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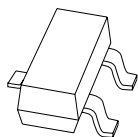
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Kind regards,

Team Nexperia



PMBTA45

500 V, 150 mA NPN high-voltage low V_{CEsat} (BISS) transistor

Rev. 02 — 10 March 2010

Product data sheet

1. Product profile

1.1 General description

NPN high-voltage low V_{CEsat} Breakthrough In Small Signal (BISS) transistor in a SOT23 (TO-236AB) small Surface-Mounted Device (SMD) plastic package.

PNP complement: PBHV9050T.

1.2 Features and benefits

- High voltage
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High collector current gain (h_{FE}) at high I_C
- AEC-Q101 qualified

1.3 Applications

- Electronic ballasts
- LED driver for LED chain module
- LCD backlighting
- Automotive motor management
- Flyback converters
- Hook switch for wired telecom
- Switch Mode Power Supply (SMPS)

1.4 Quick reference data

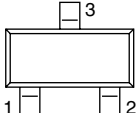
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CESM}	collector-emitter peak voltage	$V_{BE} = 0\text{ V}$	-	-	500	V
V_{CEO}	collector-emitter voltage	open base	-	-	500	V
I_C	collector current		-	-	0.15	A
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}; I_C = 30\text{ mA}$	50	100	-	



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	base		 sym021
2	emitter		
3	collector		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBTA45	-	plastic surface-mounted package; 3 leads	SOT23

4. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PMBTA45	LK*

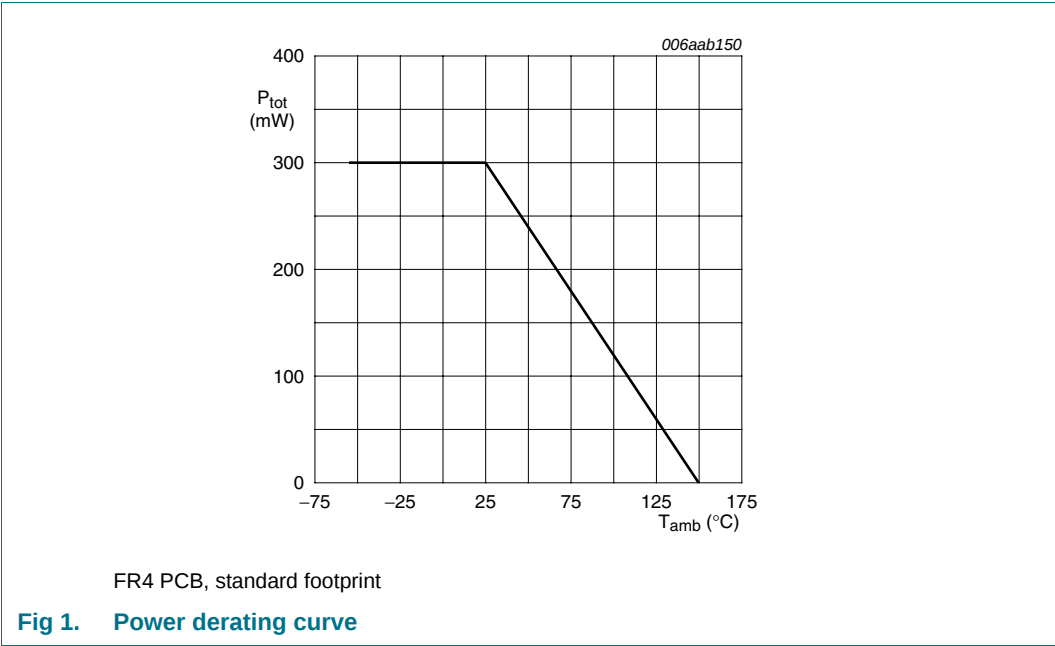
- [1] * = -: made in Hong Kong
* = p: made in Hong Kong
* = t: made in Malaysia
* = W: made in China

5. 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	-	500	V
V_{CEO}	collector-emitter voltage	open base	-	500	V
V_{CESM}	collector-emitter peak voltage	$V_{BE} = 0\text{ V}$	-	500	V
V_{EBO}	emitter-base voltage	open collector	-	6	V
I_C	collector current		-	0.15	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	0.5	A
I_{BM}	peak base current	single pulse; $t_p \leq 1\text{ ms}$	-	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[1] -	300	mW
T_j	junction temperature		-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		-55	+150	$^{\circ}\text{C}$
T_{stg}	storage temperature		-65	+150	$^{\circ}\text{C}$

