



PDTC124XM

50 V, 100 mA NPN resistor-equipped transistor;
R1 = 22 k Ω , R2 = 47 k Ω

23 October 2024

Product data sheet

1. General description

NPN Resistor-Equipped Transistor (RET) in an leadless ultra small SOT883 (SC-101) Surface-Mounted Device (SMD) plastic package.

PNP complement: PDTA124XM

2. Features and benefits

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

3. Applications

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

4. Quick reference data

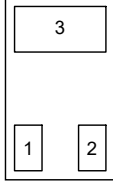
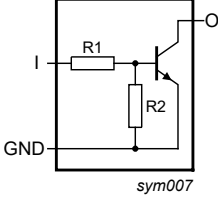
Table 1. Quick reference data

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	15.4	22	28.6	k Ω
R2/R1	bias resistor ratio		1.7	2.1	2.6	

50 V, 100 mA NPN resistor-equipped transistor; R1 = 22 k Ω , R2 = 47 k Ω

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	I	input (base)	 <p>Transparent top view</p> <p>DFN1006-3 (SOT883)</p>	 <p><i>sym007</i></p>
2	GND	ground (emitter)		
3	O	output (collector)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PDTC124XM	DFN1006-3	plastic, leadless ultra small package; 3 terminals; 0.35 mm pitch; 1 mm x 0.6 mm x 0.48 mm body	SOT883

7. Marking

Table 4. Marking codes

Type number	Marking code
PDTC124XM	DZ

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	-	7	V
V _I	input voltage		-7	40	V
I _O	output current		-	100	mA
I _{CM}	peak collector current	t _p ≤ 1 ms; single pulse	-	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1] [2]	250	mW
T _J	junction temperature		-	150	°C
T _{amb}	ambient temperature		-65	150	°C
T _{stg}	storage temperature		-65	150	°C

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

[2] Device mounted on an FR4 PCB with 60 μ m copper strip line, 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] [2]	-	500	K/W

