





## 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		-	-20	V
$V_{CEO}$	collector-emitter voltage	open base		-	-20	V
$V_{EBO}$	emitter-base voltage	open collector		-	-5	V
$I_C$	collector current			-	-2	A
$I_{CRM}$	repetitive peak collector current	$\delta \leq 0.25$ ; Operated under pulsed conditions; $t_p \leq 100$ ms		-	-3	A
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms		-	-5	A
$I_B$	base current			-	-0.5	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	300	mW
			[2]	-	480	mW
			[3]	-	540	mW
			[1] [4]	-	1.2	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 and standard footprint.

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

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

[4] Operated under pulsed conditions: pulse width  $t_p \leq 100$  ms; duty cycle  $\delta \leq 0.25$ .

## 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
			[3]	-	-	230	K/W
			[1] [4]	-	-	104	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>.

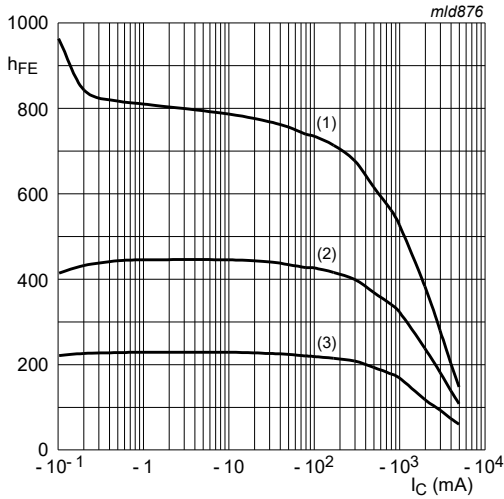
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.

[4] Operated under pulsed conditions: pulse width  $t_p \leq 100$  ms; duty cycle  $\delta \leq 0.25$ .

## 10. Characteristics

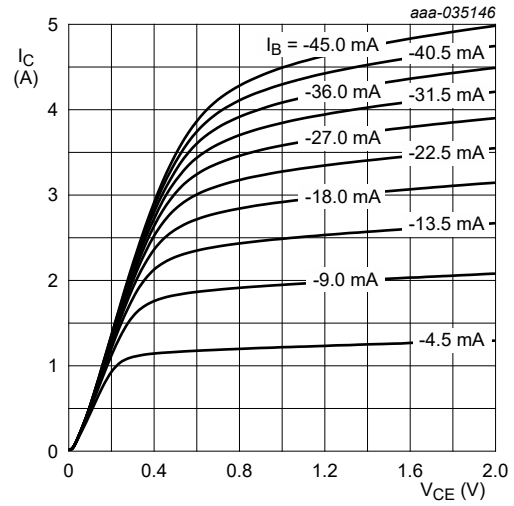
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -20\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-100	nA
		$V_{CB} = -20\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	-	-50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-100	nA
$h_{FE}$	DC current gain	$V_{CE} = -2\text{ V}; I_C = -100\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	220	-	-	
		$V_{CE} = -2\text{ V}; I_C = -500\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	220	-	-	
		$V_{CE} = -2\text{ V}; I_C = -1\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	200	-	-	
		$V_{CE} = -2\text{ V}; I_C = -2\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	150	-	-	
		$V_{CE} = -2\text{ V}; I_C = -3\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	100	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -500\text{ mA}; I_B = -50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-70	mV
		$I_C = -1\text{ A}; I_B = -50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-130	mV
		$I_C = -2\text{ A}; I_B = -100\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-230	mV
		$I_C = -2\text{ A}; I_B = -200\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-210	mV
		$I_C = -3\text{ A}; I_B = -300\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-300	mV
$R_{CEsat}$	collector-emitter saturation resistance	$I_C = -2\text{ A}; I_B = -200\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	75	105	m $\Omega$
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -2\text{ A}; I_B = -100\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-1.1	V
		$I_C = -3\text{ A}; I_B = -300\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-1.2	V
$V_{BEon}$	base-emitter turn-on voltage	$V_{CE} = -2\text{ V}; I_C = -1\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-1.2	-	-	V
$f_T$	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
$C_c$	collector capacitance	$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; I_C = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	50	pF



