



PBSS4350Z

50 V low V_{CEsat} NPN transistor

26 June 2018

Product data sheet

1. General description

NPN low V_{CEsat} transistor in a SOT223 plastic package. PNP complement: PBSS5350Z.

2. Features and benefits

- Low collector-emitter saturation voltage
- High collector current capability: I_C and I_{CM}
- High collector current gain (h_{FE}) at high I_C
- Higher efficiency leading to less heat generation
- Reduced PCB area requirements compared to DPAK.
- AEC-Q101 qualified

3. Applications

- Power management
 - DC/DC converters
 - Supply line switching
 - Battery charger
 - Linear voltage regulation (LDO).
- Peripheral drivers
 - Driver in low supply voltage applications, e.g. lamps, LEDs
 - Inductive load driver, e.g. relays, buzzers, motors.

4. Quick reference data

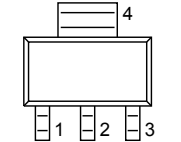
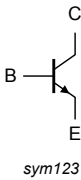
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	50	V
I_C	collector current			-	-	3	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-	5	A
h_{FE}	DC current gain	$V_{CE} = 2$ V; $I_C = 500$ mA; $T_{amb} = 25$ °C	[1]	200	-	-	
R_{CEsat}	collector-emitter saturation resistance	$I_C = 2$ A; $I_B = 200$ mA; $T_{amb} = 25$ °C	[1]	-	110	145	mΩ

[1] Pulse test: $t_p \leq 300$ μs; $\delta \leq 0.02$

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SC-73 (SOT223)	 sym123
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS4350Z	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

7. Marking

Table 4. Marking codes

Type number	Marking code
PBSS4350Z	PB4350

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		-	60	V
V _{CEO}	collector-emitter voltage	open base		-	50	V
V _{EBO}	emitter-base voltage	open collector		-	6	V
I _C	collector current			-	3	A
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	5	A
I _{BM}	peak base current			-	1	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]	-	-	62.5	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
ICBO	collector-base cut-off current	$V_{CB} = 50\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	100	nA
		$V_{CB} = 50\text{ V}; I_E = 0\text{ A}; T_J = 150\text{ }^{\circ}\text{C}$		-	-	50	μA
IEBO	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	100	nA
hFE	DC current gain	$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	200	-	-	
		$V_{CE} = 2\text{ V}; I_C = 1\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	200	-	-	
		$V_{CE} = 2\text{ V}; I_C = 2\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	100	-	-	
VCEsat	collector-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 50\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	90	mV
		$I_C = 1\text{ A}; I_B = 50\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	170	mV
		$I_C = 2\text{ A}; I_B = 200\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	290	mV
RCEsat	collector-emitter saturation resistance		[1]	-	110	145	m Ω
VBEsat	base-emitter saturation voltage		[1]	-	-	1.2	V
VBEon	base-emitter turn-on voltage	$V_{CE} = 2\text{ V}; I_C = 1\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	1.1	V
fT	transition frequency	$V_{CE} = 5\text{ V}; I_C = 100\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$		100	-	-	MHz
Cc	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	30	pF

