

ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number: PBSS5540Z-QF
Manufacturer: Nexperia USA Inc.
Package: TO-261-4, TO-261AA
Availability: Please confirm with sales

Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/pbss5540z-qf.html>

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Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



PBSS5540Z-Q

40 V low V_{CEsat} PNP transistor

30 November 2021

Product data sheet

1. General description

PNP low V_{CEsat} transistor in a SOT223 plastic package.

NPN complement: PBSS4540Z-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)
- MOSFET driver applications.

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		-	-	-5	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	-10	A
R_{CEsat}	collector-emitter saturation resistance	$I_C = -2$ A; $I_B = -200$ mA; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_{amb} = 25$ °C	-	55	80	m Ω

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	SC-73 (SOT223)	sym132
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5540Z-Q	SC-73	plastic, surface-mounted package with increased heatsink; 4 leads; 2.3 mm pitch; 6.5 mm x 3.5 mm x 1.65 mm body	SOT223

7. Marking

Table 4. Marking codes

Type number	Marking code
PBSS5540Z-Q	PB5540

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		-	-6	V
I _C	collector current			-	-5	A
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	-10	A
I _{BM}	peak base current			-	-2	A
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	1.35	W
			[2]	-	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, mounting pad for collector 1 cm².
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 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]	-	-	92	K/W
			[2]	-	-	62	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 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	$I_C = -10\ \text{mA}$; $I_B = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-40	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage (collector open)	$I_E = -100\ \mu\text{A}$; $I_B = 0\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-6	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = -30\ \text{V}$; $I_E = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	-	-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	$V_{EB} = -5\ \text{V}$; $I_C = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	-	-100	nA
h_{FE}	DC current gain	$V_{CE} = -2\ \text{V}$; $I_C = -500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	250	350	-	
		$V_{CE} = -2\ \text{V}$; $I_C = -1\ \text{A}$; pulsed; $t_p \leq 300\ \mu\text{s}$; $\delta \leq 0.02$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	200	300	-	
		$V_{CE} = -2\ \text{V}$; $I_C = -2\ \text{A}$; pulsed; $t_p \leq 300\ \mu\text{s}$; $\delta \leq 0.02$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	150	250	-	
		$V_{CE} = -2\ \text{V}$; $I_C = -5\ \text{A}$; pulsed; $t_p \leq 300\ \mu\text{s}$; $\delta \leq 0.02$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	50	150	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -500\ \text{mA}$; $I_B = -5\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	-80	-120	mV
		$I_C = -1\ \text{A}$; $I_B = -10\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	-120	-170	mV
		$I_C = -2\ \text{A}$; $I_B = -200\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	-110	-160	mV
		$I_C = -5\ \text{A}$; $I_B = -500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	-250	-375	mV
R_{CEsat}	collector-emitter saturation resistance	$I_C = -2\ \text{A}$; $I_B = -200\ \text{mA}$; pulsed; $t_p \leq 300\ \mu\text{s}$; $\delta \leq 0.02$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	55	80	m Ω
V_{BEsat}	base-emitter saturation voltage	$I_C = -5\ \text{A}$; $I_B = -500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	-	-1.3	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = -2\ \text{V}$; $I_C = -2\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	-0.8	-1.25	V
f_T	transition frequency	$V_{CE} = -10\ \text{V}$; $I_C = -100\ \text{mA}$; $f = 100\ \text{MHz}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	60	120	-	MHz
C_c	collector capacitance	$V_{CB} = -10\ \text{V}$; $I_E = 0\ \text{A}$; $i_e = 0\ \text{A}$; $f = 1\ \text{MHz}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	-	90	105	pF

