



# PDTB123YT

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

16 November 2020

Product data sheet

## 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.

## 2. Features and benefits

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

## 3. Applications

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

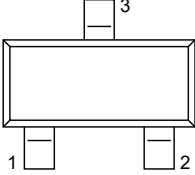
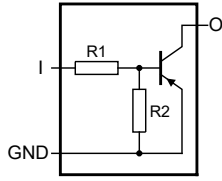
## 4. Quick reference data

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	T <sub>amb</sub> = 25 °C	1.54	2.2	2.86	k $\Omega$
R2/R1	bias resistor ratio		4.1	4.55	5	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	I	input (base)	 <p style="text-align: center;">SOT23</p>	 <p style="text-align: center;">aaa-019606</p>
2	GND	ground (emitter)		
3	O	output (collector)		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PDTB123YT	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

## 7. Marking

Table 4. Marking codes

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

[1] % = placeholder for manufacturing site code

## 8. 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	-	-20	V
$I_O$	output current		-	-500	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	250	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	150	°C
$T_{stg}$	storage temperature		-65	150	°C

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

## 9. Thermal characteristics

Table 6. Thermal characteristics

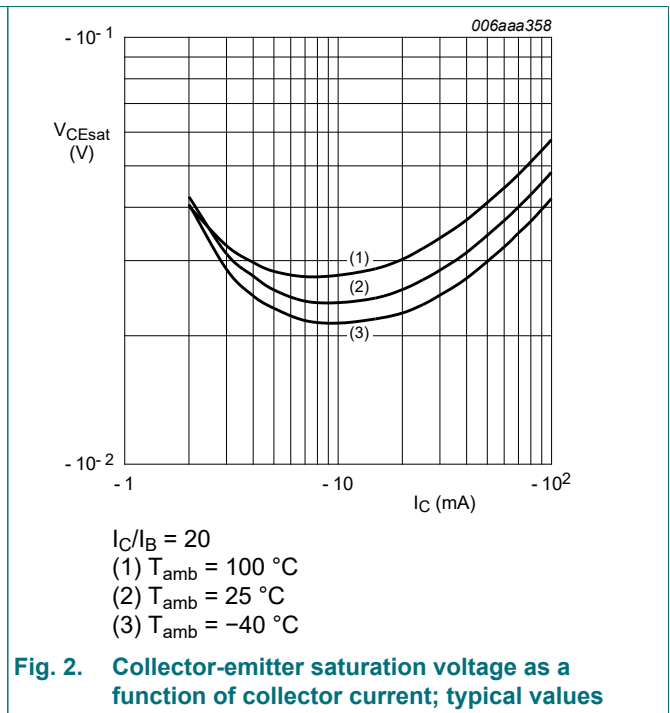
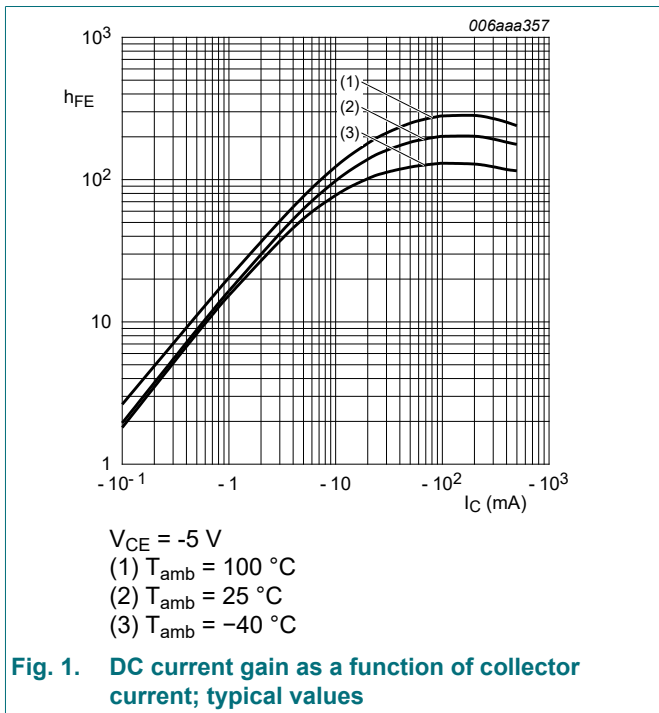
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	500	K/W

