

PDTB123YT

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

Rev. 3 — 30 August 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: PDTD123YT.

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
- $\pm 10\%$ 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

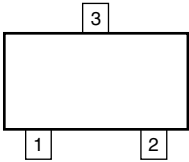
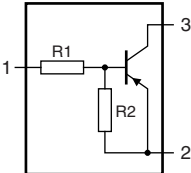
Table 1. Quick reference data

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		4.1	4.55	5	



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	input (base)	 <p>006aaa144</p>	 <p>sym003</p>
2	GND (emitter)		
3	output (collector)		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PDTB123YT	-	plastic surface-mounted package; 3 leads	SOT23

4. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PDTB123YT	*7Y

- [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	-	-5	V
V_I	input voltage				
	positive		-	+5	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	$T_{\text{amb}} \leq 25 \text{ }^\circ\text{C}$	[1] -	250	mW
T_{stg}	storage temperature		-65	+150	$^\circ\text{C}$
T_{j}	junction temperature		-	150	$^\circ\text{C}$
T_{amb}	ambient temperature		-65	+150	$^\circ\text{C}$

[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

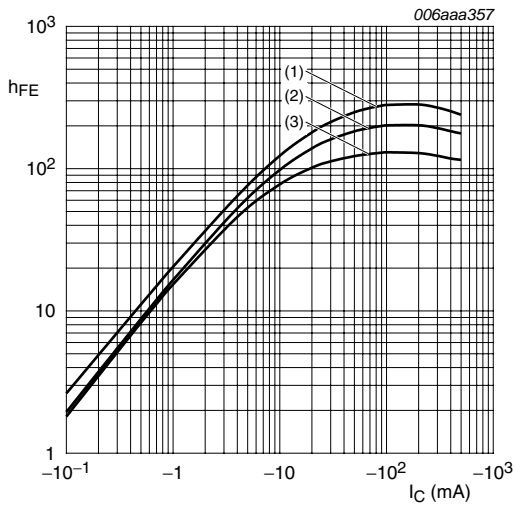
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{\text{th(j-a)}}$	thermal resistance from junction to ambient	in free air	[1] -	-	500	K/W

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

7. Characteristics

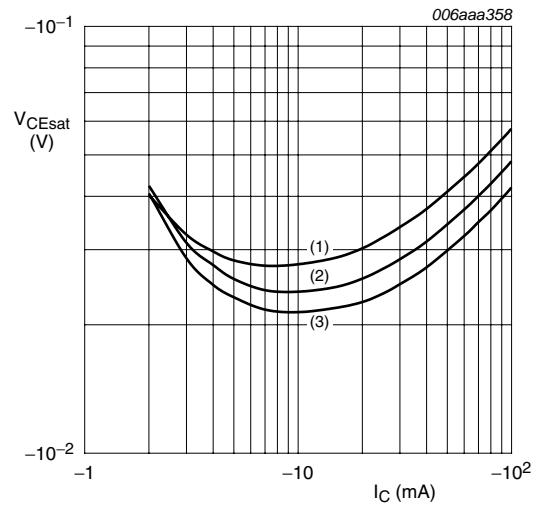
Table 7. Characteristics $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{\text{CB}} = -40 \text{ V}; I_{\text{E}} = 0 \text{ A}$	-	-	-100	nA
		$V_{\text{CB}} = -50 \text{ V}; I_{\text{E}} = 0 \text{ A}$	-	-	-100	nA
I_{CEO}	collector-emitter cut-off current	$V_{\text{CE}} = -50 \text{ V}; I_{\text{B}} = 0 \text{ A}$	-	-	-0.5	μA
I_{EBO}	emitter-base cut-off current	$V_{\text{EB}} = -5 \text{ V}; I_{\text{C}} = 0 \text{ A}$	-	-	-0.65	mA
h_{FE}	DC current gain	$V_{\text{CE}} = -5 \text{ V}; I_{\text{C}} = -50 \text{ mA}$	70	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_{\text{C}} = -50 \text{ mA}; I_{\text{B}} = -2.5 \text{ mA}$	-	-	-0.3	V
$V_{\text{I(off)}}$	off-state input voltage	$V_{\text{CE}} = -5 \text{ V}; I_{\text{C}} = -100 \text{ } \mu\text{A}$	-0.4	-0.6	-1.0	V
$V_{\text{I(on)}}$	on-state input voltage	$V_{\text{CE}} = -0.3 \text{ V}; I_{\text{C}} = -20 \text{ mA}$	-0.5	-1.0	-1.4	V
R1	bias resistor 1 (input)		1.54	2.2	2.86	kΩ
R2/R1	bias resistor ratio		4.1	4.55	5	
C_{c}	collector capacitance	$V_{\text{CB}} = -10 \text{ V}; I_{\text{E}} = i_{\text{e}} = 0 \text{ A}; f = 100 \text{ MHz}$	-	11	-	pF



