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Kind regards,

Team Nexperia



PMBT2907A

60V, 600 mA, PNP switching transistor

6 March 2015

Product data sheet

1. General description

PNP switching transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

NPN complement: PMBT2222A

40V variant: PMBT2907

2. Features and benefits

- Single general-purpose switching transistor
- AEC-Q101 qualified

3. Applications

- Switching and linear amplification

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	-60	V
I_C	collector current		-	-	-600	mA
h_{FE}	DC current gain	$V_{CE} = -10\text{ V}$; $I_C = -150\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	100	-	300	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	TO-236AB (SOT23)	sym132
2	E	emitter		
3	C	collector		



6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBT2907A	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code [1]
PMBT2907A	%2F

[1] % = placeholder for manufacturing site code

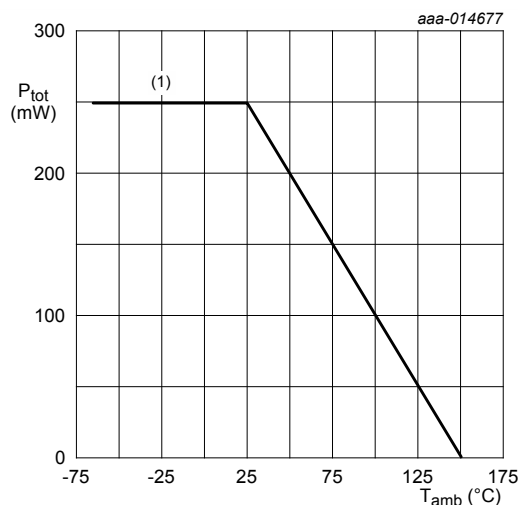
8. Limiting values

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		-	-60	V
V_{CEO}	collector-emitter voltage	open base		-	-60	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current			-	-600	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-800	mA
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] Transistor mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.



(1) FR4 PCB; standard footprint

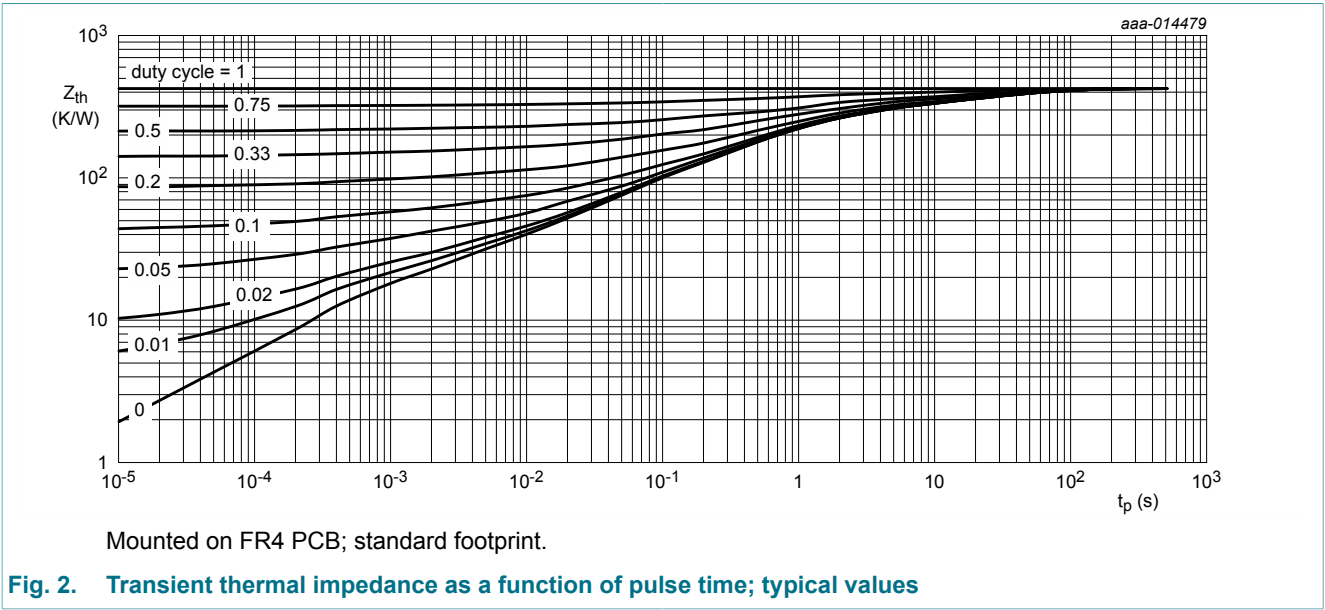
Fig. 1. Power derating curve

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] Transistor mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint.



