



PBSS5240T-Q

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

3 January 2022

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-Q

2. Features and benefits

- Low collector-emitter saturation voltage
- High current capability
- Improved device reliability due to reduced heat generation
- Qualified according to AEC-Q101 and recommended for use in automotive applications

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

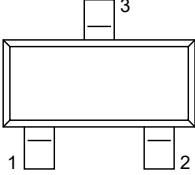
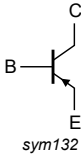
Table 1. Quick reference data

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	 <p style="text-align: center;">SOT23</p>	
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5240T-Q	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-Q	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; $t_p \leq 1$ 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		-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.

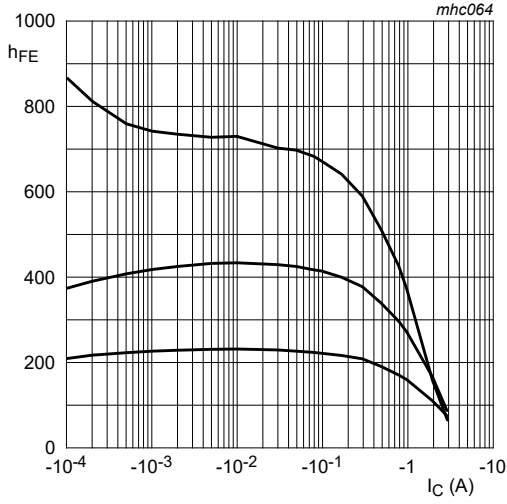
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

10. Characteristics

Table 7. Characteristics

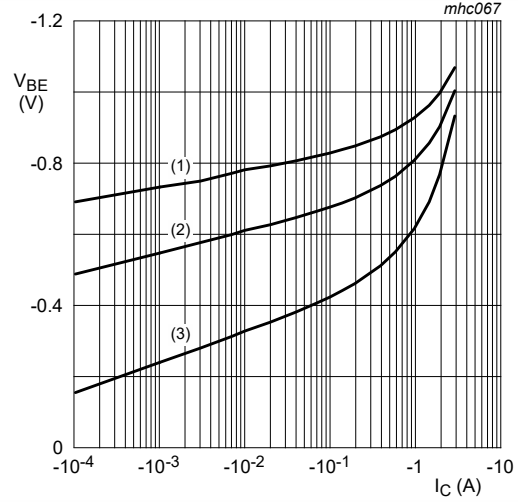
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100 \mu A$; $I_E = 0 A$		-40	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10 mA$; $I_B = 0 A$		-40	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage (collector open)	$I_E = -100 \mu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

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



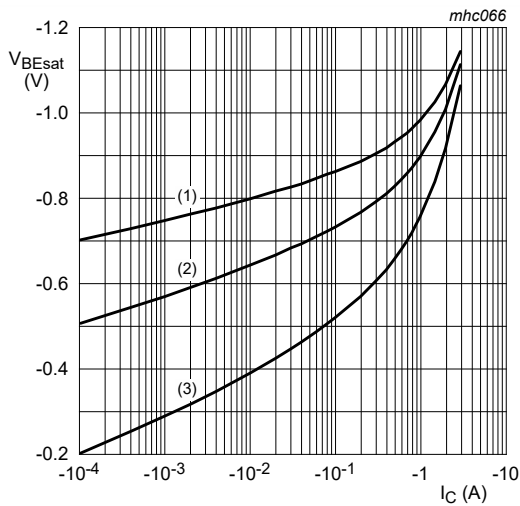
$V_{CE} = -2 \text{ V}$
 (1) $T_{amb} = 150 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

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



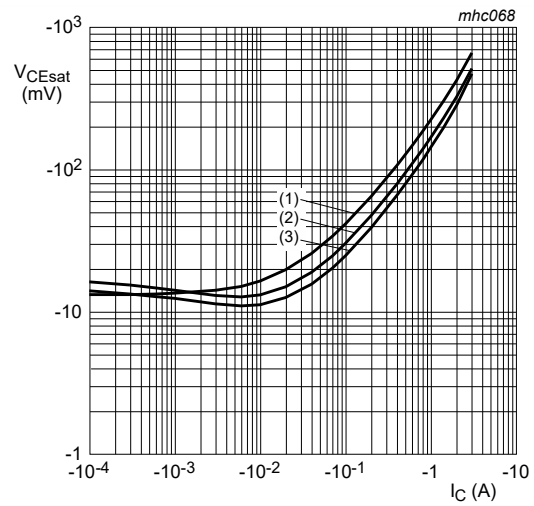
$V_{CE} = -2 \text{ V}$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 150 \text{ }^\circ\text{C}$