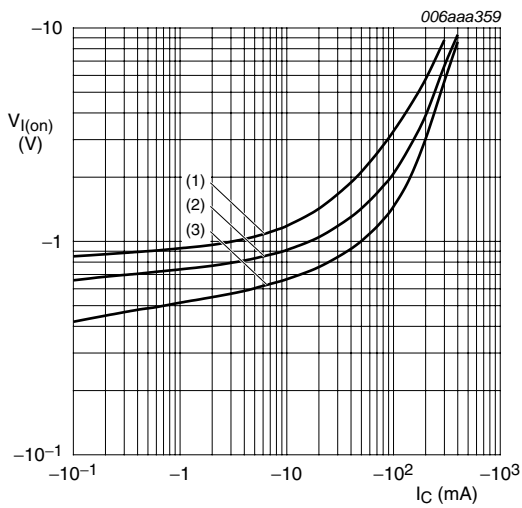
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -40 \text{ }^\circ\text{C}$

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



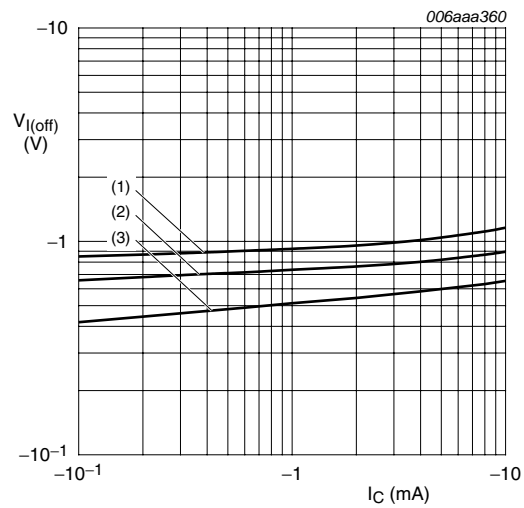
$I_C/I_B = 20$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -40 \text{ }^\circ\text{C}$

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



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

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



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

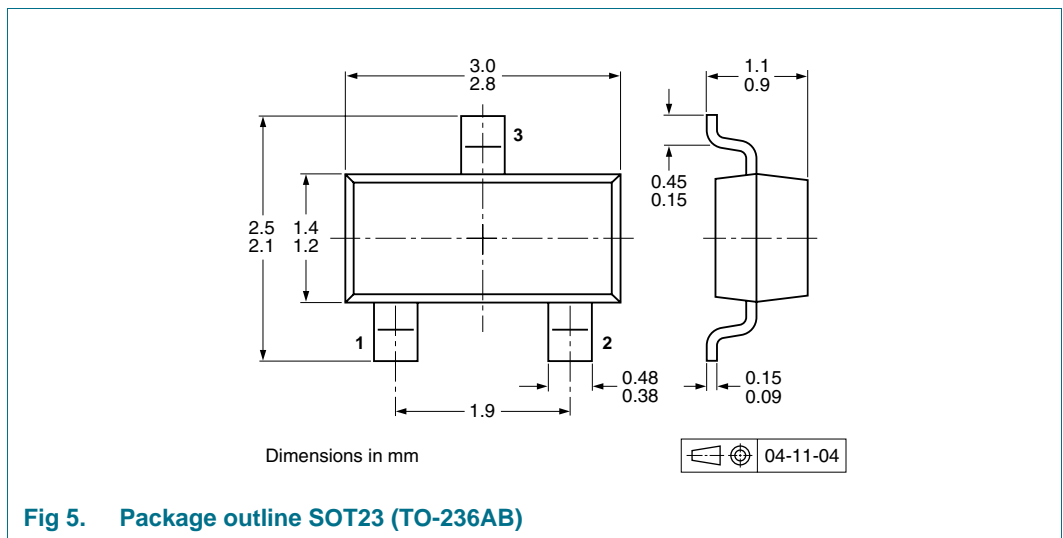
Fig 4. Off-state input voltage as a function of collector current; typical values

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
PDTB123YT	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

