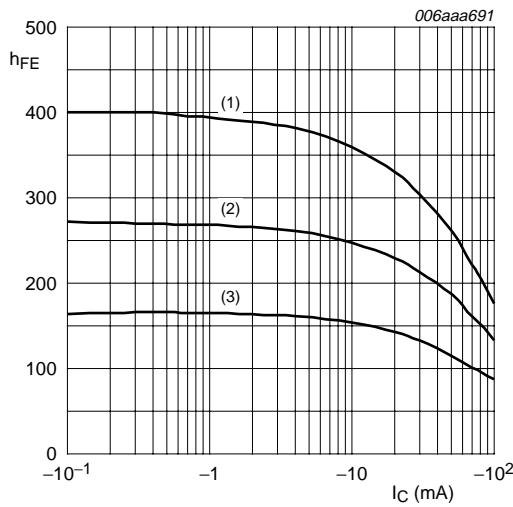
[3] Device mounted on an FR4 PCB with 60 μm copper strip line, standard footprint.

7. Characteristics

Table 8: Characteristics

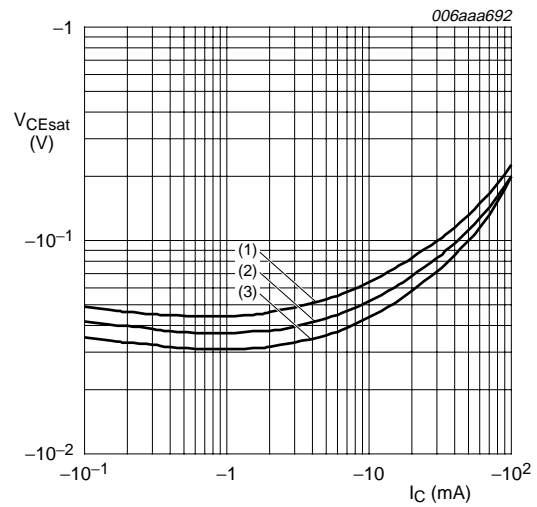
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = -50 V; I _E = 0 A	-	-	-100	nA
I _{CEO}	collector-emitter cut-off current	V _{CE} = -30 V; I _B = 0 A	-	-	-1	μA
		V _{CE} = -30 V; I _B = 0 A; T _J = 150 °C	-	-	-50	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 V; I _C = 0 A	-	-	-100	nA
h _{FE}	DC current gain	V _{CE} = -5 V; I _C = -20 mA	30	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = -10 mA; I _B = -0.5 mA	-	-	-150	mV
R1	bias resistor 1 (input)		1.54	2.2	2.86	kΩ
C _c	collector capacitance	V _{CB} = -10 V; I _E = i _e = 0 A; f = 1 MHz	-	-	3	pF



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

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



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

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

8. Package outline

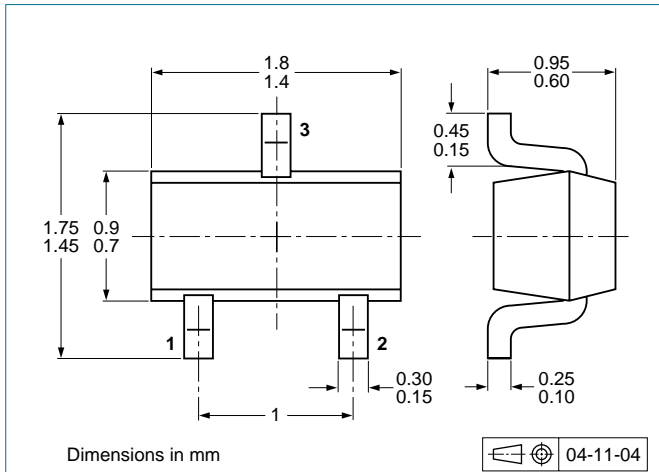


Fig 3. Package outline SOT416 (SC-75)

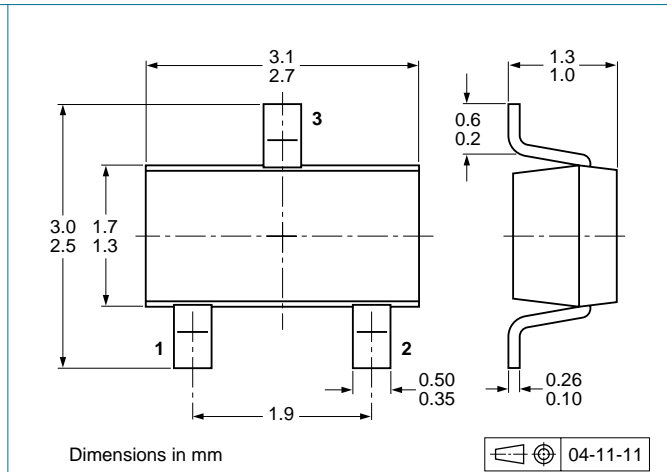


Fig 4. Package outline SOT346 (SC-59A/TO-236)