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$

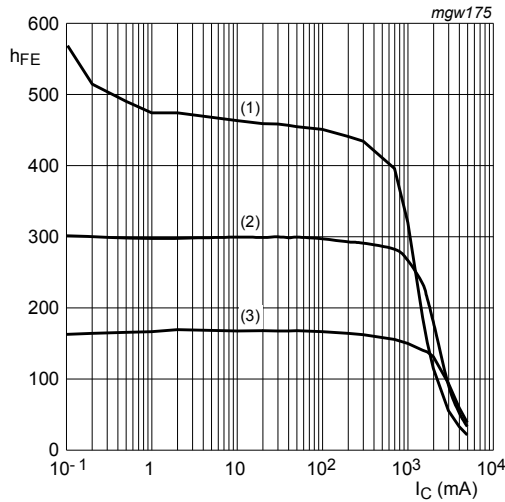


Fig. 1. DC current gain; typical values

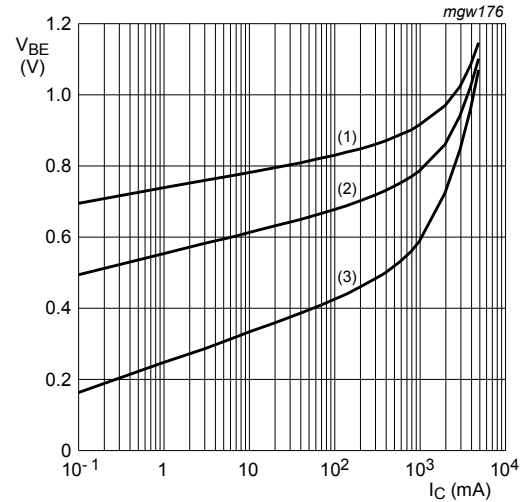


Fig. 2. Base-emitter voltage as a function of collector-current; typical values

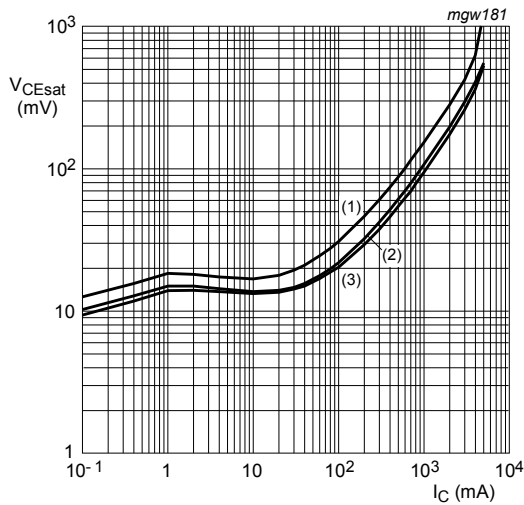


Fig. 3. Collector-emitter saturation as a function of collector current; typical values.

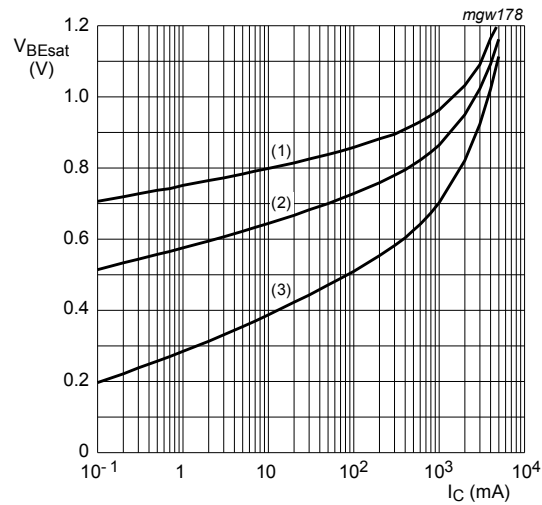
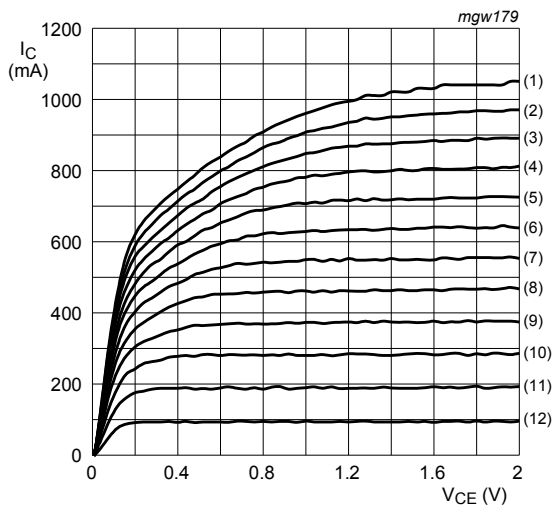
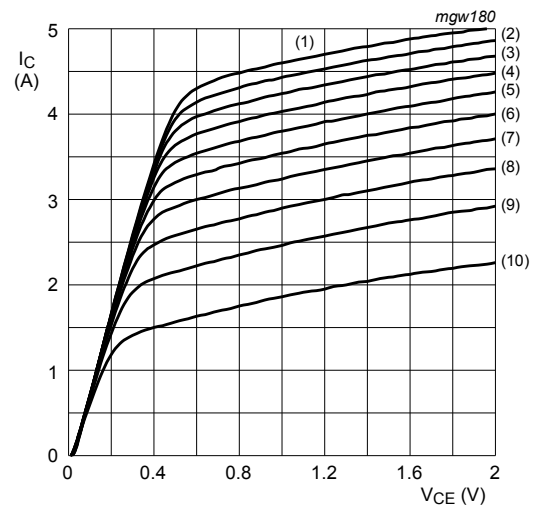