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

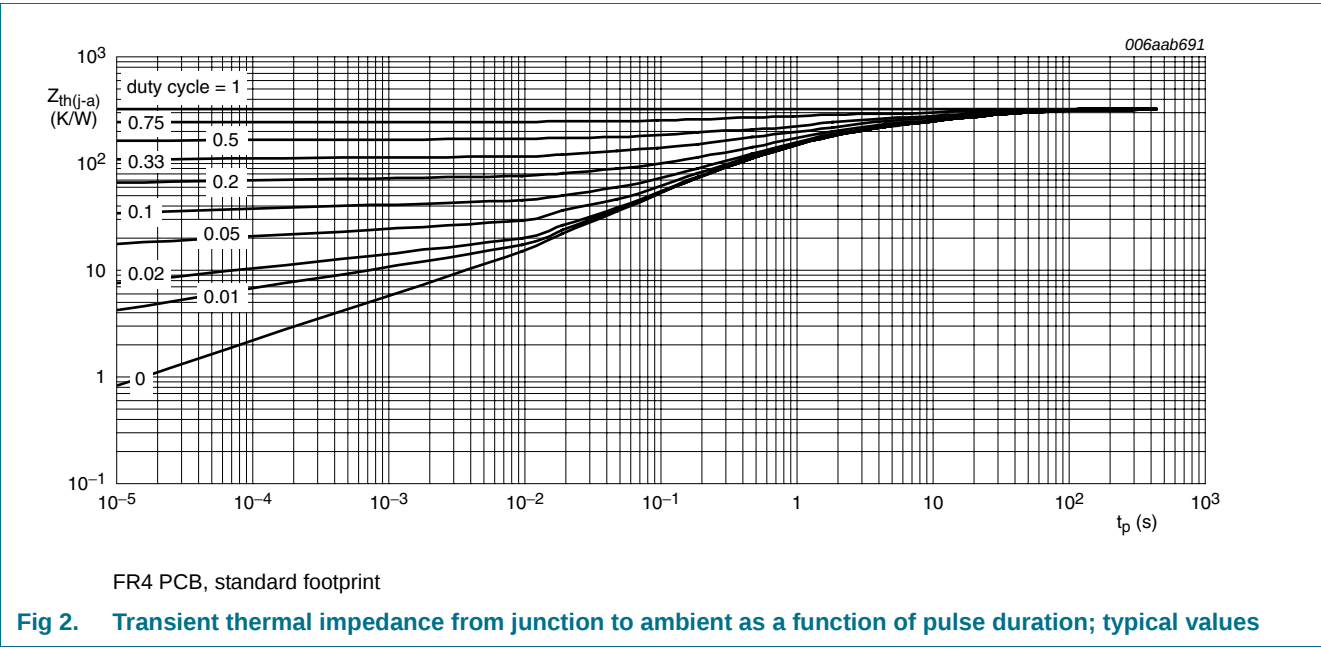


6. Thermal characteristics

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
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	-	70	K/W

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



7. Characteristics

Table 7. Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = 360\text{ V}; I_E = 0\text{ A}$	-	-	100	nA
		$V_{CB} = 360\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^{\circ}\text{C}$	-	-	10	μA
I_{CES}	collector-emitter cut-off current	$V_{CE} = 360\text{ V}; V_{BE} = 0\text{ V}$	-	-	100	nA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	100	nA
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}$				
		$I_C = 30\text{ mA}$	50	100	-	
		$I_C = 50\text{ mA}$	[1] 50	100	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 20\text{ mA}; I_B = 2\text{ mA}$	-	60	75	mV
		$I_C = 50\text{ mA}; I_B = 6\text{ mA}$	[1] -	65	90	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 50\text{ mA}; I_B = 5\text{ mA}$	[1] -	0.75	0.9	V
f_T	transition frequency	$V_{CE} = 10\text{ V}; I_E = 10\text{ mA}; f = 100\text{ MHz}$	-	35	-	MHz
C_c	collector capacitance	$V_{CB} = 20\text{ V}; I_E = I_C = 0\text{ A}; f = 1\text{ MHz}$	-	4	-	pF
C_e	emitter capacitance	$V_{EB} = 0.5\text{ V}; I_C = I_E = 0\text{ A}; f = 1\text{ MHz}$	-	200	-	pF
t_d	delay time	$V_{CC} = 20\text{ V}; I_C = 0.05\text{ A}; I_{Bon} = 5\text{ mA}; I_{Boff} = -10\text{ mA}$	-	80	-	ns
t_r	rise time		-	2700	-	ns
t_{on}	turn-on time		-	2780	-	ns
t_s	storage time		-	3400	-	ns
t_f	fall time		-	800	-	ns
t_{off}	turn-off time		-	4200	-	ns

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$.

