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PBSS5230T

30 V, 2 A PNP low VCEsat (BISS) transistor

Rev. 2 — 4 June 2012 Product data sheet

1. Product profile

1.1 General description

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

NPN complement: PBSS4230T.

1.2 Features and benefits

- Low collector-emiter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- Higher efficiency leading to less heat generation
- AEC-Q101 qualified

1.3 Applications

- DC-to-DC conversion
- Supply line switching
- Battery charger
- LCD backlighting
- Driver in low supply voltage applications (e.g. lamps and LEDs)
- Inductive load driver (e.g. relays, buzzers and motors)

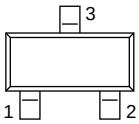
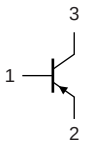
1.4 Quick reference data

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		-	-	-2	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; $t_p \leq 300$ µs; $\delta \leq 0.02$; T_{amb} = 25 °C	-	160	220	Ω

2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		
2	E	emitter		
3	C	collector		

SOT23 (TO-236AB)

sym013

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5230T	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

4. Marking

Table 4. Marking codes

Type number	Marking code[1]
PBSS5230T	%3G

[1] % = placeholder for manufacturing site code

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		-	-30	V
V_{CEO}	collector-emitter voltage	open base		-	-30	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current			-	-2	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-3	A
I_B	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			-65	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 cm^2.

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

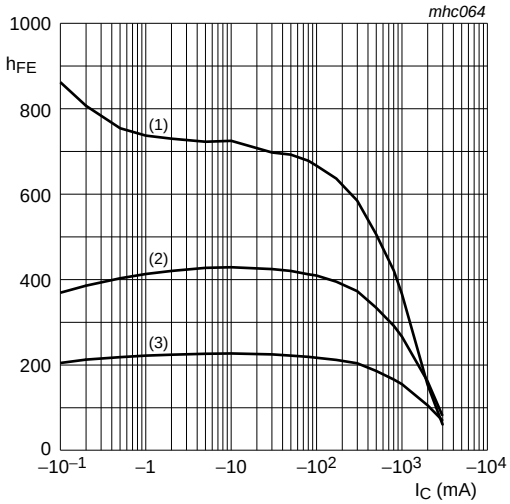
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

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

7. 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; T_{amb} = 25 °C	300	450	-	
		V_{CE} = -2 V; I_C = -1 A; pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$; T_{amb} = 25 °C	200	290	-	
		V_{CE} = -2 V; I_C = -2 A; pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$; T_{amb} = 25 °C	100	180	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = -500 mA; I_B = -50 mA; T_{amb} = 25 °C	-	-70	-110	mV
		I_C = -1 A; I_B = -50 mA; T_{amb} = 25 °C	-	-140	-225	mV
		I_C = -2 A; I_B = -200 mA; T_{amb} = 25 °C	-	-240	-350	mV
R_{CEsat}	collector-emitter saturation resistance	I_C = -500 mA; I_B = -50 mA; pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$; T_{amb} = 25 °C	-	160	220	Ω
V_{BEsat}	base-emitter saturation voltage	I_C = -2 A; I_B = -50 mA; pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$; T_{amb} = 25 °C	-	-	-1.1	V
V_{BEon}	base-emitter turn-on voltage	V_{CE} = -2 V; I_C = -100 mA; 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	-	23	28	pF



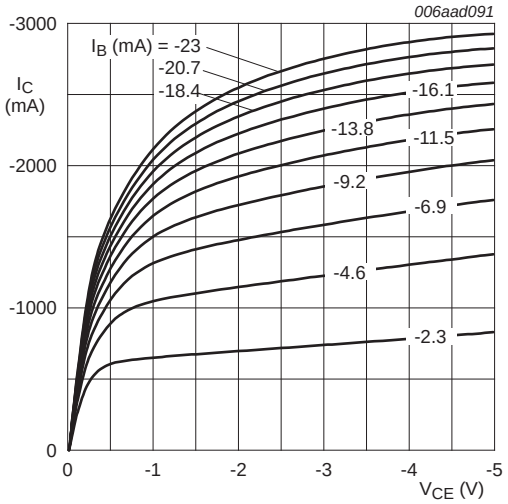
V_{CE} = -2 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

