



PBSS5130T

30 V; 1 A PNP low V_{CEsat} (BISS) transistor

9 July 2013

Product data sheet

1. General description

PNP low V_{CEsat} Breakthrough In Small Signal (BISS) transistor in a small SOT23 Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Small SMD plastic package
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- Higher efficiency due to less heat generation
- AEC-Q101 qualified

3. Applications

- DC-to-DC conversion
- Supply line switching
- Battery charger
- LCD backlighting
- Driver in low supply voltage applications (e.g. lamps and LEDs)

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	-30	V
I_C	collector current		-	-	-1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	-3	A
R_{CEsat}	collector-emitter saturation resistance	$I_C = -500$ mA; $I_B = -50$ mA; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_{amb} = 25$ °C	-	-	220	m Ω

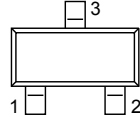
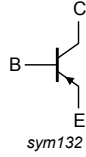


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5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 <p>TO-236AB (SOT23)</p>	 <p>sym132</p>
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5130T	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code
PBSS5130T	%3E [1]

[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		-	-30	V
V_{CEO}	collector-emitter voltage	open base		-	-30	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current			-	-1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-3	A
I_{BM}	peak base current			-	-300	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	300	mW
			[2]	-	480	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

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]	-	-	417	K/W
			[2]	-	-	260	K/W

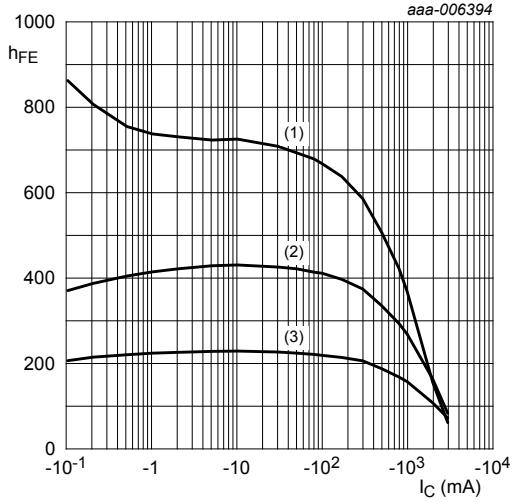
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

10. Characteristics

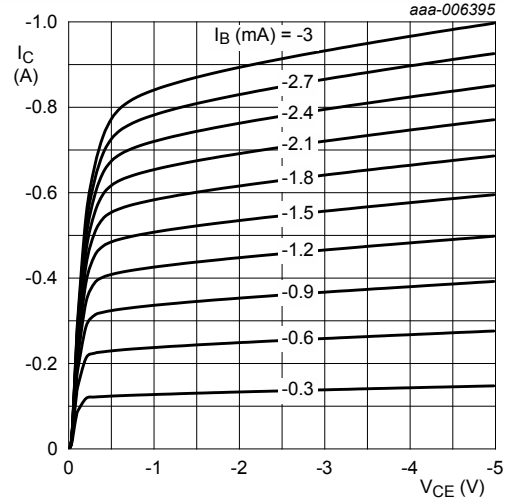
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = -30 V; I _E = 0 A; T _{amb} = 25 °C	-	-	-100	nA
		V _{CB} = -30 V; I _E = 0 A; T _j = 150 °C	-	-	-50	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = -4 V; I _C = 0 A; T _{amb} = 25 °C	-	-	-100	nA
h _{FE}	DC current gain	V _{CE} = -2 V; I _C = -100 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	300	450	-	
		V _{CE} = -2 V; I _C = -500 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	260	350	-	
		V _{CE} = -2 V; I _C = -1 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	210	290	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = -100 mA; I _B = -1 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	-	-	-100	mV
		I _C = -1 A; I _B = -50 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	-	-	-225	mV
R _{CEsat}	collector-emitter saturation resistance	I _C = -500 mA; I _B = -50 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	-	-	220	mΩ
V _{BEsat}	base-emitter saturation voltage	I _C = -2 A; I _B = -200 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	-	-	-1.1	V
V _{BEon}	base-emitter turn-on voltage	V _{CE} = -2 V; I _C = -100 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	-	-	-0.75	V
f _T	transition frequency	V _{CE} = -10 V; I _C = -100 mA; f = 100 MHz; T _{amb} = 25 °C	100	200	-	MHz
C _c	collector capacitance	V _{CB} = -10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	-	28	pF



