



PBSS5350Z

50 V, 3 A PNP low V_{CEsat} transistor

12 October 2023

Product data sheet

1. General description

PNP low V_{CEsat} transistor in a medium power SOT223 (SC-73) Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4350Z

2. Features and benefits

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- High collector current gain (h_{FE}) at high I_C
- High energy efficiency due to less heat generation

3. Applications

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

4. Quick reference data

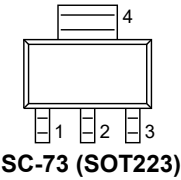
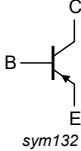
Table 1. Quick reference data

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 ≤ 1 ms	-	-	-5	A
R _{CEsat}	collector-emitter saturation resistance	I _C = -2 A; I _B = -200 mA; T _{amb} = 25 °C	[1]	120	150	mΩ

[1] Pulsed test: t_p ≤ 300 μs; δ ≤ 0.02

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
PBSS5350Z	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
PBSS5350Z	PB5350

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		[1]	-	0.65	W
			[2]	-	1	W
			[3] [4]	-	1.35	W
			[5]	-	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 Printed-Circuit Board (PCB), 35 µm single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, 35 µm single-sided copper, tin-plated, mounting pad for collector 1 cm².
[3] Device mounted on an FR4 PCB, 35 µm single-sided copper, tin-plated, mounting pad for collector 6 cm².
[4] Device mounted on an FR4 PCB, 70 µm single-sided copper, tin-plated, mounting pad for collector 1 cm².
[5] Device mounted on an FR4 PCB, 70 µm single-sided copper, tin-plated, mounting pad for collector 6 cm².