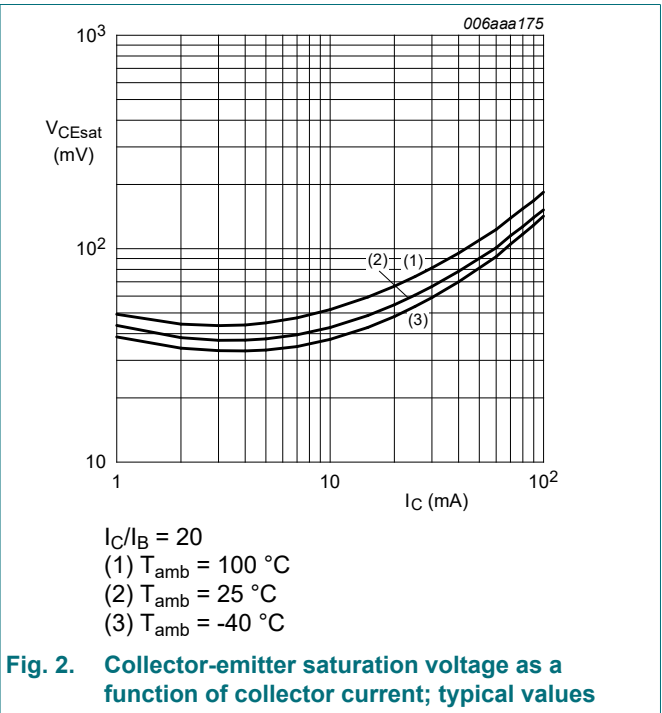
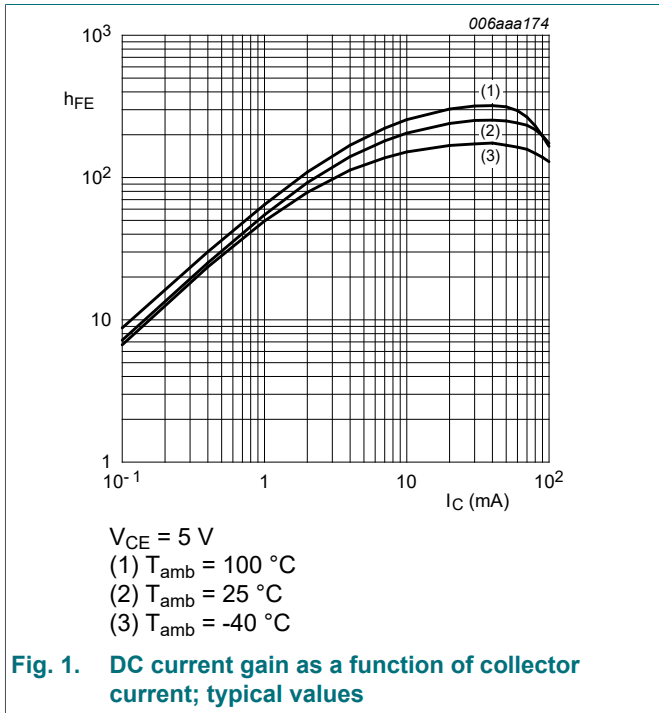
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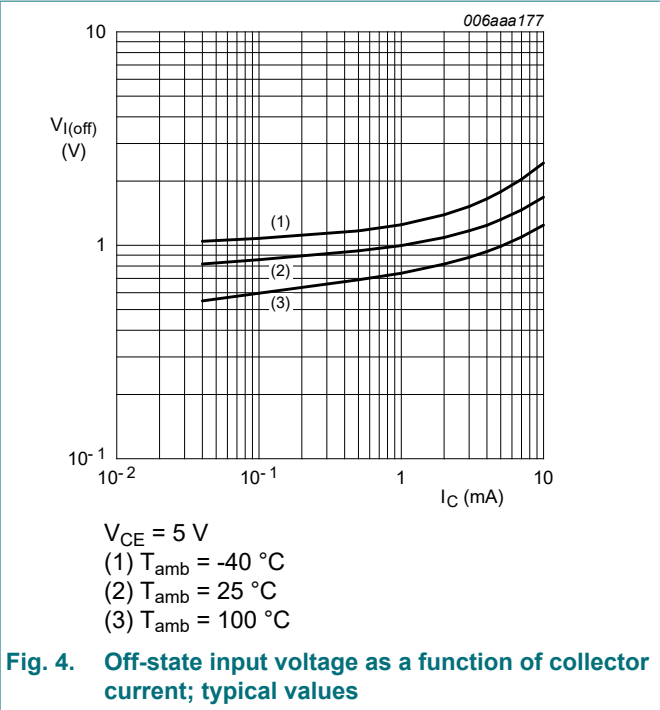
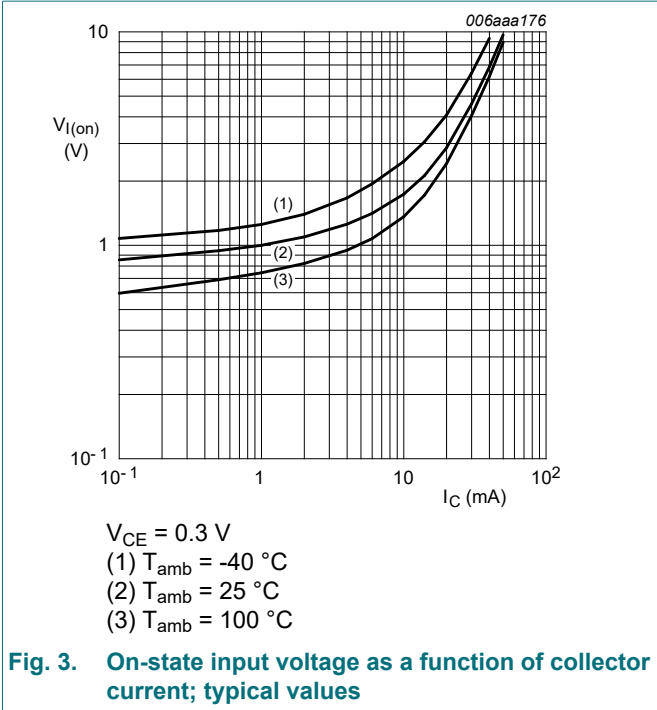
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = 50\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30\text{ V}; I_B = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	100	nA
		$V_{CE} = 30\text{ V}; I_B = 0\text{ A}; T_j = 150\text{ °C}$	-	-	5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	120	μA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 5\text{ mA}; T_{amb} = 25\text{ °C}$	80	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	150	mV
$V_{I(off)}$	off-state input voltage	$V_{CE} = 5\text{ V}; I_C = 100\text{ μA}; T_{amb} = 25\text{ °C}$	-	0.8	0.5	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = 300\text{ mV}; I_C = 2\text{ mA}; T_{amb} = 25\text{ °C}$	2	1.1	-	V
R1	bias resistor 1 (input)	$T_{amb} = 25\text{ °C}$	15.4	22	28.6	kΩ
R2/R1	bias resistor ratio		1.7	2.1	2.6	
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$	-	-	2.5	pF



