



# PMBTA06

NPN general purpose transistor

1 July 2022

Product data sheet

## 1. General description

NPN general-purpose transistor encapsulated in a small SOT23 Surface-Mounted Device (SMD) plastic package.

PNP complement: PMBTA56

## 2. Features and benefits

- High current (max. 500 mA)
- Low voltage (max. 80 V)

## 3. Applications

- General purpose switching and amplification in e.g. telephony and professional communication equipment.

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CE0}$	collector-emitter voltage	open base	-	-	80	V
$I_C$	collector current		-	-	500	mA
$h_{FE}$	DC current gain	$V_{CE} = 1 \text{ V}; I_C = 10 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$	100	-	-	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	<p>SOT23</p>	<p>sym021</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBTA06	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

## 7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMBTA06	%1G

[1] % = placeholder for manufacturing site code

## 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		-	80	V
$V_{CEO}$	collector-emitter voltage	open base		-	80	V
$V_{EBO}$	emitter-base voltage	open collector		-	4	V
$I_C$	collector current			-	500	mA
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms		-	1	A
$I_{BM}$	peak base current			-	200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	250	mW
$T_j$	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, 35  $\mu$ m copper, tin-plated and standard footprint.

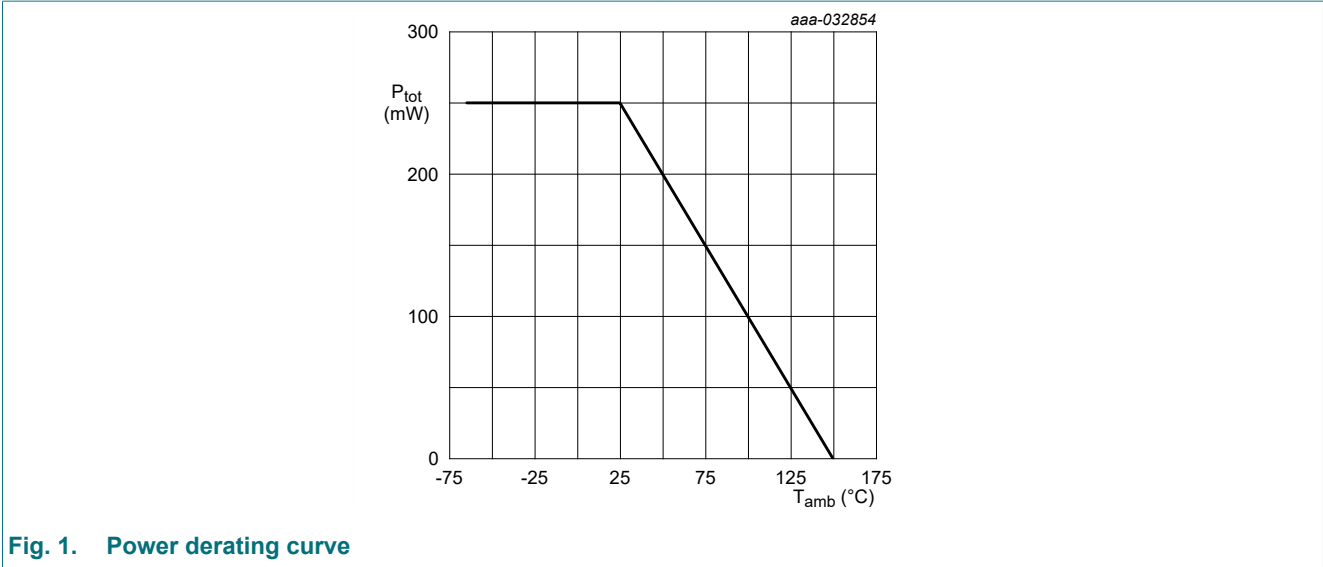


Fig. 1. Power derating curve

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W

[1] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated and standard footprint.

