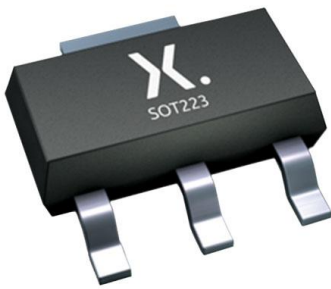


# PBSS5540Z-QX Datasheet

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DiGi Electronics Part Number	PBSS5540Z-QX-DG
Manufacturer	<a href="#">Nexperia USA Inc.</a>
Manufacturer Product Number	PBSS5540Z-QX
Description	PBSS5540Z-Q/SOT223/SC-73
Detailed Description	Bipolar (BJT) Transistor PNP 40 V 5 A 120MHz 1.35 W Surface Mount SOT-223



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RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

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## Purchase and inquiry

Manufacturer Product Number:

PBSS5540Z-QX

Series:

-

Transistor Type:

PNP

Voltage - Collector Emitter Breakdown (Max):

40 V

Current - Collector Cutoff (Max):

100nA (ICBO)

Power - Max:

1.35 W

Operating Temperature:

150°C (TJ)

Qualification:

AEC-Q101

Package / Case:

TO-261-4, TO-261AA

Manufacturer:

Nexperia USA Inc.

Product Status:

Active

Current - Collector (Ic) (Max):

5 A

Vce Saturation (Max) @ Ib, Ic:

375mV @ 500mA, 5A

DC Current Gain (hFE) (Min) @ Ic, Vce:

250 @ 500mA, 2V

Frequency - Transition:

120MHz

Grade:

Automotive

Mounting Type:

Surface Mount

Supplier Device Package:

SOT-223

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

ECCN:

EAR99

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0075



# 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; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_{amb} = 25$ °C	-	55	80	m $\Omega$

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	<p>SC-73 (SOT223)</p>	<p>sym132</p>
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; $t_p \leq 1$ ms	-	-10	A	
$I_{BM}$	peak base current		-	-2	A	
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °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 cm<sup>2</sup>.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 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]	-	-	92	K/W
			[2]	-	-	62	K/W

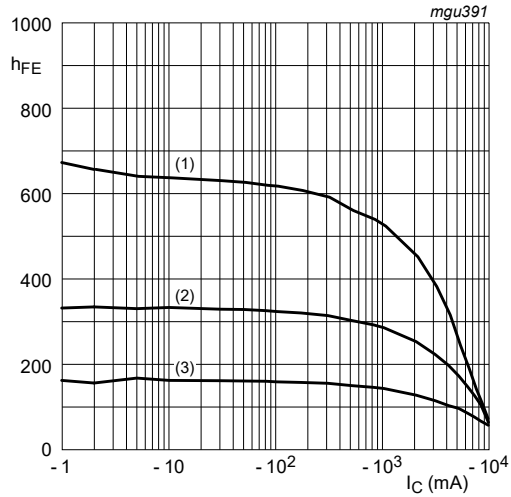
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.

## 10. Characteristics

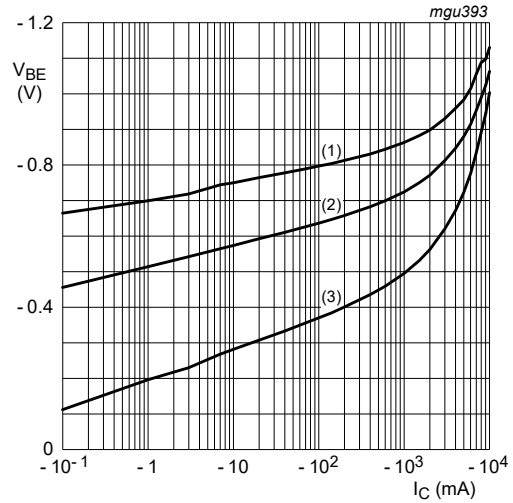
Table 7. Characteristics

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



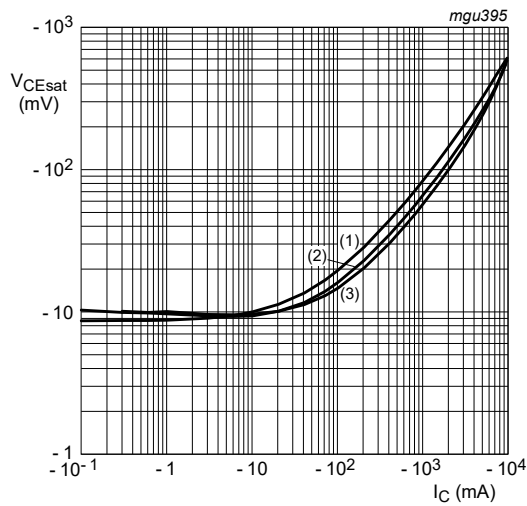
$V_{CE} = -2\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