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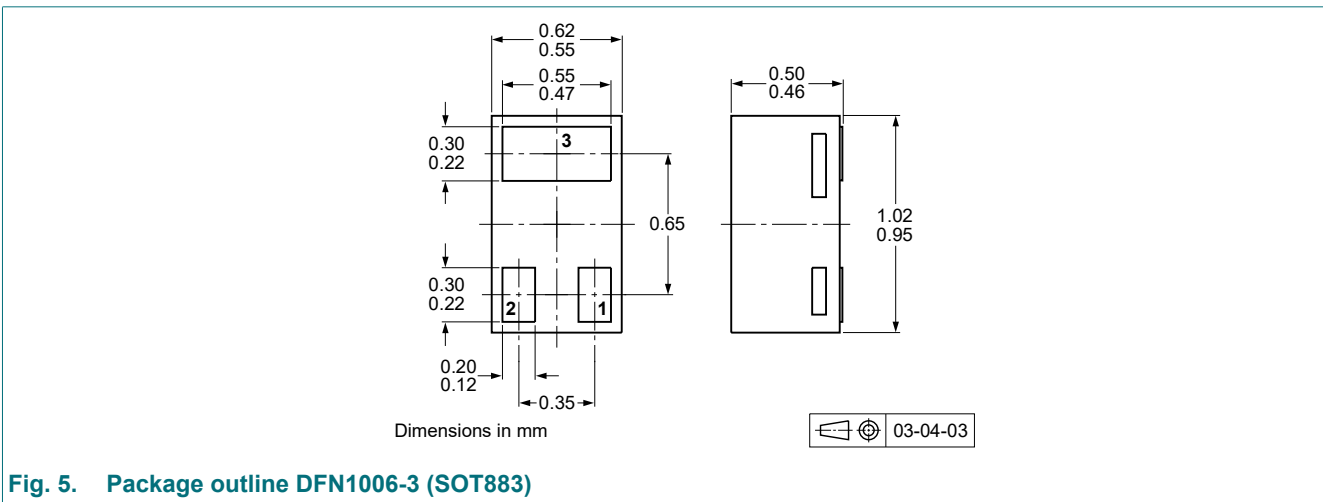