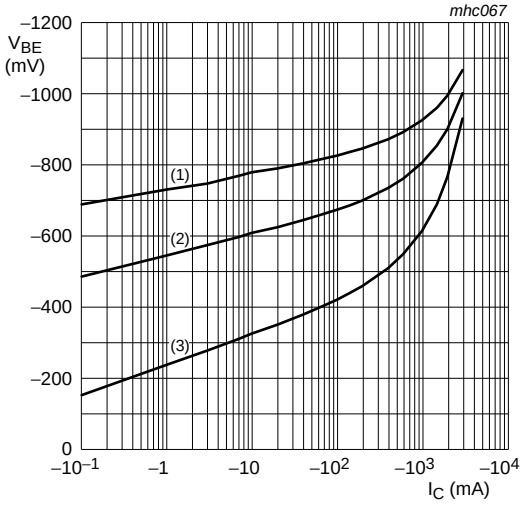
(3) T_{amb} = -55 °C

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



T_{amb} = 25 °C

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



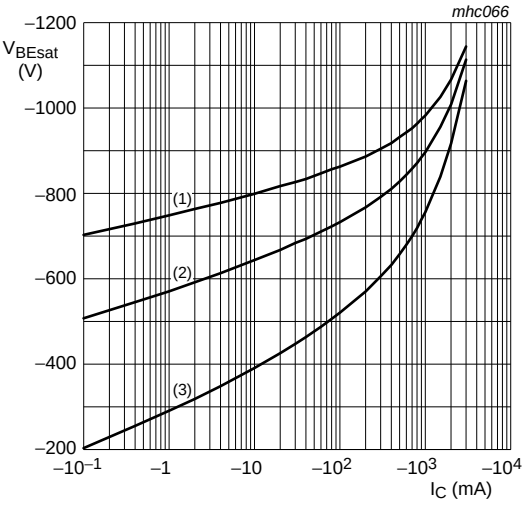
V_{CE} = -2 V

(1) T_{amb} = -55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

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



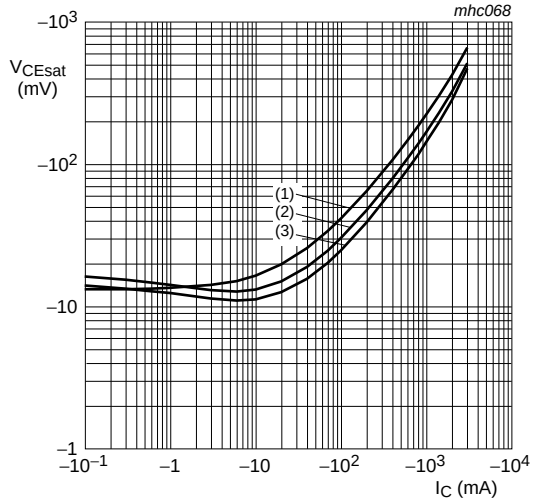
I_C/I_B = 20

(1) T_{amb} = -55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

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



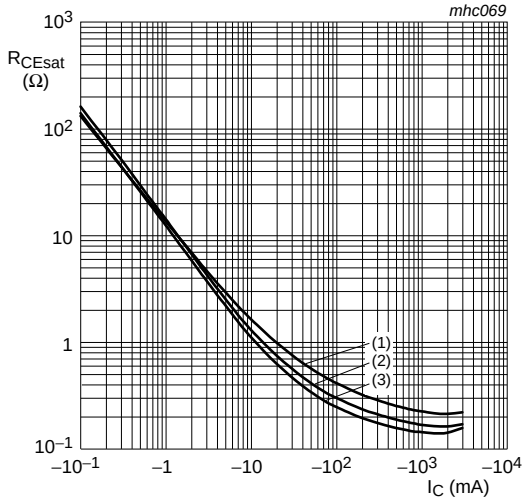
$I_C/I_B = 20$

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = -55 °C

Fig 5. Collector-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 20$

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = -55 °C

Fig 6. Collector-emitter saturation resistance 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

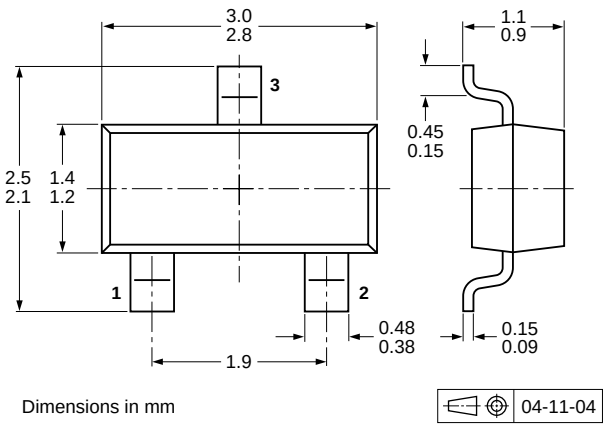


Fig 7. Package outline SOT23 (TO-236AB)