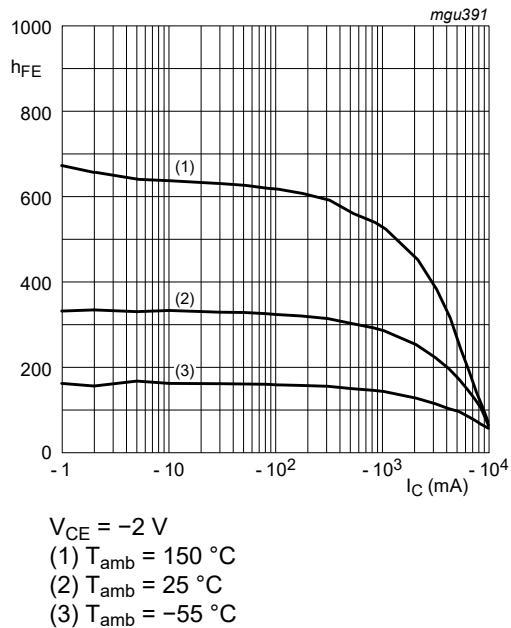


Fig. 1. DC current gain as a function of collector current; typical values

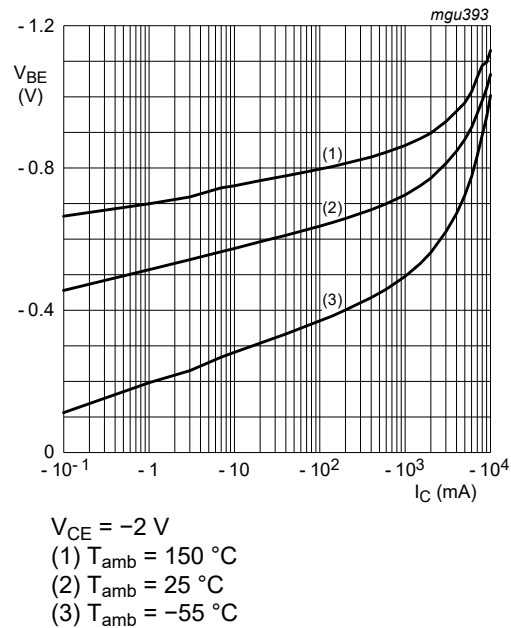


Fig. 2. Base-emitter voltage as a function of collector current; typical values

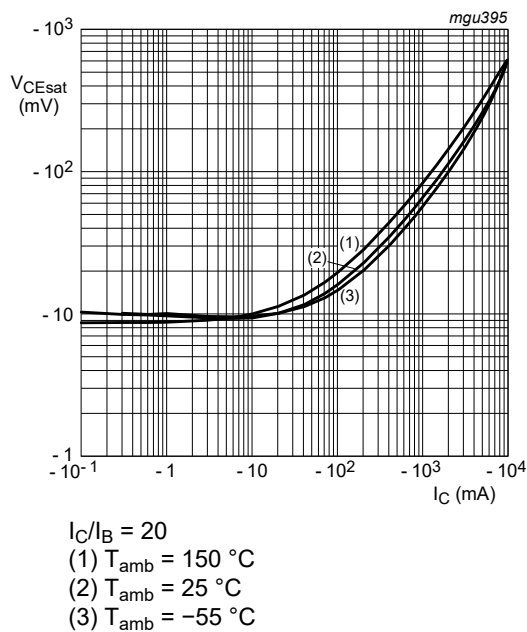


Fig. 3. Collector-emitter saturation voltage as a function of collector current; typical values