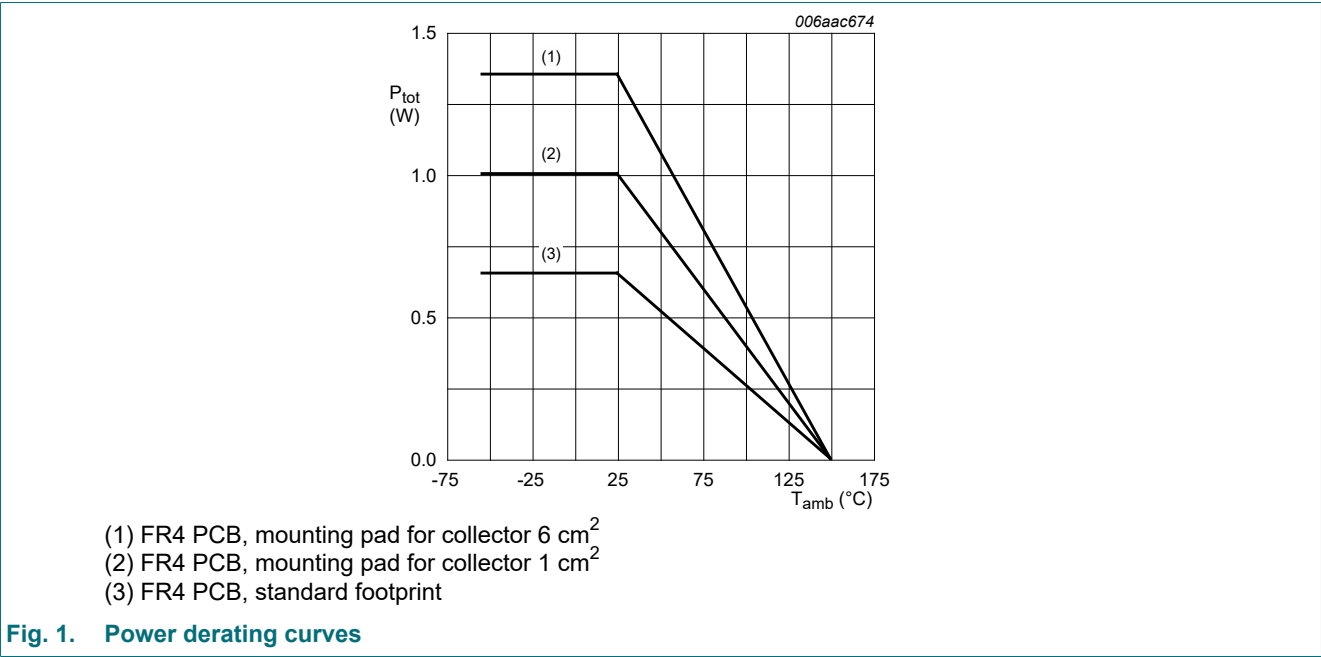


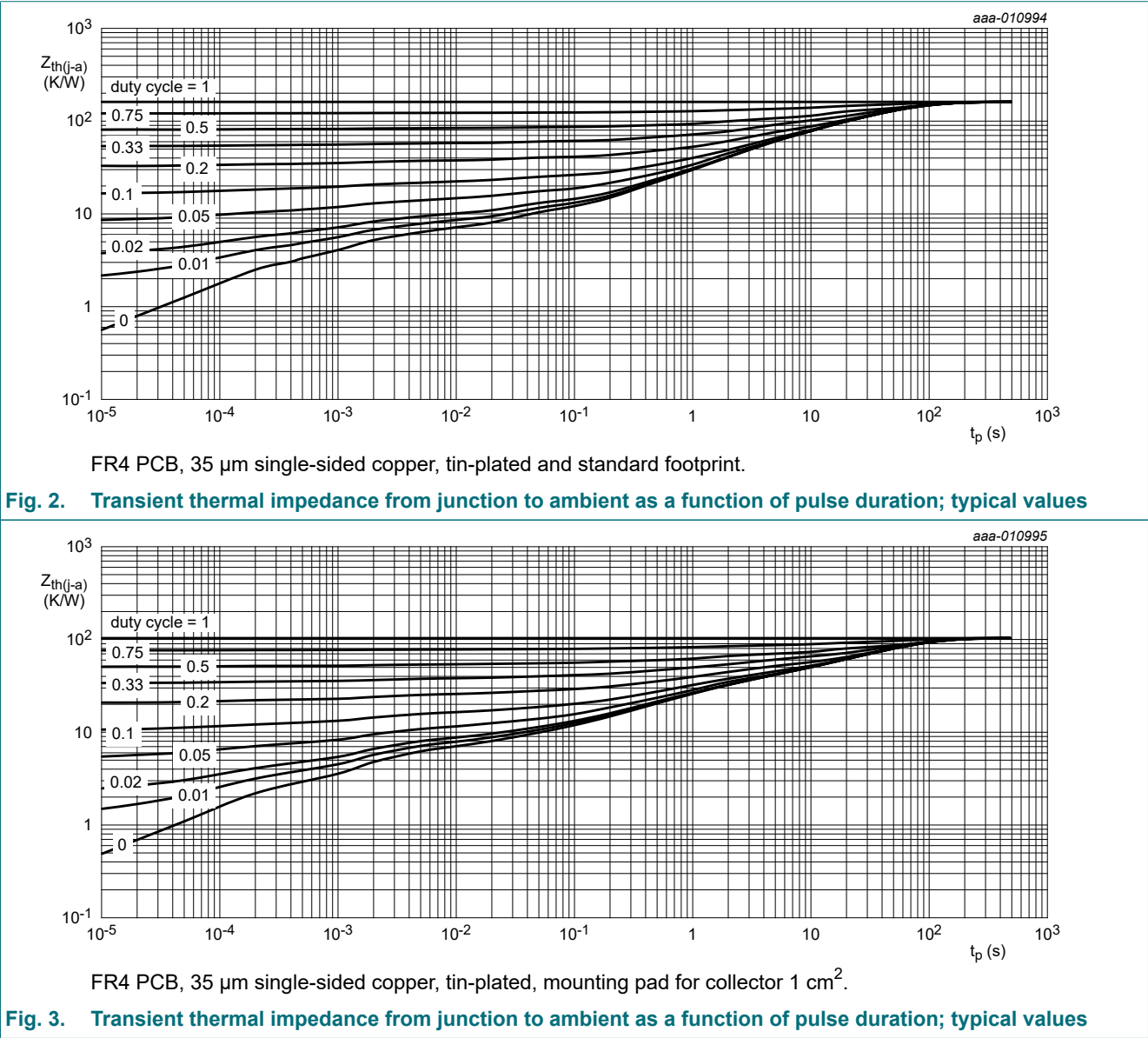
Fig. 1. Power derating curves

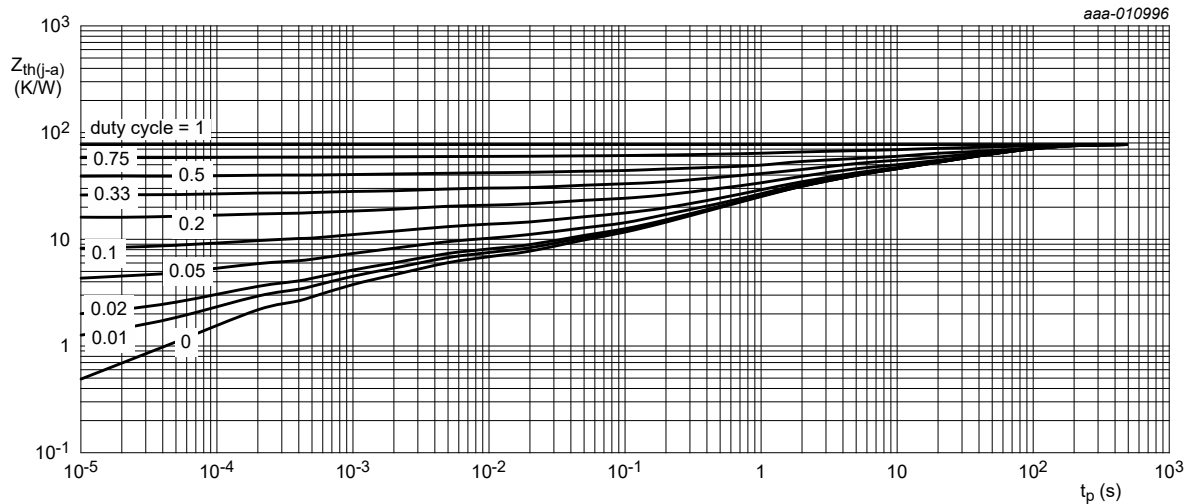
9. Thermal characteristics

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]	-	-	192	K/W
			[2]	-	-	125	K/W
			[3] [4]	-	-	92	K/W
			[5]	-	-	62.5	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	16	K/W

- [1] Device mounted on an FR4 PCB, 35 µm single-sided copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, 35 µm single-sided copper, tin-plated, mounting pad for collector 1 cm².
- [3] Device mounted on an FR4 PCB, 35 µm single-sided copper, tin-plated, mounting pad for collector 6 cm².
- [4] Device mounted on an FR4 PCB, 70 µm single-sided copper, tin-plated, mounting pad for collector 1 cm².
- [5] Device mounted on an FR4 PCB, 70 µm single-sided copper, tin-plated, mounting pad for collector 6 cm².





FR4 PCB, 35 μ m single-sided copper, tin-plated, mounting pad for collector 6 cm².

Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

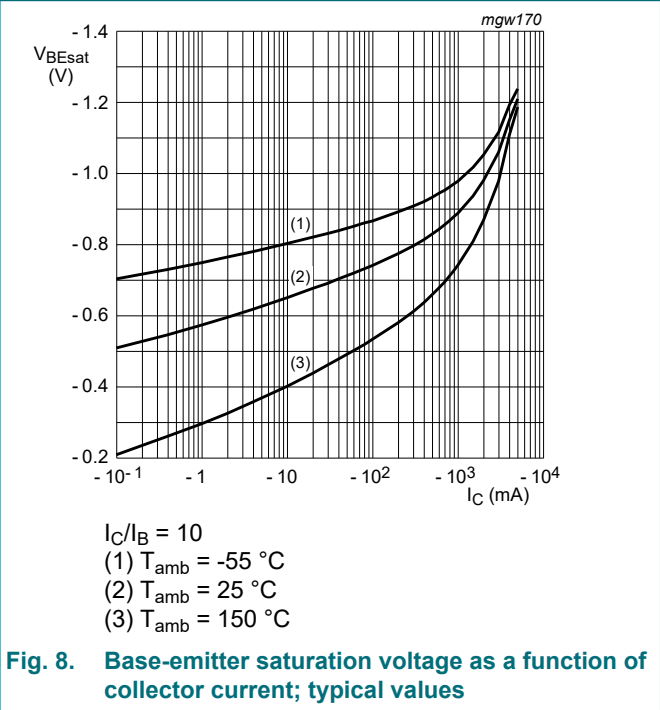
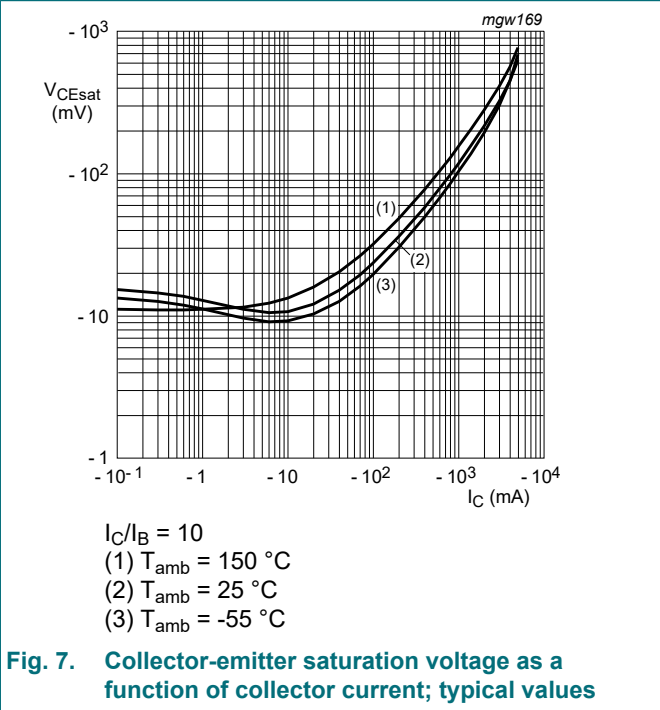
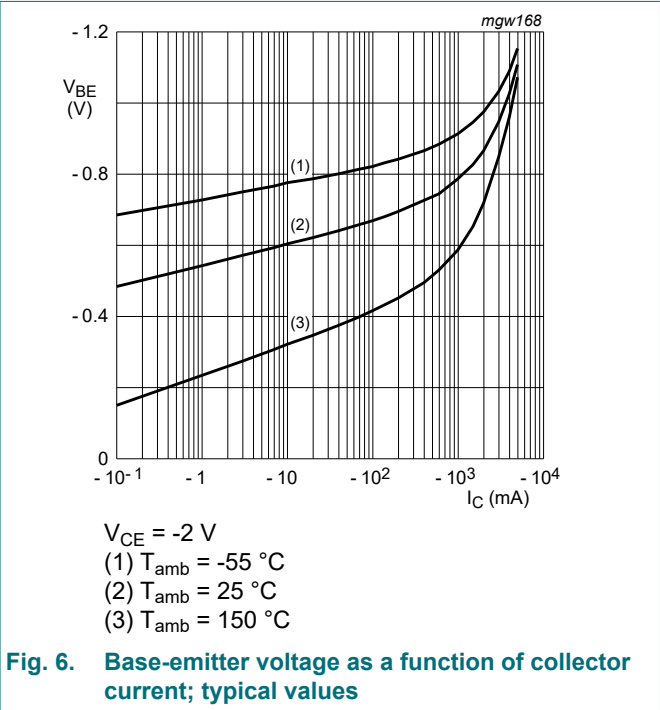
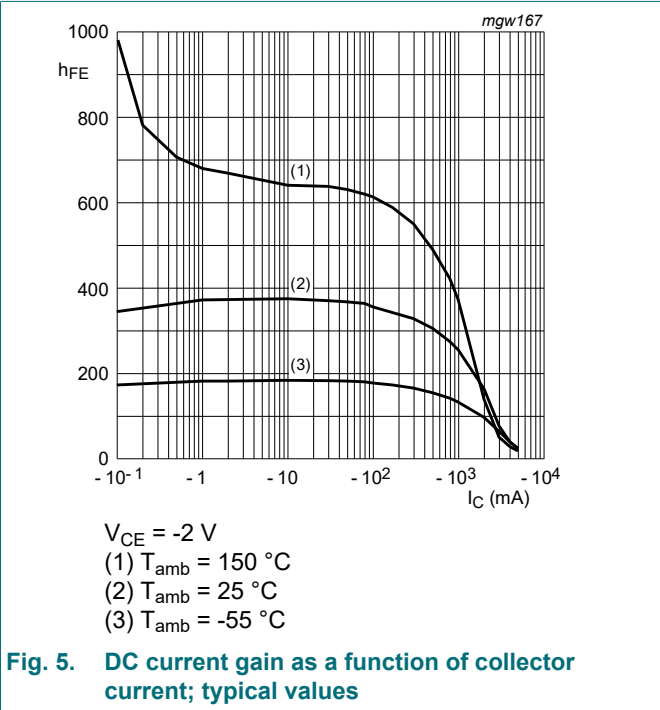
Table 7. Characteristics