Fig. 4. Base-emitter saturation voltage as a function of collector current; typical values



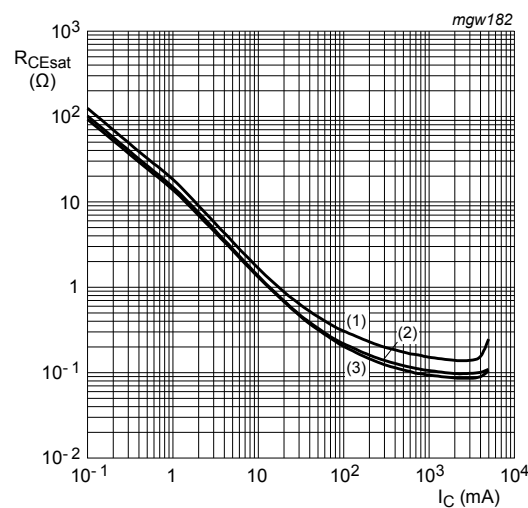
$T_{amb} = 25\text{ °C}$
 (1) $I_B = 3.96\text{ mA}$
 (2) $I_B = 3.63\text{ mA}$
 (3) $I_B = 3.30\text{ mA}$
 (4) $I_B = 2.97\text{ mA}$
 (5) $I_B = 2.64\text{ mA}$
 (6) $I_B = 2.31\text{ mA}$
 (7) $I_B = 1.98\text{ mA}$
 (8) $I_B = 1.65\text{ mA}$
 (9) $I_B = 1.32\text{ mA}$
 (10) $I_B = 0.99\text{ mA}$
 (11) $I_B = 0.66\text{ mA}$
 (12) $I_B = 0.33\text{ mA}$

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



$T_{amb} = 25\text{ °C}$
 (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. 6. 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. 7. Collector-emitter equivalent on-resistance as a function of collector current; typical values

