Product data sheet

1. General description

PNP low V_{CEsat} transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4320T

2. Features and benefits

- Low collector-emitter saturation voltage V_{CEsat} and corresponding low R_{CEsat}
- High collector current capability
- · High collector current gain
- · Improved efficiency due to reduced heat generation

3. Applications

- Power management applications
- · Low and medium power DC/DC convertors
- Supply line switching
- Battery chargers
- Linear voltage regulation with low voltage drop-out (LDO)

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V _{CEO}		open base	-	-	-20	V
I _C	collector current		-	-	-2	Α
I _{CRM}		$\delta \leq 0.25$; Operated under pulsed conditions; $t_p \leq 100 \text{ ms}$	-	-	-3	Α
R _{CEsat}	collector-emitter saturation resistance	I_C = -2 A; I_B = -200 mA; pulsed; $t_p \le$ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	-	75	105	mΩ



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5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	В	base	3	
2	Е	emitter		C
3	С	collector		В
) E
			1	sym132

6. Ordering information

Table 3. Ordering information

Type number Package					
		Name	Description	Version	
	PBSS5320T		plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23	

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PBSS5320T	ZH%

[1] % = placeholder for manufacturing site code

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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		-	-20	V
V _{CEO}	collector-emitter voltage	open base		-	-20	V
V _{EBO}	emitter-base voltage	open collector		-	-5	V
Ic	collector current			-	-2	Α
I _{CRM}	repetitive peak collector current	$\delta \leq 0.25$; Operated under pulsed conditions; $t_p \leq 100 \text{ ms}$		-	-3	А
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	-5	Α
I _B	base current			-	-0.5	Α
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	300	mW
			[2]	-	480	mW
			[3]	-	540	mW
			[1] [4]	-	1.2	W
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.
- Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm²
- Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².
- [4] Operated under pulsed conditions: pulse width $t_p \le 100$ ms; duty cycle $\delta \le 0.25$.

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R _{th(j-a)} thermal resistance from junction to ambient	thermal resistance from		[1]	-	-	417	K/W
	junction to ambient		[2]	-	-	260	K/W
			[3]	-	-	230	K/W
			[1] [4]	-	-	104	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
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².
- [4] Operated under pulsed conditions: pulse width $t_p \le 100$ ms; duty cycle $\delta \le 0.25$.

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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit	
І _{сво}	collector-base cut-off	V _{CB} = -20 V; I _E = 0 A; T _{amb} = 25 °C	-	-	-100	nA	
current		V _{CB} = -20 V; I _E = 0 A; T _j = 150 °C	-	-	-50	μΑ	
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 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	220	-	-		
		V _{CE} = -2 V; I _C = -500 mA; T _{amb} = 25 °C	220	-	-		
		V_{CE} = -2 V; I_{C} = -1 A; pulsed; t_{p} ≤ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	200	-	-		
		V_{CE} = -2 V; I_{C} = -2 A; pulsed; $t_{p} \le$ 300 µs; $\delta \le$ 0.02; T_{amb} = 25 °C	150	-	-		
		V_{CE} = -2 V; I_{C} = -3 A; pulsed; t_{p} ≤ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	100	-	-		
V _{CEsat}	collector-emitter saturation voltage	I _C = -500 mA; I _B = -50 mA; T _{amb} = 25 °C	-	-	-70	mV	
		$I_C = -1 \text{ A}; I_B = -50 \text{ mA}; T_{amb} = 25 ^{\circ}\text{C}$	-	-	-130	mV	
			I_C = -2 A; I_B = -100 mA; pulsed; t_p ≤ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	-230	mV
		I_C = -2 A; I_B = -200 mA; pulsed; $t_p \le$ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	-210	mV	
		I_C = -3 A; I_B = -300 mA; pulsed; $t_p \le$ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	-300	mV	
R _{CEsat}	collector-emitter saturation resistance	I_C = -2 A; I_B = -200 mA; pulsed; $t_p \le$ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	-	75	105	mΩ	
V _{BEsat}	base-emitter saturation voltage	I_C = -2 A; I_B = -100 mA; pulsed; $t_p \le$ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	-1.1	V	
		I_C = -3 A; I_B = -300 mA; pulsed; $t_p \le$ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	-1.2	V	
V_{BEon}	base-emitter turn-on voltage	V_{CE} = -2 V; I_{C} = -1 A; pulsed; t_{p} ≤ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C	-1.2	-	-	V	
f _τ	transition frequency	V_{CE} = -5 V; I_{C} = -100 mA; f = 100 MHz; T_{amb} = 25 °C	100	-	-	MHz	
C _c	collector capacitance	V _{CB} = -10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	-	50	pF	