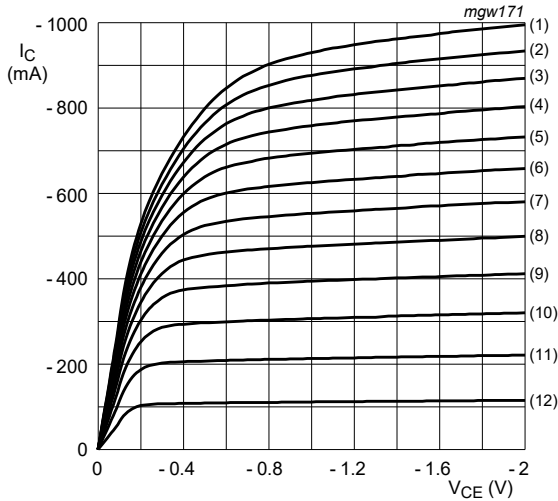
$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100\text{ }\mu\text{A}$; $I_E = 0\text{ A}$	-60	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10\text{ mA}$; $I_B = 0\text{ A}$	-50	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage (collector open)	$I_E = -100\text{ }\mu\text{A}$; $I_C = 0\text{ A}$	-6	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = -50\text{ V}$; $I_E = 0\text{ A}$	-	-	-100	nA
		$V_{CB} = -50\text{ V}$; $I_E = 0\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	-	-50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\text{ V}$; $I_C = 0\text{ A}$	-	-	-100	nA
h_{FE}	DC current gain	$V_{CE} = -2\text{ V}$; $I_C = -500\text{ mA}$	200	-	-	
		$V_{CE} = -2\text{ V}$; $I_C = -1\text{ A}$	[1] 200	-	-	
		$V_{CE} = -2\text{ V}$; $I_C = -2\text{ A}$	[1] 100	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -500\text{ mA}$; $I_B = -50\text{ mA}$	-	-	-100	mV
		$I_C = -1\text{ A}$; $I_B = -50\text{ mA}$	-	-	-180	mV
		$I_C = -2\text{ A}$; $I_B = -200\text{ mA}$	[1] -	-	-300	mV
R_{CEsat}	collector-emitter saturation resistance	$I_C = -2\text{ A}$; $I_B = -200\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1] -	120	150	m Ω
V_{BEsat}	base-emitter saturation voltage	$I_C = -2\text{ A}$; $I_B = -200\text{ mA}$	[1] -	-	-1.2	V
V_{BEon}	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
f_T	transition frequency	$V_{CE} = -5\text{ V}$; $I_C = -100\text{ mA}$; $f = 100\text{ MHz}$	100	-	-	MHz