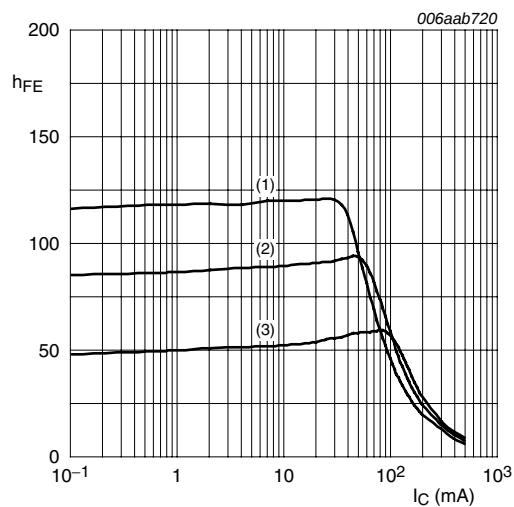


Fig 3. DC current gain as a function of collector current; typical values

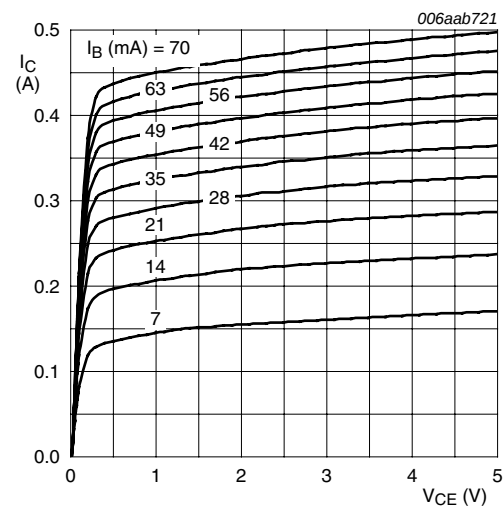


Fig 4. Collector current as a function of collector-emitter voltage; typical values

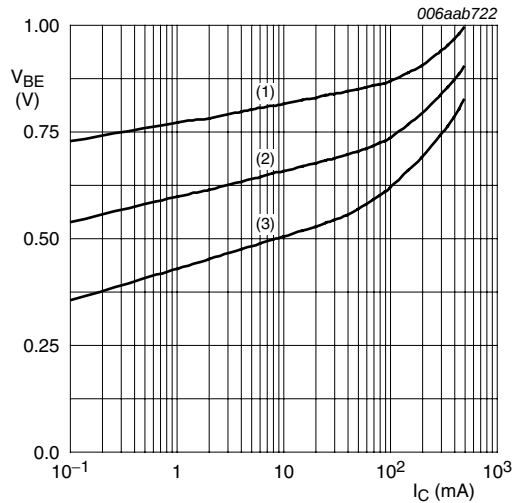


Fig 5. Base-emitter voltage as a function of collector current; typical values

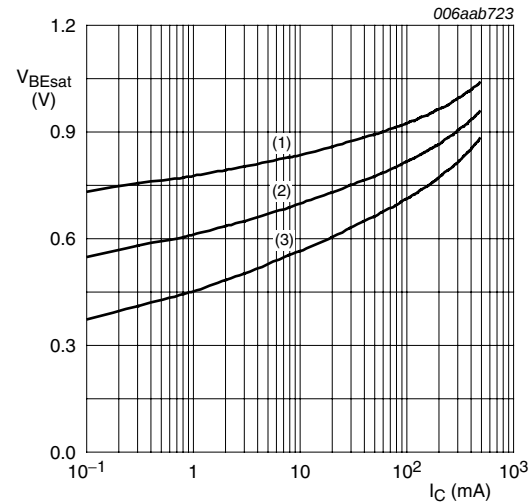


Fig 6. Base-emitter saturation voltage as a function of collector current; typical values