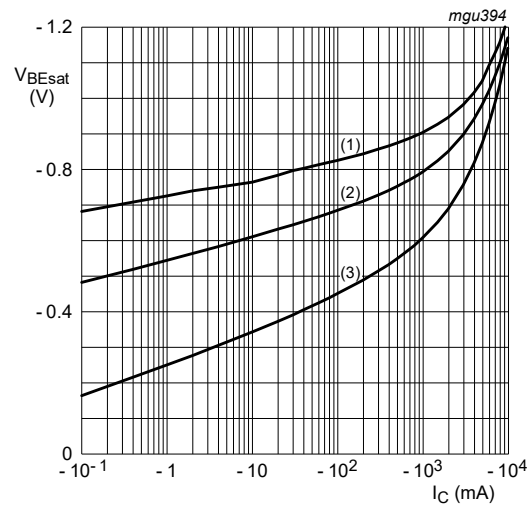
$V_{CE} = -2\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



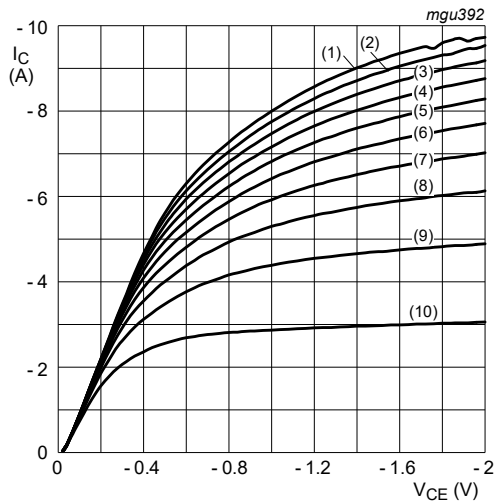
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



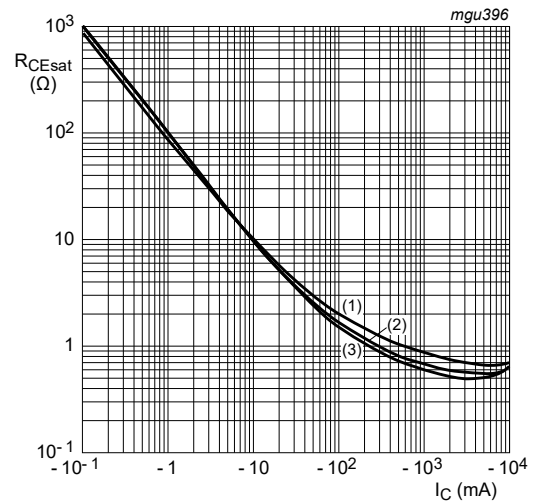
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