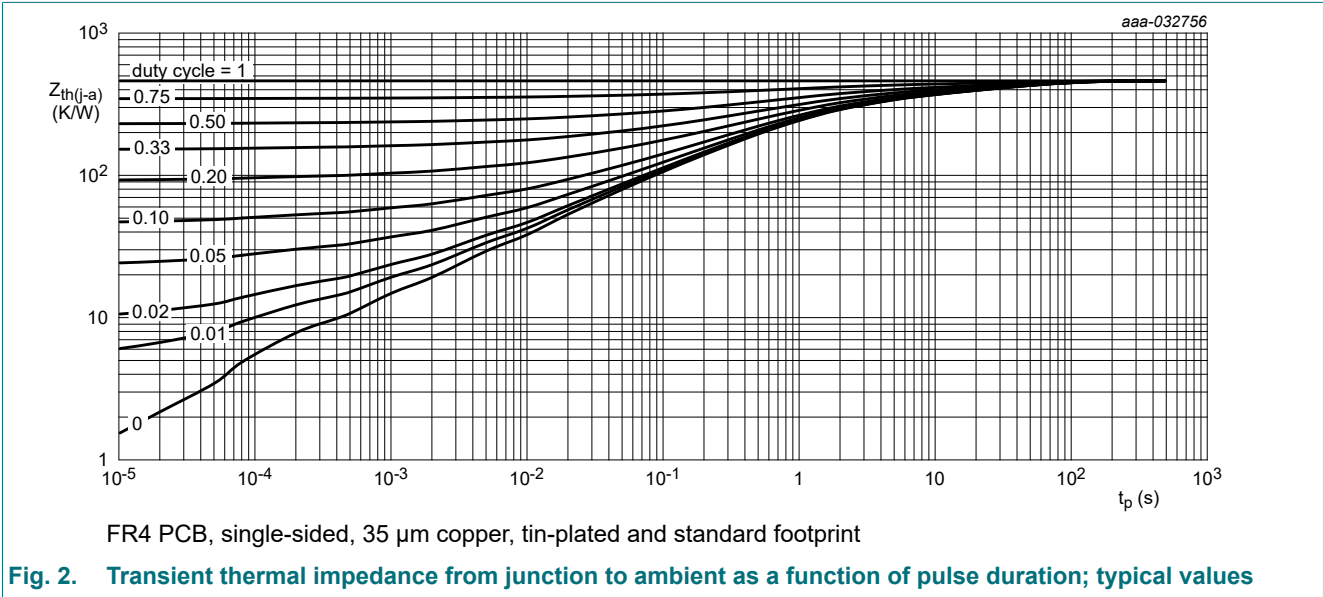


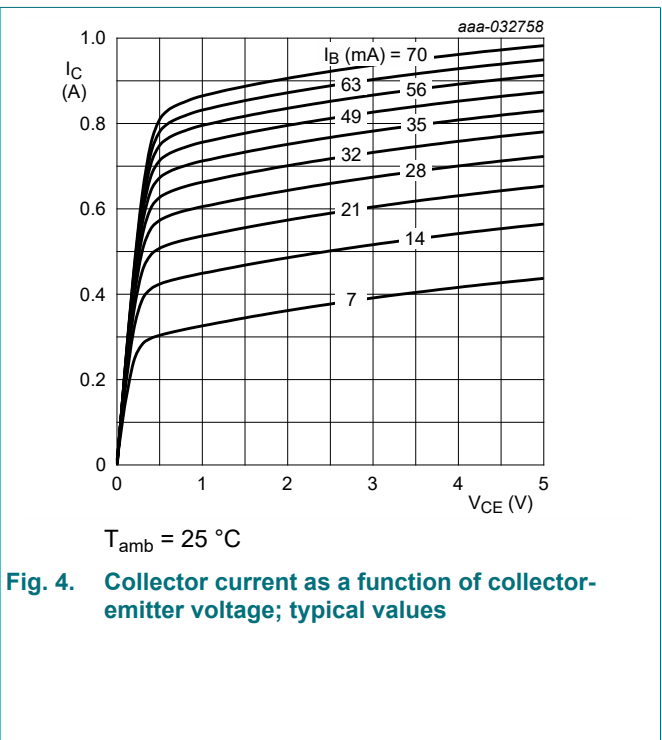
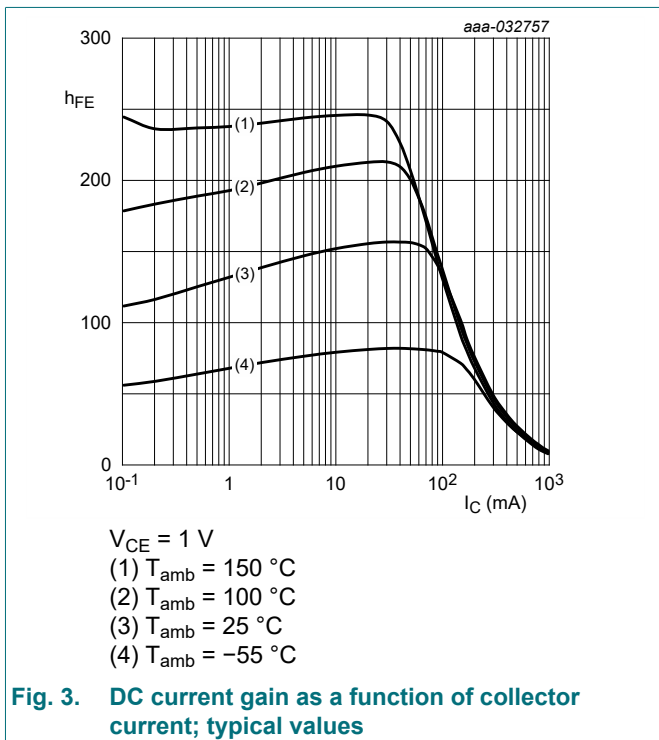
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