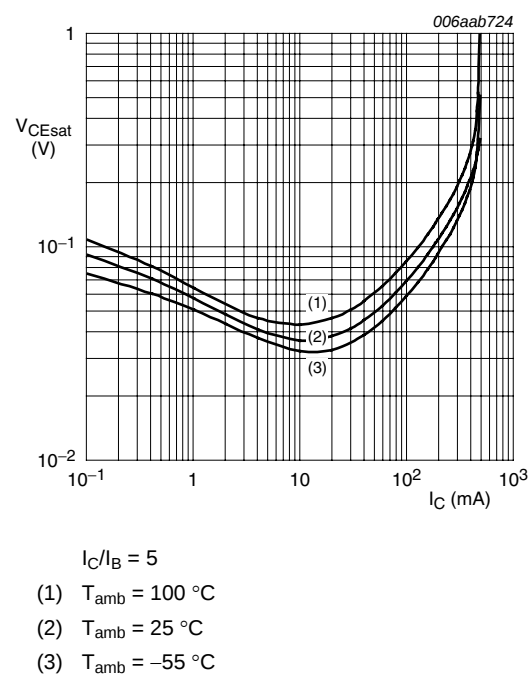


Fig 7. Collector-emitter saturation voltage as a function of collector current; typical values

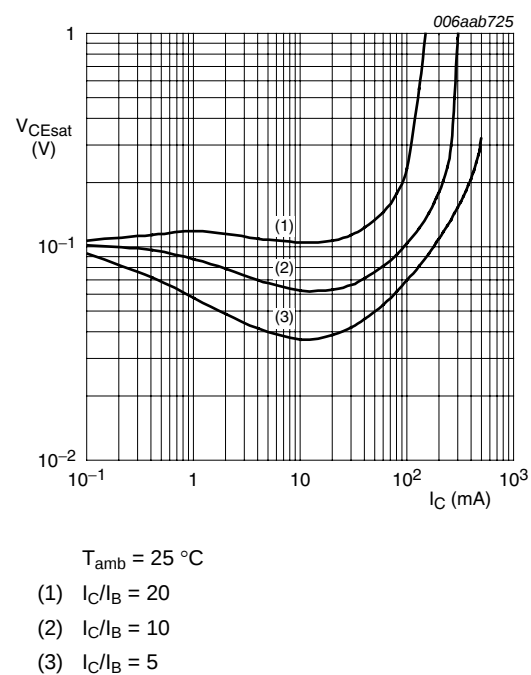


Fig 8. Collector-emitter saturation voltage as a function of collector current; typical values

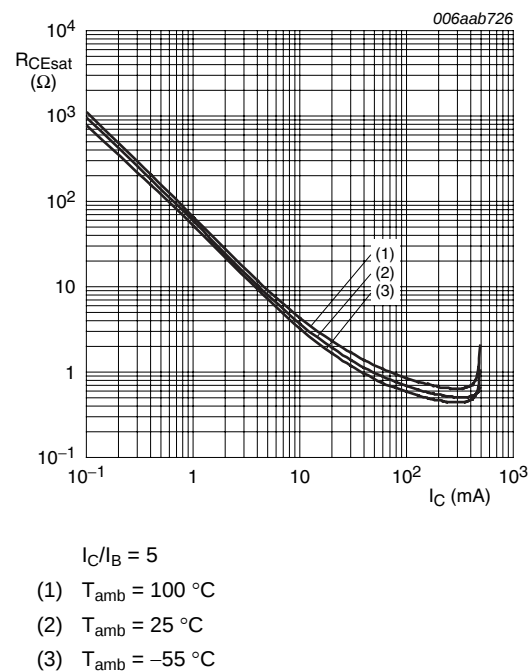


Fig 9. Collector-emitter saturation resistance as a function of collector current; typical values

