PDTA123T series

PNP resistor-equipped transistors; R1 = 2.2 kΩ, 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

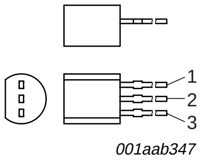
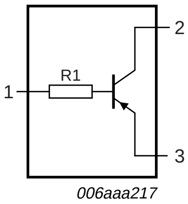
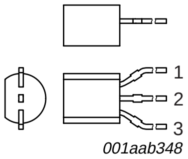
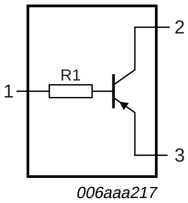
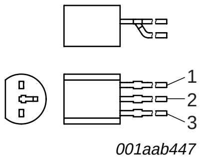
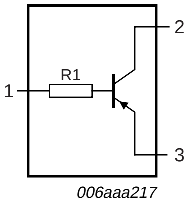
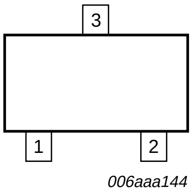
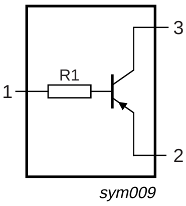
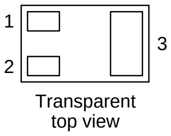
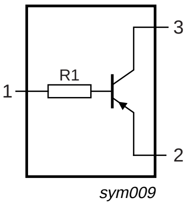
Table 2: Quick reference data

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	kΩ

PHILIPS

2. Pinning information

Table 3: Pinning

Pin	Description	Simplified outline	Symbol
SOT54			
1	input (base)		
2	output (collector)		
3	GND (emitter)		
SOT54A			
1	input (base)		
2	output (collector)		
3	GND (emitter)		
SOT54 variant			
1	input (base)		
2	output (collector)		
3	GND (emitter)		
SOT23; SOT323; SOT346; SOT416			
1	input (base)		
2	GND (emitter)		
3	output (collector)		
SOT883			
1	input (base)		
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.

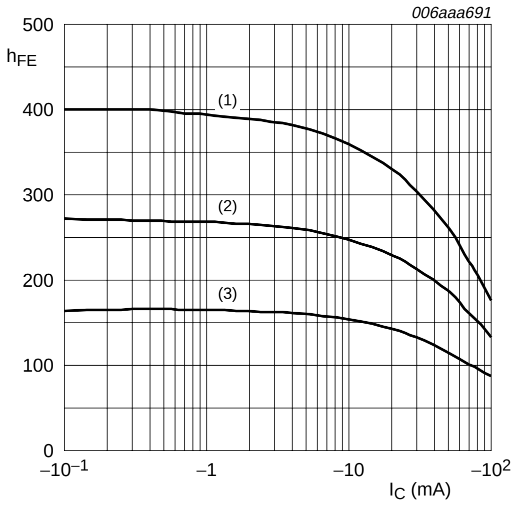
[3] Device mounted on an FR4 PCB with 60 µm copper strip line, standard footprint.

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



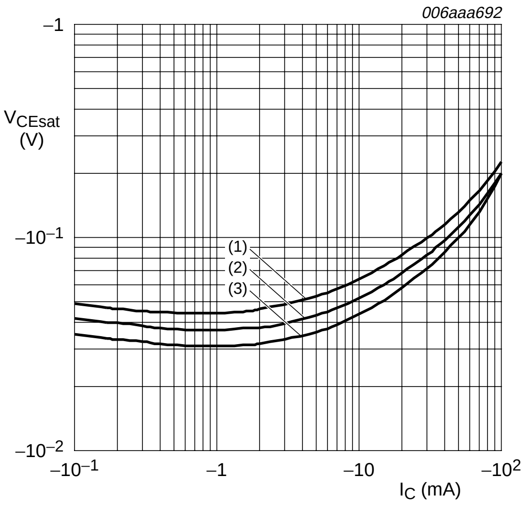
V_{CE} = –5 V

(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

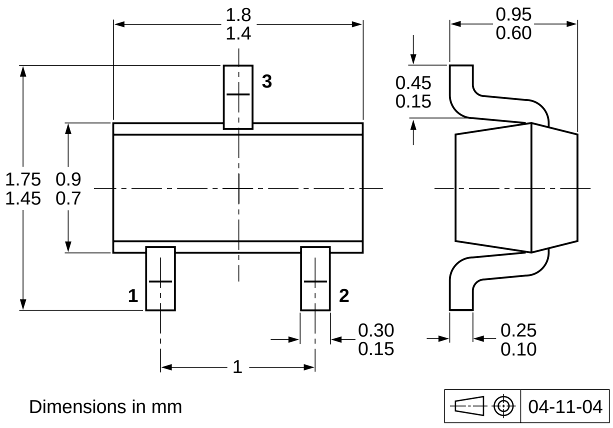


Fig 3. Package outline SOT416 (SC-75)

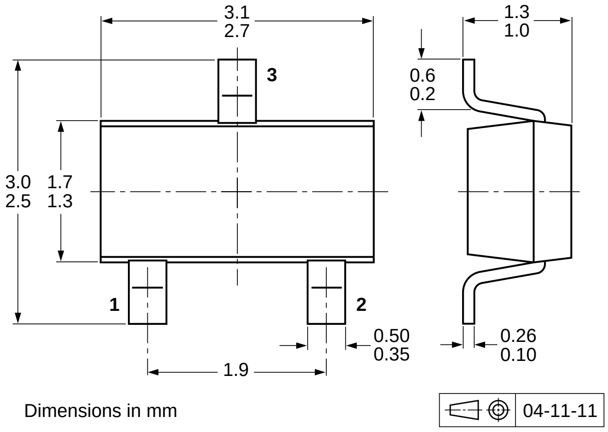


Fig 4. Package outline SOT346 (SC-59A/TO-236)