10. Soldering

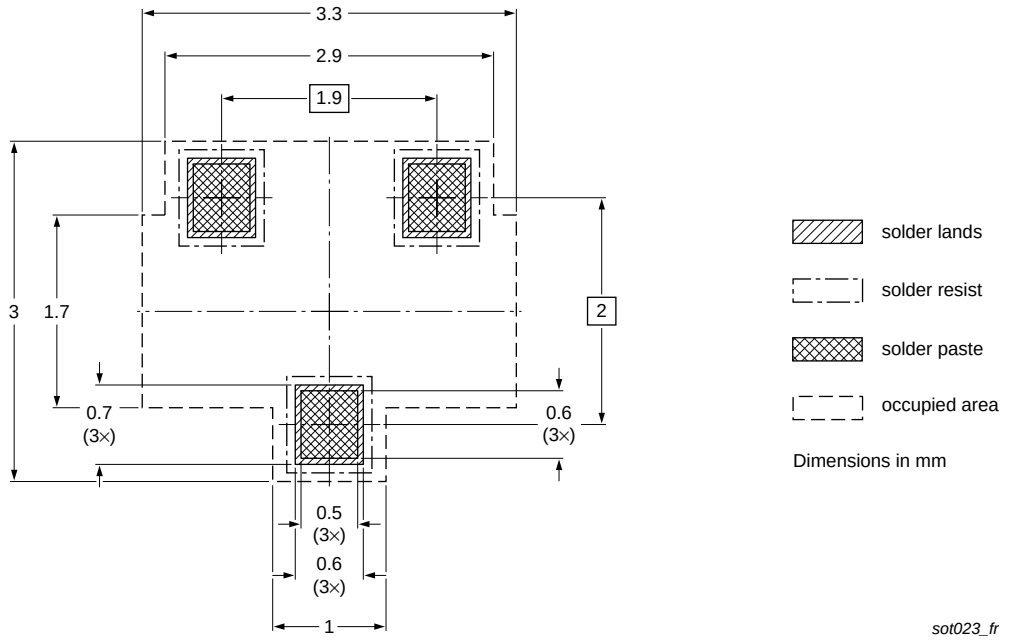


Fig 8. Reflow soldering footprint for SOT23 (TO-236AB)

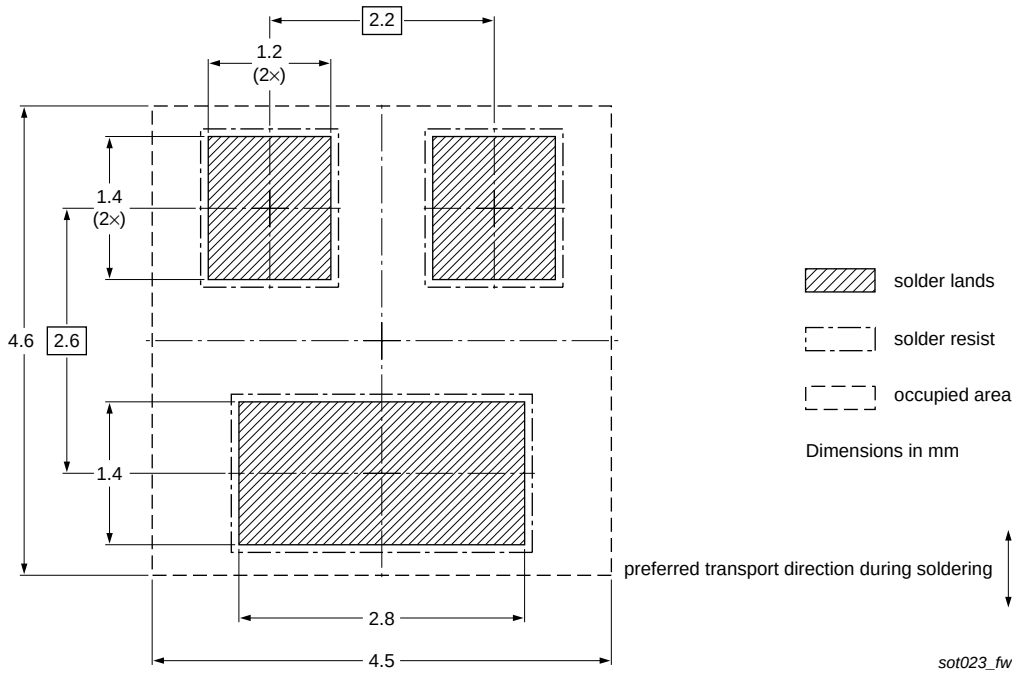


Fig 9. Wave soldering footprint for SOT23 (TO-236AB)

11. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5230T v.2	20120604	Product data sheet	-	PBSS5230T v.1
Modifications:	• 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. • 1 “Product profile”: updated • 4 “Marking”: corrected • Table 5.: updated • 7 “Characteristics”: V_{CEsat} corrected, Fig 1. to Fig 6. added • 8 “Test information”: added • 9 “Package outline”: replaced by minimized package outline drawing • 10 “Soldering”: added			
PBSS5230T v.1	20031218	Product data sheet	-	-

12. Legal information

12.1 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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14. Contents

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