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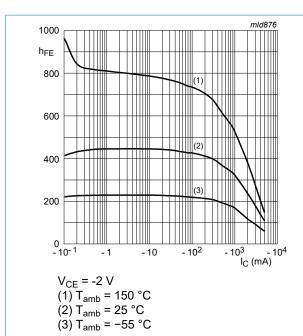


Fig. 1. DC current gain as a function of collector current; typical values

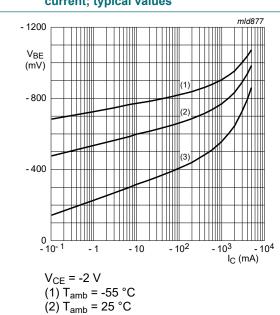
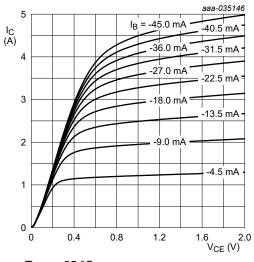


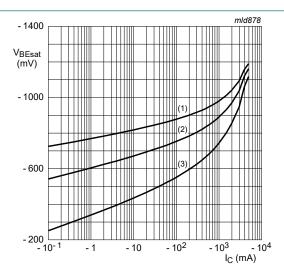
Fig. 3. Base-emitter voltage as a function of collector current; typical values

(3) $T_{amb} = 150 \, ^{\circ}C$



 T_{amb} = 25 °C

Fig. 2. Collector current as a function of collectoremitter voltage; typical values



 $I_{\rm C}/I_{\rm B} = 10$

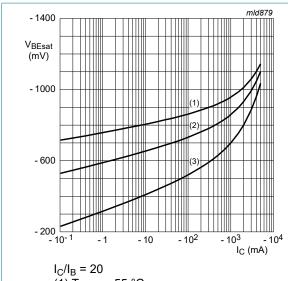
(1) $T_{amb} = -55$ °C

(2) $T_{amb} = 25 \, ^{\circ}C$

(3) $T_{amb} = 150 \, ^{\circ}C$

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

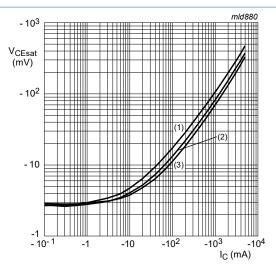
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$$(1) I_{amb} = -55$$

(3)
$$T_{amb} = 150 \, ^{\circ}C$$

Fig. 5. Base-emitter saturation voltage as a function of Fig. 6. collector current; typical values



$$I_{\rm C}/I_{\rm B} = 10$$

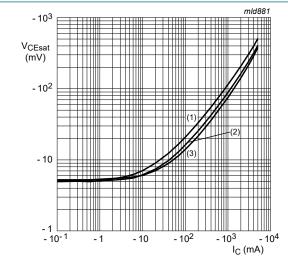
$$I_{C}/I_{B} = 10$$

(1) $T_{amb} = 150 \,^{\circ}C$
(2) $T_{amb} = 25 \,^{\circ}C$
(3) $T_{amb} = -55 \,^{\circ}C$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3)
$$T_{amb} = -55 \, ^{\circ}C$$

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



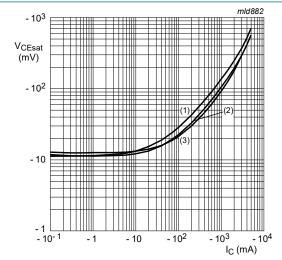
$$I_{\rm C}/I_{\rm B}=20$$

$$(1) T_{amb} = 150 °C$$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3)
$$T_{amb} = -55 \, ^{\circ}C$$