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = -50\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-10	nA
		$V_{CB} = -50\text{ V}; I_E = 0\text{ A}; T_j = 125\text{ }^{\circ}\text{C}$	-	-	-10	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-50	nA
h_{FE}	DC current gain	$V_{CE} = -10\text{ V}; I_C = -0.1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	75	-	-	
		$V_{CE} = -10\text{ V}; I_C = -1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	100	-	-	
		$V_{CE} = -10\text{ V}; I_C = -10\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	100	-	-	
		$V_{CE} = -10\text{ V}; I_C = -150\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	100	-	300	
		$V_{CE} = -10\text{ V}; I_C = -500\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	50	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-400	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-1.6	V
V_{BEsat}	base-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-1.3	V
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-2.6	V
t_d	delay time	$I_C = -150\text{ mA}; I_{Bon} = -15\text{ mA}; I_{Boff} = 15\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	12	ns
t_r	rise time		-	-	30	ns
t_{on}	turn-on time		-	-	40	ns
t_s	storage time		-	-	300	ns
t_f	fall time		-	-	65	ns
t_{off}	turn-off time		-	-	365	ns
C_C	collector capacitance	$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	8	pF
C_E	emitter capacitance	$V_{EB} = -2\text{ V}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	30	pF
f_T	transition frequency	$V_{CE} = -20\text{ V}; I_C = -50\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	200	-	-	MHz

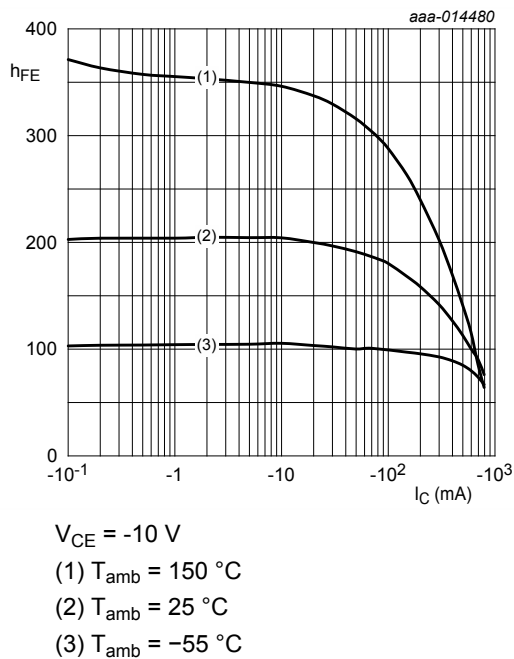


Fig. 3. DC current gain as a function of collector current; typical values

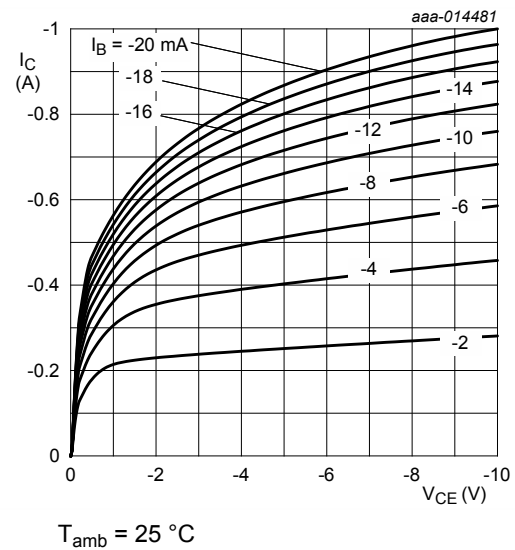


Fig. 4. Collector current as a function of collector-emitter voltage; typical values

