



PBSS5240T

40 V, 2 A PNP low V_{CEsat} transistor

1 January 2023

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: PBSS4240T

2. Features and benefits

- Low collector-emitter saturation voltage
- High current capability
- Improved device reliability due to reduced heat generation

3. Applications

- Supply line switching circuits
- Battery management applications
- DC/DC converter applications
- Strobe flash units
- Heavy duty battery powered equipment (motor and lamp drivers)

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	-40	V
I _C	collector current		-	-	-2	A
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms	-	-	-3	A
R _{CEsat}	collector-emitter saturation resistance	I _C = -500 mA; I _B = -50 mA; T _{amb} = 25 °C [1]	-	140	220	mΩ

[1] Device mounted on a printed-circuit board, single sided copper, tin plated, standard footprint.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SOT23	 sym132
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5240T	SOT23	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]
PBSS5240T	ZF%

[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		-	-40	V
V _{CEO}	collector-emitter voltage	open base		-	-40	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 ≤ 1 ms		-	-3	A
I _{BM}	peak base current			-	-300	mA
P _{tot}	total power dissipation	T _{amb} ≤ 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 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
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100\ \mu\text{A}$; $I_E = 0\ \text{A}$	-40	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10\ \text{mA}$; $I_B = 0\ \text{A}$	-40	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage (collector open)	$I_E = -100\ \mu\text{A}$; $I_C = 0\ \text{A}$	-5	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = -30\ \text{V}$; $I_E = 0\ \text{A}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-	-100	nA
		$V_{CB} = -30\ \text{V}$; $I_E = 0\ \text{A}$; $T_j = 150\ ^\circ\text{C}$	-	-	-50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -4\ \text{V}$; $I_C = 0\ \text{A}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-	-100	nA
h_{FE}	DC current gain	$V_{CE} = -2\ \text{V}$; $I_C = -100\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	300	450	-	
		$V_{CE} = -2\ \text{V}$; $I_C = -500\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	260	350	-	
		$V_{CE} = -2\ \text{V}$; $I_C = -1\ \text{A}$; $T_{amb} = 25\ ^\circ\text{C}$	210	290	-	
		$V_{CE} = -2\ \text{V}$; $I_C = -2\ \text{A}$; $T_{amb} = 25\ ^\circ\text{C}$	100	180	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -100\ \text{mA}$; $I_B = -1\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-55	-100	mV
		$I_C = -500\ \text{mA}$; $I_B = -50\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-70	-110	mV
		$I_C = -750\ \text{mA}$; $I_B = -15\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-140	-225	mV
		$I_C = -1\ \text{A}$; $I_B = -50\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-140	-225	mV
		$I_C = -2\ \text{A}$; $I_B = -200\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-240	-350	mV
R_{CEsat}	collector-emitter saturation resistance	$I_C = -500\ \text{mA}$; $I_B = -50\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$ [1]	-	140	220	m Ω
V_{BEsat}	base-emitter saturation voltage	$I_C = -2\ \text{A}$; $I_B = -200\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-	-1.1	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = -2\ \text{V}$; $I_C = -100\ \text{mA}$; $T_{amb} = 25\ ^\circ\text{C}$	-	-	-0.75	V
f_T	transition frequency	$V_{CE} = -10\ \text{V}$; $I_C = -100\ \text{mA}$; $f = 100\ \text{MHz}$; $T_{amb} = 25\ ^\circ\text{C}$	100	200	-	MHz
C_c	collector capacitance	$V_{CB} = -10\ \text{V}$; $I_E = 0\ \text{A}$; $i_e = 0\ \text{A}$; $f = 1\ \text{MHz}$; $T_{amb} = 25\ ^\circ\text{C}$	-	23	28	pF

[1] Device mounted on a printed-circuit board, single sided copper, tin plated, standard footprint.