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



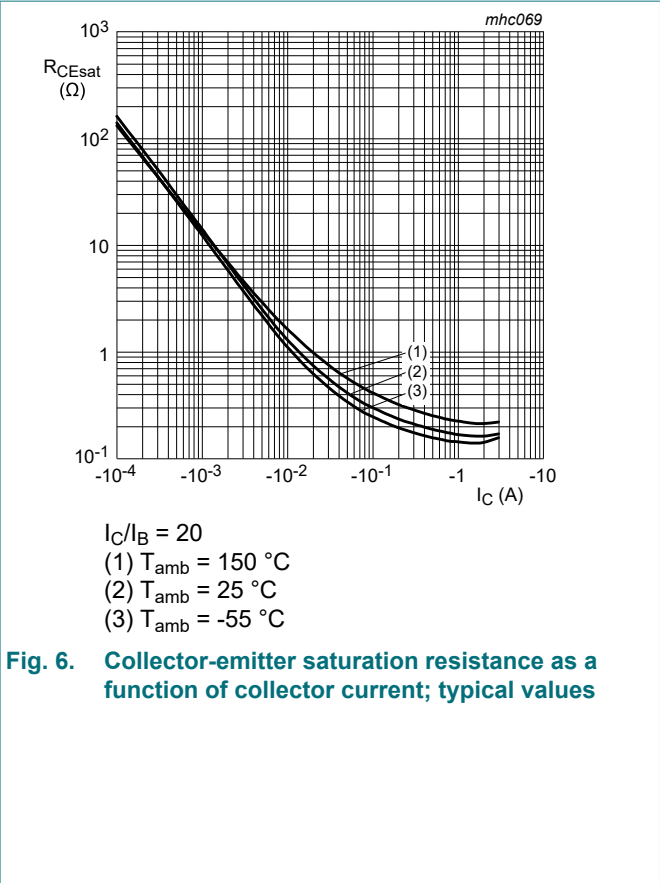
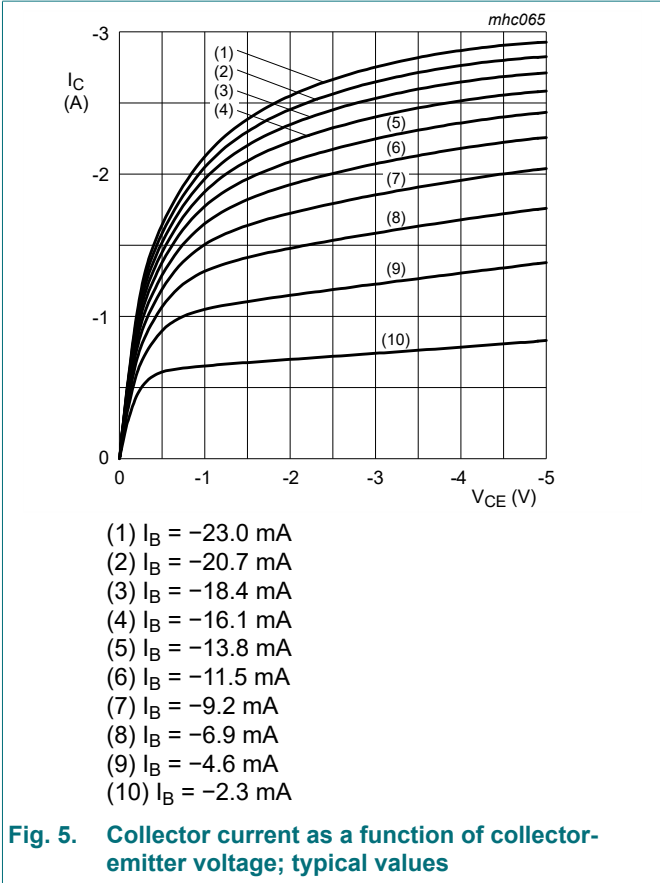
$I_C/I_B = 20$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 150 \text{ }^\circ\text{C}$

