



# PMBTA56-Q

PNP general purpose transistor

4 August 2021

Product data sheet

## 1. General description

PNP general-purpose transistor in a small SOT23 plastic package. NPN complement: PMBTA06.

## 2. Features and benefits

- High current (max. 500 mA)
- Low voltage (max. 80 V).
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

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

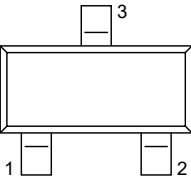
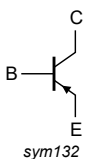
## 4. Quick reference data

Table 1. Quick reference data

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

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 <p style="text-align: center;">SOT23</p>	
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBTA56-Q	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 <sup>[1]</sup>
PMBTA56-Q	%2G

[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		-	-5	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.

## 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]	-	-	500	K/W

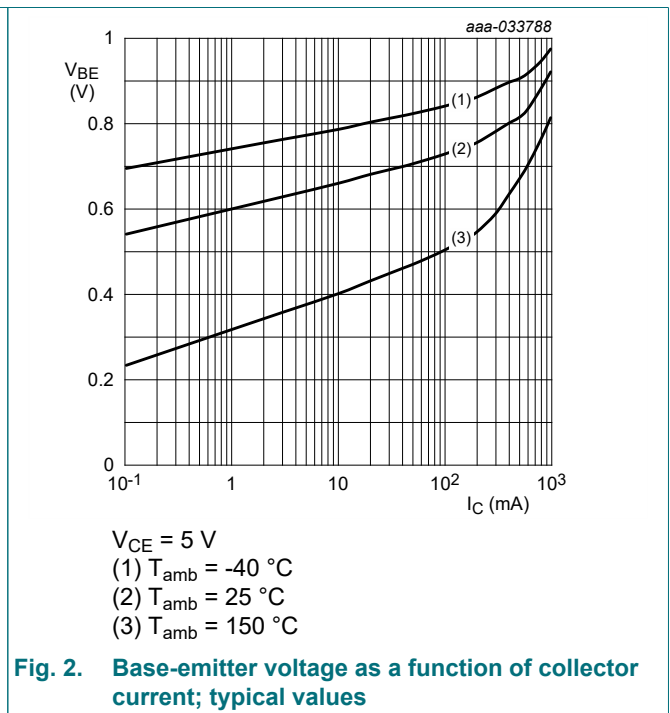
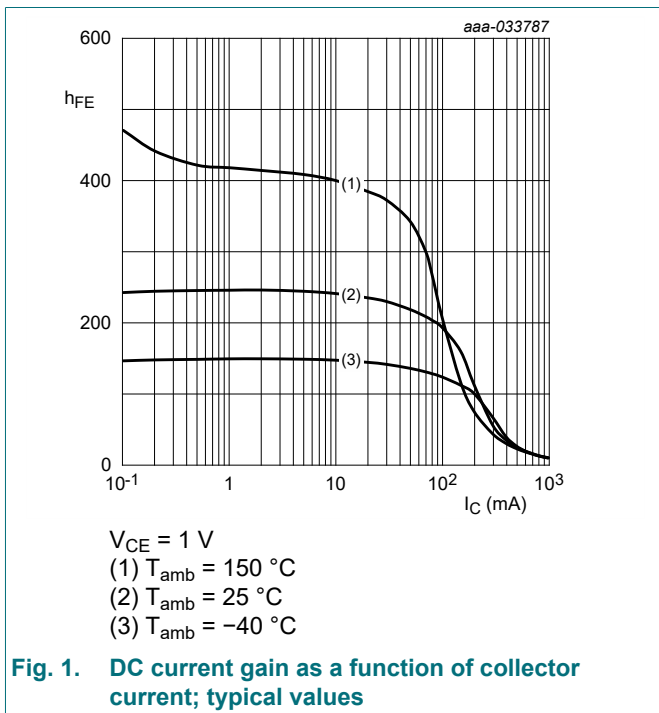
[1] Device mounted on an FR4 PCB, single-sided, 35  $\mu$ m copper, tin-plated and standard footprint.

