

# PDTB123YT

PNP 500 mA, 50 V resistor-equipped transistor;  
R1 = 2.2 k $\Omega$ , R2 = 10 k $\Omega$

Rev. 3 — 30 August 2010

Product data sheet

## 1. Product profile

### 1.1 General description

500 mA PNP Resistor-Equipped Transistor (RET) in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

NPN complement: PDTD123YT.

### 1.2 Features and benefits

- 500 mA output current capability
- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs
- $\pm 10$  % resistor ratio tolerance
- AEC-Q101 qualified

### 1.3 Applications

- Digital application in automotive and industrial segments
- Control of IC inputs
- Cost-saving alternative for BC807 series in digital applications
- Switching loads

### 1.4 Quick reference data

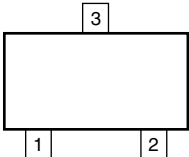
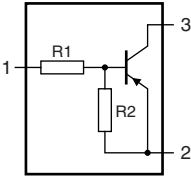
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	-50	V
I <sub>O</sub>	output current		-	-	-500	mA
R1	bias resistor 1 (input)		1.54	2.2	2.86	k $\Omega$
R2/R1	bias resistor ratio		4.1	4.55	5	



## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	input (base)	 006aaa144	 sym003
2	GND (emitter)		
3	output (collector)		

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PDTB123YT	-	plastic surface-mounted package; 3 leads	SOT23

## 4. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
PDTB123YT	*7Y

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

## 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	-	-50	V
$V_{CEO}$	collector-emitter voltage	open base	-	-50	V
$V_{EBO}$	emitter-base voltage	open collector	-	-5	V
$V_I$	input voltage				
	positive		-	+5	V
	negative		-	-12	V
$I_O$	output current		-	-500	mA

**Table 5. Limiting values ...continued***In accordance with the Absolute Maximum Rating System (IEC 60134).*

Symbol	Parameter	Conditions	Min	Max	Unit
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25\text{ °C}$	[1] -	250	mW
$T_{\text{stg}}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-	150	°C
$T_{\text{amb}}$	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
$R_{\text{th(j-a)}}$	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** *$T_{\text{amb}} = 25\text{ °C}$  unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{\text{CBO}}$	collector-base cut-off current	$V_{\text{CB}} = -40\text{ V}; I_{\text{E}} = 0\text{ A}$	-	-	-100	nA
		$V_{\text{CB}} = -50\text{ V}; I_{\text{E}} = 0\text{ A}$	-	-	-100	nA
$I_{\text{CEO}}$	collector-emitter cut-off current	$V_{\text{CE}} = -50\text{ V}; I_{\text{B}} = 0\text{ A}$	-	-	-0.5	μA
$I_{\text{EBO}}$	emitter-base cut-off current	$V_{\text{EB}} = -5\text{ V}; I_{\text{C}} = 0\text{ A}$	-	-	-0.65	mA
$h_{\text{FE}}$	DC current gain	$V_{\text{CE}} = -5\text{ V}; I_{\text{C}} = -50\text{ mA}$	70	-	-	
$V_{\text{CEsat}}$	collector-emitter saturation voltage	$I_{\text{C}} = -50\text{ mA}; I_{\text{B}} = -2.5\text{ mA}$	-	-	-0.3	V
$V_{\text{I(off)}}$	off-state input voltage	$V_{\text{CE}} = -5\text{ V}; I_{\text{C}} = -100\text{ μA}$	-0.4	-0.6	-1.0	V
$V_{\text{I(on)}}$	on-state input voltage	$V_{\text{CE}} = -0.3\text{ V}; I_{\text{C}} = -20\text{ mA}$	-0.5	-1.0	-1.4	V
R1	bias resistor 1 (input)		1.54	2.2	2.86	kΩ
R2/R1	bias resistor ratio		4.1	4.55	5	
$C_{\text{c}}$	collector capacitance	$V_{\text{CB}} = -10\text{ V}; I_{\text{E}} = i_{\text{e}} = 0\text{ A}; f = 100\text{ MHz}$	-	11	-	pF