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



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

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

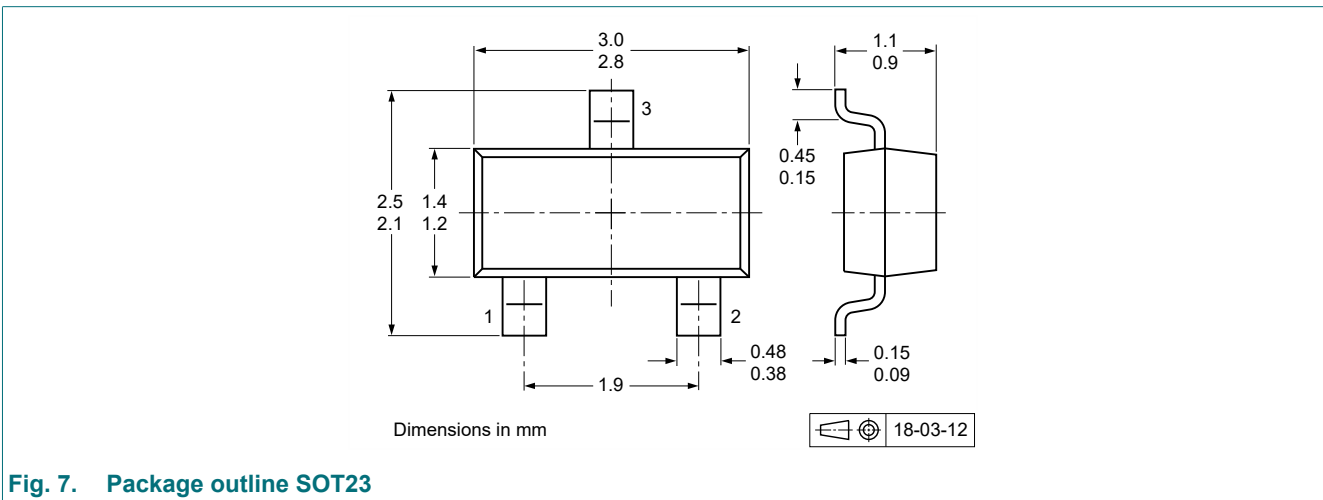


11. Test information

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

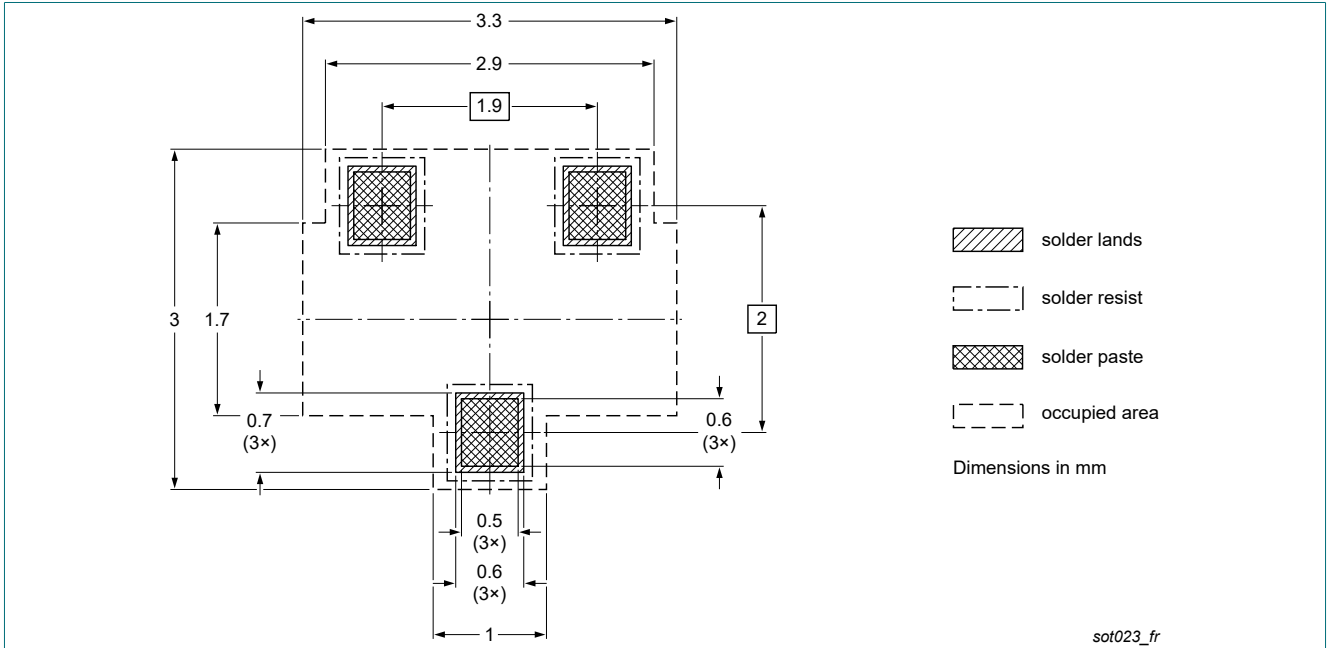


Fig. 8. Reflow soldering footprint for SOT23