11. Test information

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

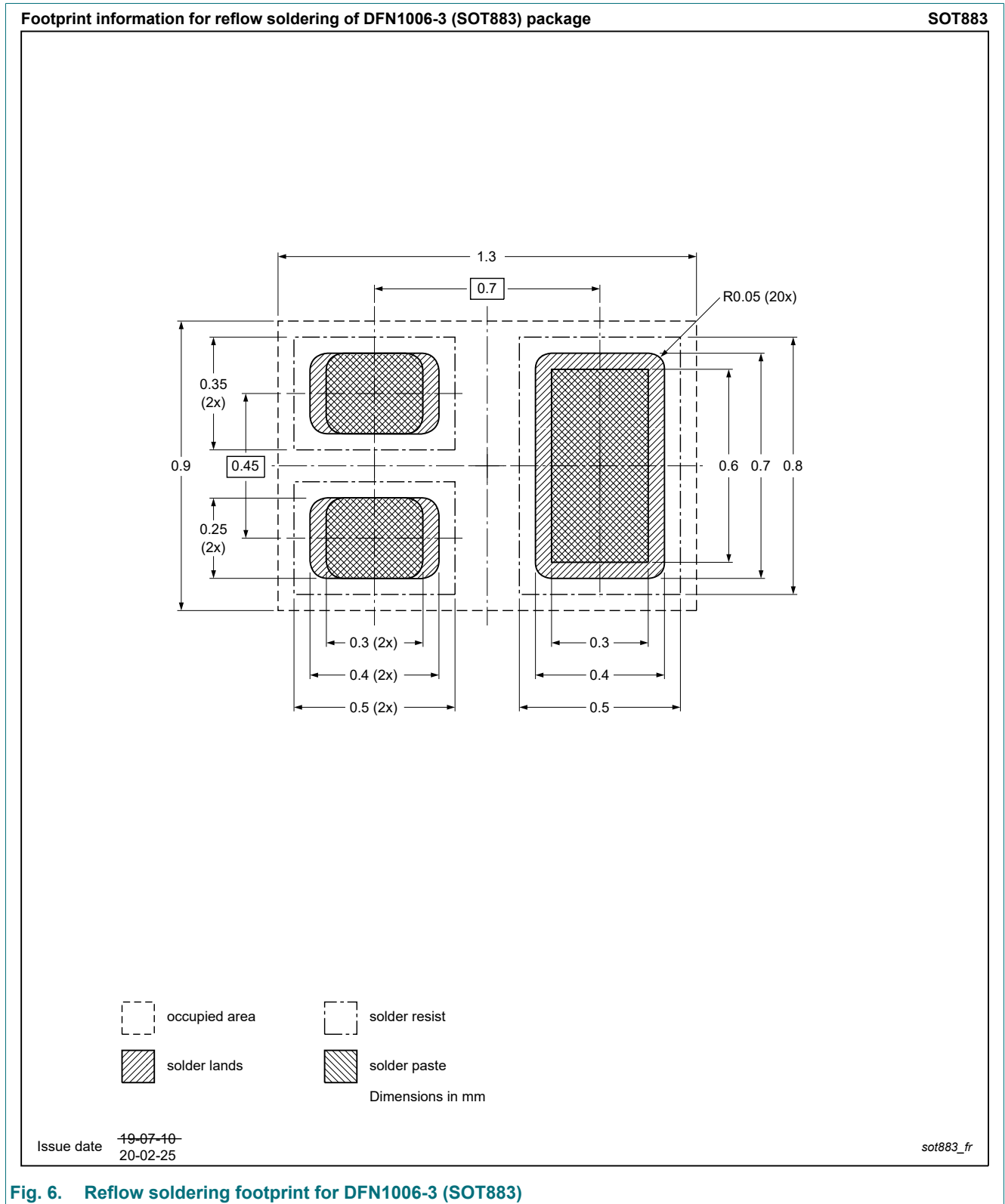


Fig. 6. Reflow soldering footprint for DFN1006-3 (SOT883)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PDTC124XM v.8	20241023	Product data sheet	-	PDTC124X_SER_7
Modification:	<ul style="list-style-type: none"> 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. Family data sheet reduced to single type data sheet. Packing information removed. 			
PDTC124X_SER_7	20091116	Product data sheet	-	PDTC124X_SER_6
PDTC124X_SER_6	20050714	Product data sheet	-	PDTC124X_SERIES_5
PDTC124X_SERIES_5	20040813	Product specification	-	PDTC124X_SERIES_4
PDTC124X_SERIES_4	20030410	Product specification	-	PDTC124XEF_2 PDTC124XE_3
PDTC124XE_3	19990518	Product specification	-	PDTC124XE_2
PDTC124XE_2	19980921	Product specification	-	PDTC124XE_1
PDTC124XE_1	19971215	Product specification	-	-
PDTC124XEF_2	19990518	Preliminary specification	-	PDTC124XEF_1
PDTC124XEF_1	19981111	Preliminary specification	-	-

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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