



PDTA113ZU

50 V, 100 mA PNP resistor-equipped transistor;
R1 = 1 k Ω , R2 = 10 k Ω

12 March 2025

Product data sheet

1. General description

PNP Resistor-Equipped Transistor (RET) in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Built-in bias resistors
- Reduces component count
- Simplifies circuit design
- Reduces pick and place costs
- AEC-Q101 qualified

3. Applications

- General purpose switching and amplification
- Circuit drivers
- Inverter and interface circuits

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		-	-	-100	mA
R1	bias resistor 1 (input)	T _{amb} = 25 °C	0.7	1	1.3	k Ω
R2/R1	bias resistor ratio		8	10	12	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	I	input (base)	 SC-70 (SOT323)	 sym003
2	G	GND (emitter)		
3	O	output (collector)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PDTA113ZU	SC-70	plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body	SOT323

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PDTA113ZU	%16

[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			-10	5	V
I _O	output current			-	-100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	200	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

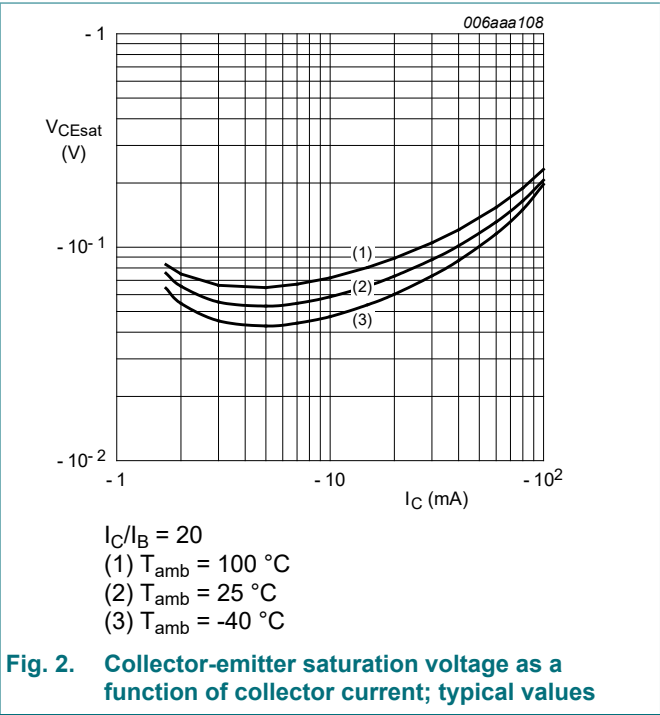
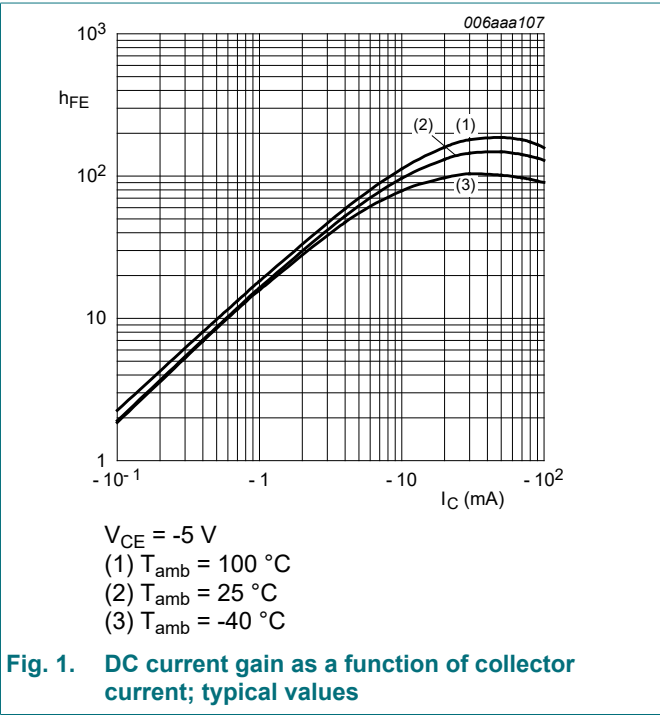
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W

