



PDTB113ZT

PNP 500 mA, 50 V resistor-equipped transistor;
R1 = 1 k Ω , R2 = 10 k Ω

15 January 2021

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: PDTD113ZT.

2. Features and benefits

- 500 mA output current capability
- Reduces pick and place costs
- Built-in bias resistors
- ± 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

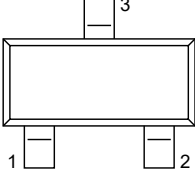
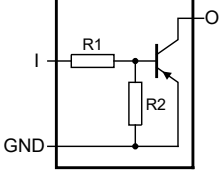
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	-50	V
I _O	output current		-	-	-500	mA
R1	bias resistor 1	T _{amb} = 25 °C	0.7	1	1.3	k Ω
R2/R1	bias resistor ratio		9	10	11	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	I	input (base)	 SOT23	 aaa-019606
2	GND	ground (emitter)		
3	O	output (collector)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PDTB113ZT	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[1]
PDTB113ZT	XK%

[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		-	-10	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	$V_{CE} = -50 \text{ V}$; $I_B = 0 \text{ A}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-0.5	μA
I_{CBO}	collector-base cut-off current	$V_{CB} = -40 \text{ V}$; $I_E = 0 \text{ A}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-100	nA
		$V_{CB} = -50 \text{ V}$; $I_E = 0 \text{ A}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-100	nA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5 \text{ V}$; $I_C = 0 \text{ A}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-0.8	mA
h_{FE}	DC current gain	$V_{CE} = -5 \text{ V}$; $I_C = -50 \text{ mA}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		70	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -50 \text{ mA}$; $I_B = -2.5 \text{ mA}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-300	mV
$V_{I(off)}$	off-state input voltage	$V_{CE} = -5 \text{ V}$; $I_C = -100 \text{ } \mu\text{A}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-0.3	-0.6	-1	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = -0.3 \text{ V}$; $I_C = -20 \text{ mA}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-0.4	-0.8	-1.4	V
R1	bias resistor 1	$T_{amb} = 25 \text{ }^{\circ}\text{C}$		0.7	1	1.3	kΩ
R2/R1	bias resistor ratio			9	10	11	
C_c	collector capacitance	$V_{CB} = -10 \text{ V}$; $I_E = 0 \text{ A}$; $i_e = 0 \text{ A}$; $f = 100 \text{ MHz}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	11	-	pF