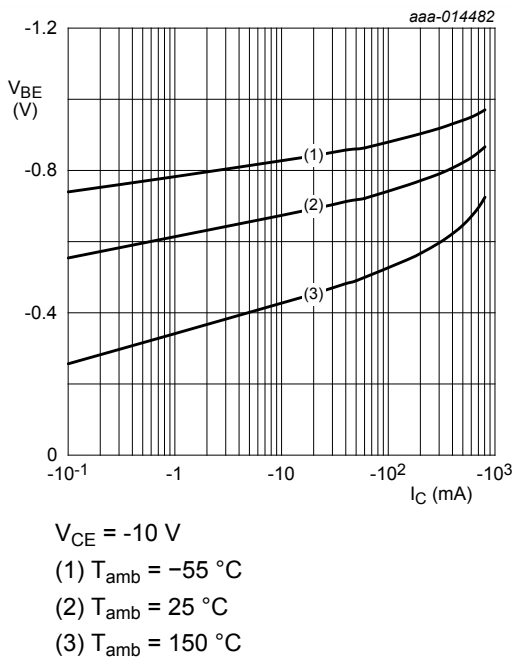


Fig. 5. Base-emitter voltage as a function of collector current; typical values

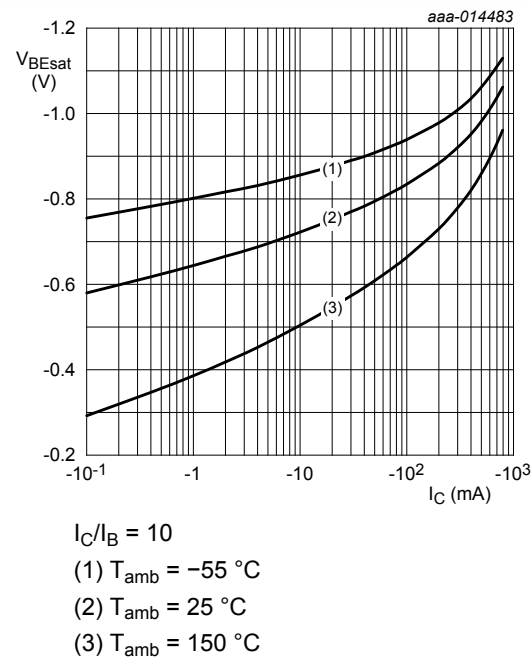
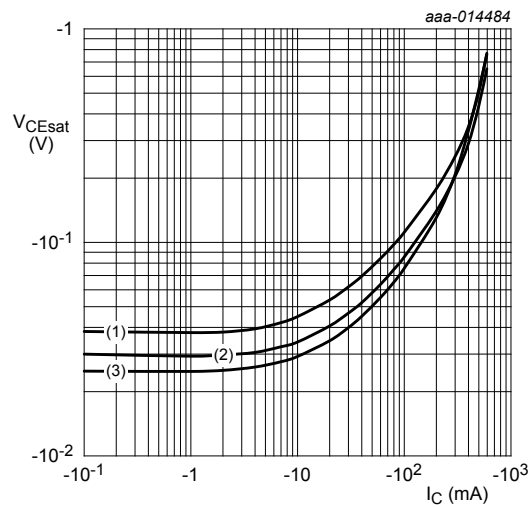
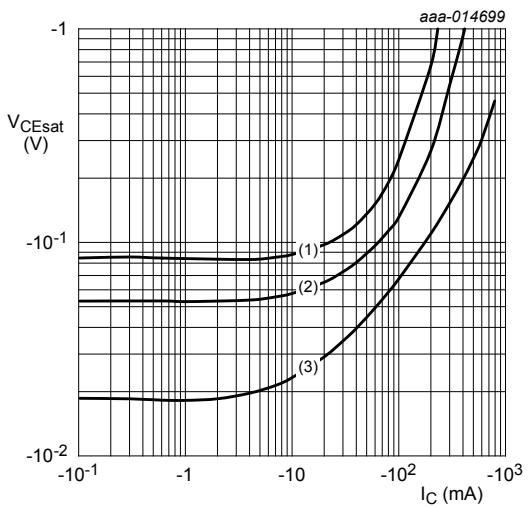


Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values



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

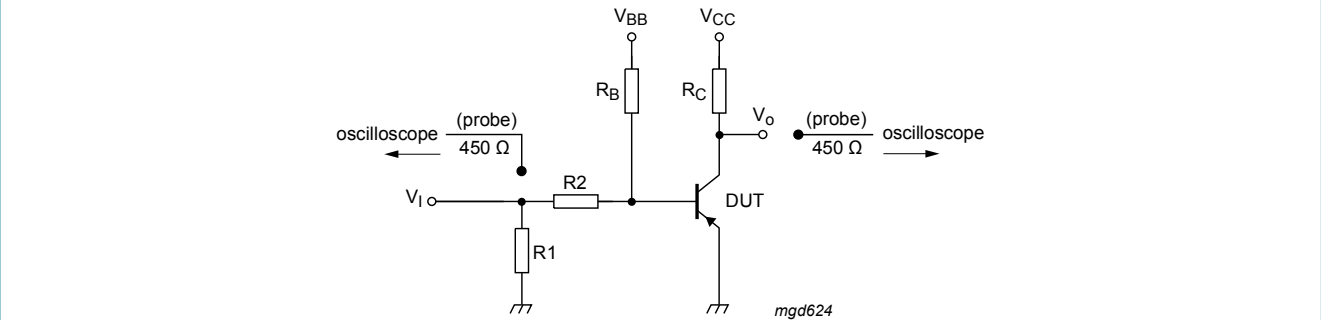
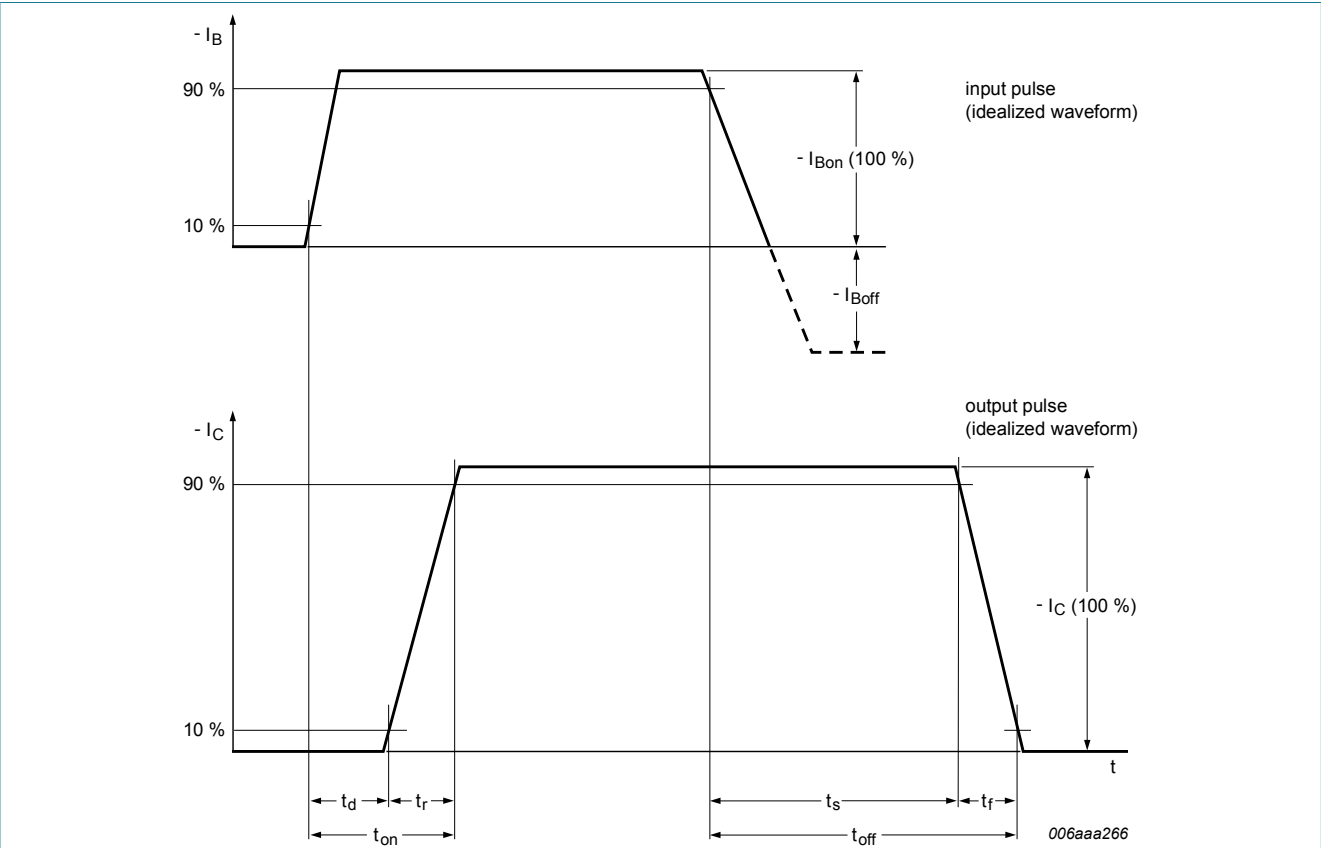
Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ }^{\circ}\text{C}$
(1) $I_C/I_B = 100$
(2) $I_C/I_B = 50$
(3) $I_C/I_B = 10$