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

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100\text{ }\mu\text{A}$; $T_{lead} = 0\text{ }^{\circ}\text{C}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-100	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -2\text{ mA}$; $I_B = 0$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-100	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = -50\text{ V}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = -30\text{ V}$; $I_B = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-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	$V_{EB} = -5\text{ V}$; $I_C = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-800	μA
h_{FE}	DC current gain	$V_{CE} = -5\text{ V}$; $I_C = -5\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	35	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -10\text{ mA}$; $I_B = -0.5\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-150	mV
$V_{I(off)}$	off-state input voltage	$V_{CE} = -5\text{ V}$; $I_C = -100\text{ }\mu\text{A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-0.65	-0.3	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = -300\text{ mV}$; $I_C = -20\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-2.5	-0.95	-	V
R1	bias resistor 1 (input)	$T_{amb} = 25\text{ }^{\circ}\text{C}$	0.7	1	1.3	kΩ
R2/R1	bias resistor ratio		8	10	12	
C_c	collector capacitance	$V_{CB} = -10\text{ V}$; $I_E = 0\text{ A}$; $i_e = 0\text{ A}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	2	pF



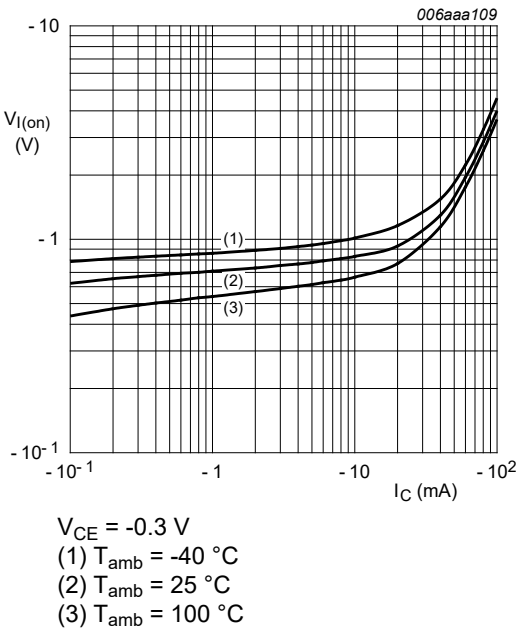


Fig. 3. On-state input voltage as a function of collector current; typical values

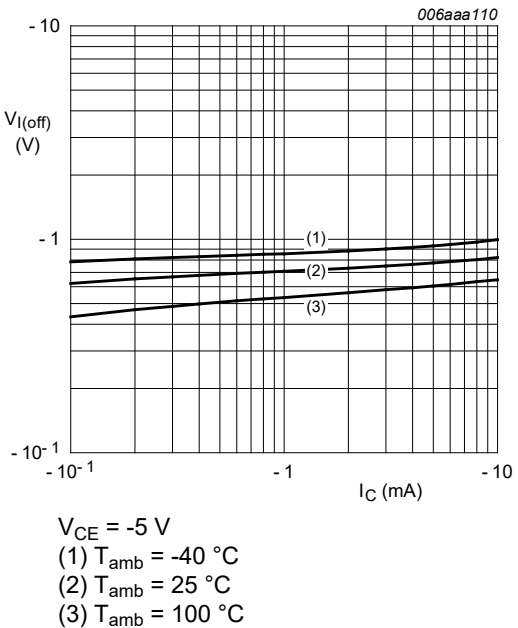


Fig. 4. Off-state input voltage as a function of collector current; typical values

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.