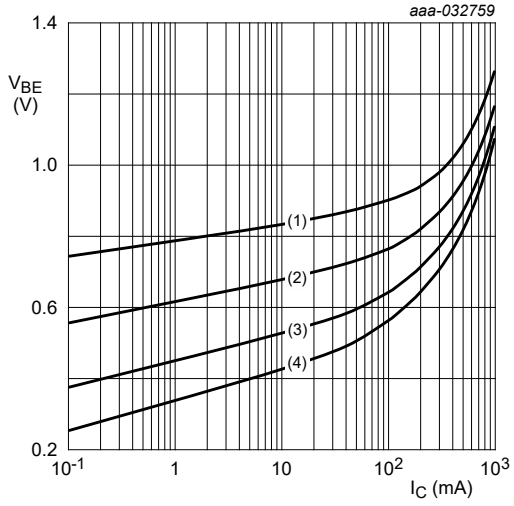
## 10. Characteristics

**Table 7. Characteristics**

$T_{amb} = 25\text{ °C}$  unless otherwise specified

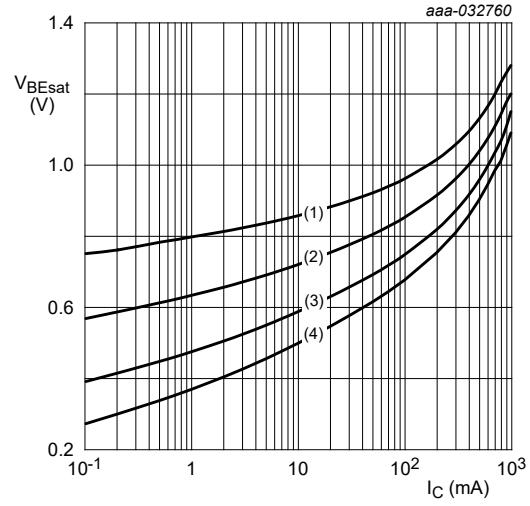
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100\text{ }\mu\text{A}$ ; $I_E = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$	80	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 2\text{ mA}$ ; $I_B = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$	80	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage (collector open)	$I_E = 0\text{ A}$ ; $I_C = 100\text{ }\mu\text{A}$ ; $T_{amb} = 25\text{ °C}$	4	-	-	V
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 80\text{ V}$ ; $I_E = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$	-	-	50	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}$ ; $I_C = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$	-	-	50	nA
$h_{FE}$	DC current gain	$V_{CE} = 1\text{ V}$ ; $I_C = 10\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	100	-	-	
		$V_{CE} = 1\text{ V}$ ; $I_C = 100\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	100	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}$ ; $I_B = 10\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	-	-	0.25	V
$V_{BE}$	base-emitter voltage	$V_{CE} = 1\text{ V}$ ; $I_C = 100\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	-	-	1.2	V
$f_T$	transition frequency	$V_{CE} = 2\text{ V}$ ; $I_C = 10\text{ mA}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	100	-	-	MHz