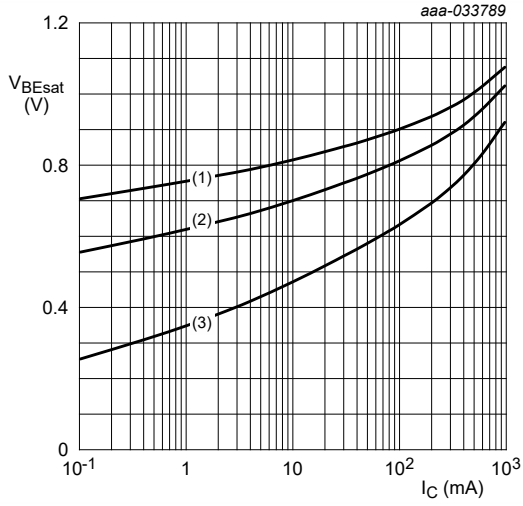
## 10. Characteristics

**Table 7. Characteristics**

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

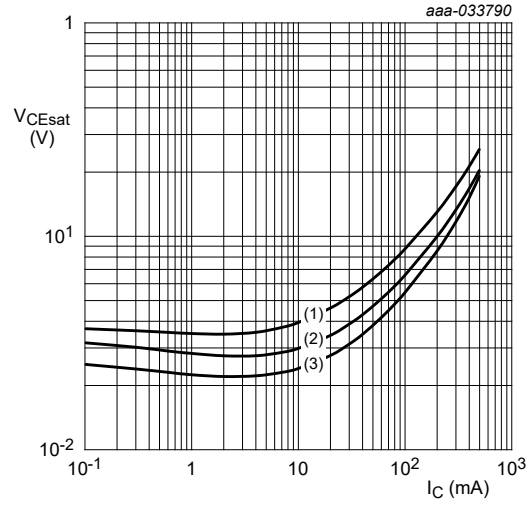
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100\text{ }\mu\text{A}$ ; $I_E = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$	-80	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -1\text{ mA}$ ; $I_B = 0\text{ A}$ ; $T_{amb} = 25\text{ °C}$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





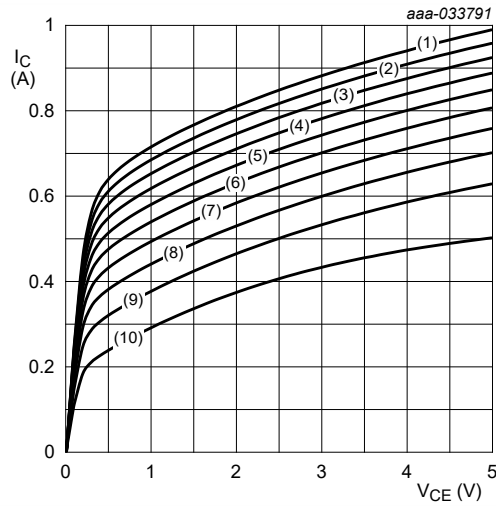
$I_C/I_B = 10$   
 (1)  $T_{amb} = -40\text{ }^\circ\text{C}$   
 (2)  $T_{amb} = 25\text{ }^\circ\text{C}$   
 (3)  $T_{amb} = 150\text{ }^\circ\text{C}$

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



$I_C/I_B = 10$   
 (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. 4. Collector-emitter saturation voltage as a function of collector current; typical values**



$T_{amb} = 25\text{ }^\circ\text{C}$   
 (1)  $I_B = 50\text{ mA}$   
 (2)  $I_B = 45\text{ mA}$   
 (3)  $I_B = 40\text{ mA}$   
 (4)  $I_B = 35\text{ mA}$   
 (5)  $I_B = 30\text{ mA}$   
 (6)  $I_B = 25\text{ mA}$   
 (7)  $I_B = 20\text{ mA}$   
 (8)  $I_B = 15\text{ mA}$   
 (9)  $I_B = 10\text{ mA}$   
 (10)  $I_B = 5\text{ mA}$

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

## 11. Test information

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### 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