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C _c	collector capacitance	V _{CB} = -10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz	-	-	40	pF

[1] Pulsed test: t_p ≤ 300 μs; δ ≤ 0.02

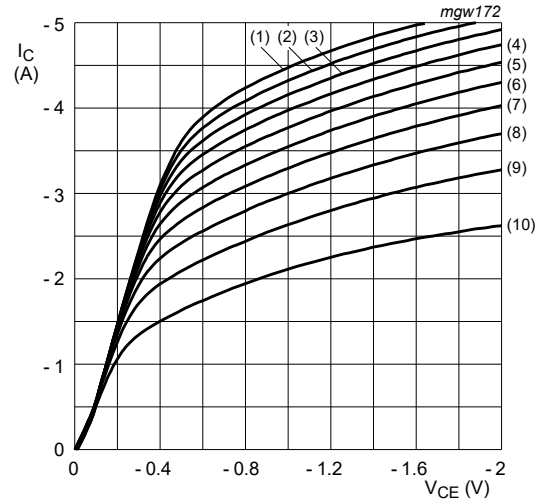




$T_{amb} = 25\text{ }^{\circ}\text{C}$

- (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) $I_B = -0.33\text{ mA}$

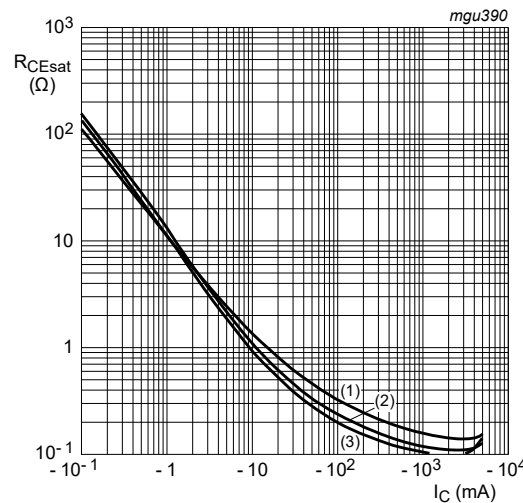
Fig. 9. Collector current as a function of collector-emitter voltage; typical values



$T_{amb} = 25\text{ }^{\circ}\text{C}$

- (1) $I_B = -250\text{ mA}$
- (2) $I_B = -225\text{ mA}$
- (3) $I_B = -200\text{ mA}$
- (4) $I_B = -175\text{ mA}$
- (5) $I_B = -150\text{ mA}$
- (6) $I_B = -125\text{ mA}$
- (7) $I_B = -100\text{ mA}$
- (8) $I_B = -75\text{ mA}$
- (9) $I_B = -50\text{ mA}$
- (10) $I_B = -25\text{ mA}$

Fig. 10. Collector current as a function of collector-emitter voltage; typical values