11. Package outline

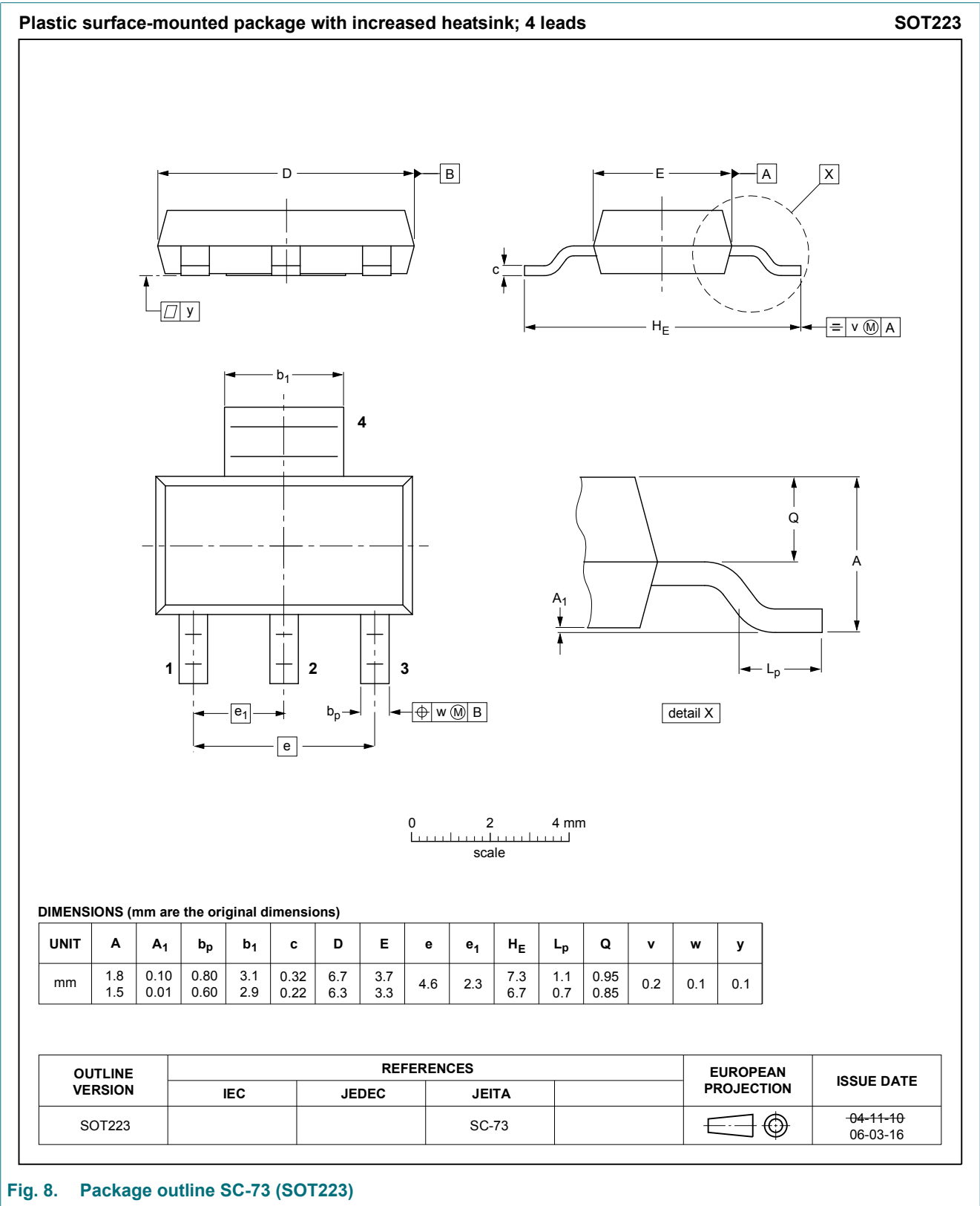
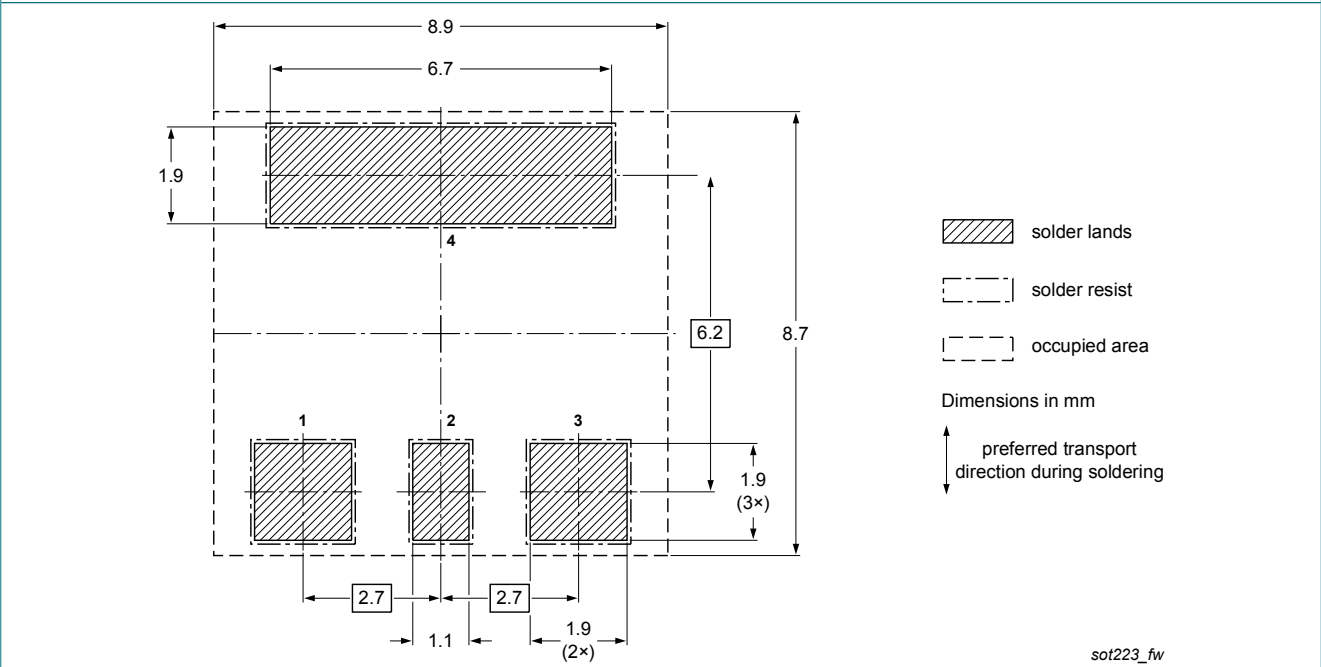
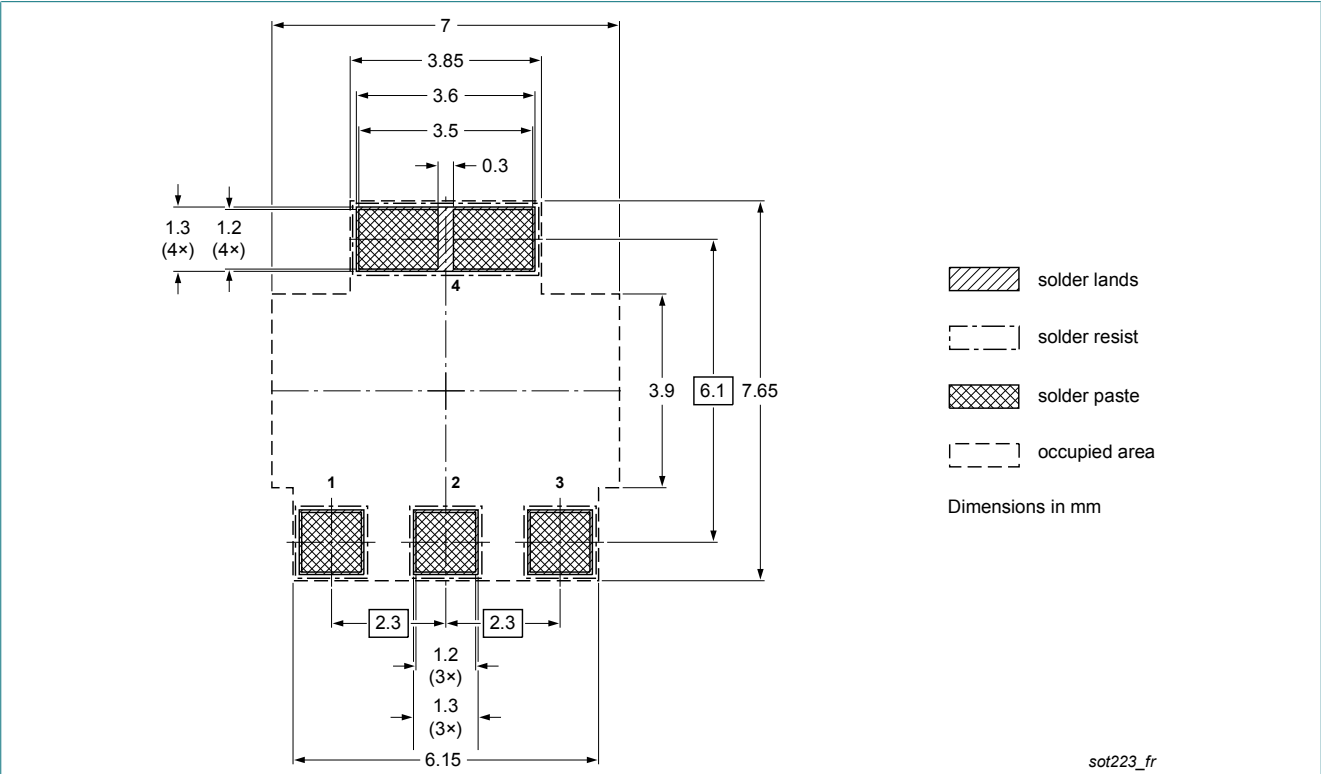


Fig. 8. Package outline SC-73 (SOT223)

12. Soldering



13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4350Z v.3	20180626	Product data sheet	-	PBSS4350Z v.2
Modifications:	- Figures 6 and 7 corrected - 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.			
PBSS4350Z v.2	20030513	Product data sheet	-	PBSS4350Z v.1
PBSS4350Z v.1	20030120	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А