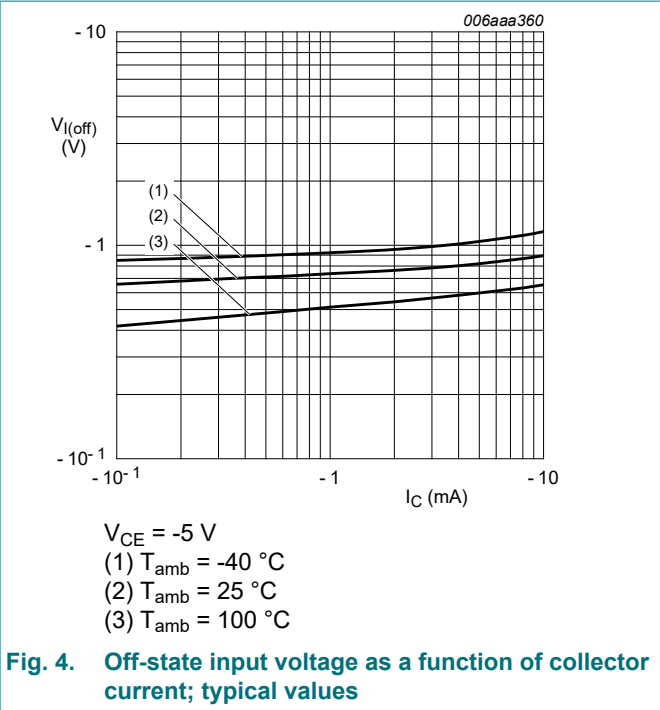
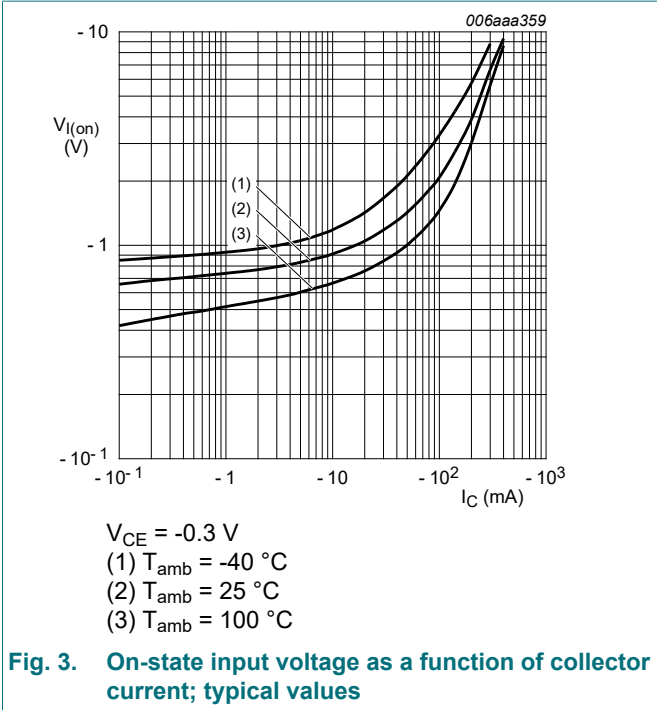
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CEO}$	collector-emitter cut-off current	$V_{CE} = -50\text{ V}; I_B = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	-0.5	μA
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -40\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	-100	nA
		$V_{CB} = -50\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	-100	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	-0.65	mA
$h_{FE}$	DC current gain	$V_{CE} = -5\text{ V}; I_C = -50\text{ mA}; T_{amb} = 25\text{ °C}$	70	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -50\text{ mA}; I_B = -2.5\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	-300	mV
$V_{I(off)}$	off-state input voltage	$V_{CE} = -5\text{ V}; I_C = -100\text{ μA}; T_{amb} = 25\text{ °C}$	-0.4	-0.6	-1	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = -0.3\text{ V}; I_C = -20\text{ mA}; T_{amb} = 25\text{ °C}$	-0.5	-1	-1.4	V
R1	bias resistor 1	$T_{amb} = 25\text{ °C}$	1.54	2.2	2.86	kΩ
R2/R1	bias resistor ratio		4.1	4.55	5	
$C_C$	collector capacitance	$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}$	-	11	-	pF