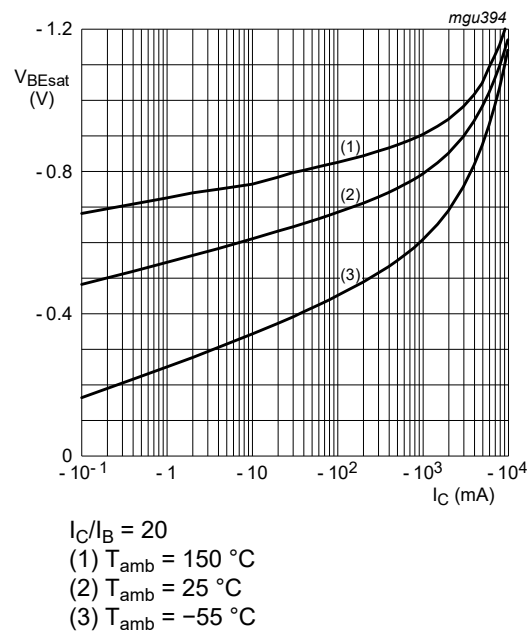
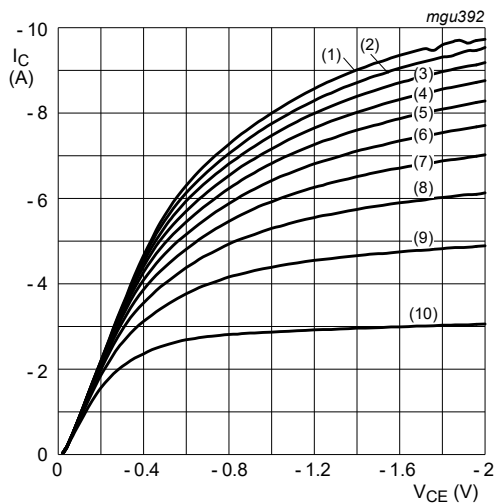
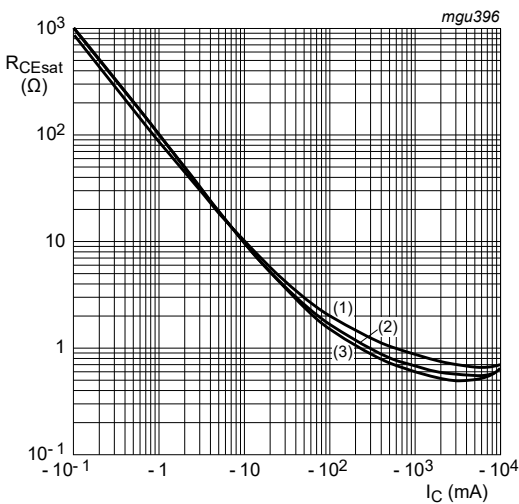


Fig. 4. Base-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ }^{\circ}\text{C}$
(1) $I_B = -150\text{ mA}$
(2) $I_B = -135\text{ mA}$
(3) $I_B = -120\text{ mA}$
(4) $I_B = -105\text{ mA}$
(5) $I_B = -90\text{ mA}$
(6) $I_B = -75\text{ mA}$
(7) $I_B = -60\text{ mA}$
(8) $I_B = -45\text{ mA}$
(9) $I_B = -30\text{ mA}$
(10) $I_B = -15\text{ mA}$

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



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

Fig. 6. Collector-emitter equivalent on-resistance 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

