



PMBTA06-Q

NPN general purpose transistor

5 July 2021

Product data sheet

1. General description

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

PNP complement: PMBTA56-Q

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 in e.g. telephony and professional communication equipment.

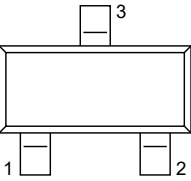
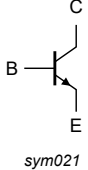
4. Quick reference data

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 style="text-align: center;">SOT23</p>	 <p style="text-align: center;">sym021</p>
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBTA06-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 ^[1]
PMBTA06-Q	%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 μ m copper, tin-plated and standard footprint.

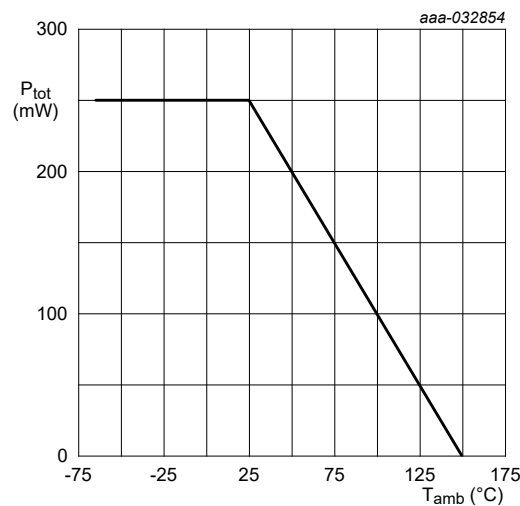


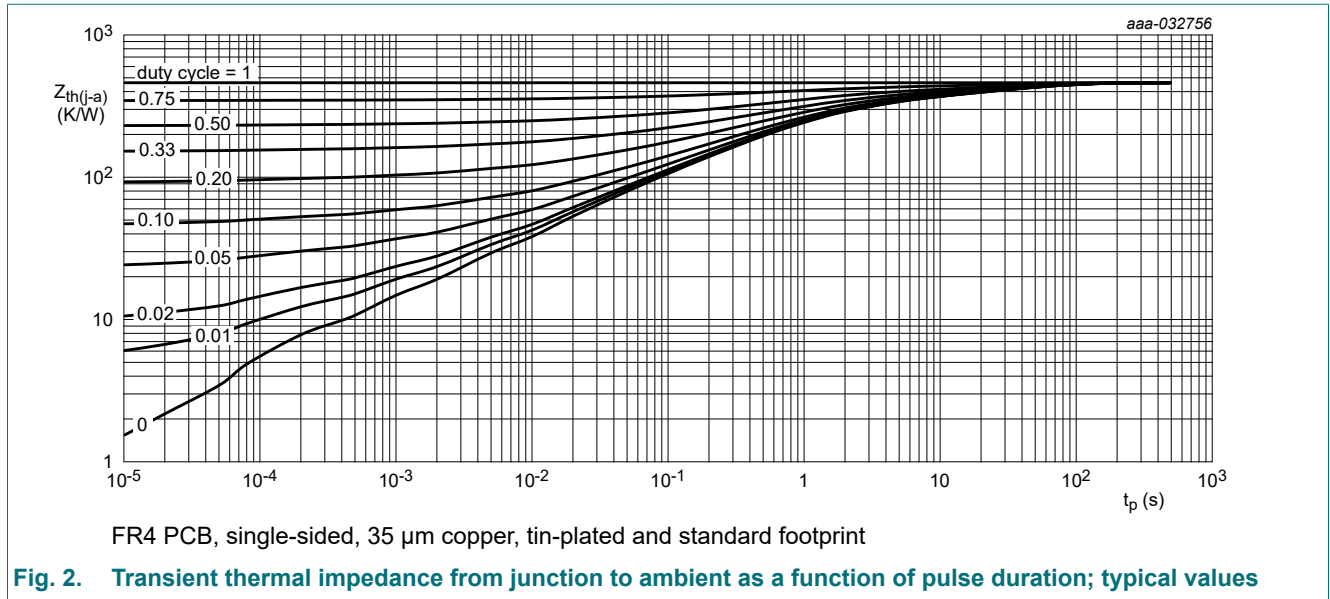
Fig. 1. Power derating curve

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W

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

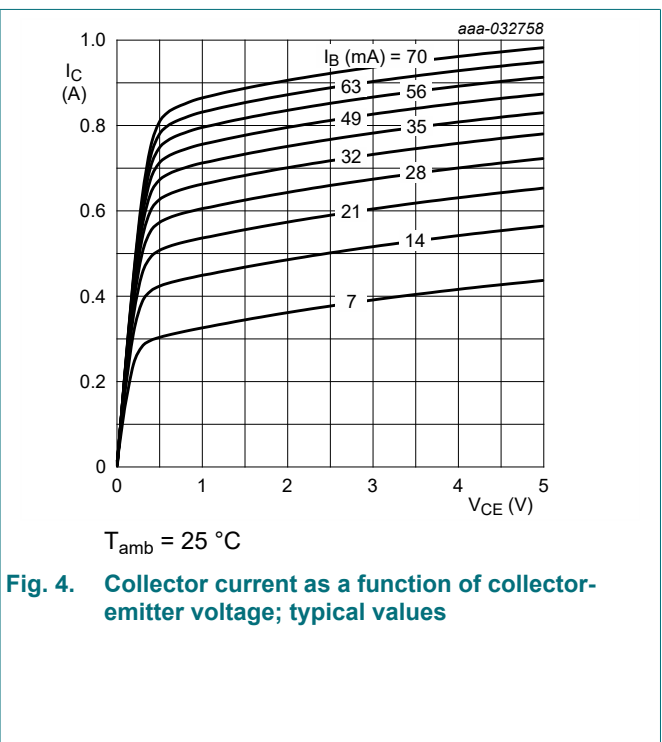
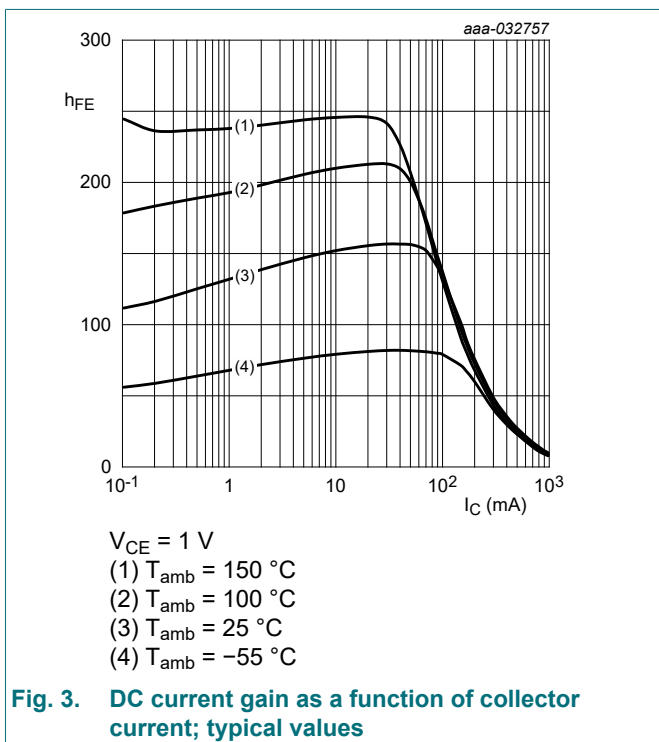


10. Characteristics

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	$I_C = 2\text{ mA}$; $I_B = 0\text{ A}$; $T_{amb} = 25\text{ °C}$	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