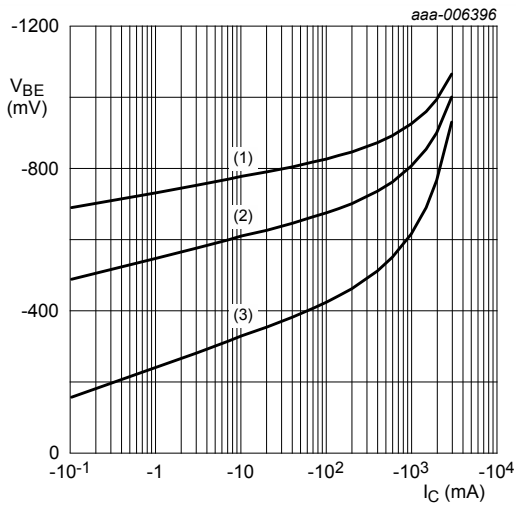
$V_{CE} = -2\text{ V}$
 (1) $T_{amb} = 150^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = -55^\circ\text{C}$

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



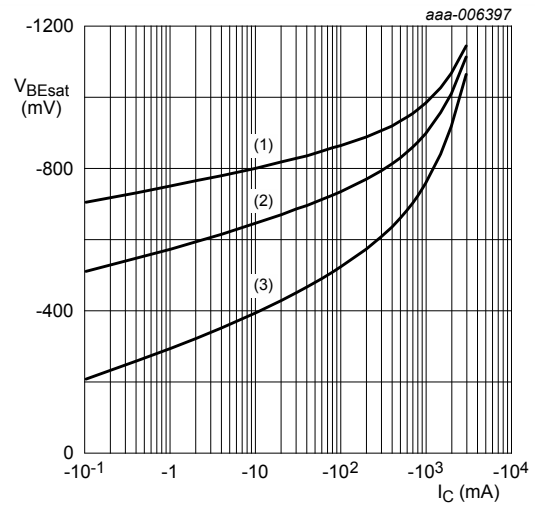
$T_{amb} = 25^\circ\text{C}$

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



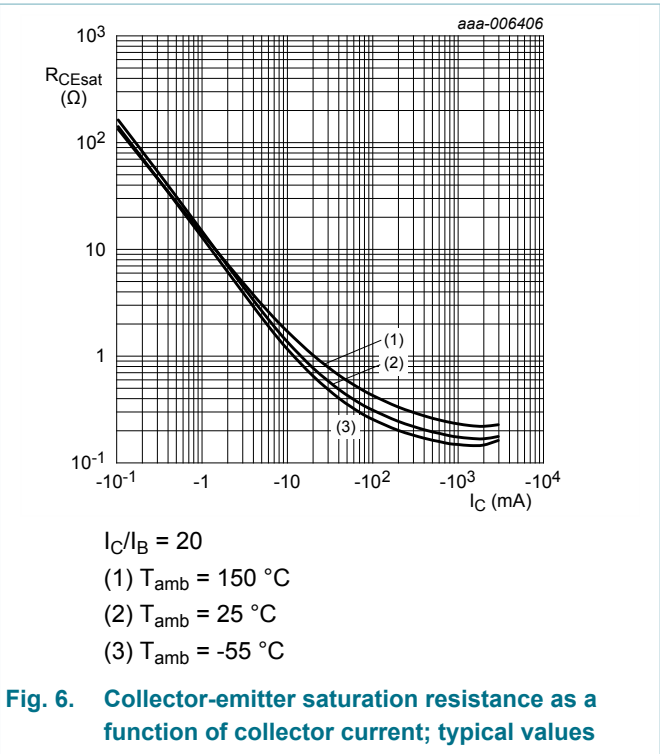
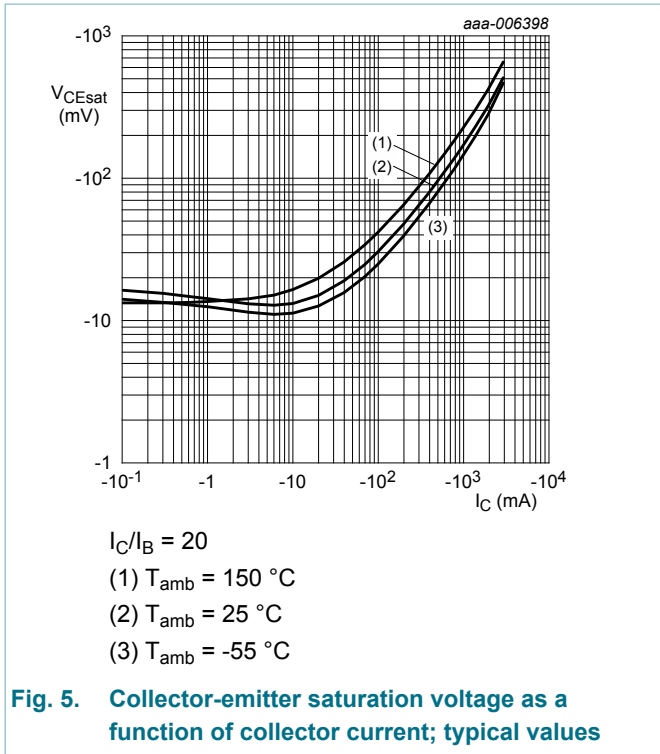
$V_{CE} = -2\text{ V}$
 (1) $T_{amb} = 150^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = -55^\circ\text{C}$