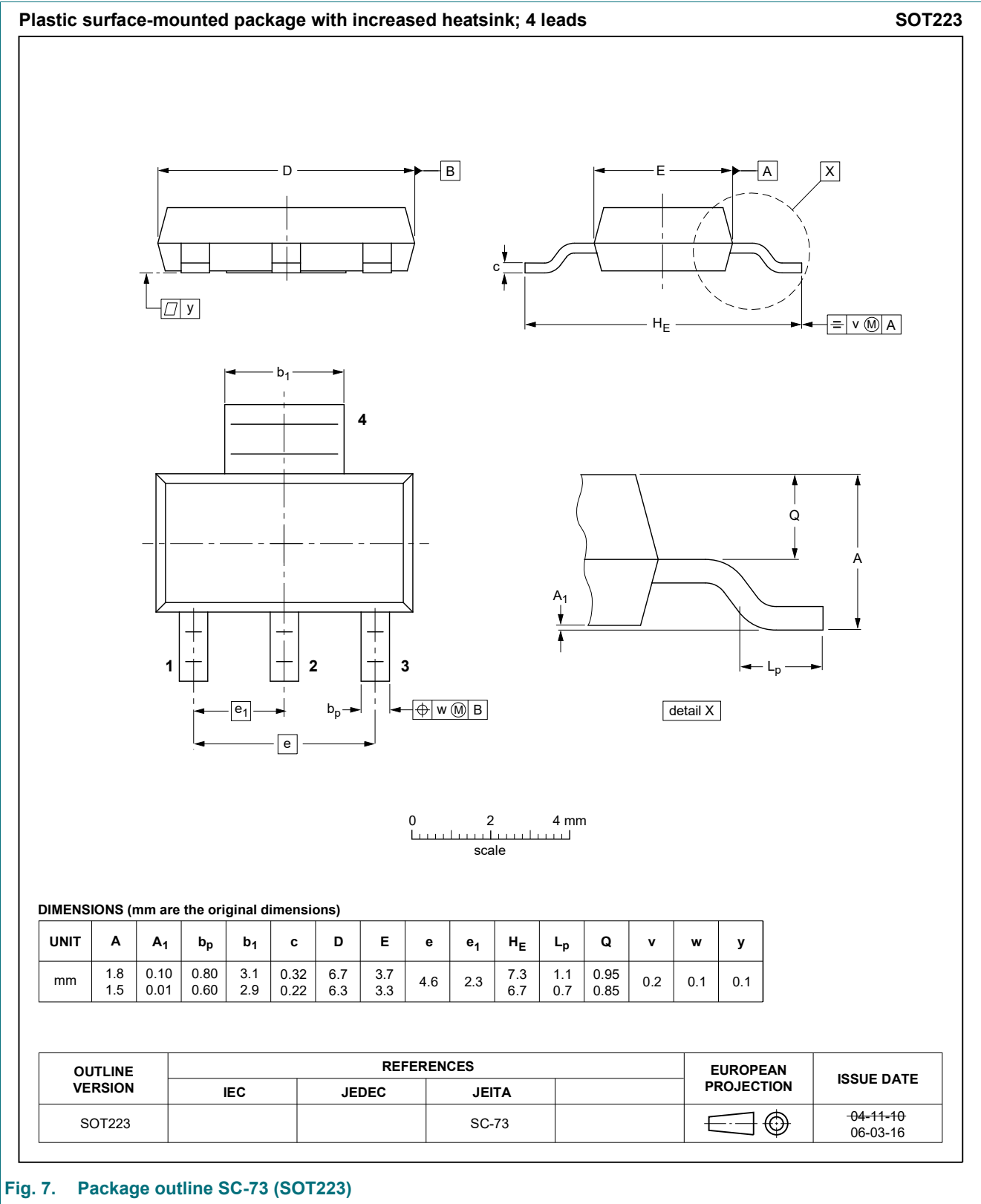
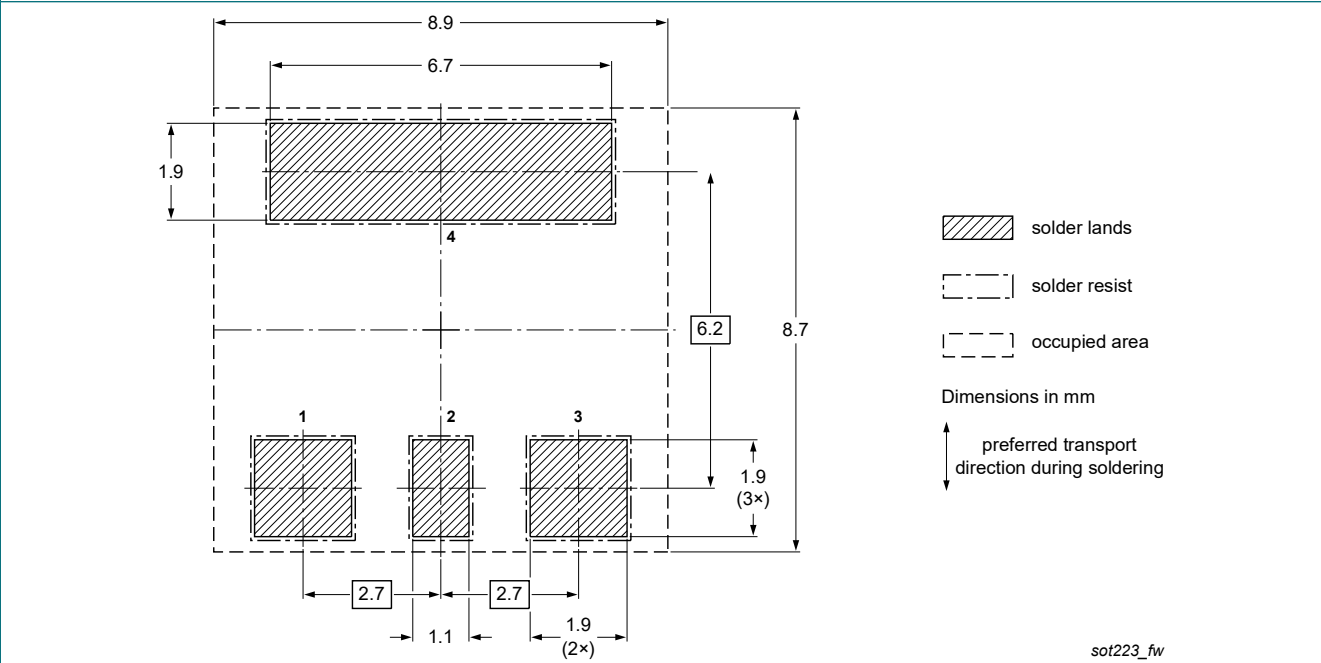
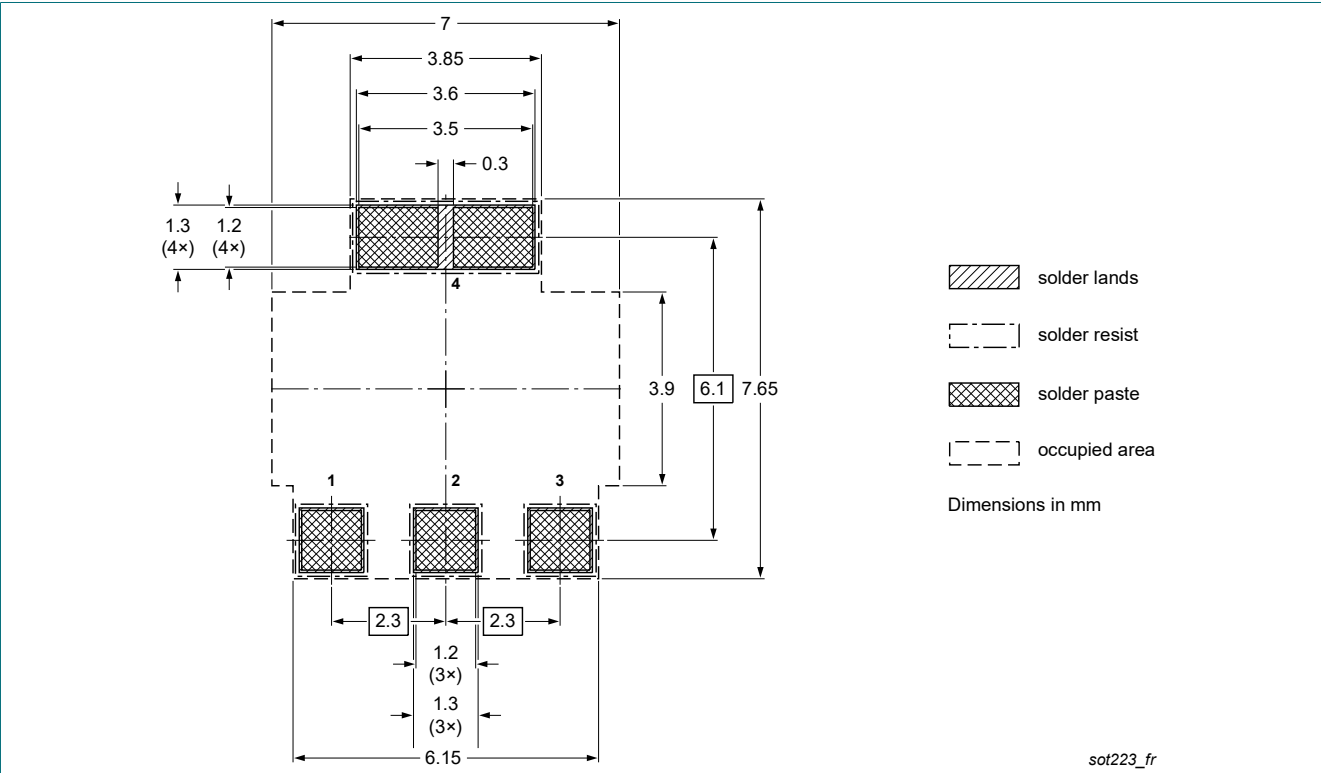


Fig. 7. Package outline SC-73 (SOT223)

13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5540Z-Q v.1	20211130	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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