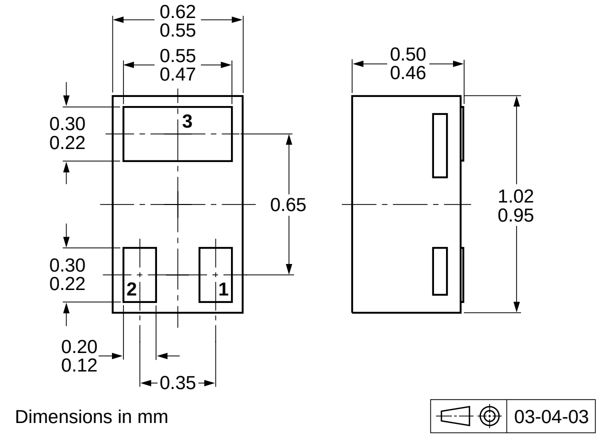


Fig 5. Package outline SOT883 (SC-101)

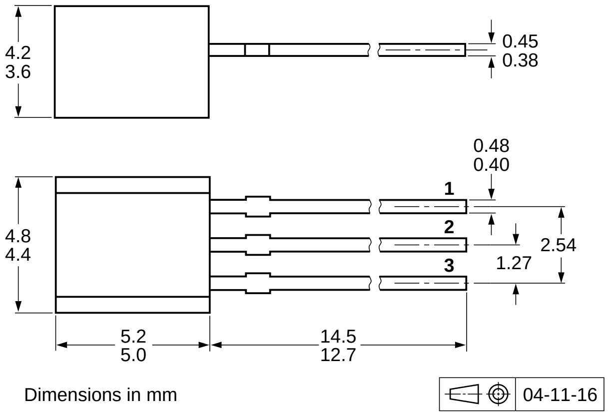


Fig 6. Package outline SOT54 (SC-43A/TO-92)

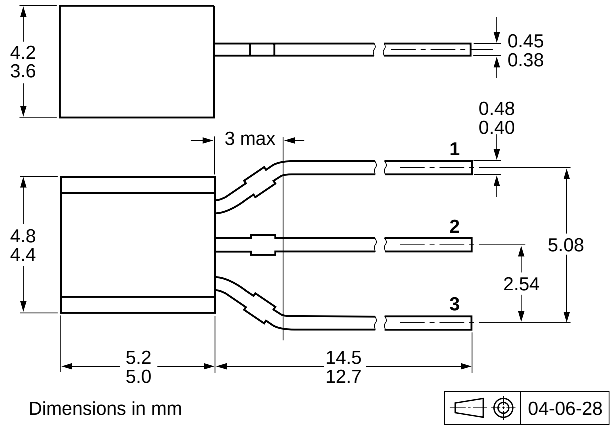


Fig 7. Package outline SOT54A

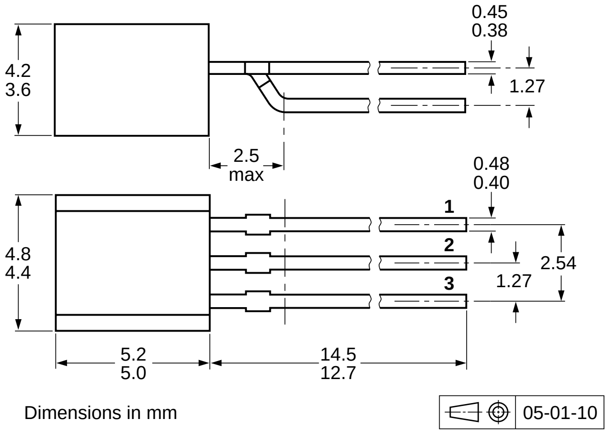


Fig 8. Package outline SOT54 variant

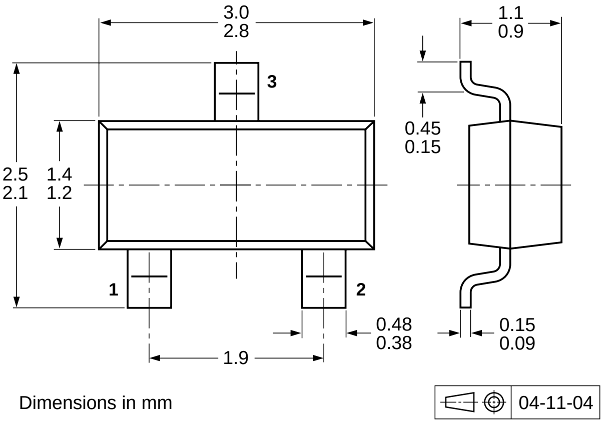


Fig 9. Package outline SOT23 (TO-236AB)

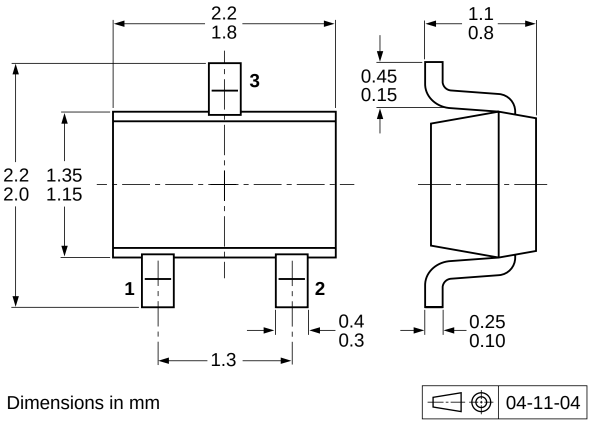


Fig 10. Package outline SOT323 (SC-70)

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 ammopack, 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.

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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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16. Contents

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