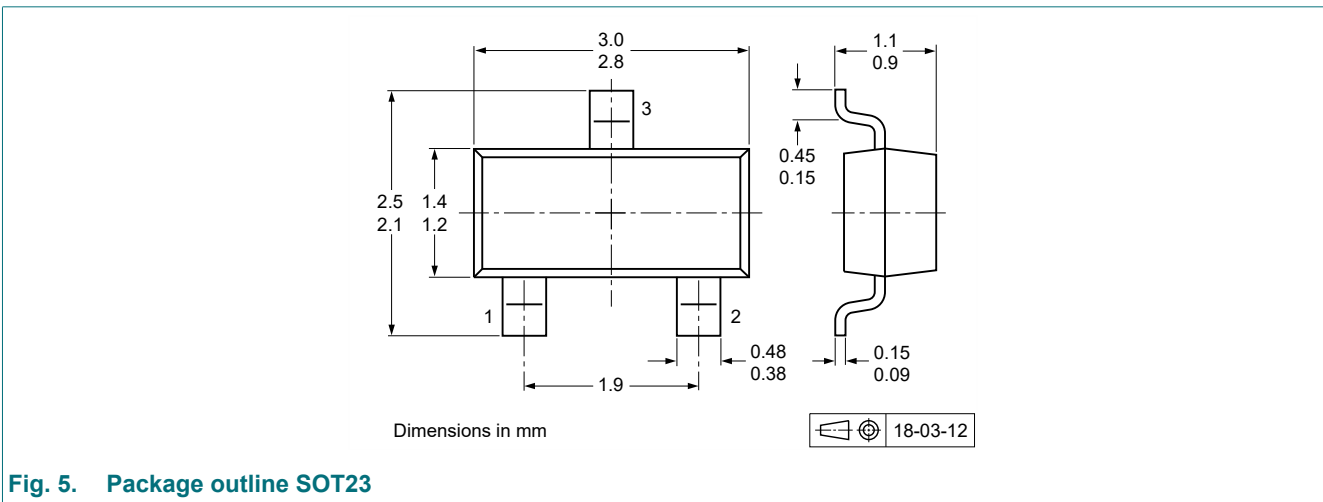


## 11. Test information

### 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.

## 12. Package outline



### 13. Soldering

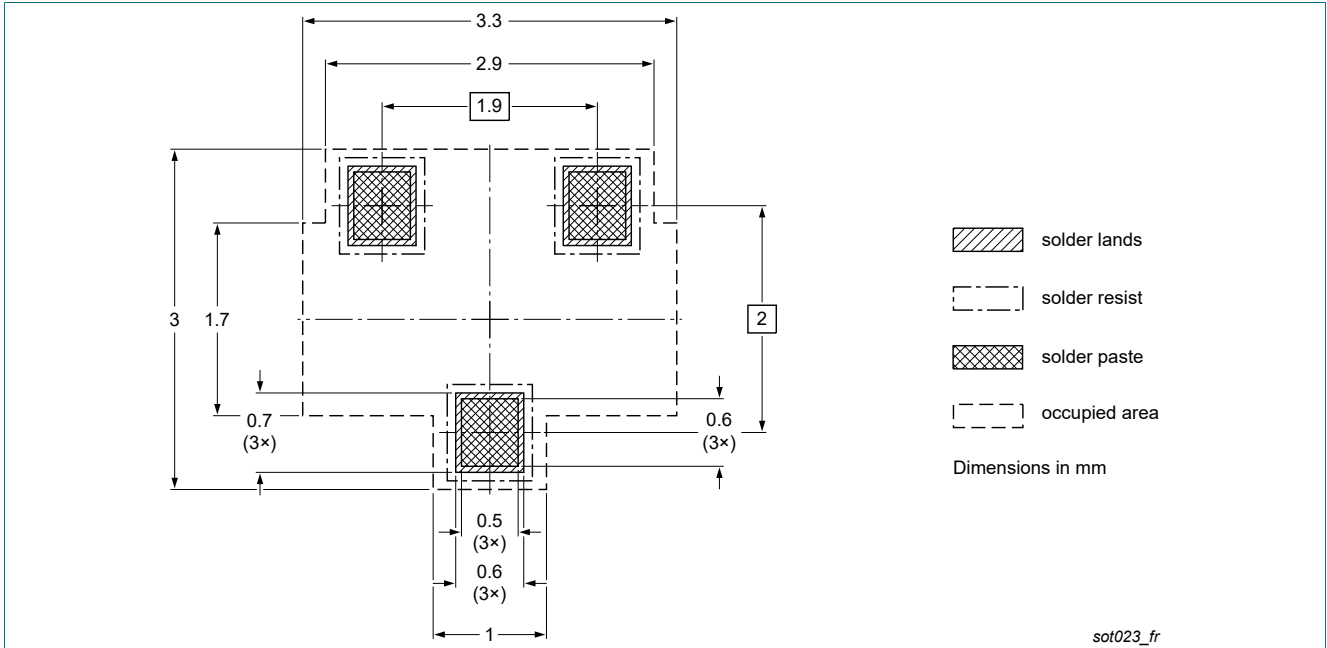


Fig. 6. Reflow soldering footprint for SOT23

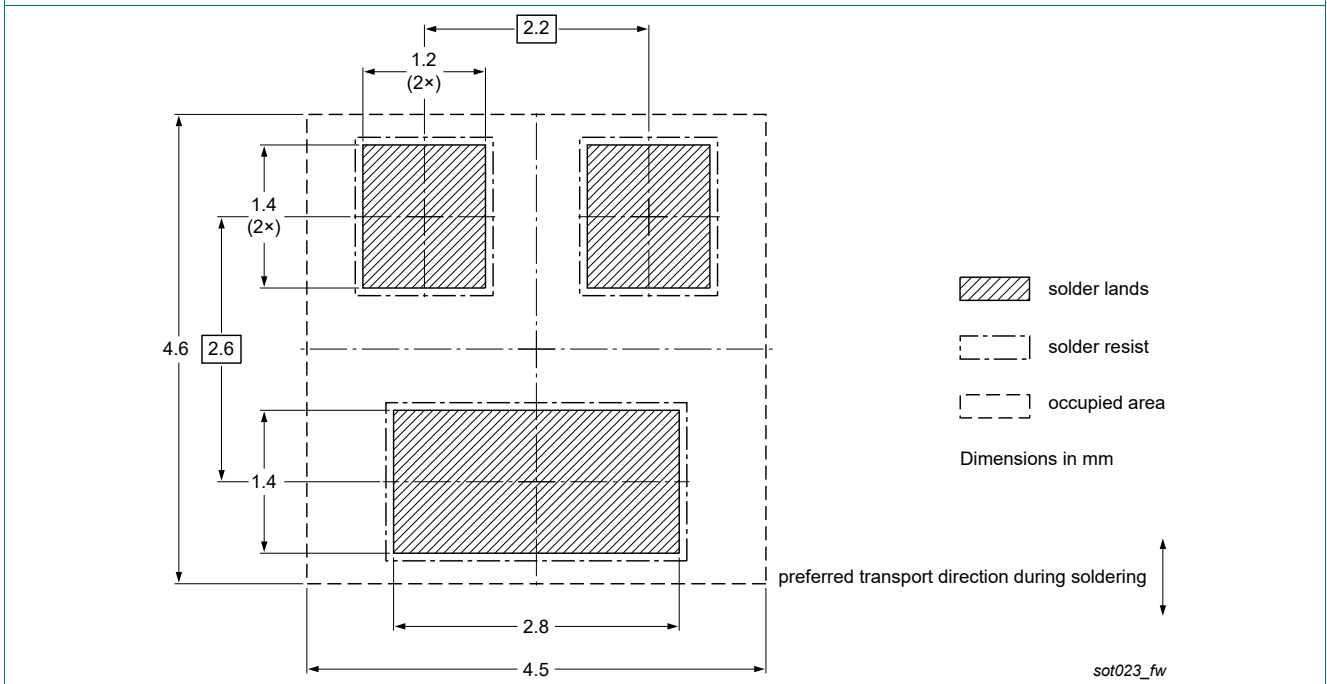


Fig. 7. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PDTB123YT v.4	20201116	Product data sheet	-	PDTB123YT v.3
Modifications:	<ul style="list-style-type: none"> <li>Limiting values: Negative input voltage changed</li> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>			
PDTB123YT v.3	20100923	Product data sheet	-	PDTB123YT_SER v.2
PDTB123YT_SER v.2	20091116	Product data sheet	-	PDTB123YT_SER v.1
PDTB123YT_SER v.1	20050427	Product data sheet	-	-

## 15. Legal information

### 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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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## Contents

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1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	2
9. Thermal characteristics.....	3
10. Characteristics.....	3
11. Test information.....	4
12. Package outline.....	4
13. Soldering.....	5
14. Revision history.....	6
15. Legal information.....	7

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Date of release: 16 November 2020

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