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

11. Test information



11.1 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

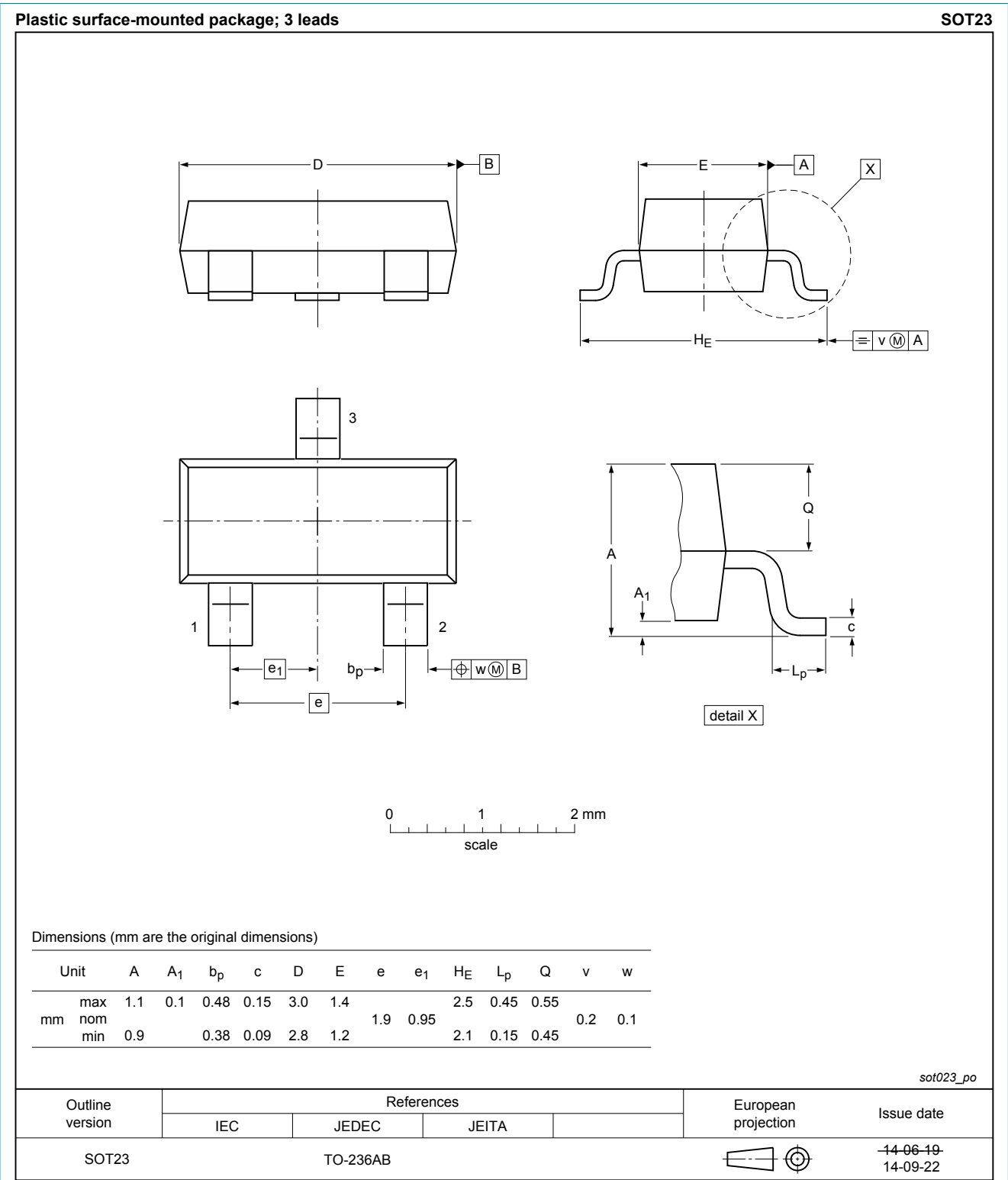