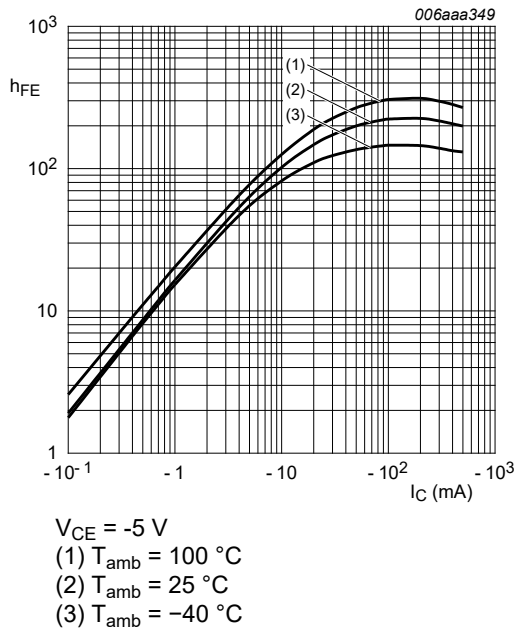


Fig. 1. DC current gain as a function of collector current; typical values

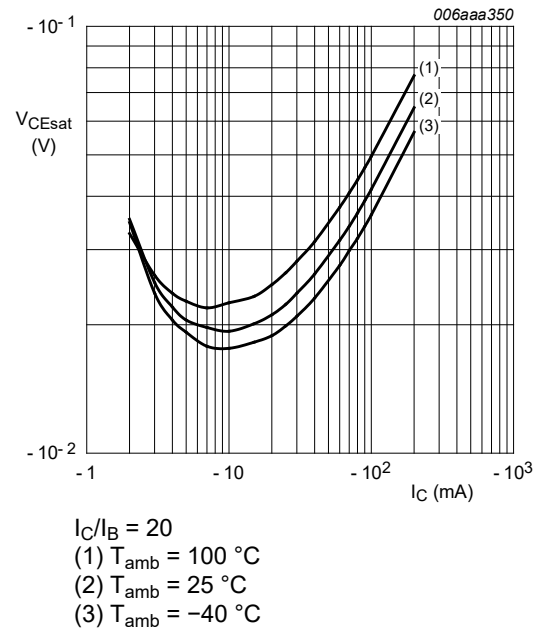
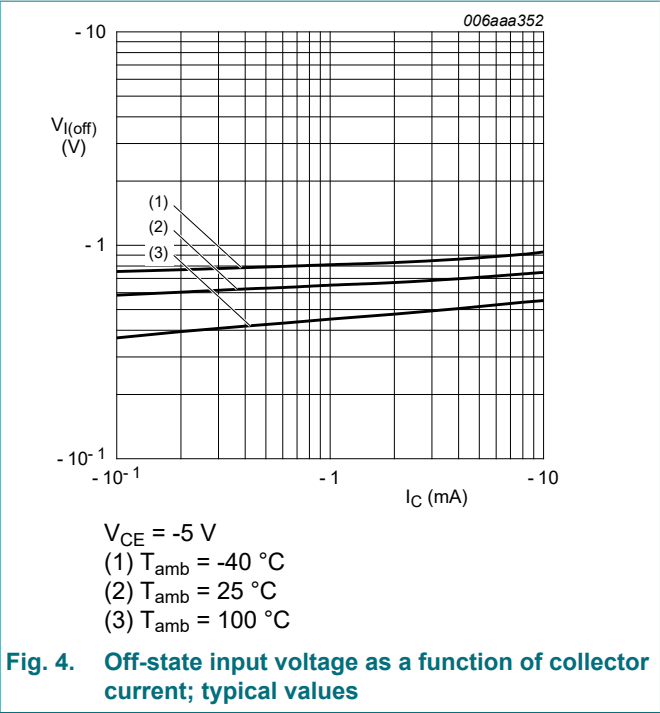
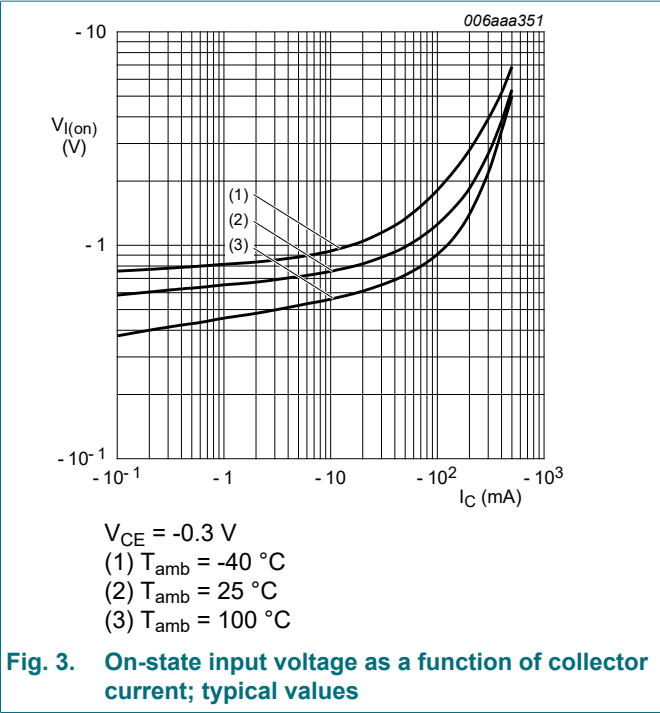


Fig. 2. Collector-emitter saturation voltage as a function of collector current; typical values