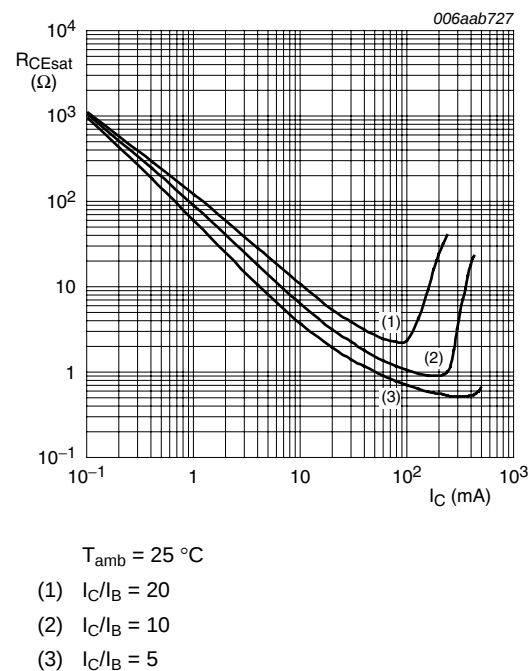
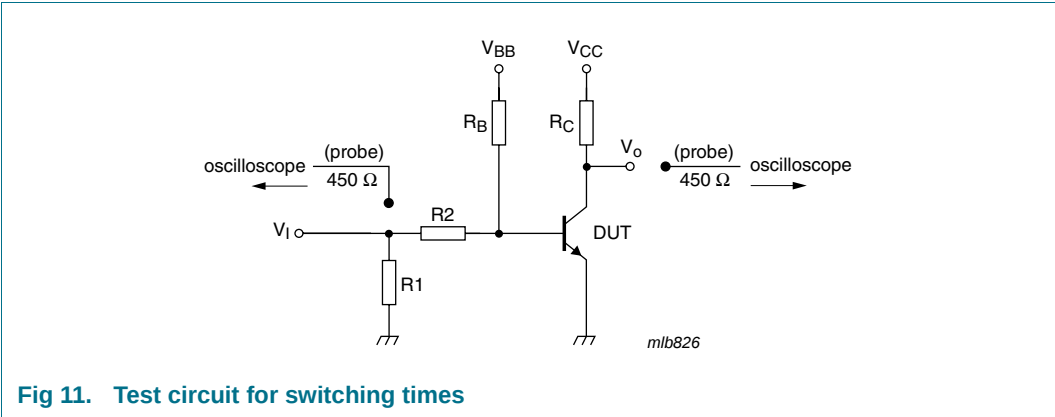


Fig 10. Collector-emitter saturation resistance as a function of collector current; typical values

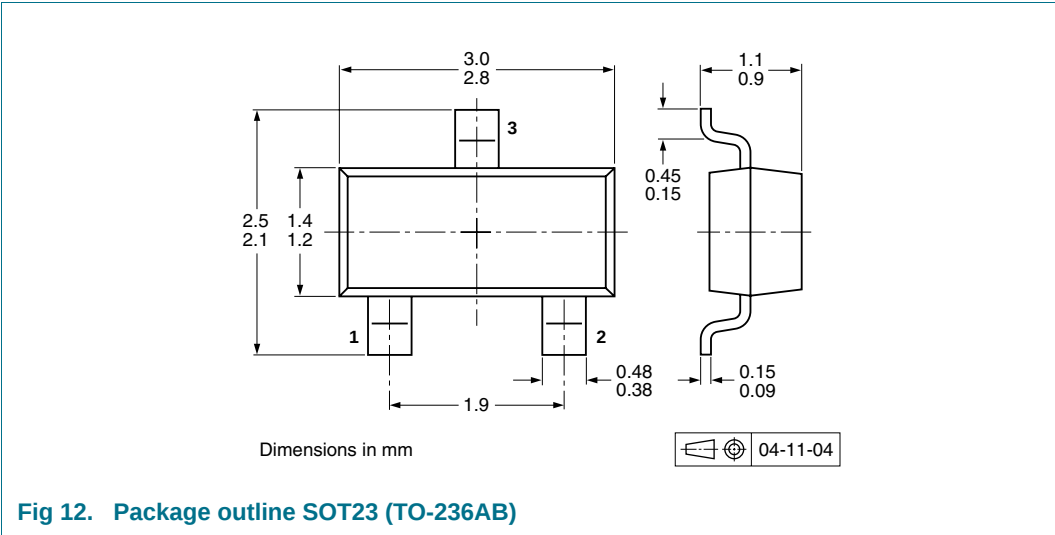
8. Test information



8.1 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.

9. Package outline



10. Packing information

Table 8. Packing methods
The indicated -xxx are the last three digits of the 12NC ordering code.[\[1\]](#)

Type number	Package	Description	Packing quantity	
			3000	10000
PMBTA45	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235

[1] For further information and the availability of packing methods, see [Section 14](#).