Fig. 3. Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = -55^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = 150^\circ\text{C}$

Fig. 4. Base-emitter saturation voltage as a function of collector current; typical values

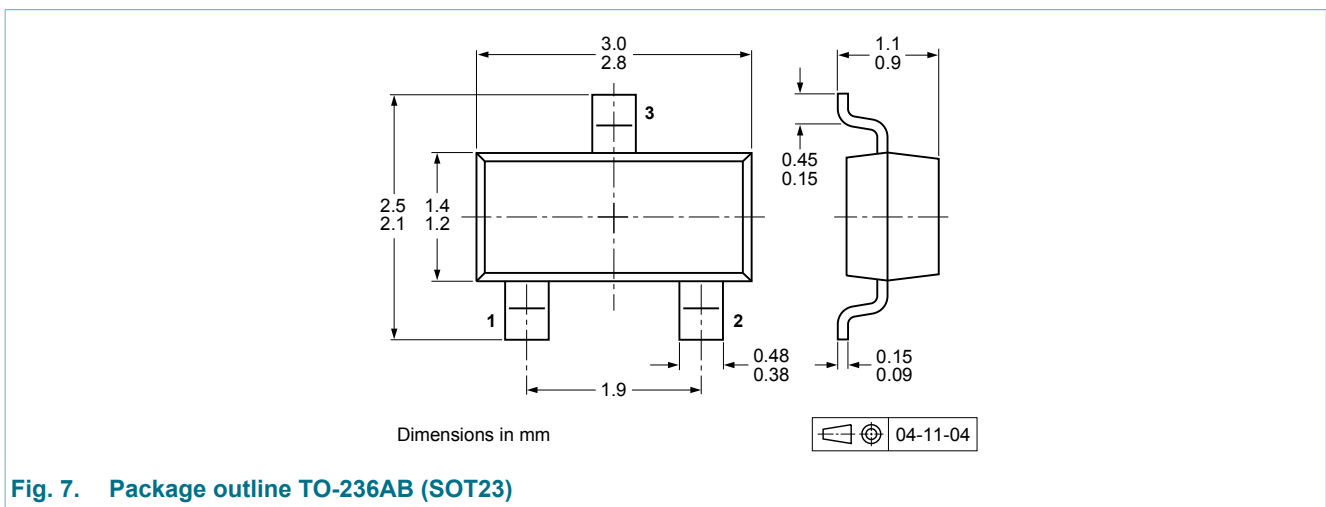


11. Test information

11.1 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.