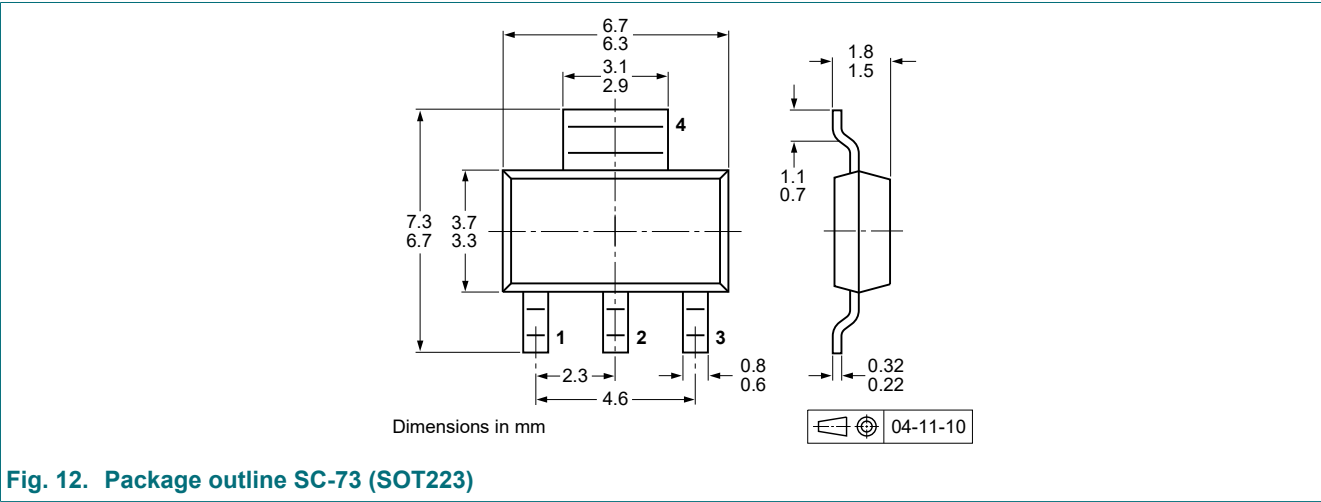


$I_C/I_B = 20$

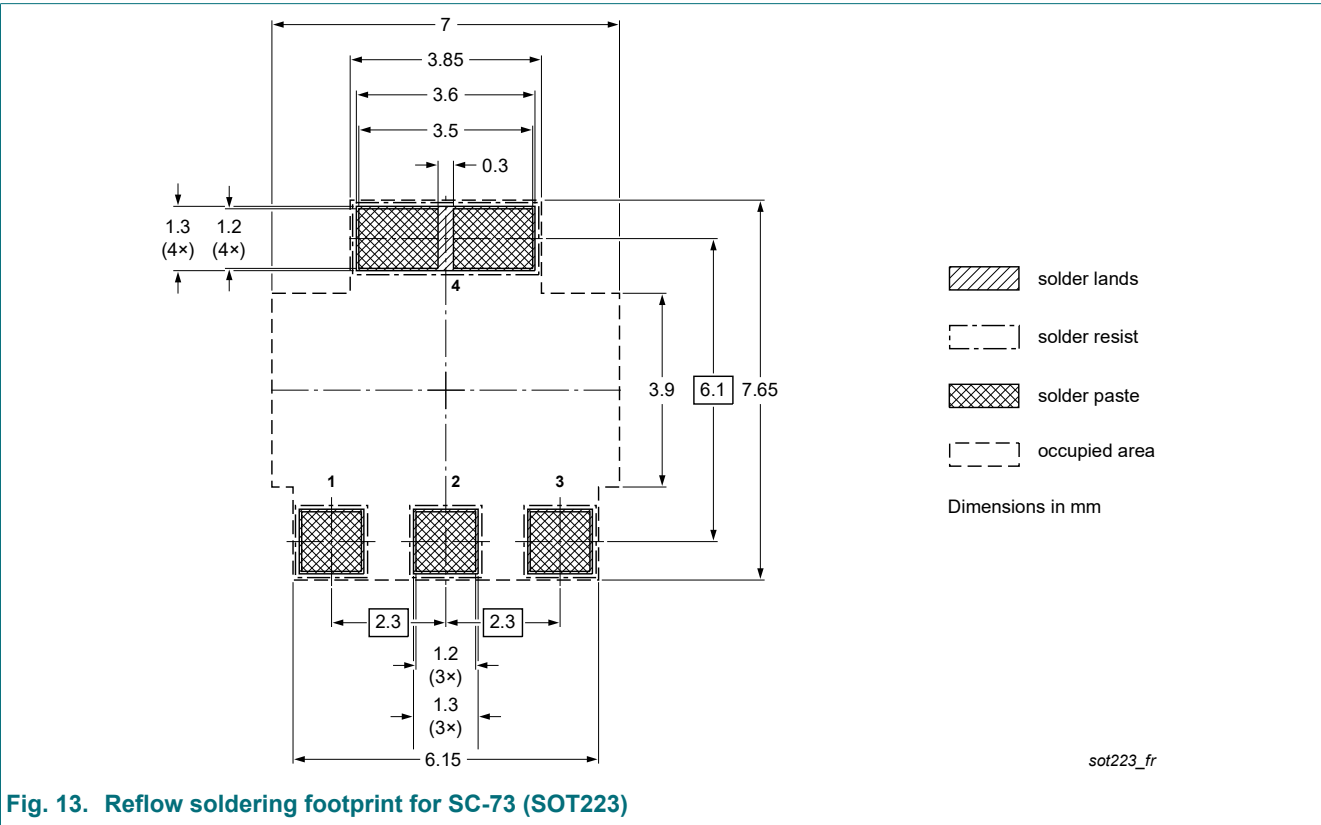
- (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