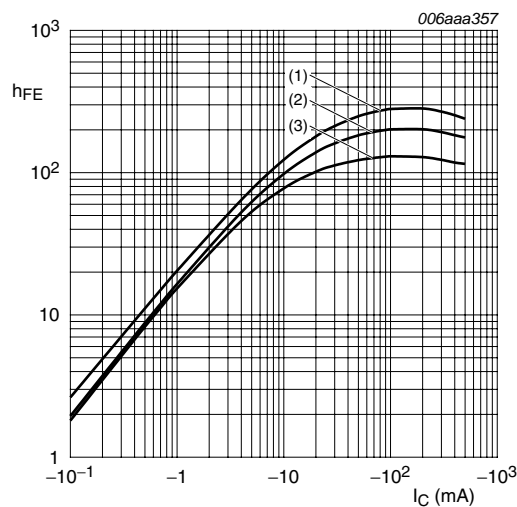


Fig 1. DC current gain as a function of collector current; typical values

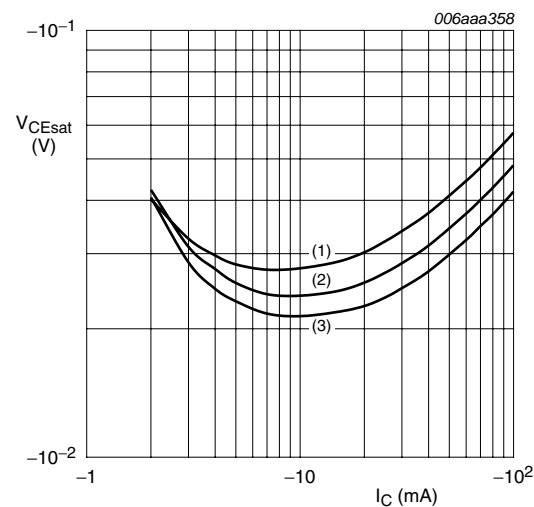


Fig 2. Collector-emitter saturation voltage as a function of collector current; typical values