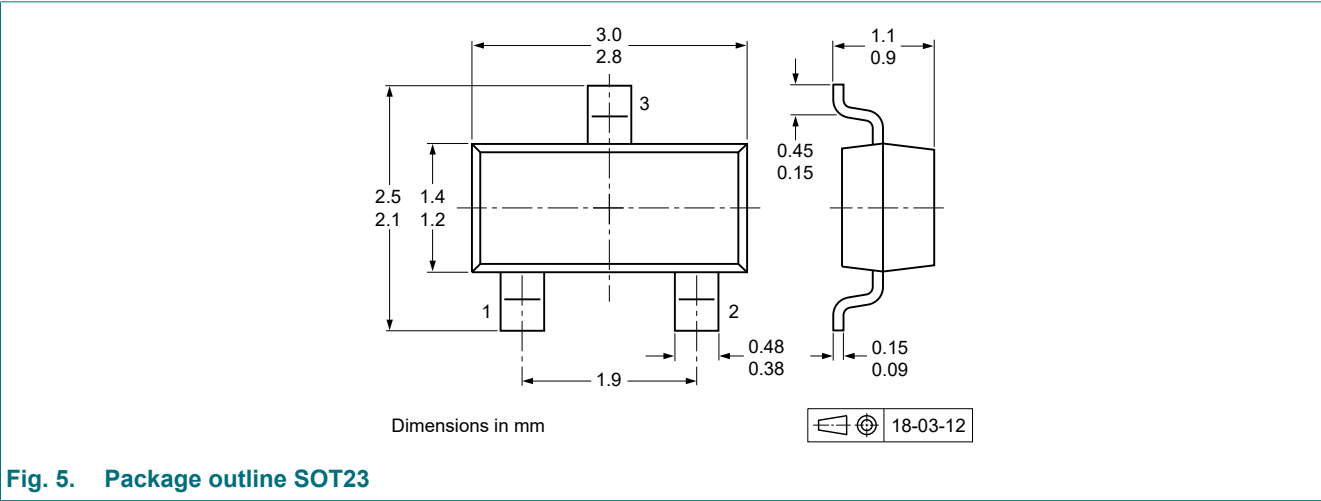


11. Test information

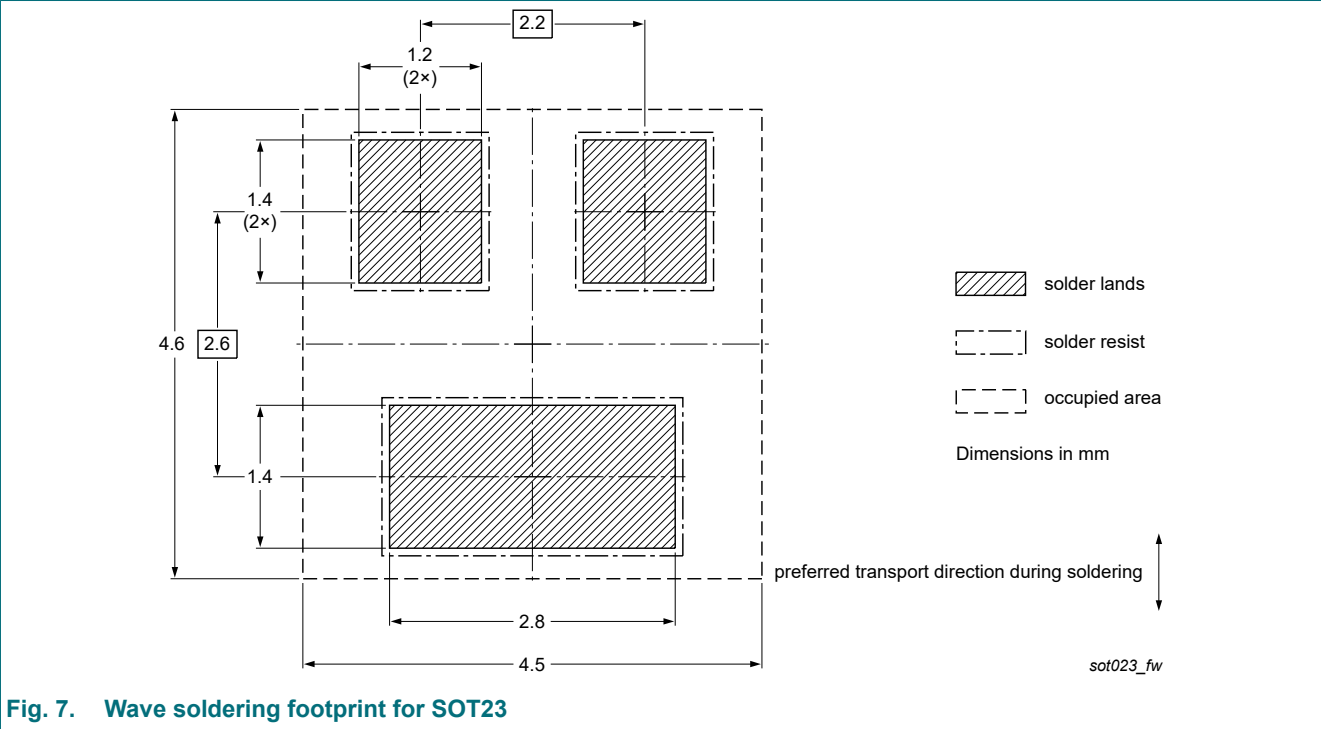
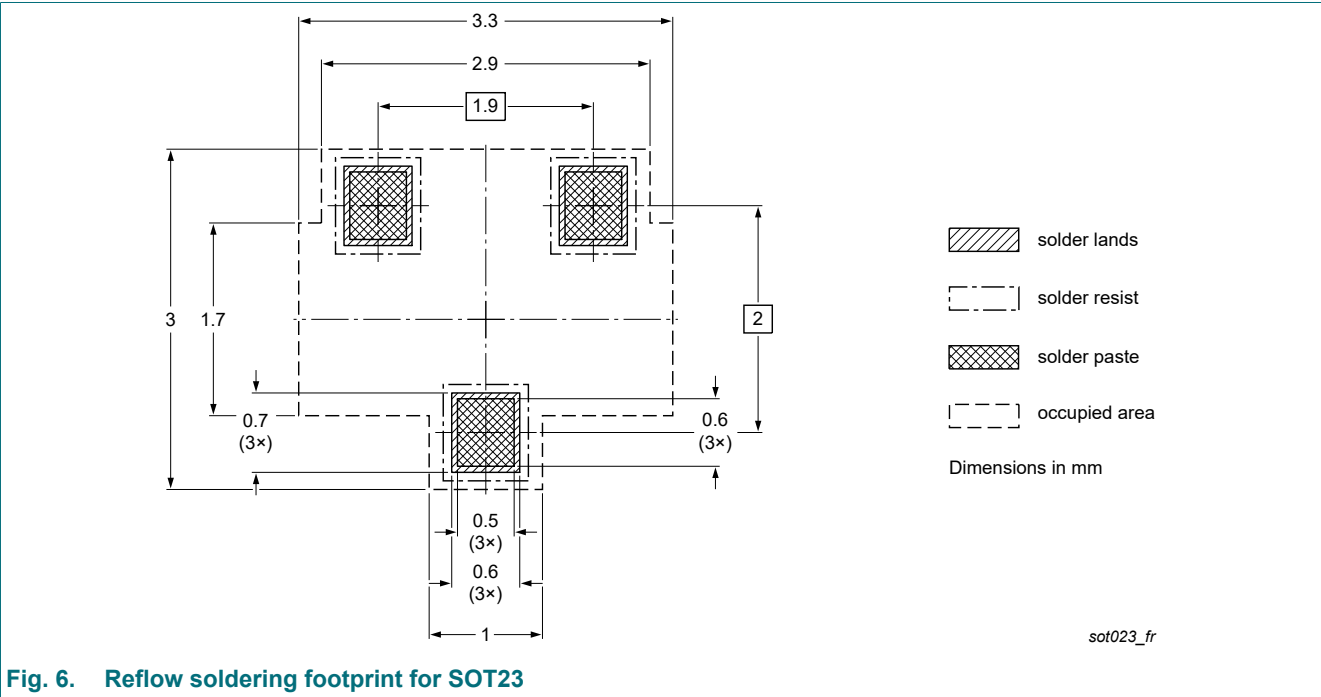
Quality information

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



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PDTB113ZT v.4	20200115	Product data sheet	-	PDTB113ZT v.3
Modifications:	- Marking of this product changed. - The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. - Legal texts have been adapted to the new company name where appropriate.			
PDTB113ZT v.3	20100923	Product data sheet	-	PDTB113ZT v.2
PDTB113ZT v.2	20091116	Product data sheet	-	PDTB113ZT v.1
PDTB113ZT 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

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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