



# PBSS4240T-Q

40 V; 2 A NPN low V<sub>CEsat</sub> transistor

13 May 2022

Product data sheet

## 1. General description

NPN low V<sub>CEsat</sub> transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

PNP complement: PBSS5240T-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 <sub>CEO</sub>	collector-emitter voltage	open base	-	-	40	V
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms	-	-	3	A
R <sub>CEsat</sub>	collector-emitter saturation resistance	I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C	-	140	200	mΩ

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	<p>SOT23</p>	<p>sym123</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">PBSS4240T-Q</a>	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	<a href="#">SOT23</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PBSS4240T-Q	ZE%

[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 cm<sup>2</sup>.

## 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 cm<sup>2</sup>.

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	100	nA
		$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	-	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 2\text{ V}; I_C = 100\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	350	470	-	
		$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	300	450	-	
		$V_{CE} = 2\text{ V}; I_C = 1\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	300	420	-	
		$V_{CE} = 2\text{ V}; I_C = 2\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	150	250	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 1\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	45	70	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	70	100	mV
		$I_C = 750\text{ mA}; I_B = 15\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	120	180	mV
		$I_C = 1\text{ A}; I_B = 50\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	130	180	mV
		$I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	240	320	mV
$R_{CEsat}$	collector-emitter saturation resistance	$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	140	200	m $\Omega$
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	1.1	V
$V_{BEon}$	base-emitter turn-on voltage	$V_{CE} = 2\text{ V}; I_C = 100\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	0.75	V
$f_T$	transition frequency	$V_{CE} = 10\text{ V}; I_C = 100\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	100	230	-	MHz
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	-	15	20	pF