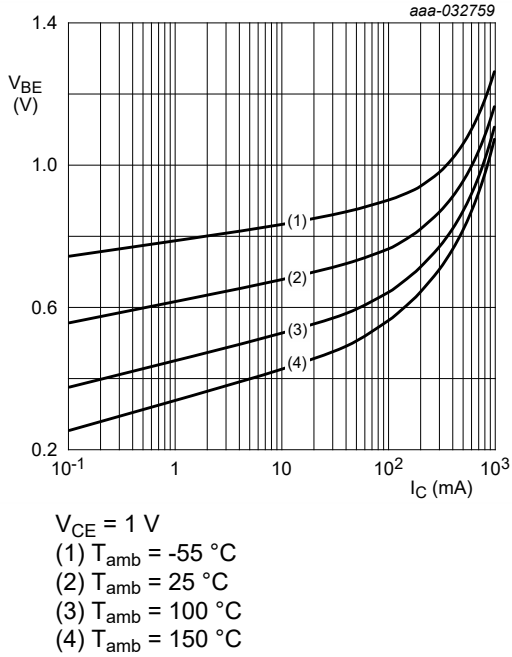


Fig. 5. Base-emitter voltage as a function of collector current; typical values

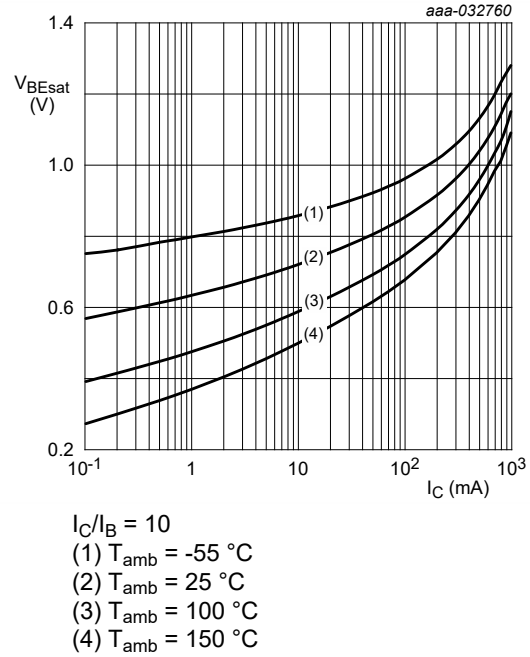


Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values

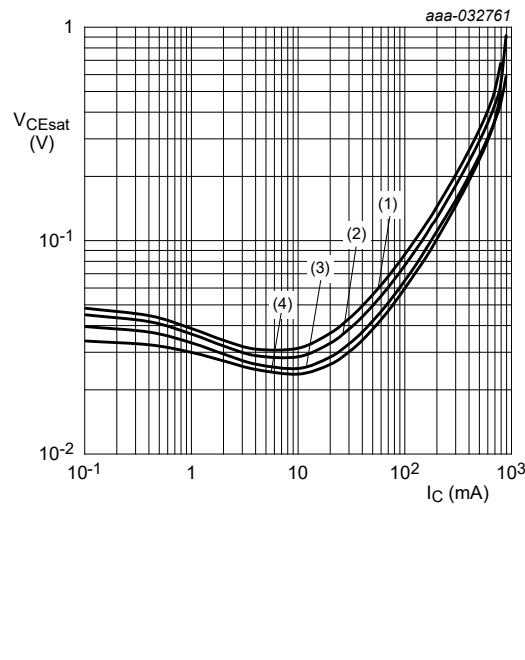


Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values

11. Test information

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