**Fig. 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

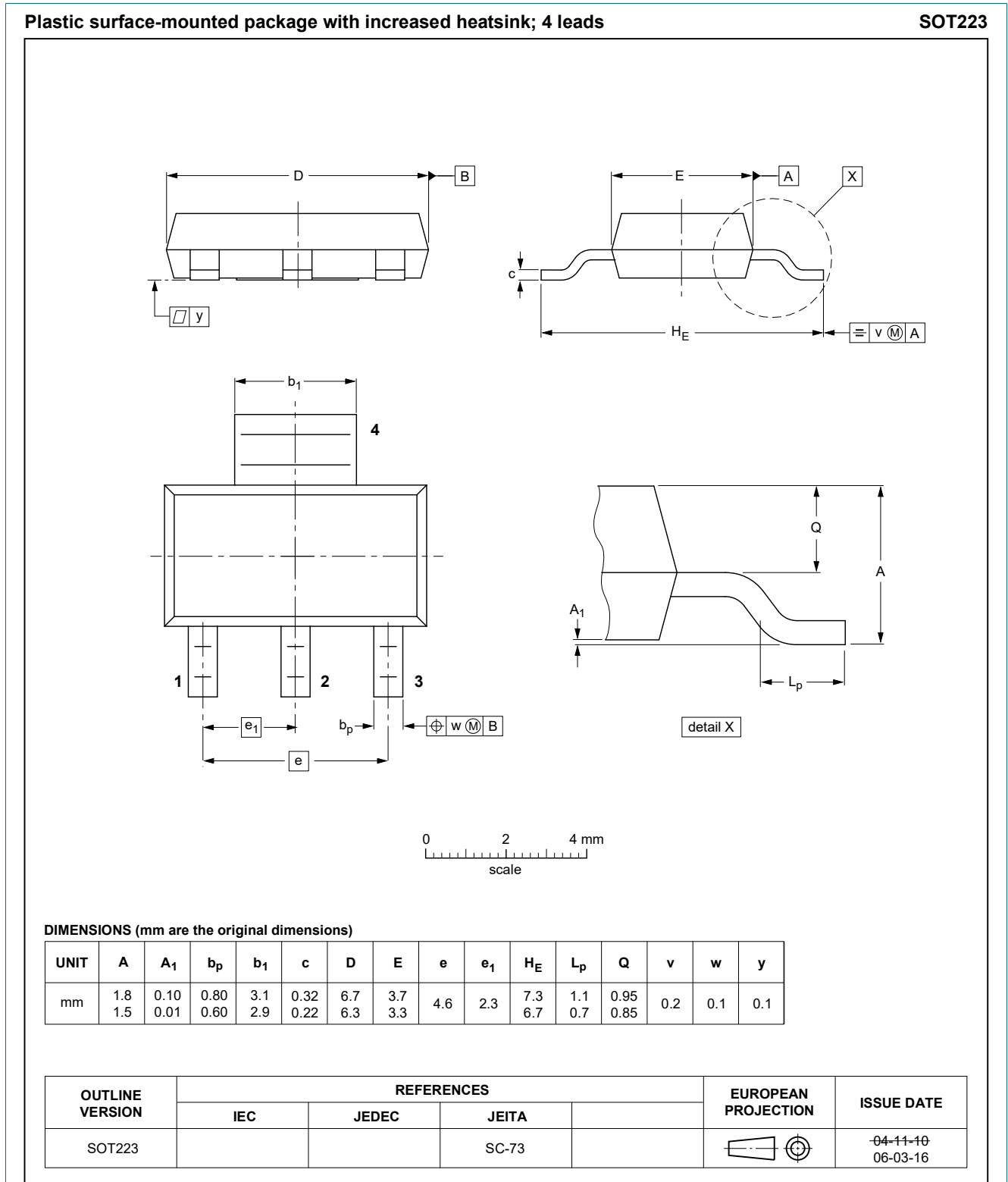
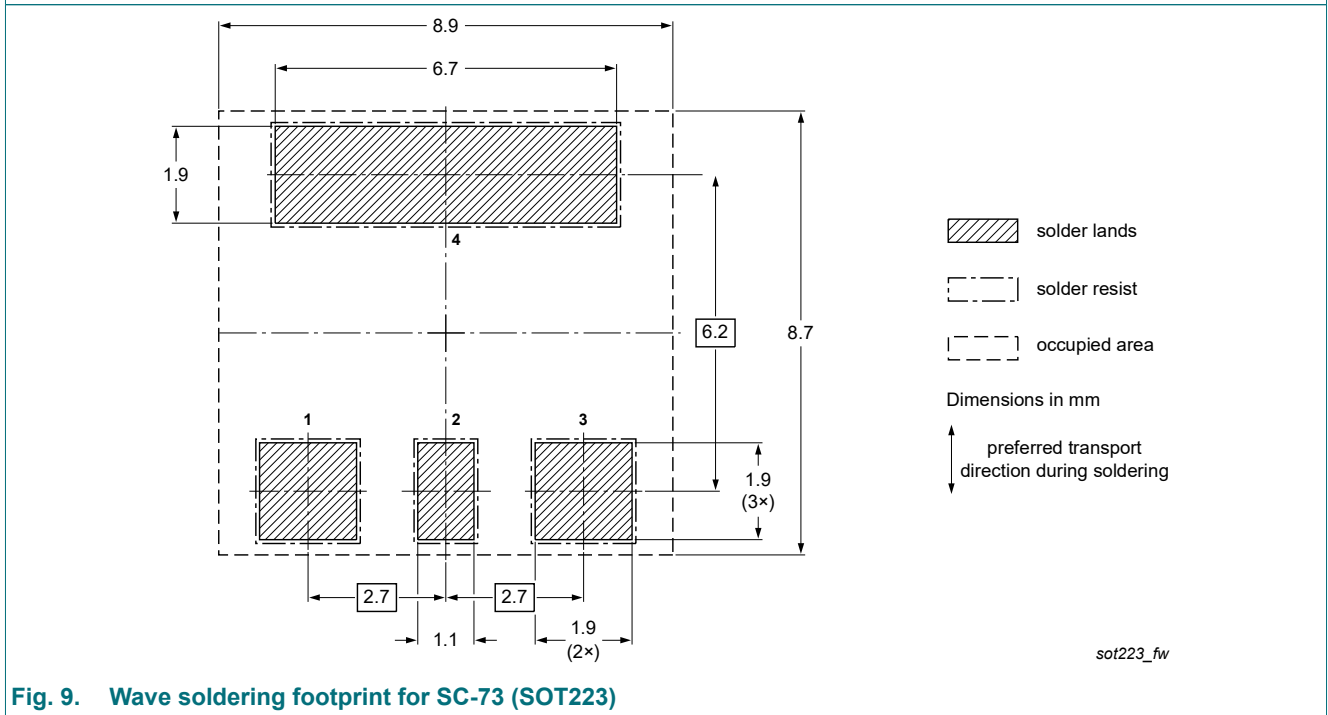
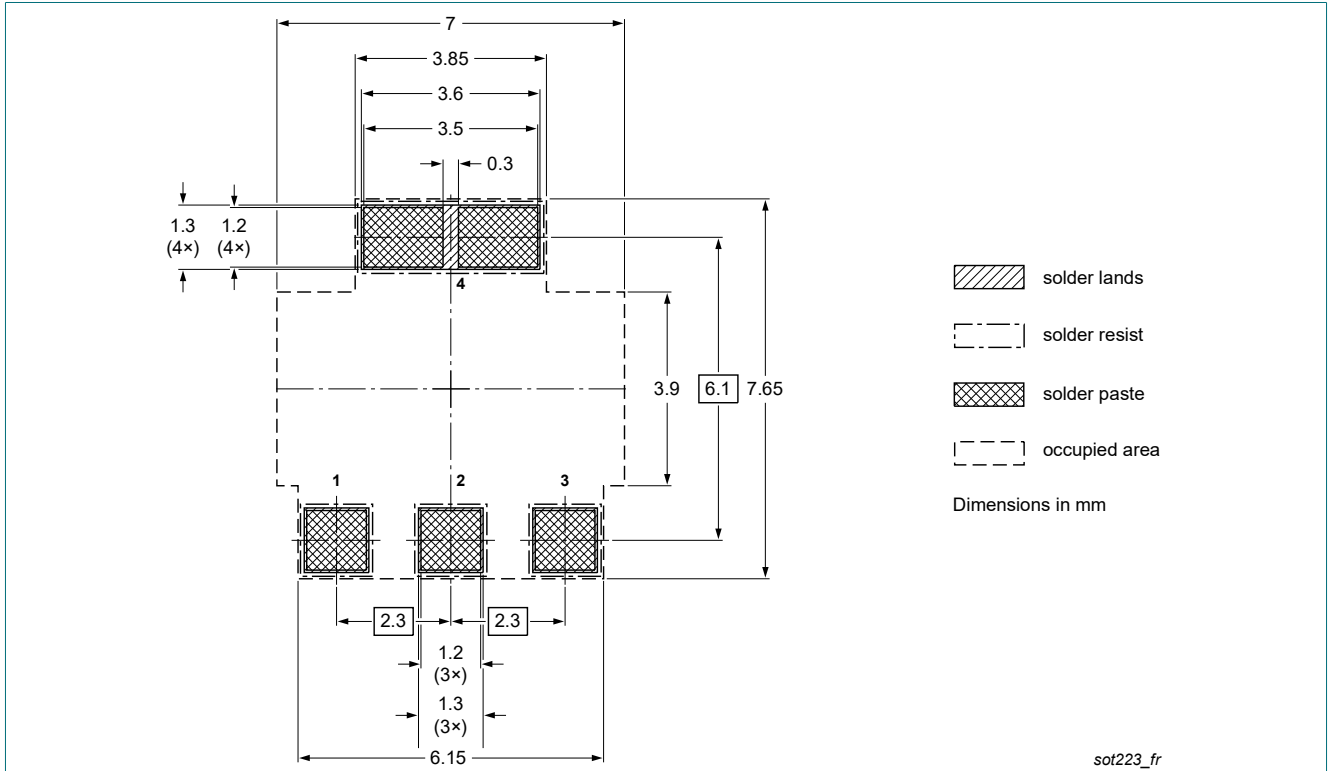


Fig. 7. Package outline SC-73 (SOT223)



**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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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 30 November 2021

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