

PDTA123T series

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

Rev. 02 — 3 September 2009

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
	NXP	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

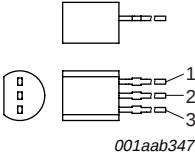
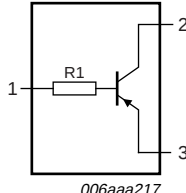
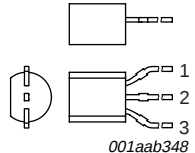
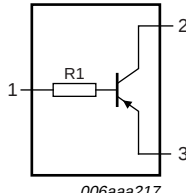
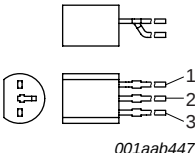
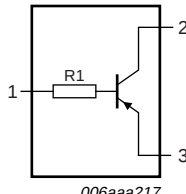
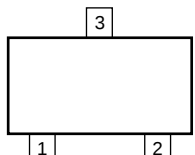
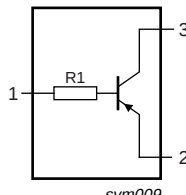
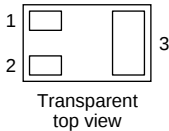
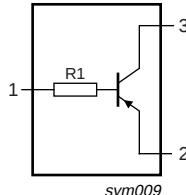
1.4 Quick reference data

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

2. Pinning information

Table 3. Pinning

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

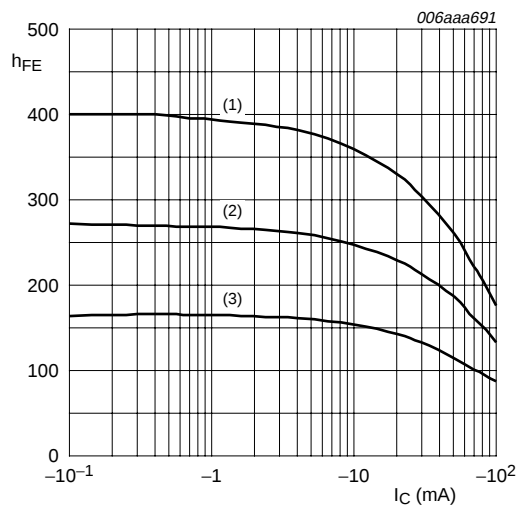
[2] Reflow soldering is the only recommended soldering method.

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

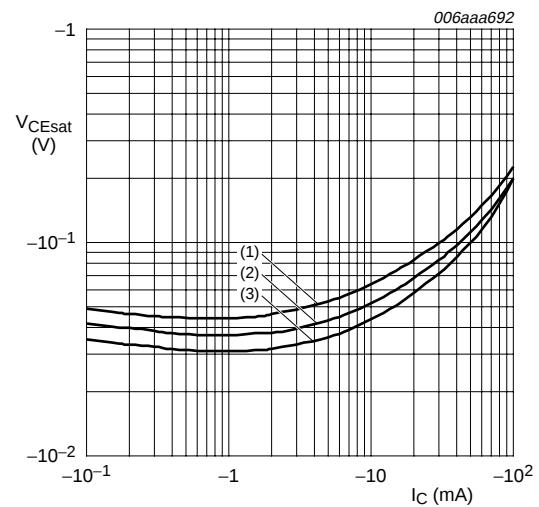
7. Characteristics

Table 8. Characteristics
 $T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = -50\text{ V}$; $I_E = 0\text{ A}$	-	-	-100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = -30\text{ V}$; $I_B = 0\text{ A}$	-	-	-1	μA
		$V_{CE} = -30\text{ V}$; $I_B = 0\text{ A}$; $T_J = 150\text{ }^{\circ}\text{C}$	-	-	-50	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	$V_{CE} = -5\text{ V}$; $I_C = -20\text{ mA}$	30	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -10\text{ mA}$; $I_B = -0.5\text{ mA}$	-	-	-150	mV
R1	bias resistor 1 (input)		1.54	2.2	2.86	k Ω
C_c	collector capacitance	$V_{CB} = -10\text{ V}$; $I_E = i_e = 0\text{ A}$; $f = 1\text{ MHz}$	-	-	3	pF