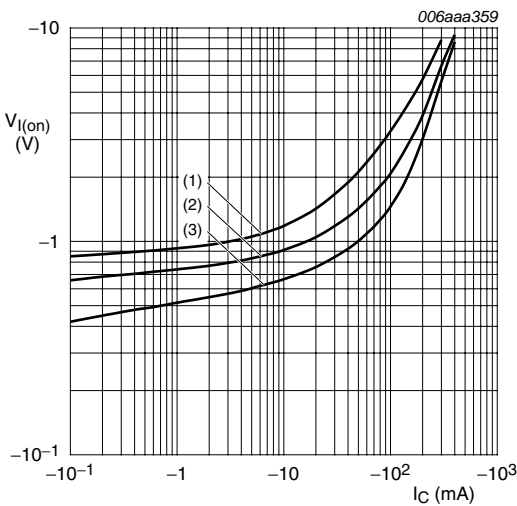


Fig 3. On-state input voltage as a function of collector current; typical values

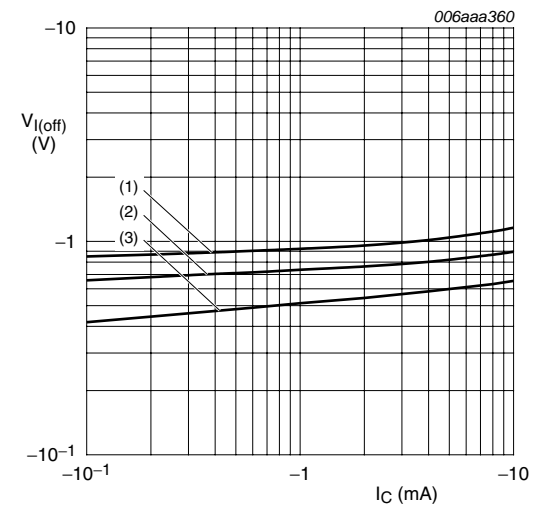


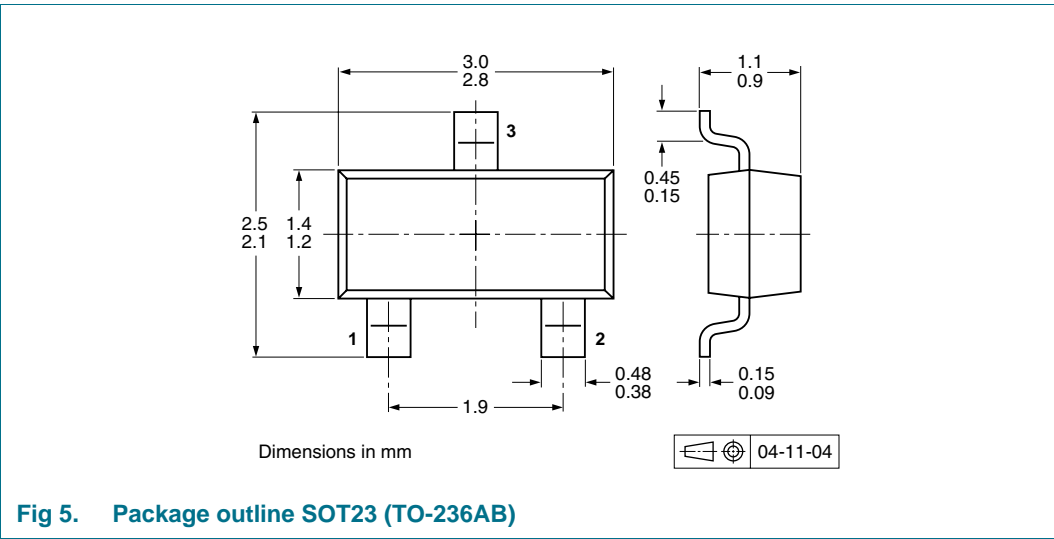
Fig 4. Off-state input voltage as a function of collector current; typical values