Fig. 11. Package outline TO-236AB (SOT23)

13. Soldering

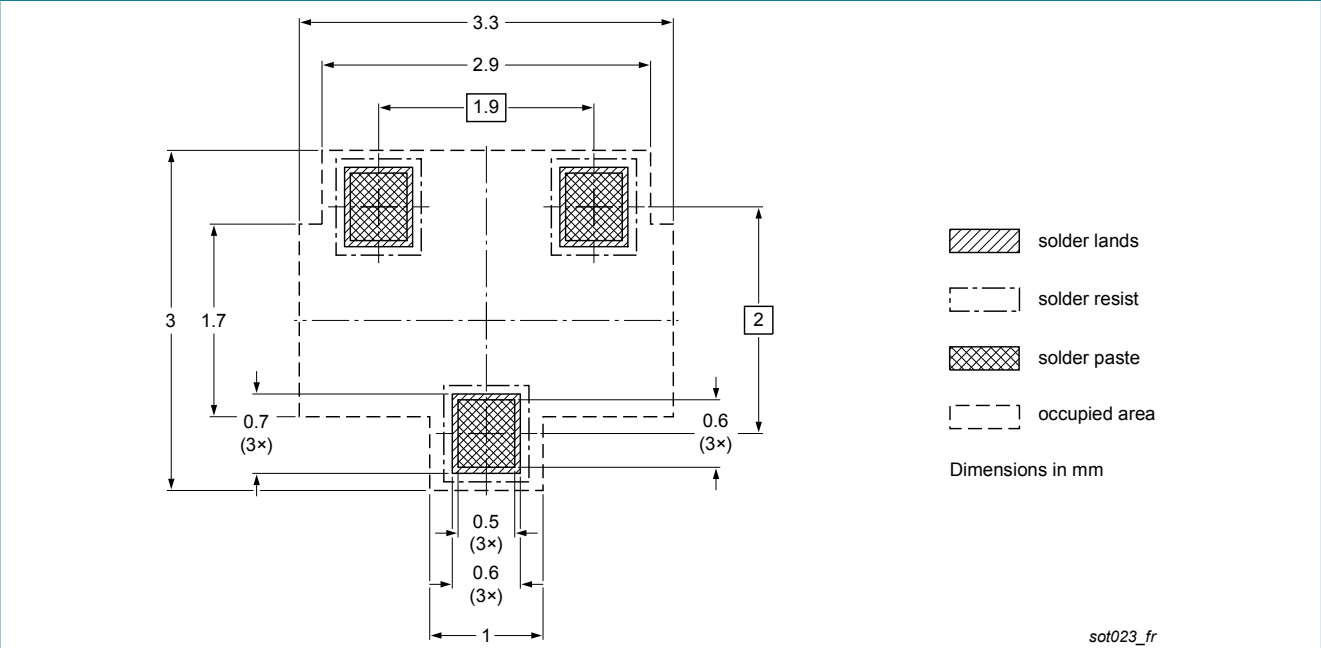


Fig. 12. Reflow soldering footprint for TO-236AB (SOT23)