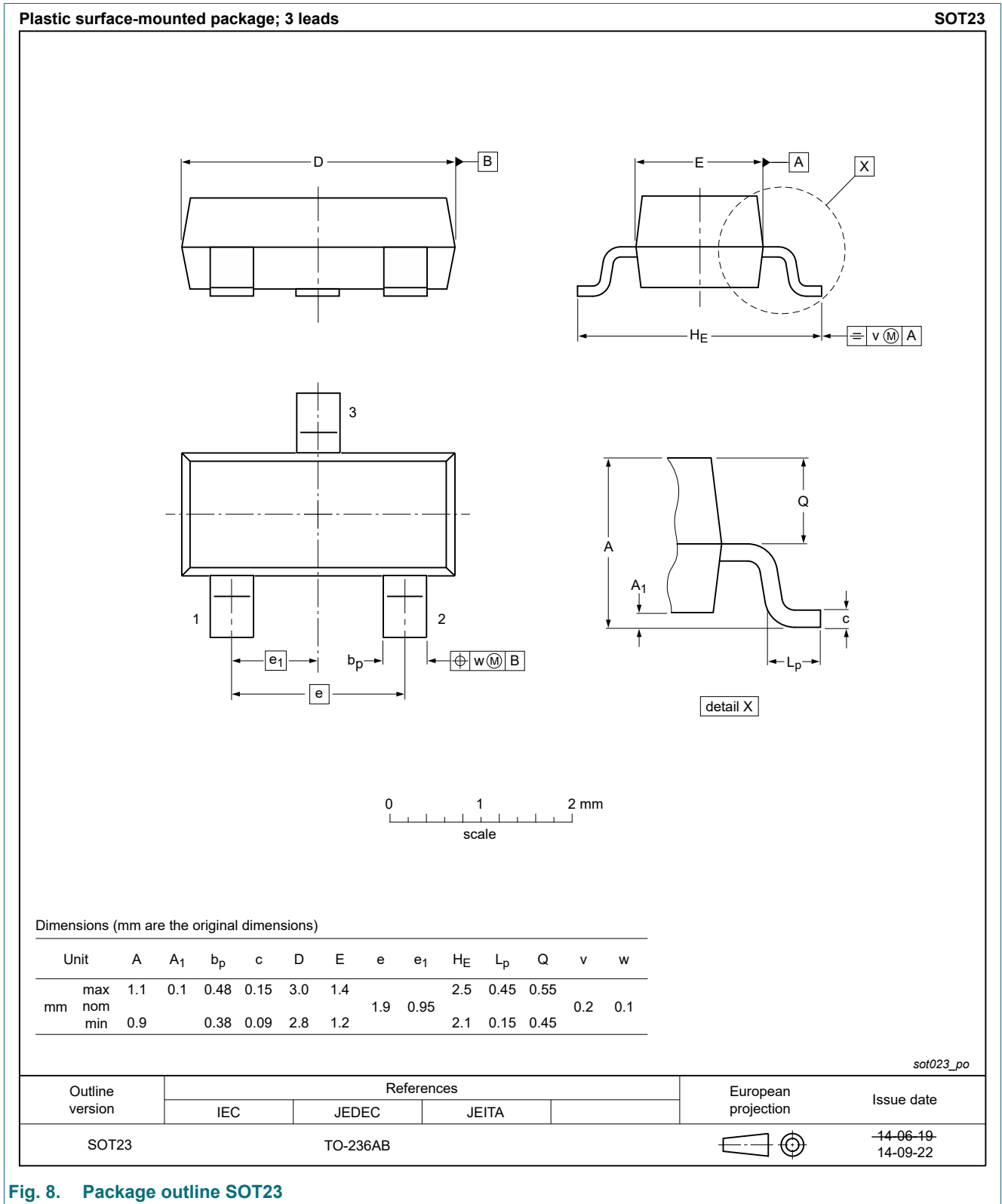


Fig. 8. Package outline SOT23

13. Soldering



Fig. 9. Reflow soldering footprint for SOT23

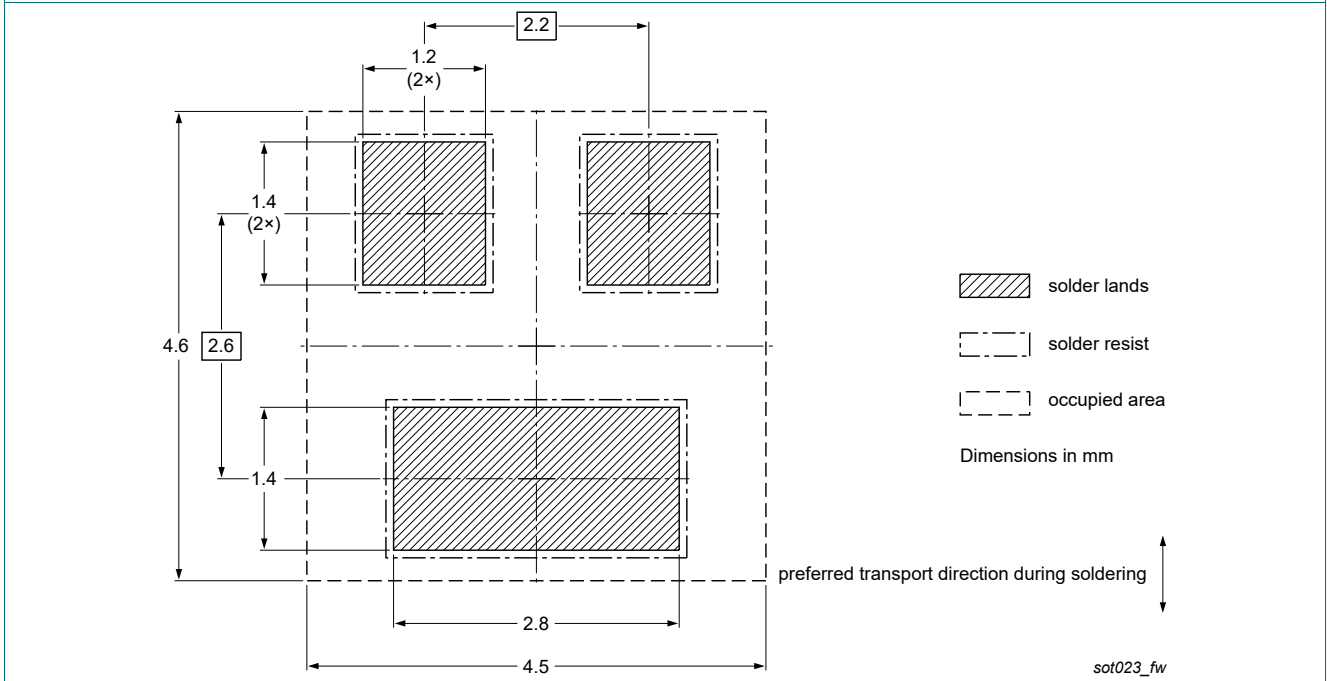


Fig. 10. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBTA06-Q v.1	20210618	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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