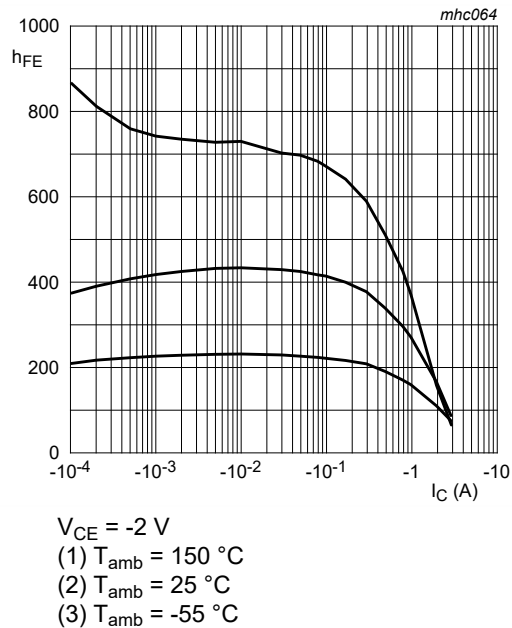


Fig. 1. DC current gain as a function of collector current; typical values

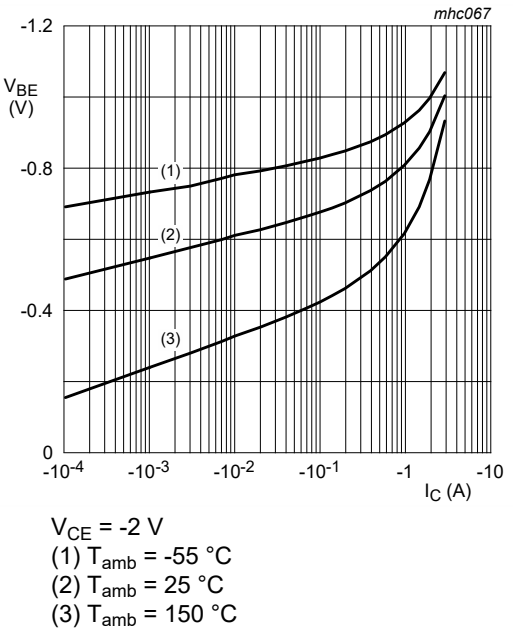


Fig. 2. Base-emitter voltage as a function of collector current; typical values

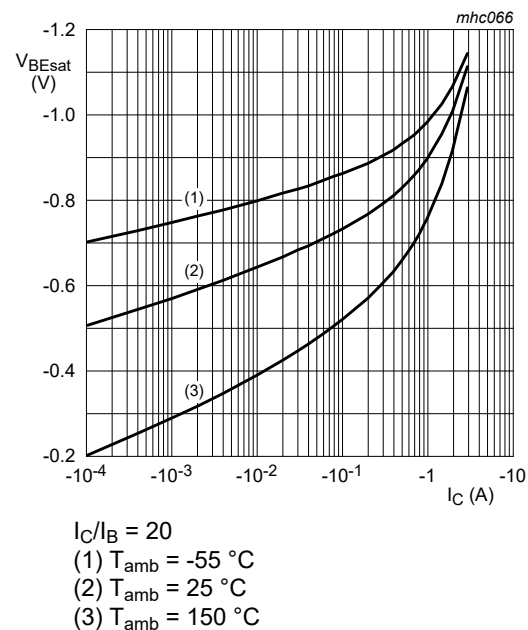


Fig. 3. Base-emitter saturation voltage as a function of collector current; typical values

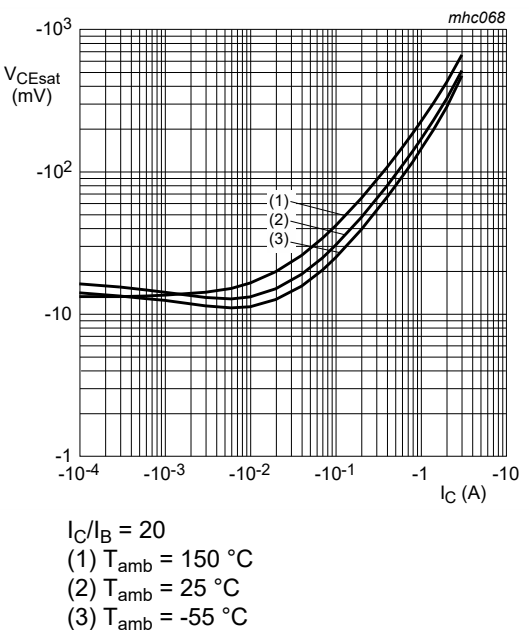
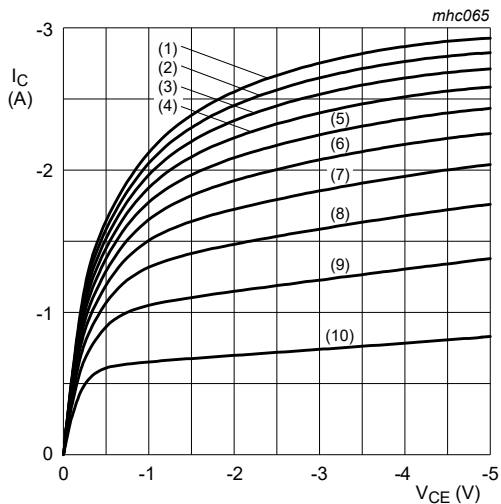
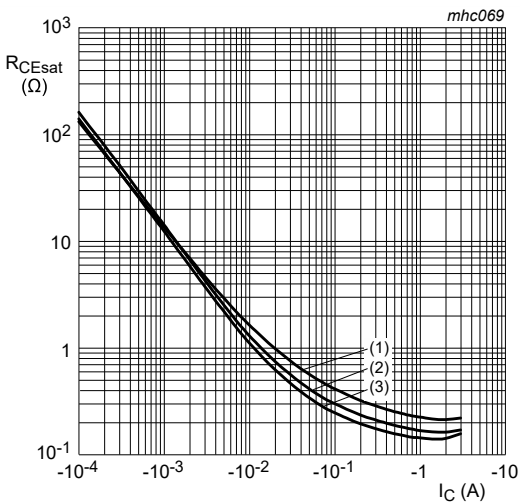