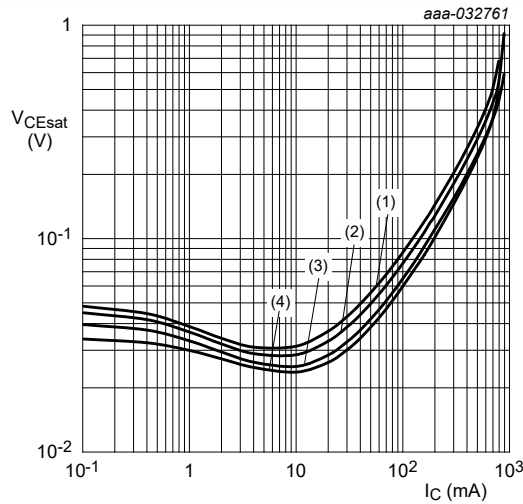
$V_{CE} = 1\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 100\text{ °C}$   
 (4)  $T_{amb} = 150\text{ °C}$

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



$I_C/I_B = 10$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 100\text{ °C}$   
 (4)  $T_{amb} = 150\text{ °C}$

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



$I_C/I_B = 10$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 100\text{ °C}$   
 (3)  $T_{amb} = 25\text{ °C}$   
 (4)  $T_{amb} = -55\text{ °C}$