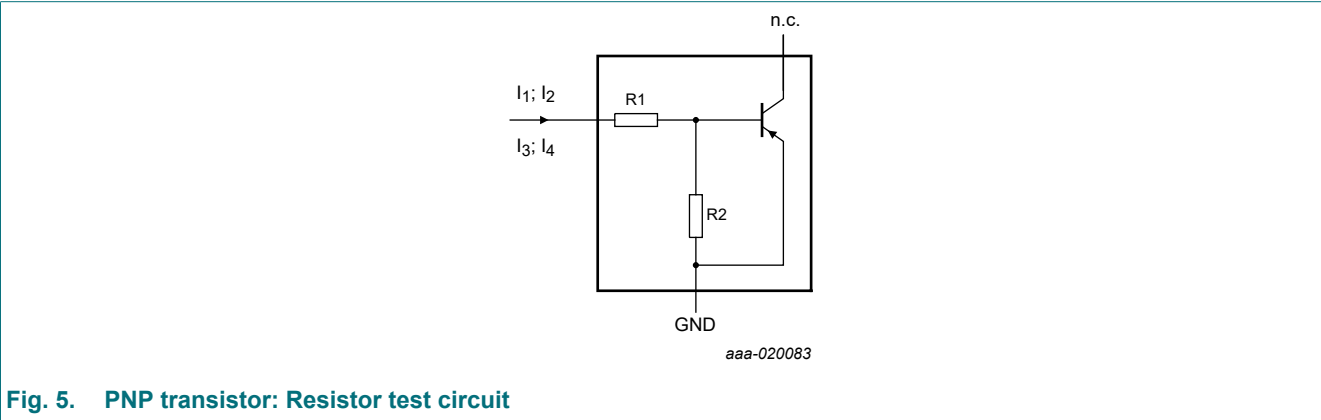
Resistor calculation

- Calculation of bias resistor 1 (R1)

$$R_1 = \frac{V(I_2) - V(I_1)}{I_2 - I_1}$$

- Calculation of bias resistor ratio (R2/R1)