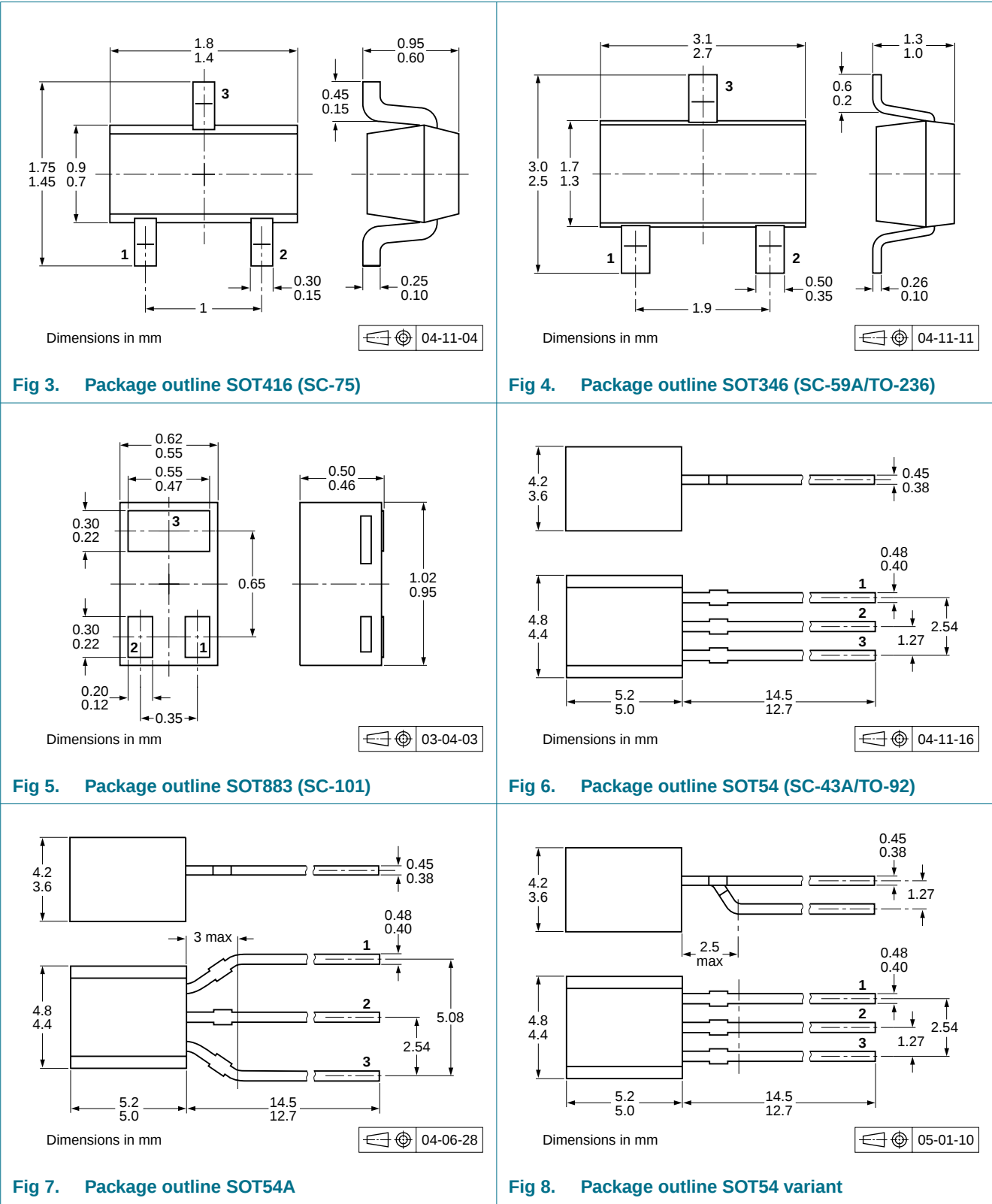
- $V_{CE} = -5\text{ V}$
- (1) $T_{amb} = 100\text{ }^{\circ}\text{C}$
 - (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 - (3) $T_{amb} = -40\text{ }^{\circ}\text{C}$

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


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

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

8. Package outline



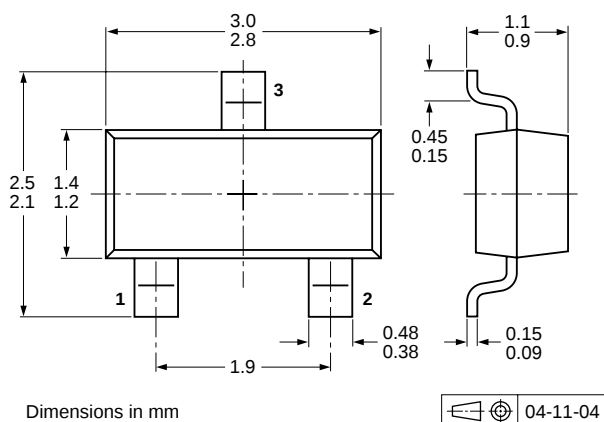


Fig 9. Package outline SOT23 (TO-236AB)

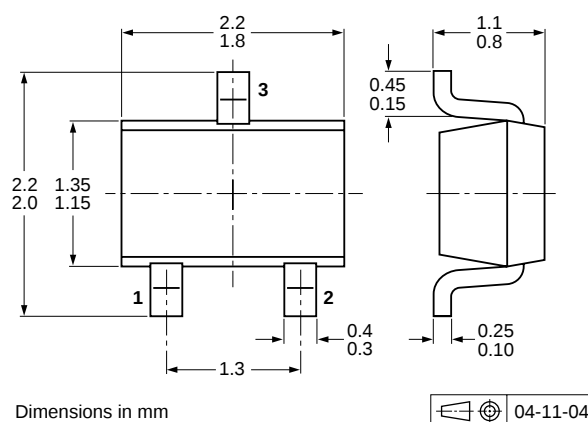


Fig 10. Package outline SOT323 (SC-70)

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 12](#).

10. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PDTA123T_SER_2	20090903	Product data sheet	-	PDTA123T_SER_1
Modifications:	This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content.			
PDTA123T_SER_1	20060307	Product data sheet	-	-

11. Legal information

11.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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

[2] The term 'short data sheet' is explained in section "Definitions".

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