12. Package outline



13. Soldering

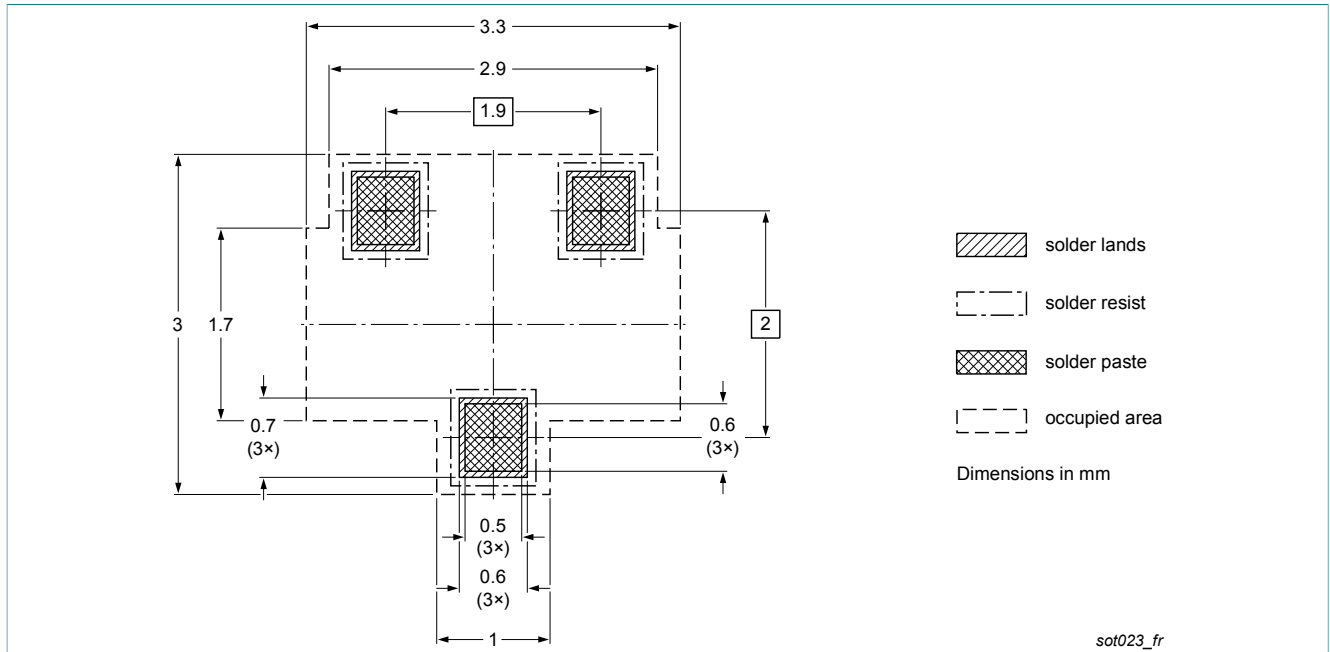


Fig. 8. Reflow soldering footprint for TO-236AB (SOT23)

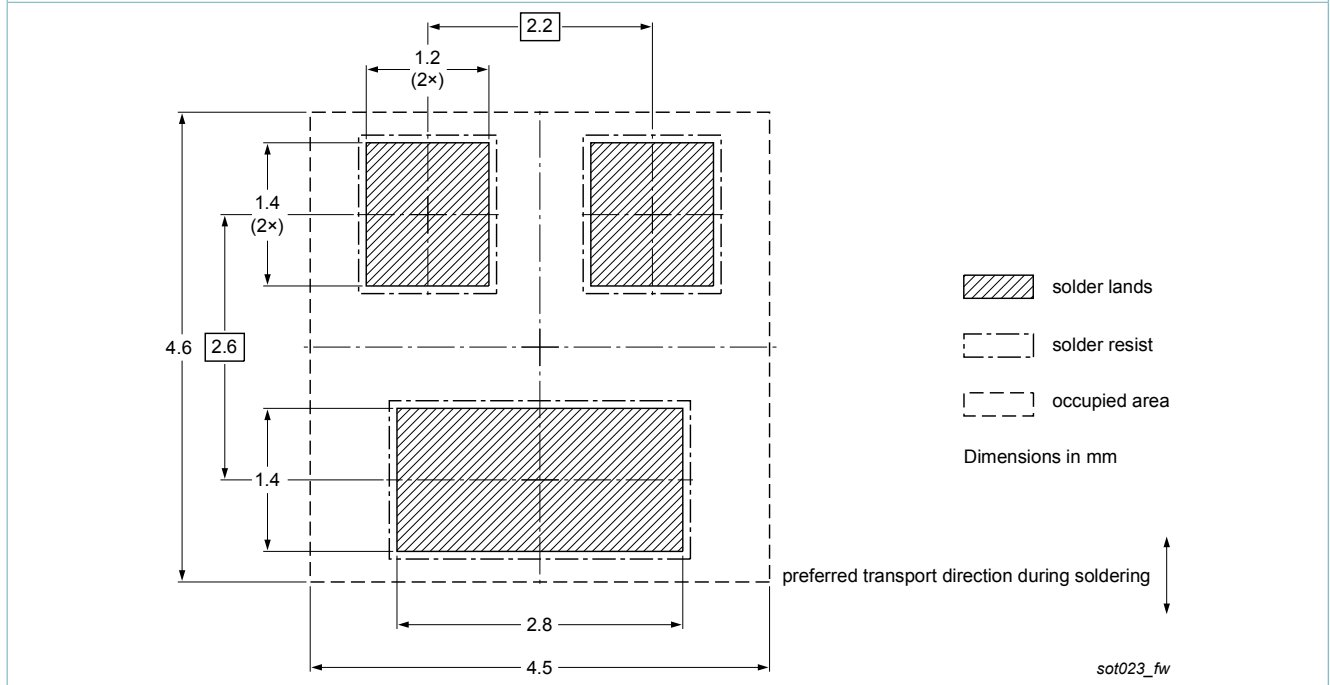


Fig. 9. Wave soldering footprint for TO-236AB (SOT23)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5130T v.2	20130709	Product data sheet	-	PBSS5130T v.1
Modifications:	<ul style="list-style-type: none"> The format of this document has been redesigned to comply with the new identity guidelines of NXP Semiconductors. Legal texts have been adapted to the new company name where appropriate. Sections "General description", "Features and benefits" and "Applications": updated Section "Marking": updated Table "Limiting values": ambient temperature T_{amb} updated Table "Characteristics": base-emitter saturation voltage V_{BEsat} added Figures 1 to 6: added Section "Test information": added Figure "Package outline TO-236AB (SOT23)": replaced by minimized outline drawing Section "Soldering": added Section "Legal information": updated 			
PBSS5130T v.1	20031212	Product data sheet	-	-

15. Legal information

15.1 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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 Date of release: 9 July 2013
