

PDTB123ET

PNP 500 mA, 50 V resistor-equipped transistor;
R1 = 2.2 k Ω , R2 = 2.2 k Ω

Rev. 3 — 22 September 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: PDTD123ET.

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
- ± 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

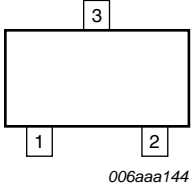
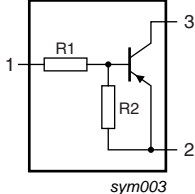
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	-50	V
I _O	output current		-	-	-500	mA
R1	bias resistor 1 (input)		1.54	2.2	2.86	k Ω
R2/R1	bias resistor ratio		0.9	1.0	1.1	



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
PDTB123ET	-	plastic surface-mounted package; 3 leads	SOT23

4. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PDTB123ET	*7S

- [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	-	-10	V
V_I	input voltage				
	positive		-	+10	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 _{tot}	total power dissipation	T _{amb} ≤ 25 °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.

6. Thermal characteristics

Table 6. Thermal characteristics

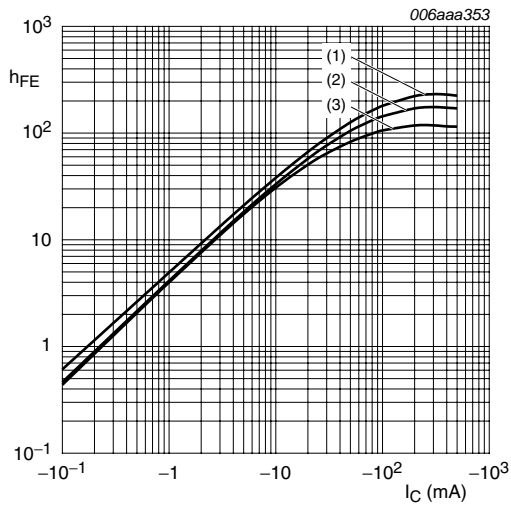
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1] -	-	500	K/W

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

7. Characteristics

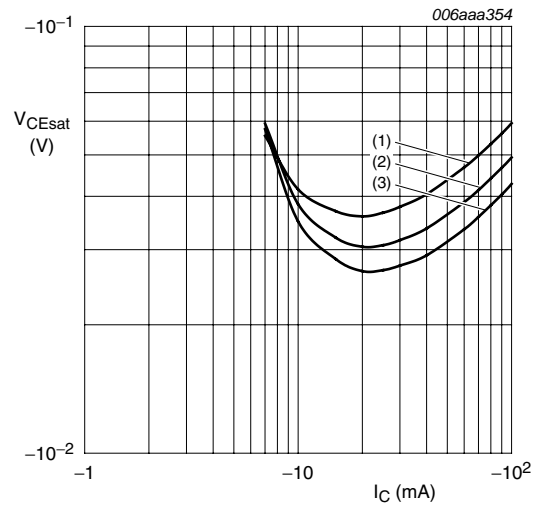
Table 7. Characteristics*T_{amb} = 25 °C unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = -40 V; I _E = 0 A	-	-	-100	nA
		V _{CB} = -50 V; I _E = 0 A	-	-	-100	nA
I _{CEO}	collector-emitter cut-off current	V _{CE} = -50 V; I _B = 0 A	-	-	-0.5	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 V; I _C = 0 A	-	-	-2.0	mA
h _{FE}	DC current gain	V _{CE} = -5 V; I _C = -50 mA	40	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = -50 mA; I _B = -2.5 mA	-	-	-0.3	V
V _{I(off)}	off-state input voltage	V _{CE} = -5 V; I _C = -100 μA	-0.6	-1.1	-1.8	V
V _{I(on)}	on-state input voltage	V _{CE} = -0.3 V; I _C = -20 mA	-1.0	-1.5	-2.0	V
R1	bias resistor 1 (input)		1.54	2.2	2.86	k Ω
R2/R1	bias resistor ratio		0.9	1.0	1.1	
C _c	collector capacitance	V _{CB} = -10 V; I _E = i _e = 0 A; f = 100 MHz	-	11	-	pF



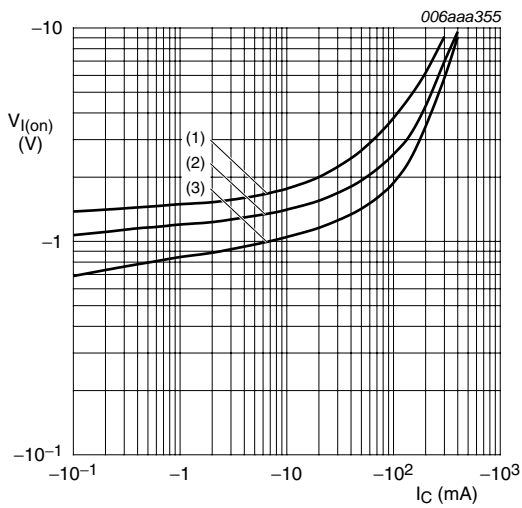
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 100^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = -40^\circ\text{C}$