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

### 11. Package outline

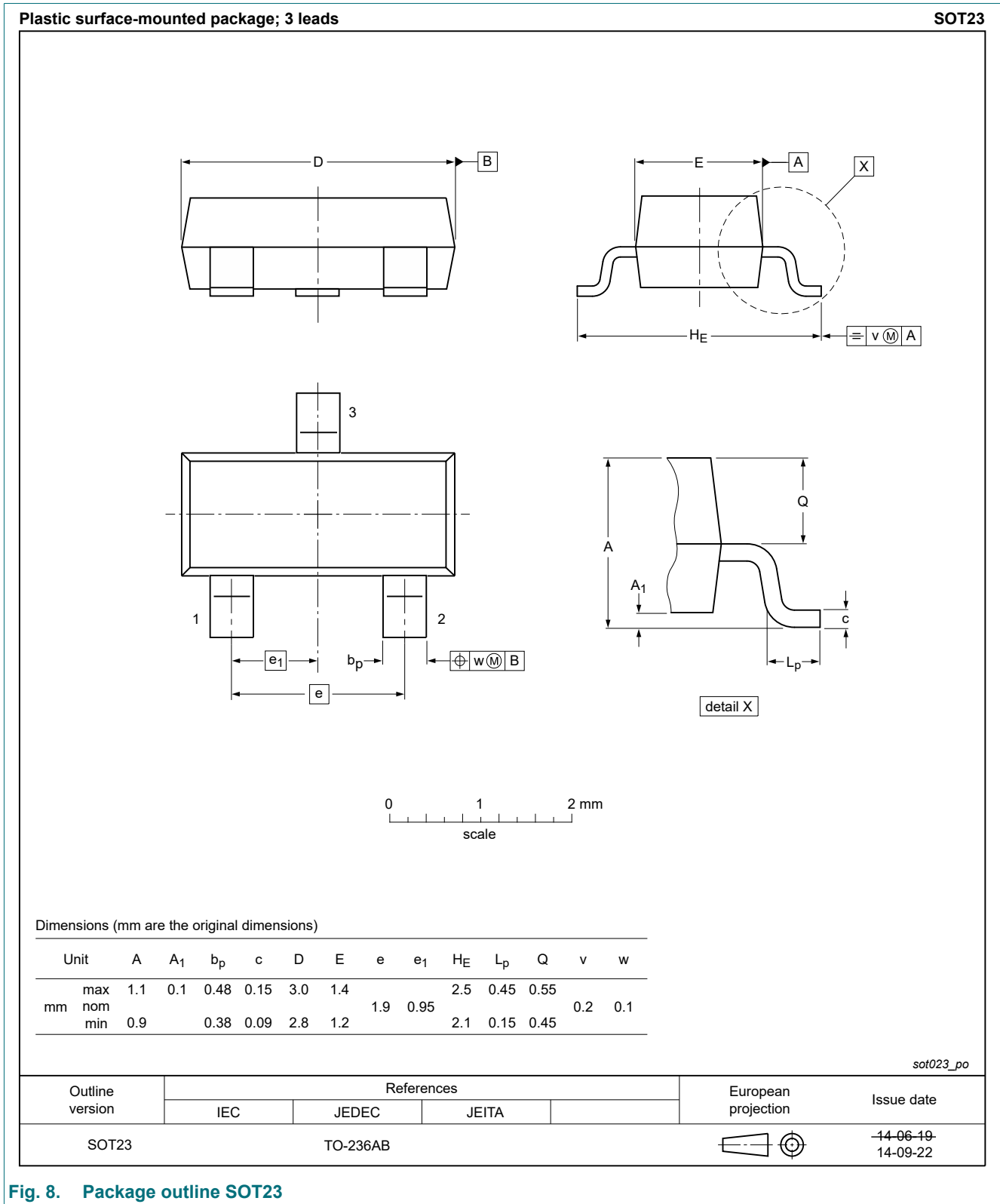


Fig. 8. Package outline SOT23

## 12. Soldering

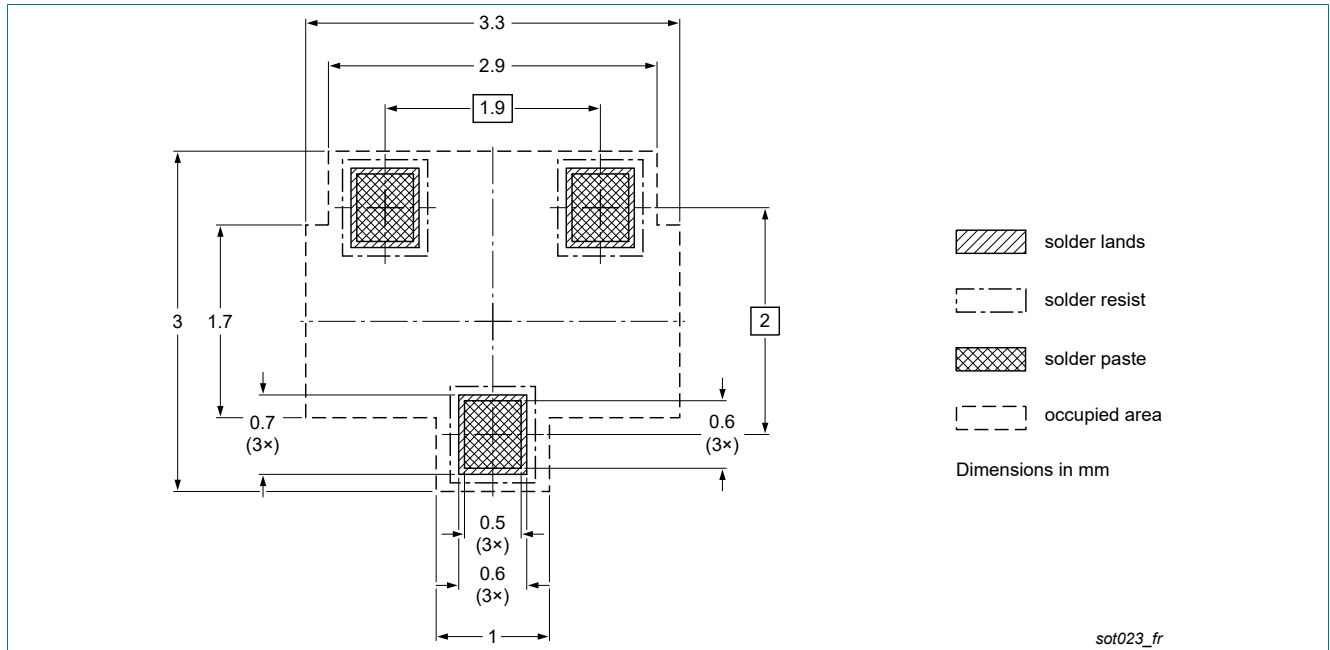


Fig. 9. Reflow soldering footprint for SOT23

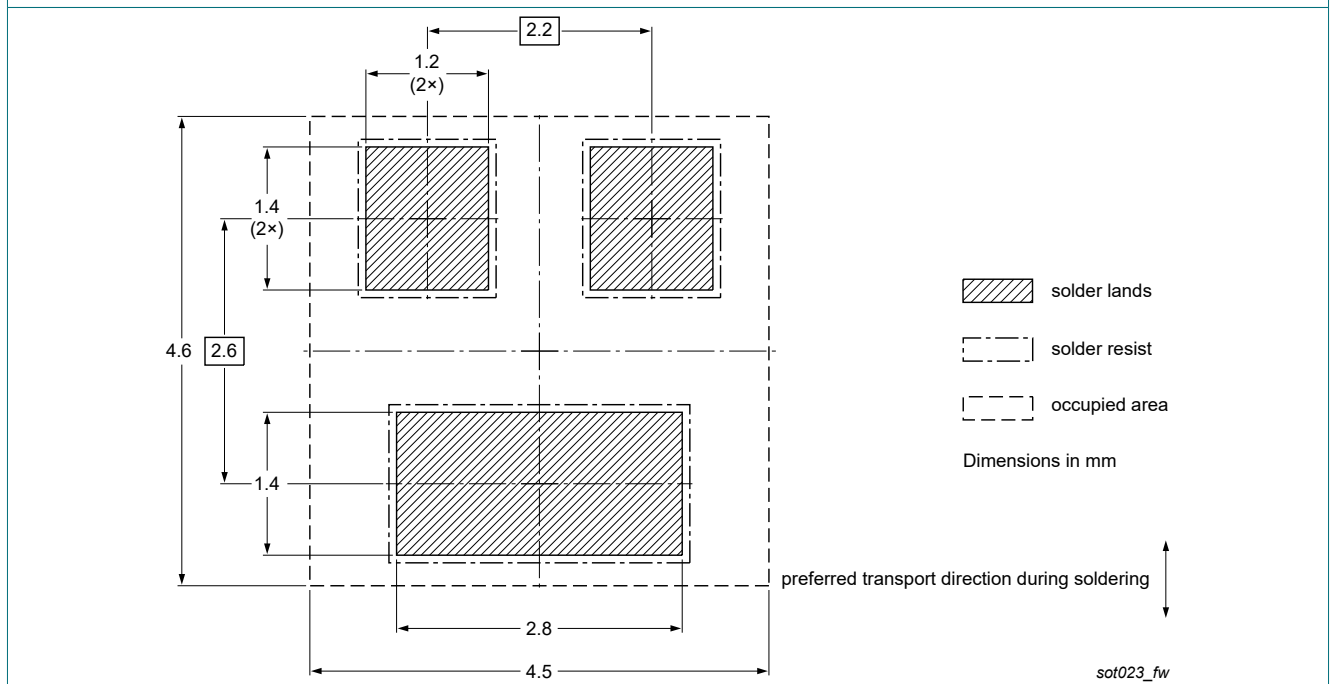


Fig. 10. Wave soldering footprint for SOT23

## 13. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBTA06 v.3	20220701	Product data sheet	-	PMBTA06 v.2
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Product(s) changed to non-automotive qualification. Please refer to <a href="https://www.nexperia.com">nexperia.com</a> for automotive (-Q) product alternative(s).</li></ul>			
PMBTA06 v.2	20040122	Product data sheet	-	PMBTA06 v.1
PMBTA06 v.1	19990429	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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