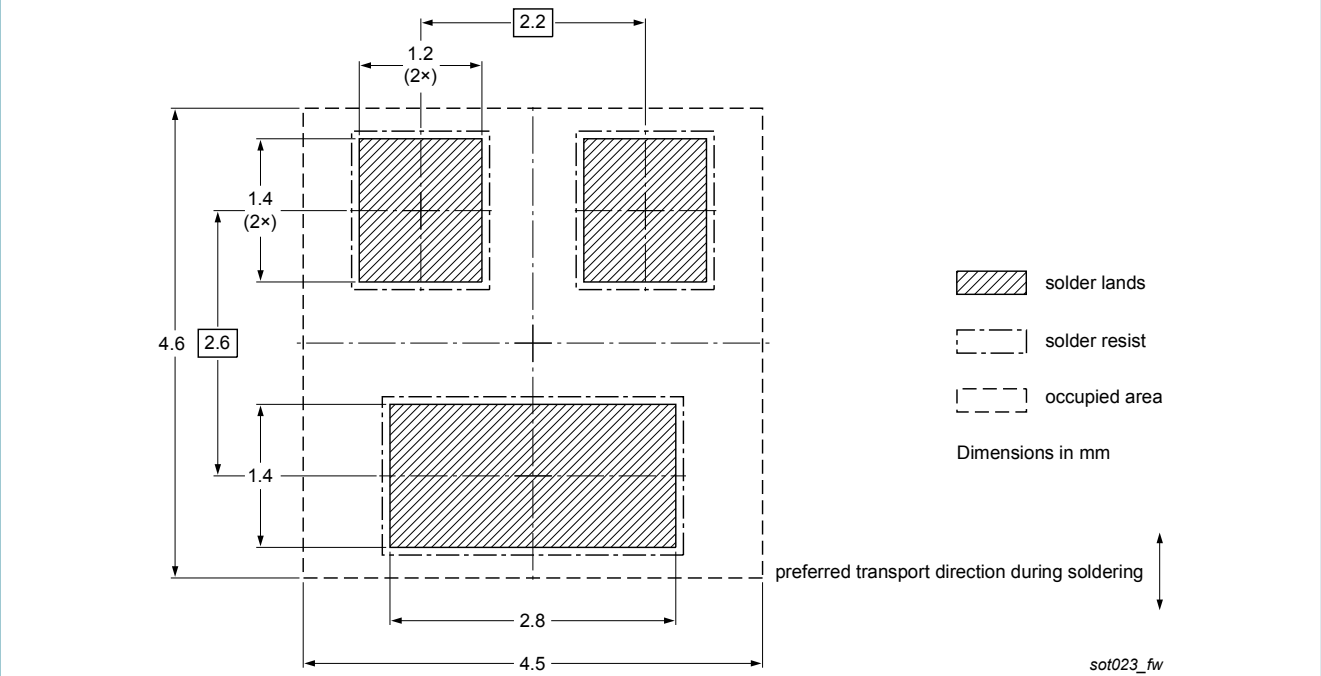


Fig. 13. Wave soldering footprint for TO-236AB (SOT23)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT2907A v.5	20150306	Product data sheet	-	PMBT2907_ PMBT2907A v.4
Modifications:	- The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors - Legal texts have been adapted to the new company name where appropriate - Data sheet PMBT29007_PMBT2907A split into two separate data sheets			
PMBT2907_ PMBT2907A v.4	20040116	Product data sheet	-	PMBT2907_ PMBT2907A v.3
PMBT2907_ PMBT2907A v.3	19990427	Product specification	-	PMBT2907_ PMBT2907A v.2
PMBT2907_ PMBT2907A v.2	19970904	Product specification	-	PMBT2907_ PMBT2907A v.1
PMBT2907_ PMBT2907A v.1	19970507	Product specification	-	-

15. Legal information

15.1 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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