Fig. 4. Collector-emitter saturation voltage as a function of collector current; typical values



- (1) $I_B = -23.0 \text{ mA}$
- (2) $I_B = -20.7 \text{ mA}$
- (3) $I_B = -18.4 \text{ mA}$
- (4) $I_B = -16.1 \text{ mA}$
- (5) $I_B = -13.8 \text{ mA}$
- (6) $I_B = -11.5 \text{ mA}$
- (7) $I_B = -9.2 \text{ mA}$
- (8) $I_B = -6.9 \text{ mA}$
- (9) $I_B = -4.6 \text{ mA}$
- (10) $I_B = -2.3 \text{ mA}$

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



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

Fig. 6. Collector-emitter saturation resistance as a function of collector current; typical values

11. Package outline

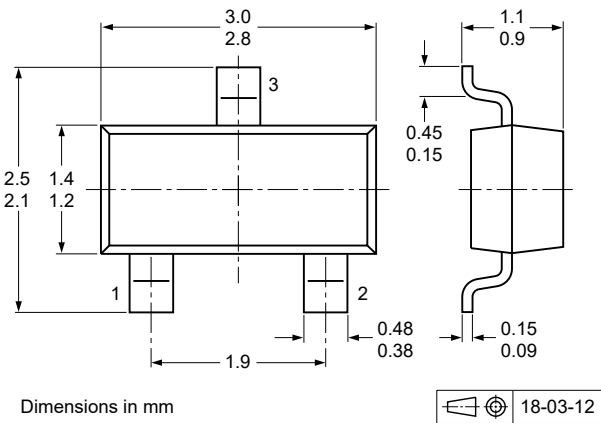


Fig. 7. Package outline SOT23

12. Soldering

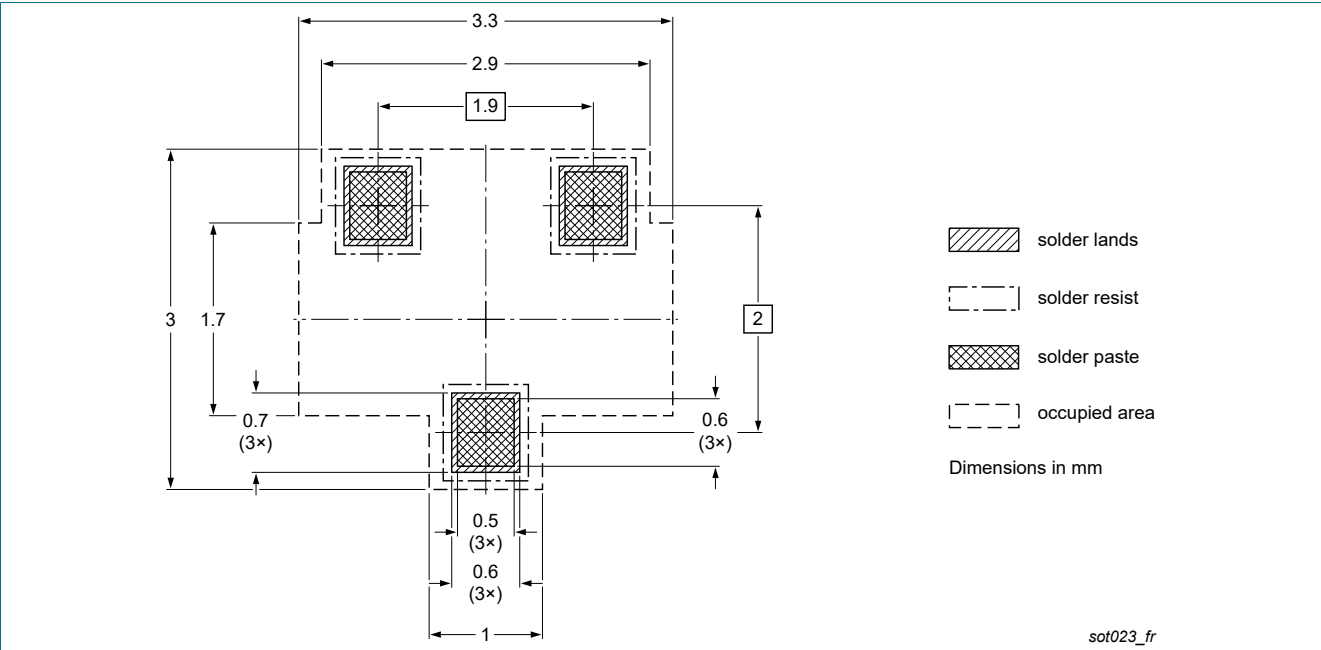