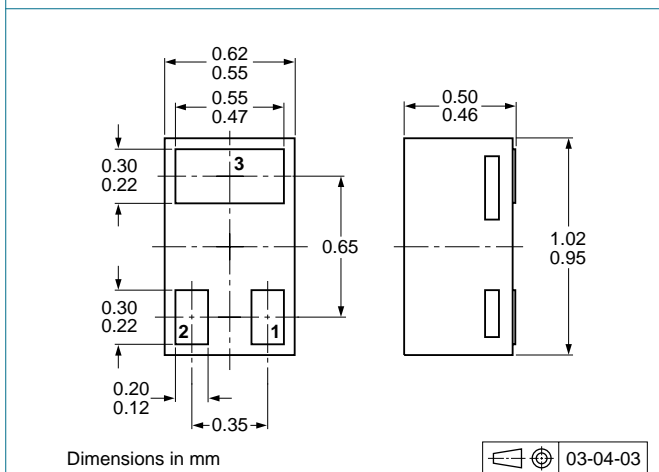


Fig 5. Package outline SOT883 (SC-101)

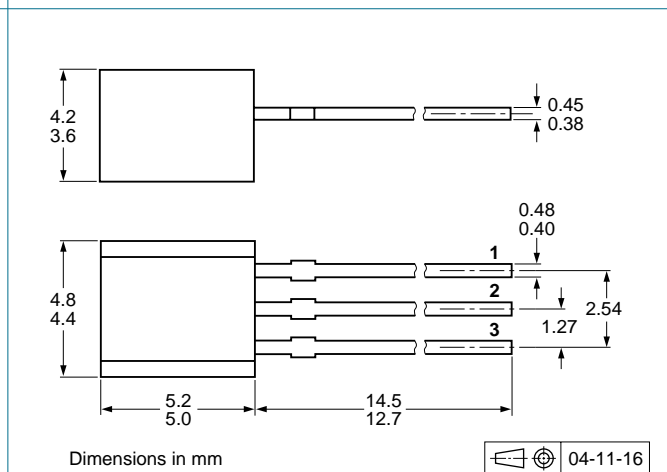


Fig 6. Package outline SOT54 (SC-43A/TO-92)