## 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

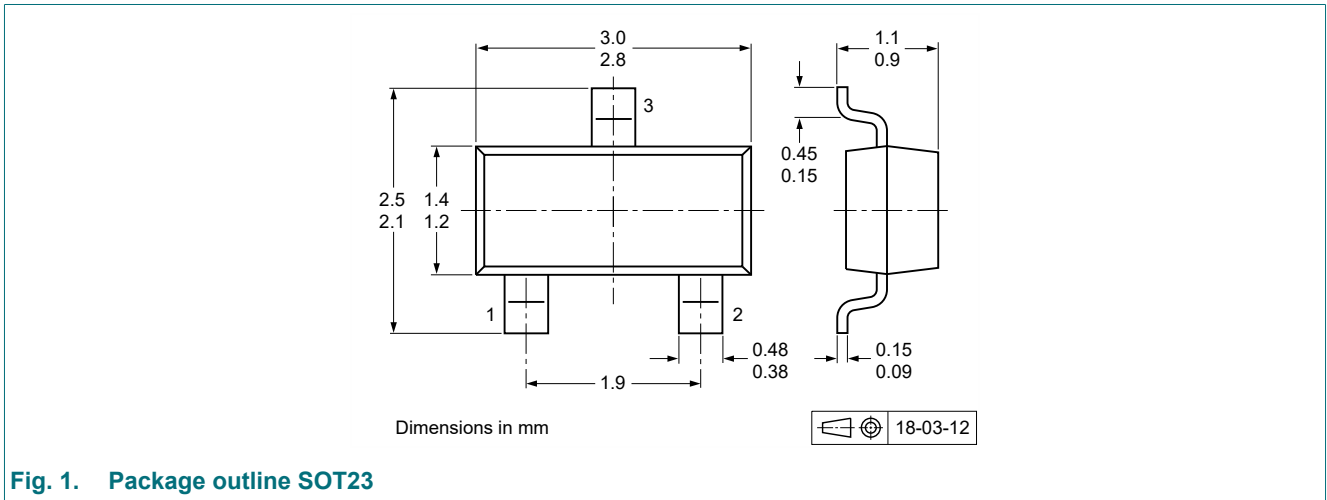


Fig. 1. Package outline SOT23

## 13. Soldering

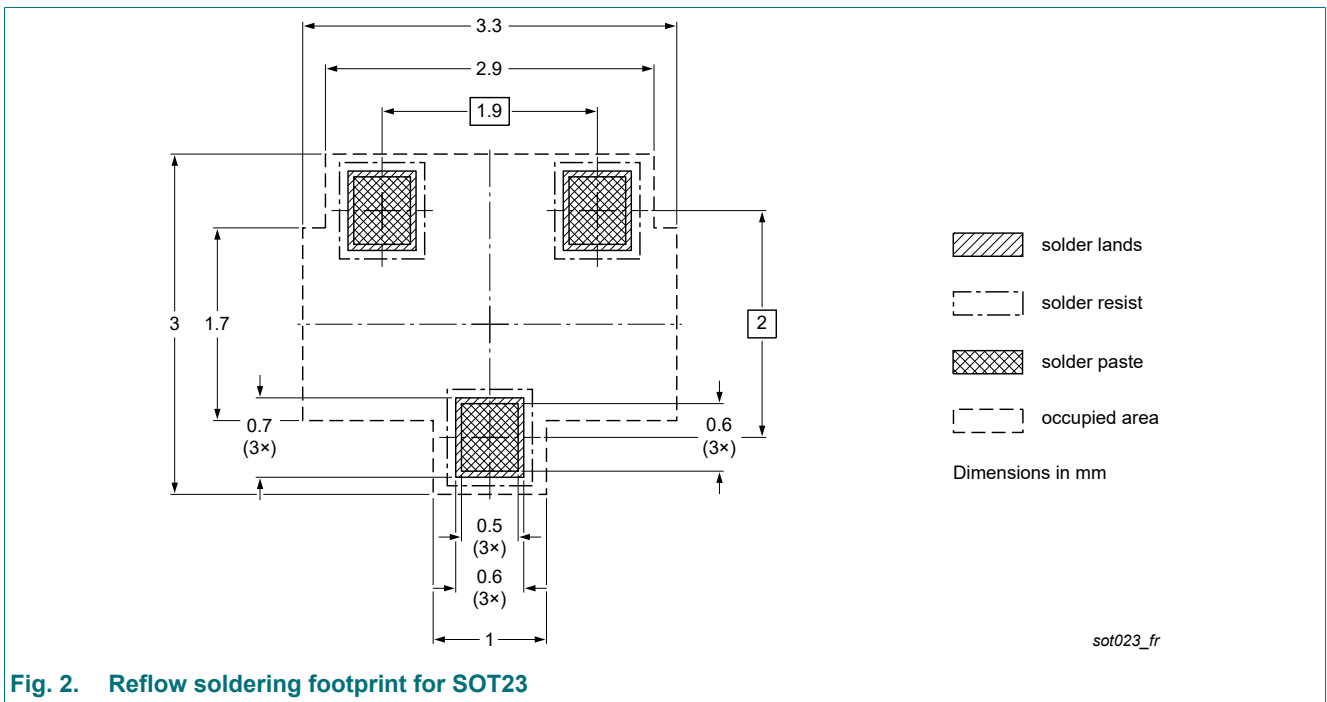


Fig. 2. Reflow soldering footprint for SOT23

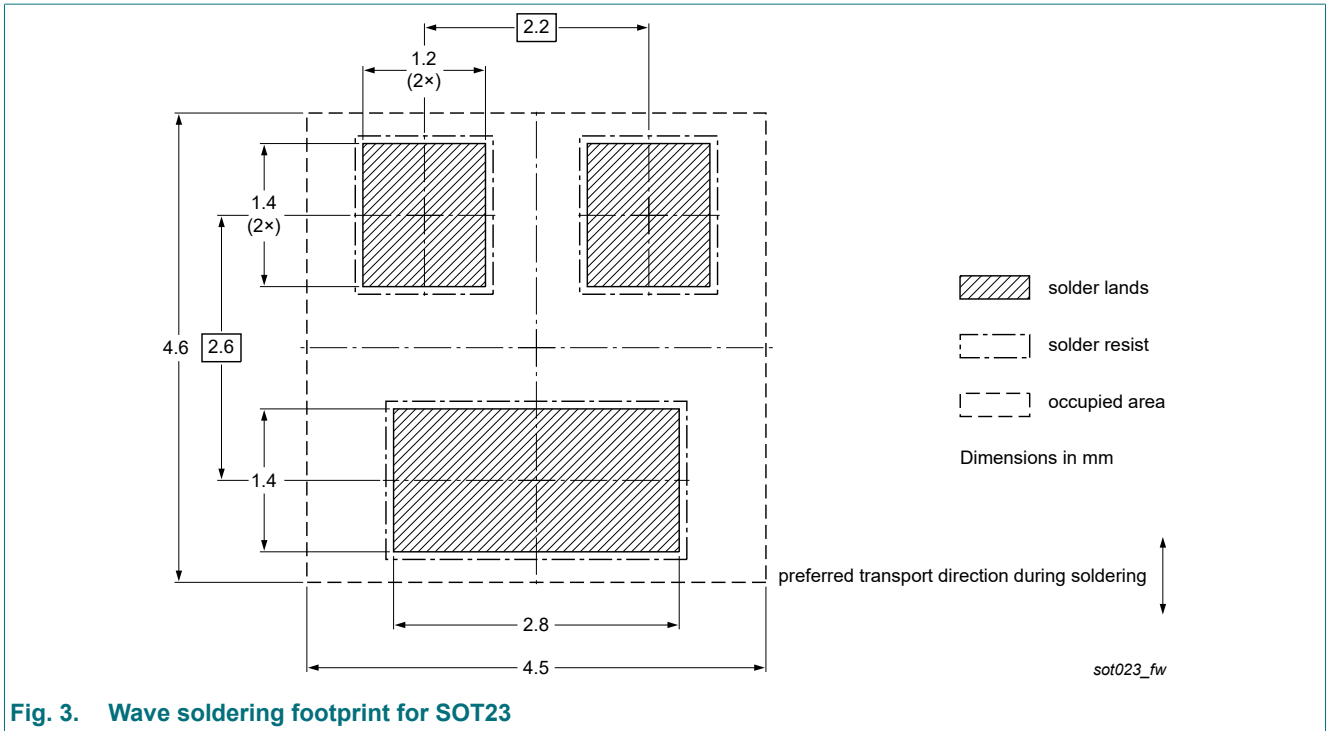


Fig. 3. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4240T-Q v.1	20220513	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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