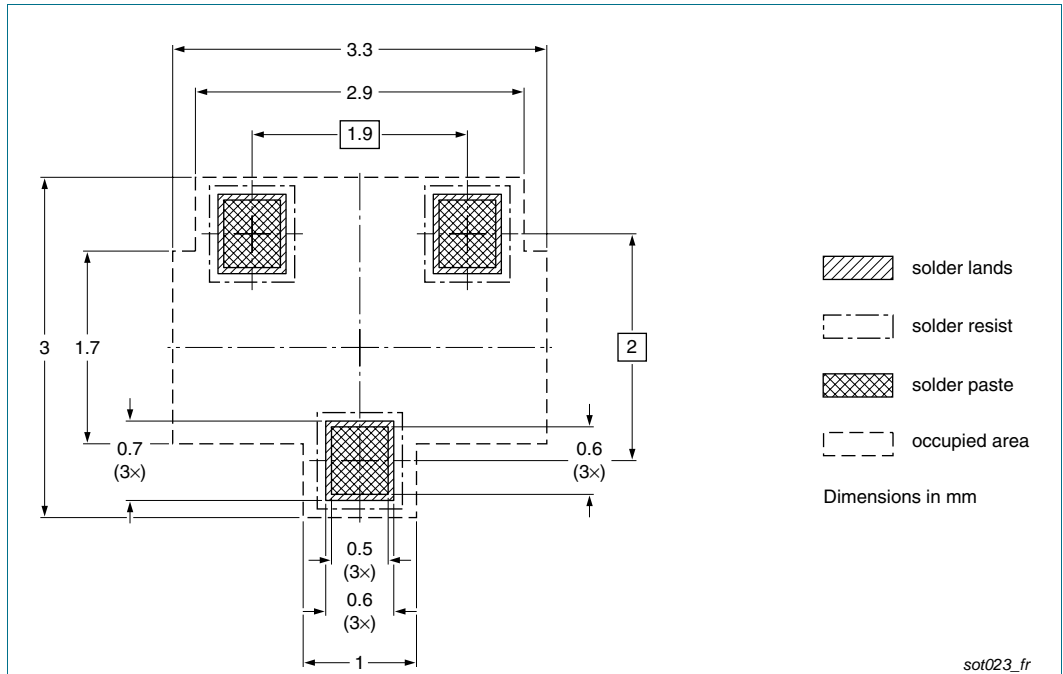


Fig 6. Reflow soldering footprint SOT23 (TO-236AB)

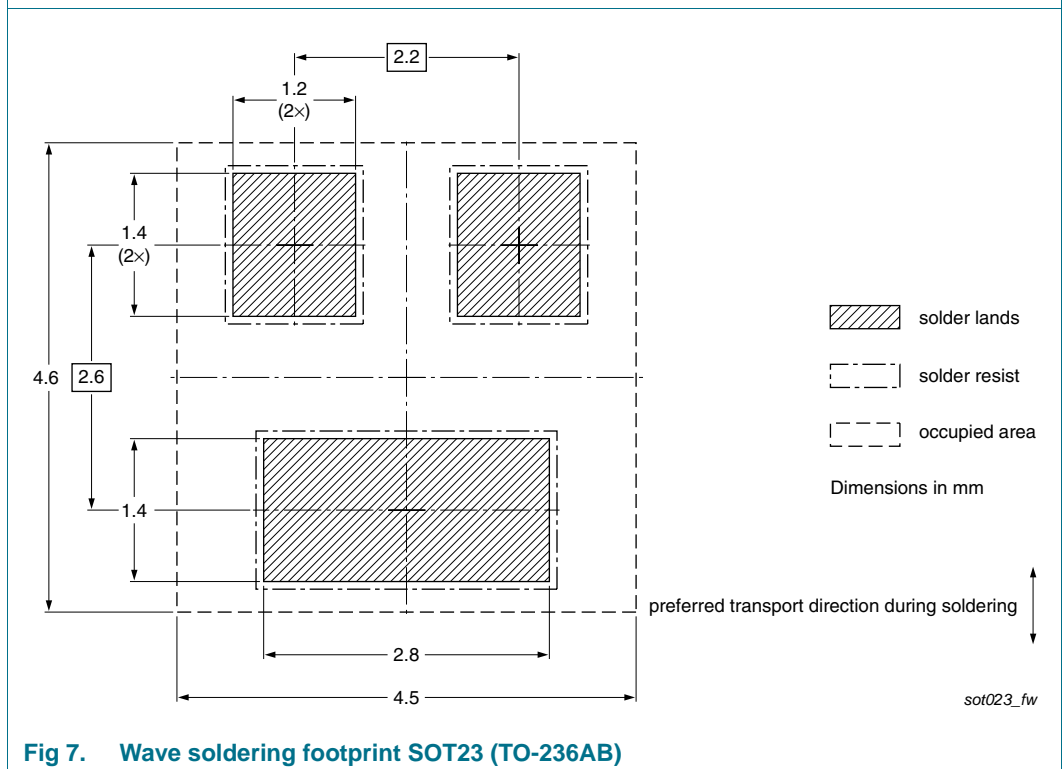


Fig 7. Wave soldering footprint SOT23 (TO-236AB)