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



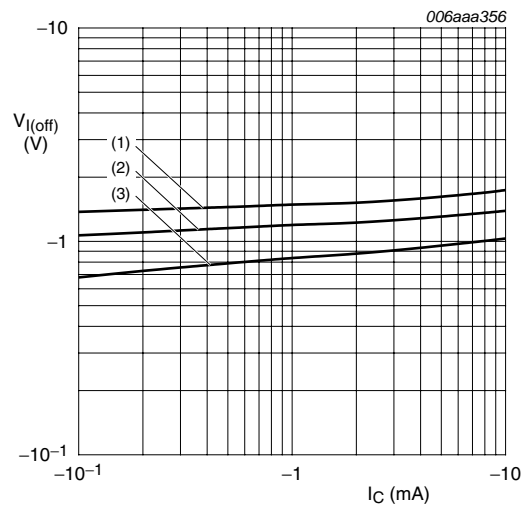
$I_C/I_B = 20$
 (1) $T_{amb} = 100^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = -40^\circ\text{C}$

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



$V_{CE} = -0.3\text{ V}$
 (1) $T_{amb} = -40^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = 100^\circ\text{C}$

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



$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -40^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = 100^\circ\text{C}$

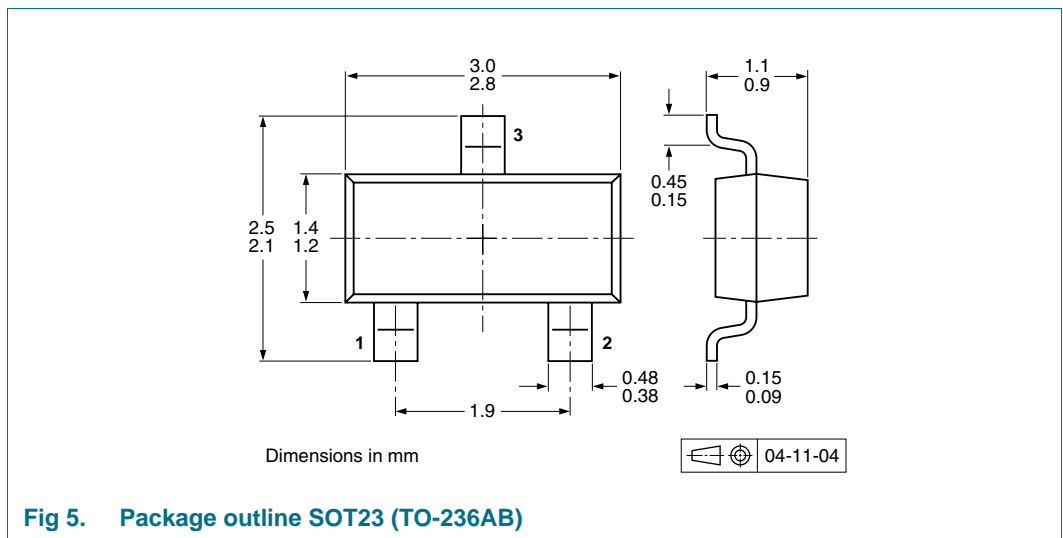
Fig. 4. Off-state input voltage as a function of collector current; typical values

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.^[1]

Type number	Package	Description	Packing quantity	
			3000	10000
PDTB123ET	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