Collector-emitter saturation voltage as a Fig. 7. function of collector current; typical values



$$I_{\rm C}/I_{\rm B}=50$$

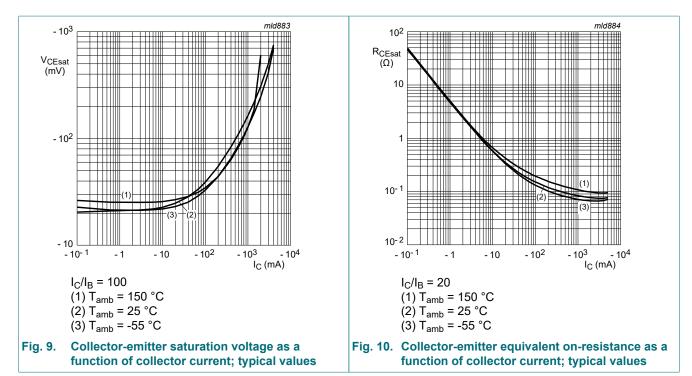
(1)
$$T_{amb} = 150 \, ^{\circ}C$$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

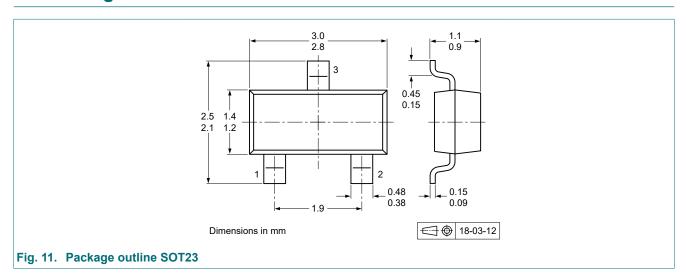
(3)
$$T_{amb} = -55 \, ^{\circ}C$$

Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

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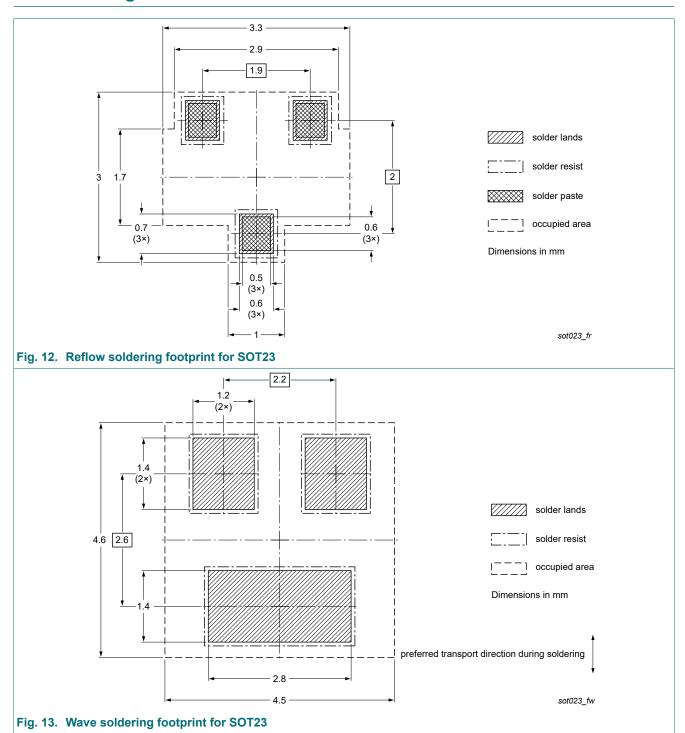


11. Package outline



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12. Soldering



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13. Revision history

Table 8. Revision history

Tuble 0. Revision history							
Data sheet ID	Release date	Data sheet status	Change notice	Supersedes			
PBSS5320T v.4	20230101	Product data sheet	-	PBSS5320T v.3			
Modifications:	 Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). Characteristics: Figure 2 added 						
PBSS5320T v.3	20220505	Product data sheet	-	PBSS5320T v.2			
PBSS5320T v.2	20040115			PBSS5320T v.1			
PBSS5320T v.1	20020808	Product data sheet	-	-			

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14. 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.

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