Fig. 11. Collector-emitter saturation resistance as a function of collector current; typical values

11. Package outline



12. Soldering



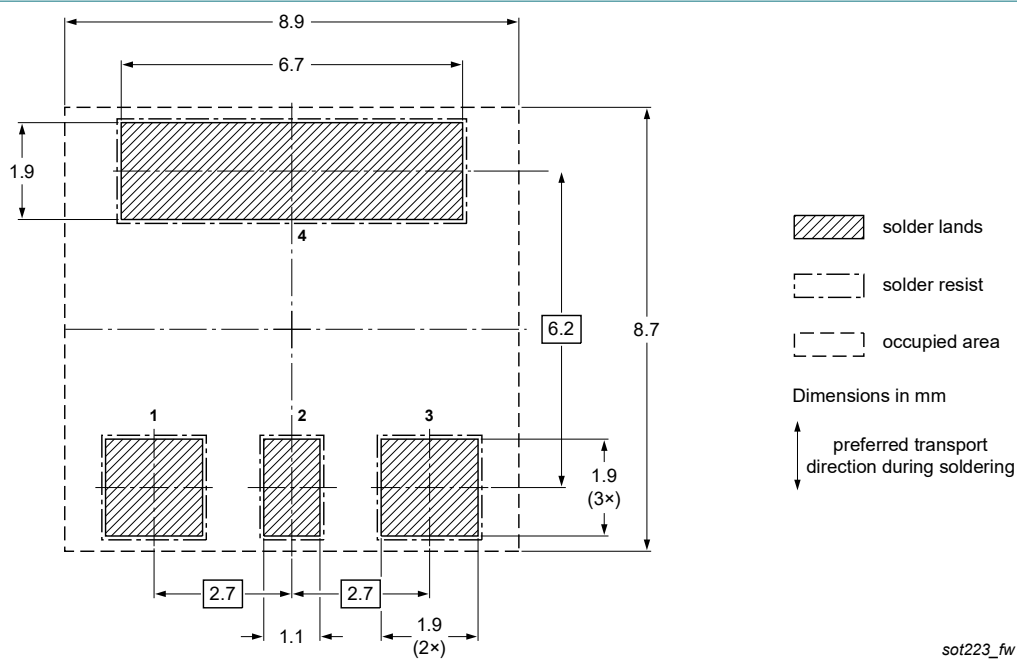


Fig. 14. Wave soldering footprint for SC-73 (SOT223)

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5350Z v.6	20231012	Product data sheet	-	PBSS5350Z v.5
Modifications:	Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
PBSS5350Z v.5	20191118	Product data sheet	-	PBSS5350Z v.4
PBSS5350Z v.4	20030513	Product data sheet	-	PBSS5350Z v.3
PBSS5350Z v.3	20030120	Product data sheet	-	PBSS5350Z v.2
PBSS5350Z v.2	20011113	Product data sheet	-	PBSS5350Z v.1
PBSS5350Z v.1	20010717	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.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information.....2

6. Ordering information.....2

7. Marking.....2

8. Limiting values..... 3

9. Thermal characteristics..... 4

10. Characteristics..... 5

11. Package outline..... 8

12. Soldering..... 8

13. Revision history..... 10

14. Legal information..... 11

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