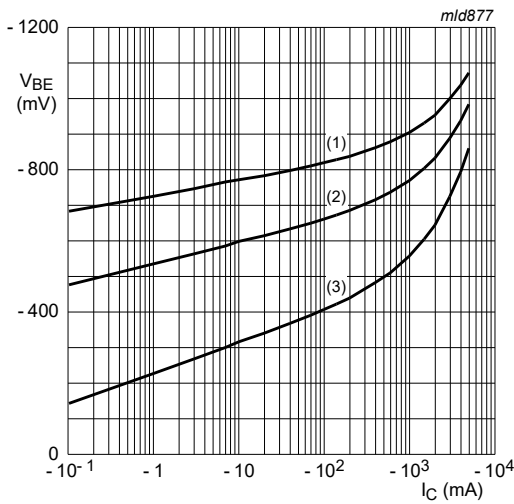
$V_{CE} = -2\text{ V}$   
 (1)  $T_{amb} = 150^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = -55^\circ\text{C}$

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



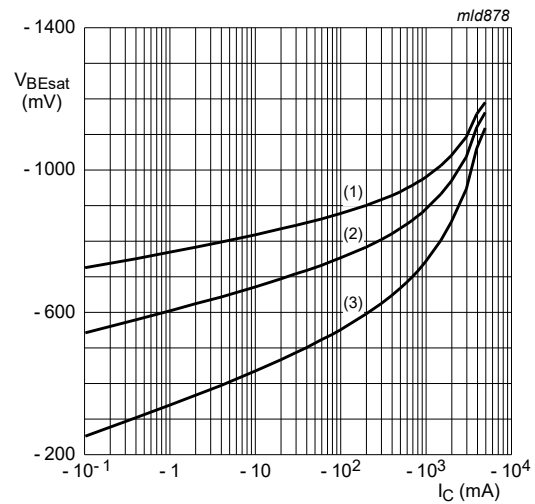
$T_{amb} = 25^\circ\text{C}$

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



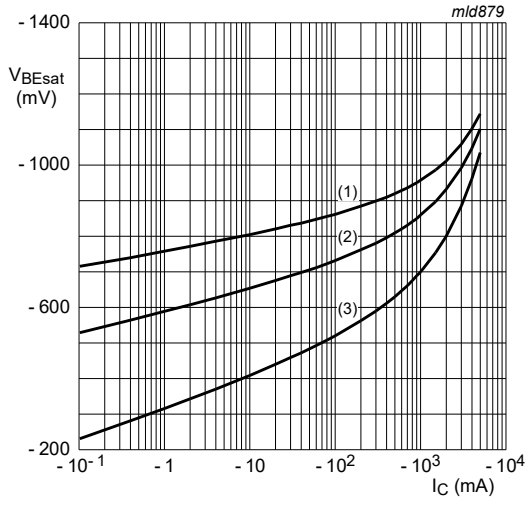
$V_{CE} = -2\text{ V}$   
 (1)  $T_{amb} = -55^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = 150^\circ\text{C}$

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



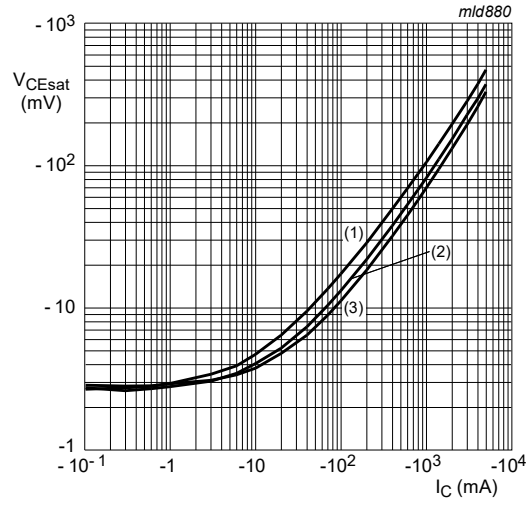
$I_C/I_B = 10$   
 (1)  $T_{amb} = -55^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = 150^\circ\text{C}$

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



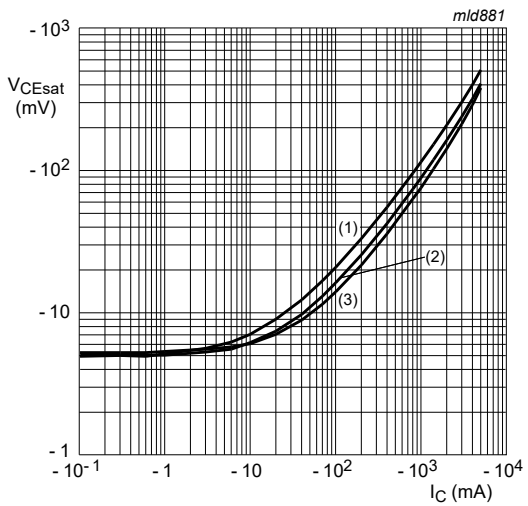
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