Fig. 8. Reflow soldering footprint for SOT23

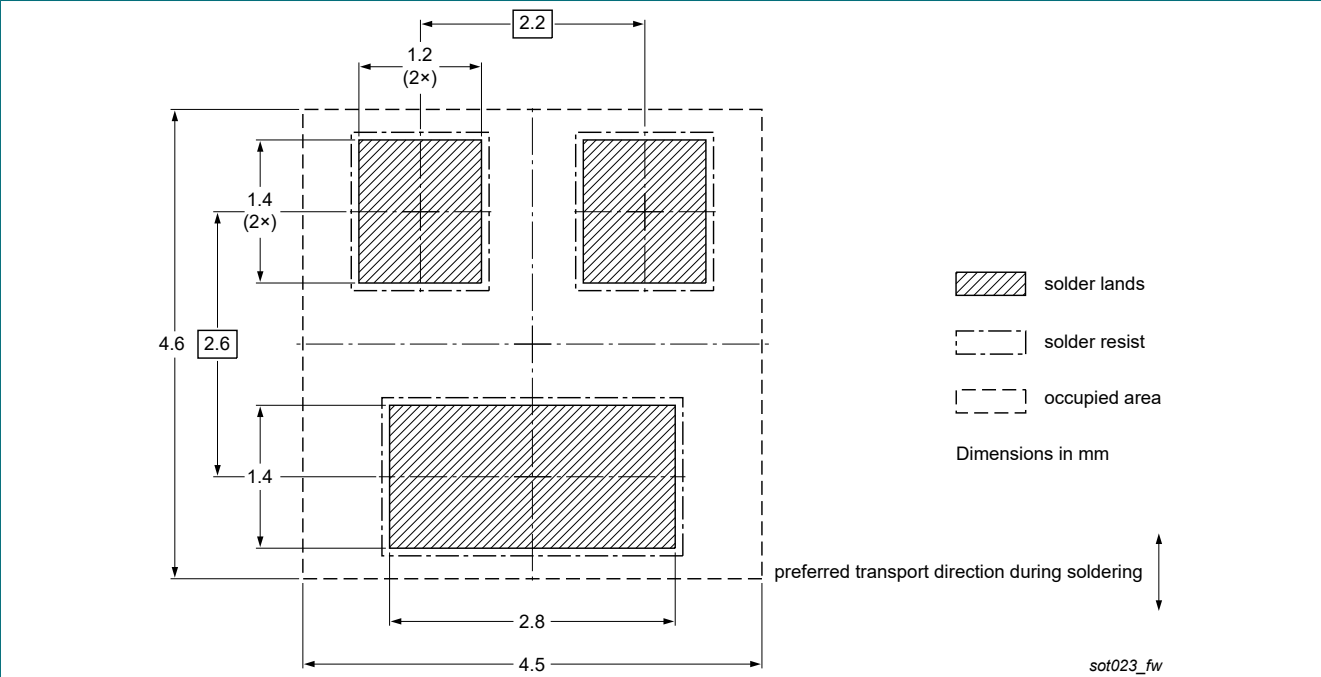


Fig. 9. Wave soldering footprint for SOT23

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5240T v.3	20230101	Product data sheet	-	PBSS5240T v.2
Modifications:	• Characteristics: breakdown voltages added • Characteristics: R_{CEsat} typical value changed • Characteristics figures: scales changed from mA to A and mV to V; no change of curves. • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
PBSS5240T v.2	20040115	Product data sheet	-	PBSS5240T v.1
PBSS5240T v.1	20011031	Product data sheet	-	-

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.

- [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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