11. Soldering

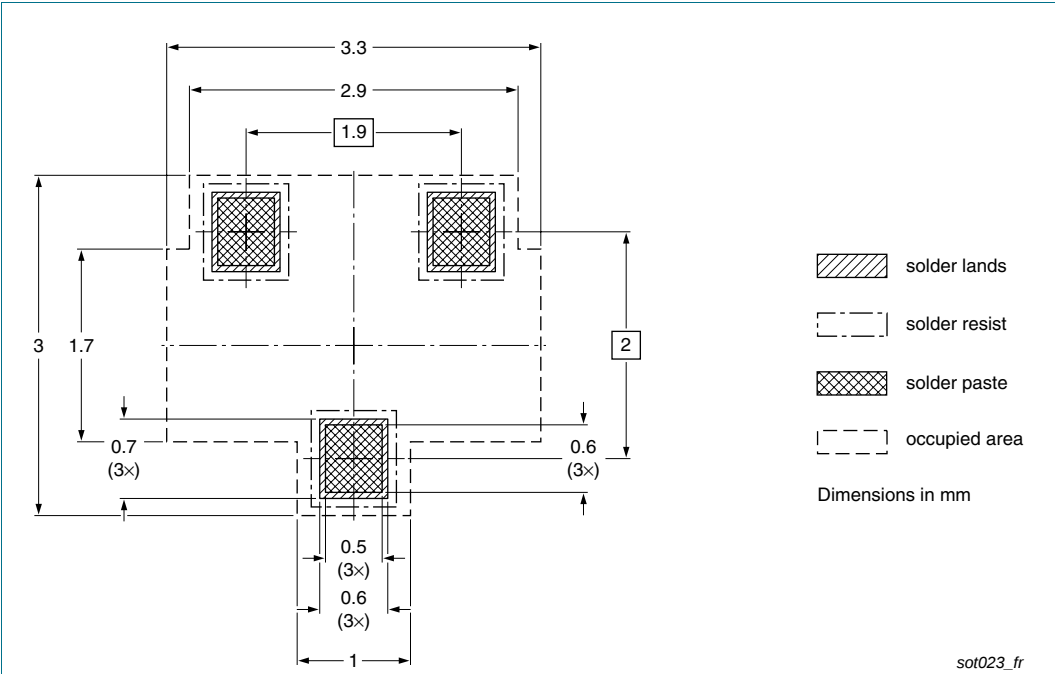


Fig 13. Reflow soldering footprint SOT23 (TO-236AB)

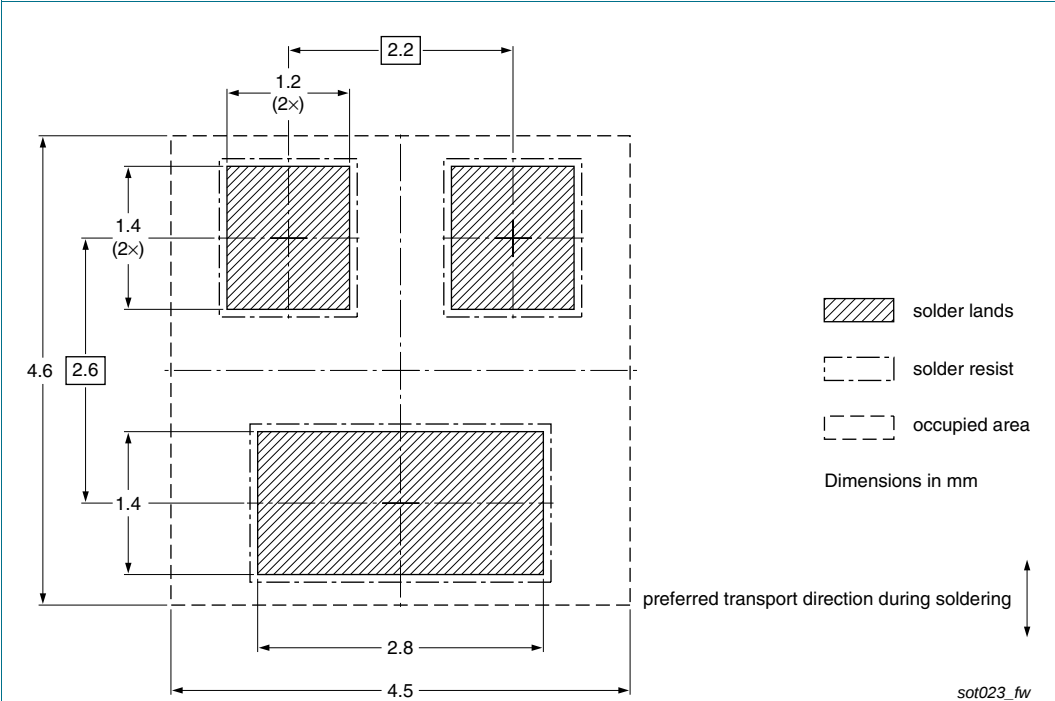


Fig 14. Wave soldering footprint SOT23 (TO-236AB)

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMBTA45_2	20100310	Product data sheet	-	PMBTA45_1
Modifications:	• Figure 7 : updated			
PMBTA45_1	20090916	Product data sheet	-	-

13. Legal information

13.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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