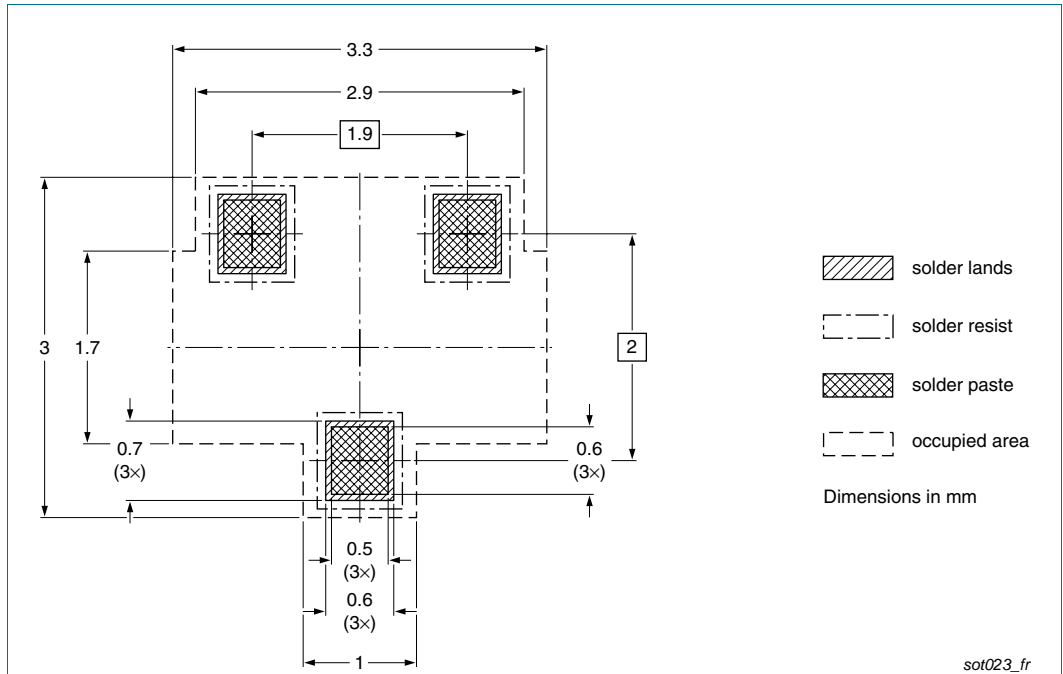


Fig 6. Reflow soldering footprint SOT23 (TO-236AB)

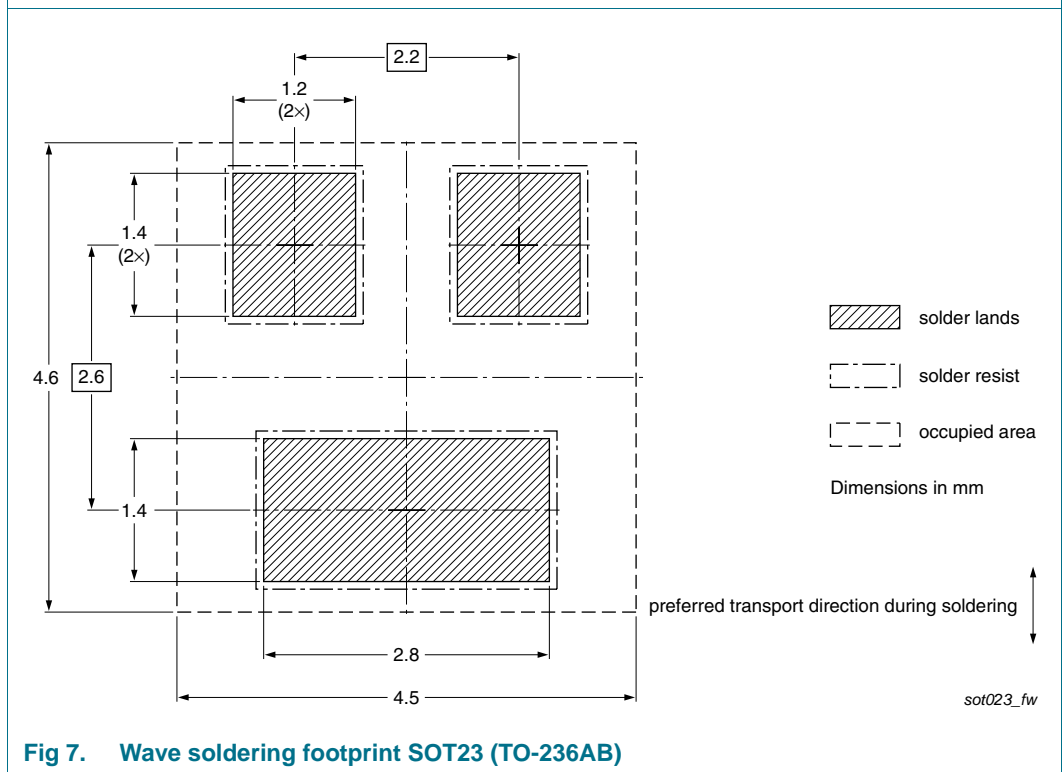


Fig 7. Wave soldering footprint SOT23 (TO-236AB)

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PDTB123ET v.3	20100922	Product data sheet	-	PDTB123E_SER_2
Modifications:		<ul style="list-style-type: none">• Type numbers PDTB123EK and PDTB123ES deleted.• Table 7 “Characteristics”: unit for V_{CEsat} changed from mV to V.• Section 8 “Test information”: added.• Section 11 “Soldering”: added.• Section 13 “Legal information”: updated.		
PDTB123E_SER_2	20091116	Product data sheet	-	PDTB123E_SER_1
PDTB123E_SER_1	20050427	Product data sheet	-	-

13. Legal information

13.1 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".

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