$$\frac{R_2}{R_1} = \frac{V(I_4) - V(I_3)}{R_1 \cdot (I_4 - I_3)} - 1$$

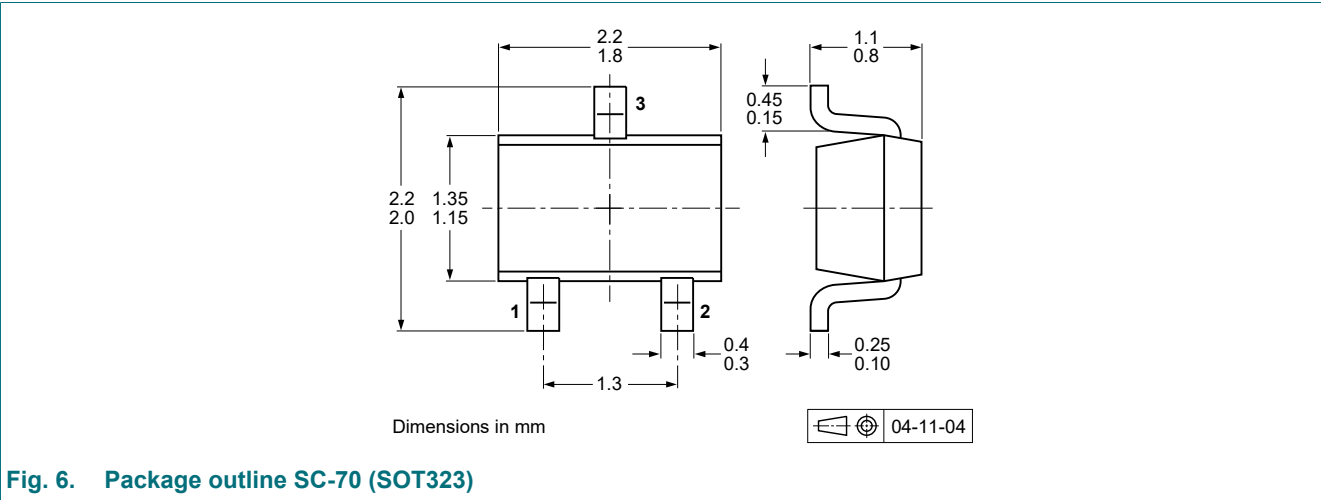


Resistor test conditions

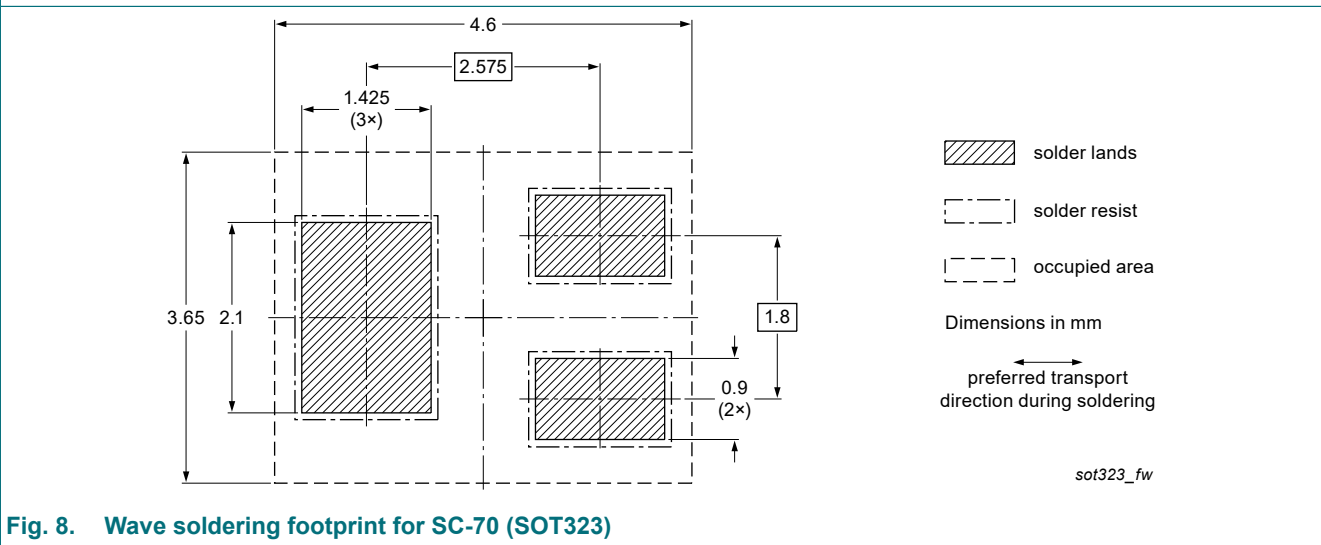
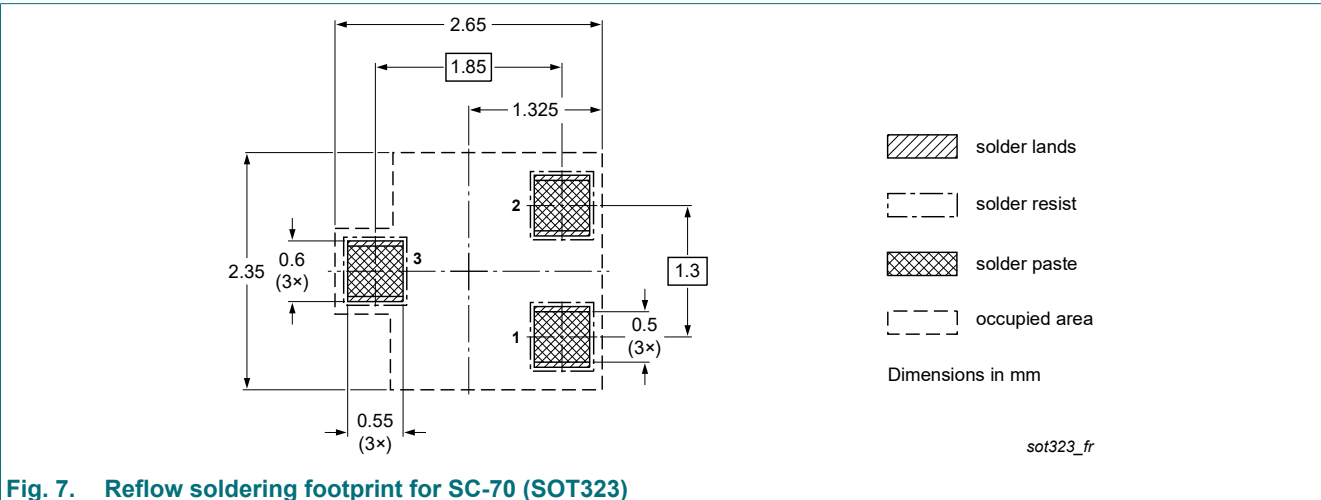
Table 8. Resistor test conditions

Type number	R1 (kΩ)	R2 (kΩ)	Test conditions			
			I ₁	I ₂	I ₃	I ₄
PDTA113ZU	1	10	-700 μA	-800 μA	450 μA	550 μA

12. Package outline



13. Soldering



14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PDTA113ZU v.5	20250312	Product data sheet	-	PDTA113Z_SER_4
Modifications:	- 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. - Section "Packing information" removed. - Family data sheet splitted to single type data sheets for the active products.			
PDTA113Z_SER_4	20090902	Product data sheet	-	PDTA113Z_SER_3
PDTA113Z_SER_3	20050407	Product data sheet	-	PDTA113ZT_2
PDTA113ZT_2	20040518	Objective data sheet	-	PDTA113ZT_1
PDTA113ZT_1	20040325	Objective 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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