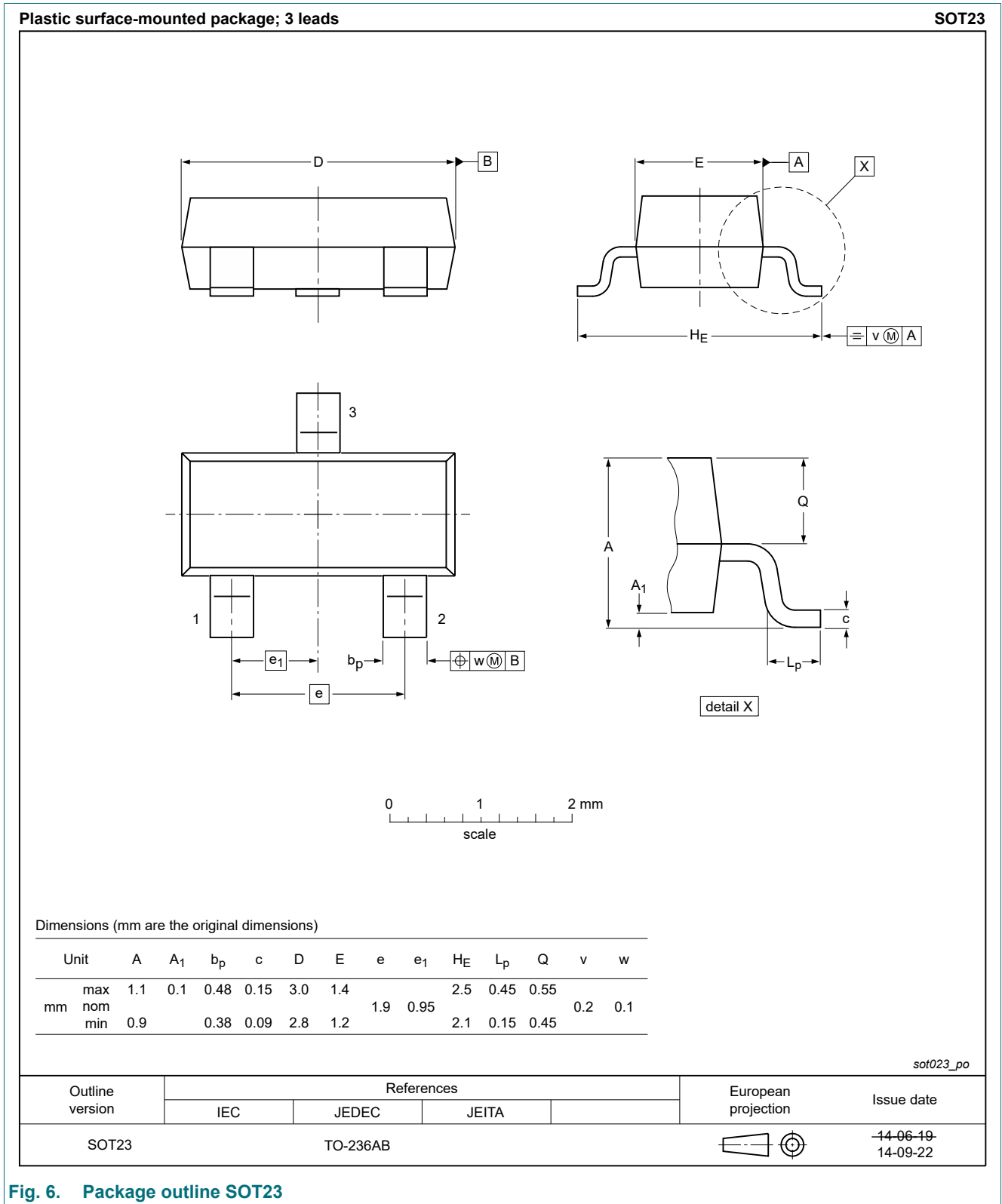


Fig. 6. Package outline SOT23

### 13. Soldering

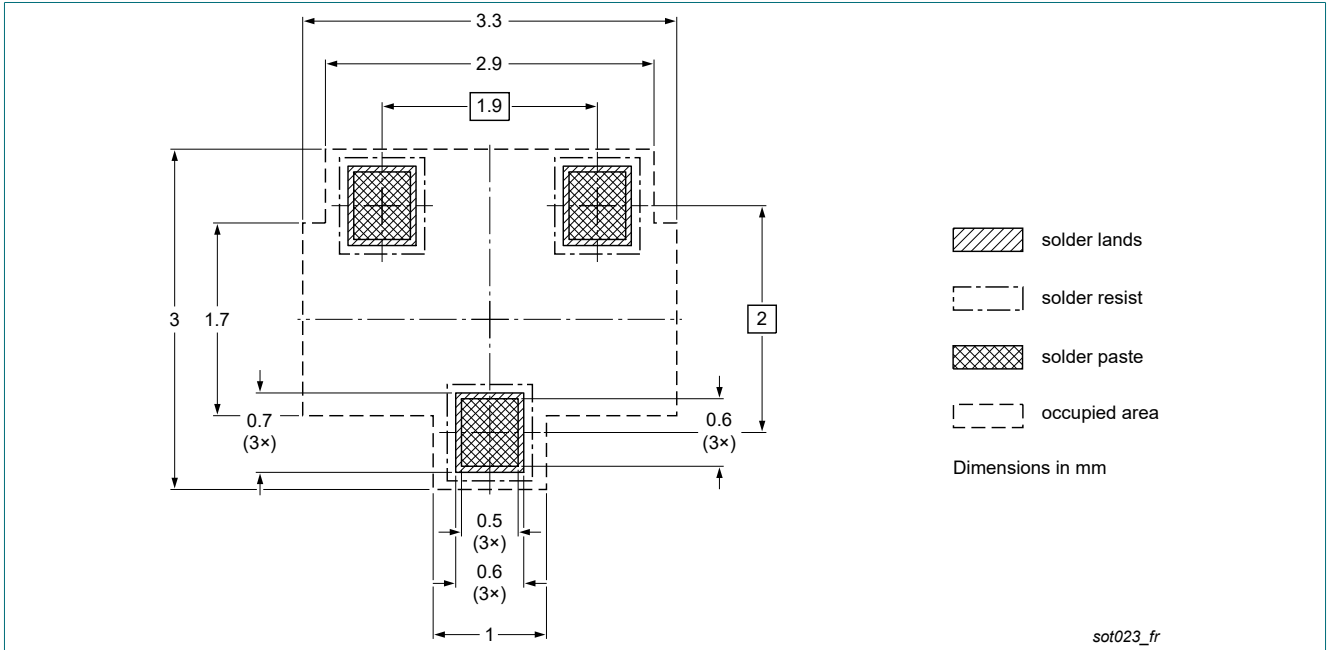


Fig. 7. Reflow soldering footprint for SOT23

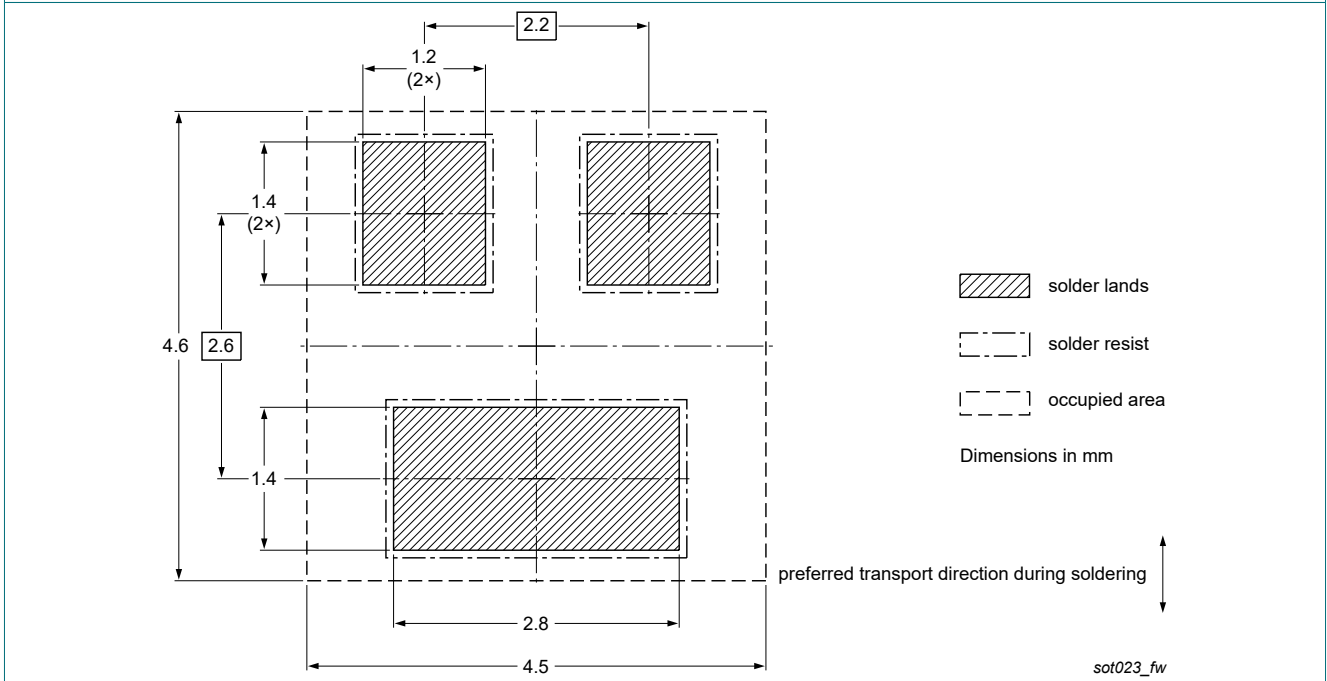


Fig. 8. Wave soldering footprint for SOT23



## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBTA56-Q v.1	20210804	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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