**Fig. 5. Base-emitter saturation voltage as a function of collector current; typical values**



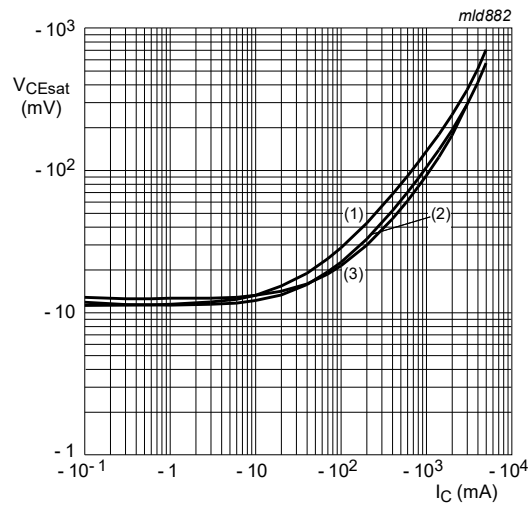
$I_C/I_B = 10$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

**Fig. 6. Collector-emitter saturation voltage as a function of collector current; typical values**



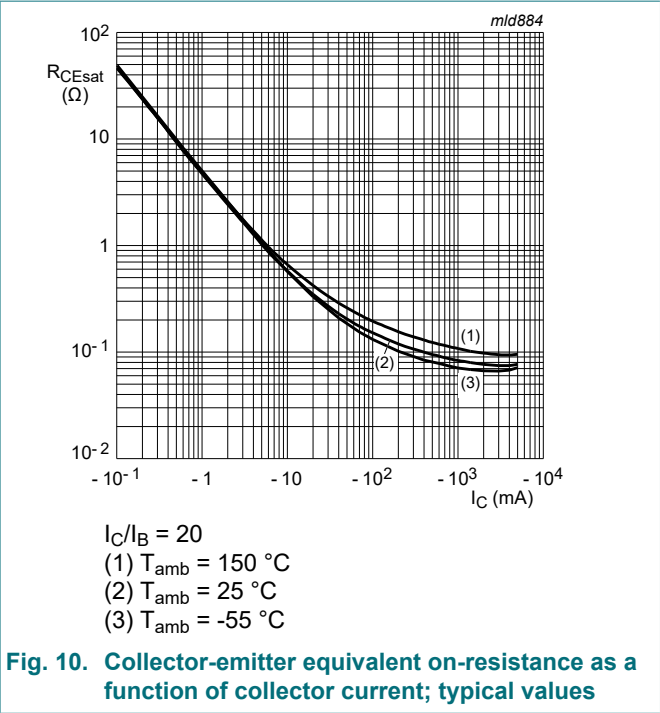
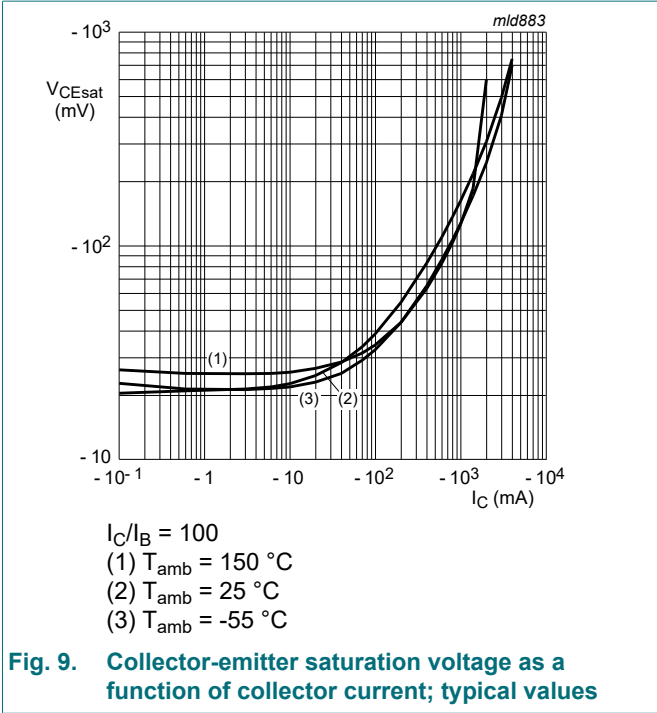
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

**Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values**

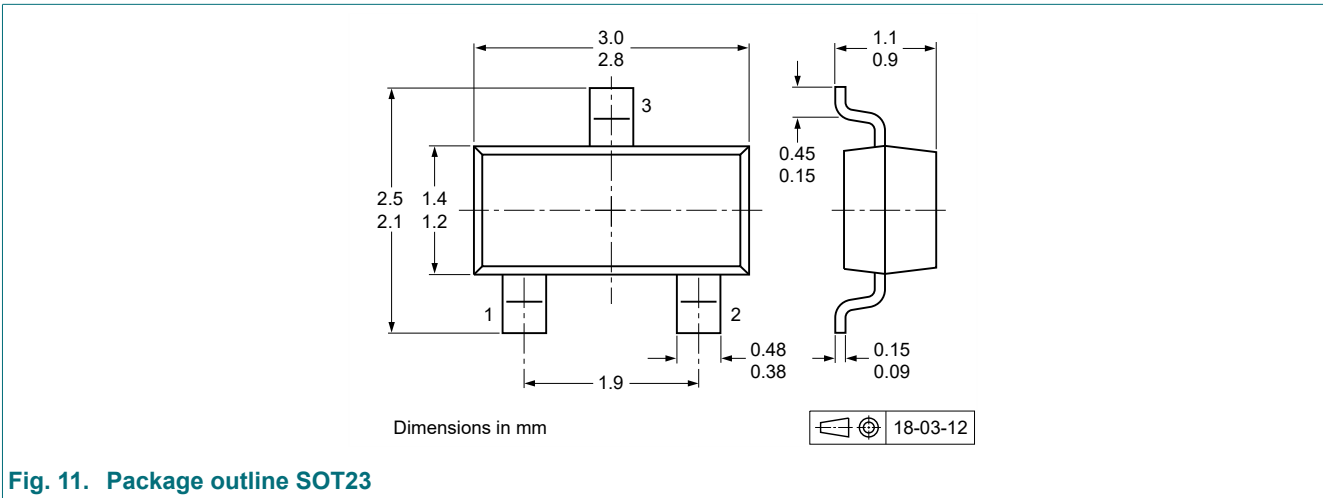


$I_C/I_B = 50$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

**Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values**



## 11. Package outline



## 12. Soldering

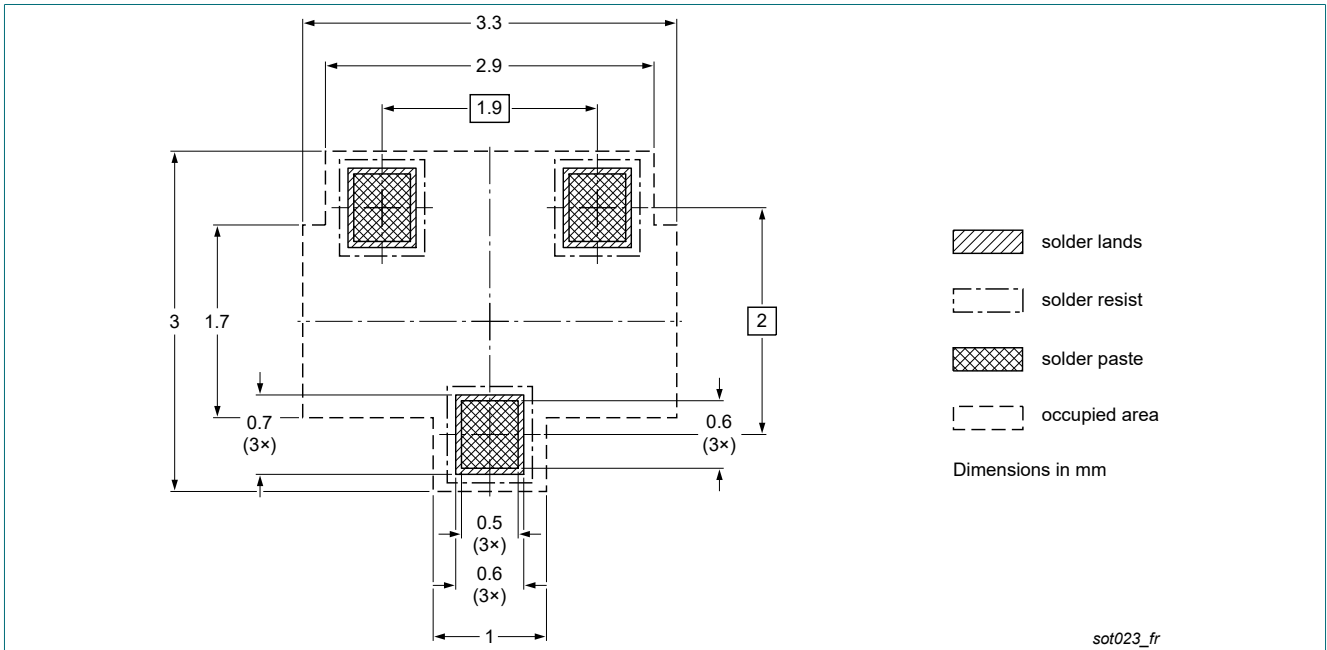


Fig. 12. Reflow soldering footprint for SOT23

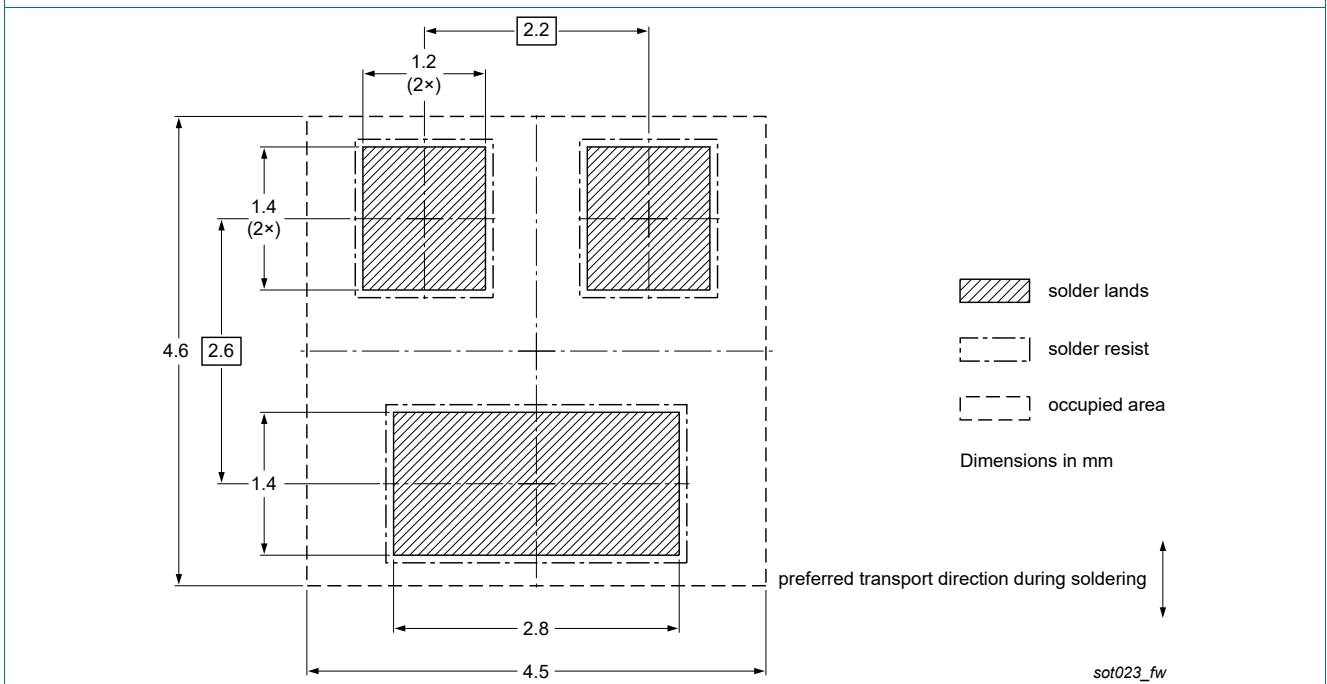


Fig. 13. Wave soldering footprint for SOT23



## 13. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5320T v.4	20230101	Product data sheet	-	PBSS5320T v.3
Modifications:	<ul style="list-style-type: none"><li>Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li><li>Characteristics: Figure 2 added</li></ul>			
PBSS5320T v.3	20220505	Product data sheet	-	PBSS5320T v.2
PBSS5320T v.2	20040115			PBSS5320T v.1
PBSS5320T v.1	20020808	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

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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.....	3
10. Characteristics.....	4
11. Package outline.....	7
12. Soldering.....	8
13. Revision history.....	9
14. Legal information.....	10

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