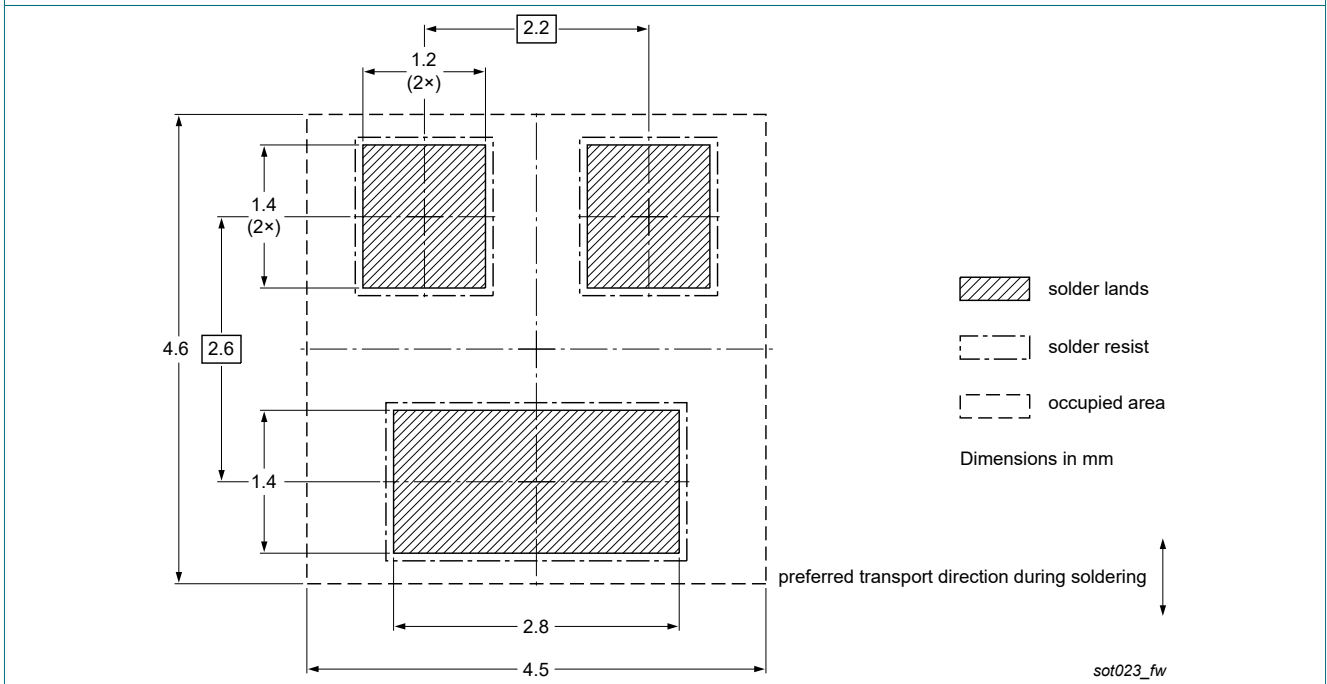


Fig. 9. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5240T-Q v.1	20220103	Product data sheet	-	-

15. 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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- [2] The term 'short data sheet' is explained in section "Definitions".
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