8. Test information

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

9. Package outline



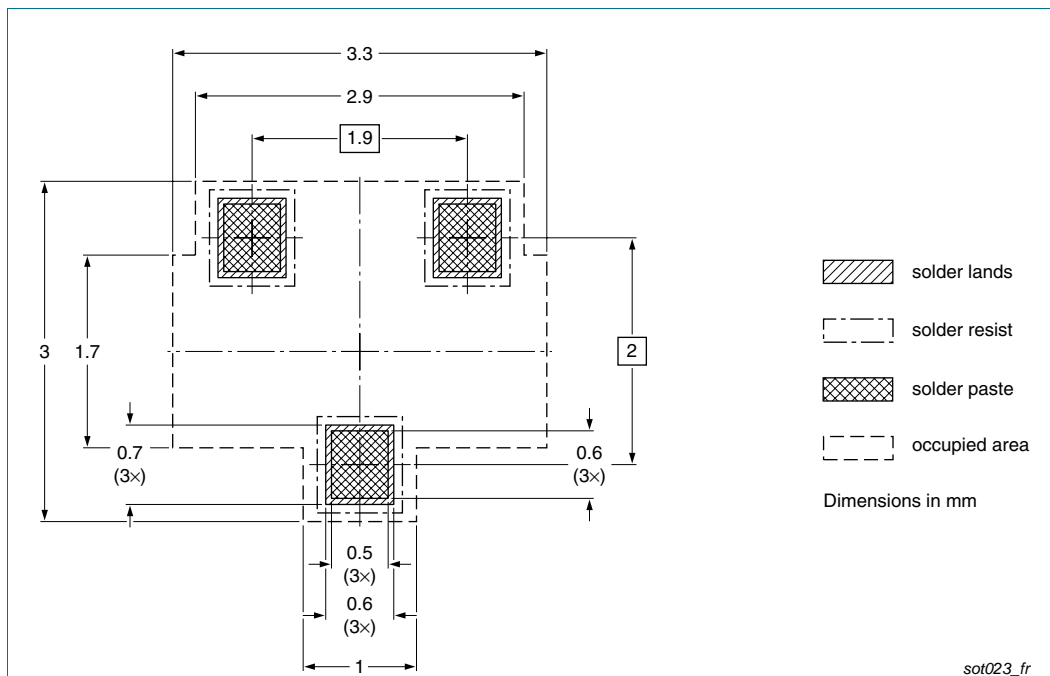
10. Packing information

**Table 8. Packing methods**  
The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

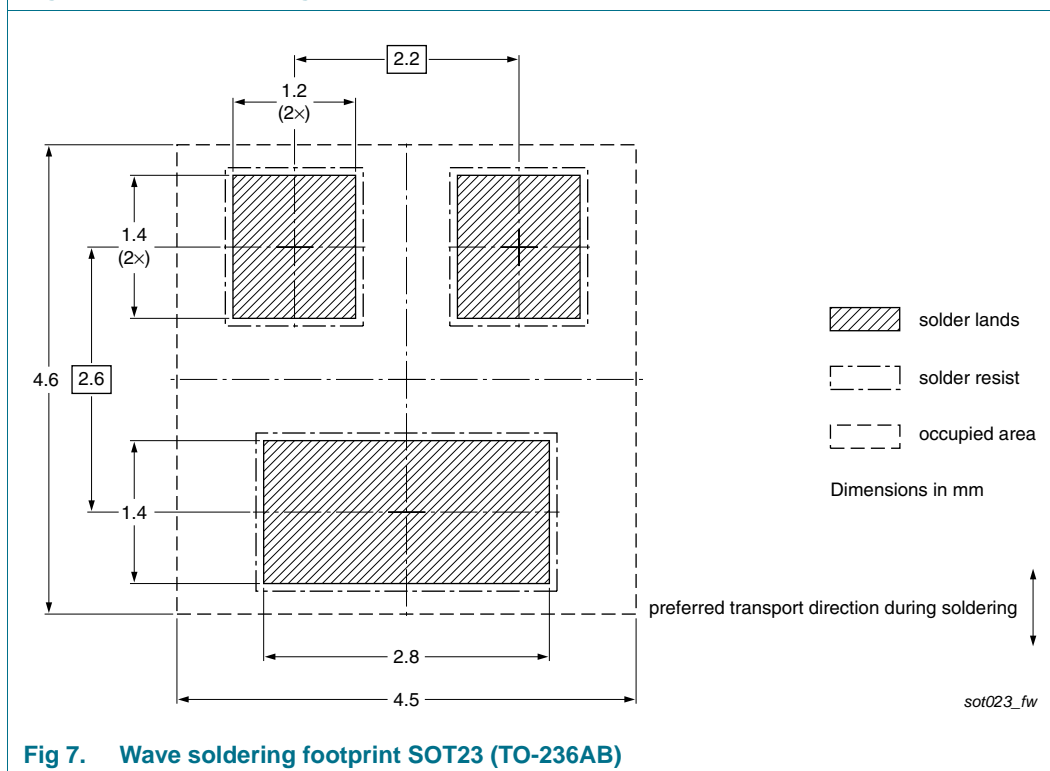
Type number	Package	Description	Packing quantity	
			3000	10000
PDTB123YT	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235

[1] For further information and the availability of packing methods, see [Section 14](#).

## 11. Soldering



**Fig 6. Reflow soldering footprint SOT23 (TO-236AB)**



**Fig 7. Wave soldering footprint SOT23 (TO-236AB)**

## 12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PDTB123YT v.3	20100830	Product data sheet	-	PDTB123Y_SER_2
Modifications:	<ul style="list-style-type: none"><li>• Type numbers PDTB123YK and PDTB123YS deleted.</li><li>• <a href="#">Table 7 “Characteristics”</a>: unit for <math>V_{CEsat}</math> changed from mV to V.</li><li>• <a href="#">Section 8 “Test information”</a>: added.</li><li>• <a href="#">Section 11 “Soldering”</a>: added.</li><li>• <a href="#">Section 13 “Legal information”</a>: updated.</li></ul>			
PDTB123Y_SER_2	20091116	Product data sheet	-	PDTB123Y_SER_1
PDTB123Y_SER_1	20050427	Product data sheet	-	-

## 13. Legal information

### 13.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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