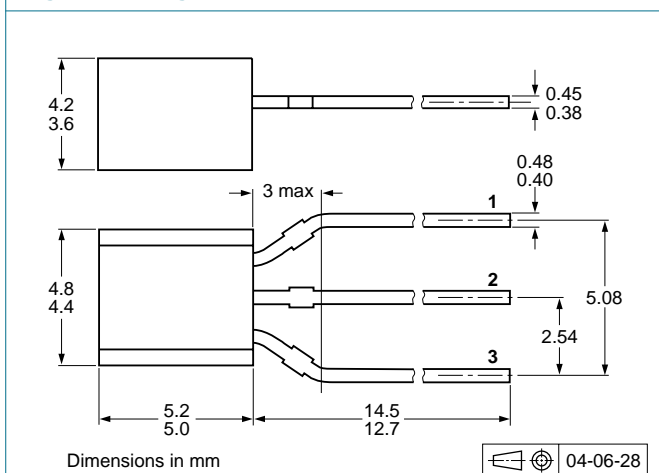


Fig 7. Package outline SOT54A

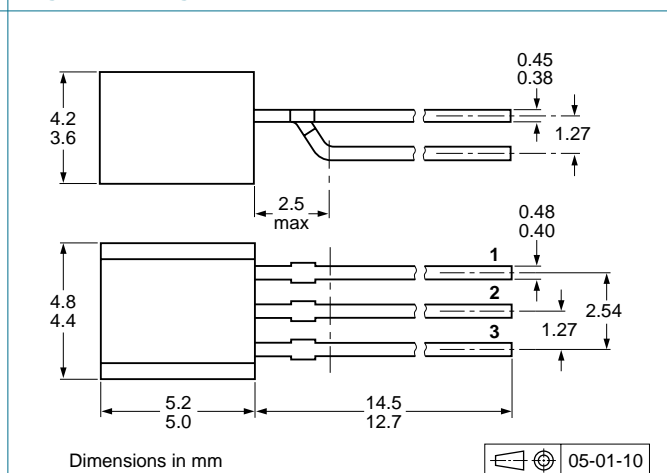
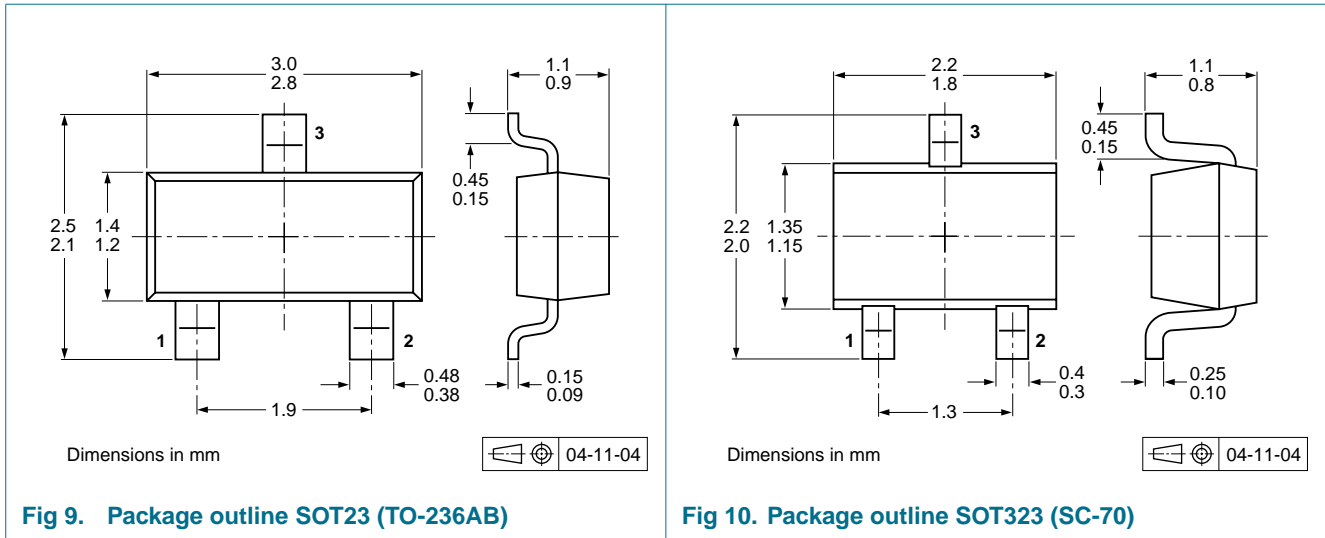


Fig 8. Package outline SOT54 variant



9. Packing information

Table 9: Packing methods

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

Type number	Package	Description	Packing quantity		
			3000	5000	10000
PDTA123TE	SOT416	4 mm pitch, 8 mm tape and reel	-115	-	-135
PDTA123TK	SOT346	4 mm pitch, 8 mm tape and reel	-115	-	-135
PDTA123TM	SOT883	2 mm pitch, 8 mm tape and reel	-	-	-315
PDTA123TS	SOT54	bulk, straight leads	-	-412	-
	SOT54A	tape and reel, wide pitch	-	-	-116
		tape ammpack, wide pitch	-	-	-126
	SOT54 variant	bulk, delta pinning	-	-112	-
PDTA123TT	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-235
PDTA123TU	SOT323	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 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PDTA123T_SER_1	20060307	Product data sheet	-	-	-

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.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

12. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

13. Disclaimers

Life support — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors

15. Contact information

For additional information, please visit: <http://www.semiconductors.philips.com>

For sales office addresses, send an email to: sales.addresses@www.semiconductors.philips.com

customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

14. Trademarks

Notice — All referenced brands, product names, service names and trademarks are the property of their respective owners.

16. Contents

1	Product profile	1
1.1	General description	1
1.2	Features	1
1.3	Applications	1
1.4	Quick reference data	1
2	Pinning information	2
3	Ordering information	3
4	Marking	3
5	Limiting values	4
6	Thermal characteristics	4
7	Characteristics	5
8	Package outline	6
9	Packing information	7
10	Revision history	8
11	Data sheet status	9
12	Definitions	9
13	Disclaimers	9
14	Trademarks	9
15	Contact information	9



© Koninklijke Philips Electronics N.V. 2006

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: 7 March 2006
Document number: PDTA123T_SER_1

Published in The Netherlands