

PBHV8118T

180 V, 1 A NPN high-voltage low V_{CEsat} (BISS) transistor

Rev. 01 — 7 May 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 small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

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
- Small SMD plastic package

1.3 Applications

- LED driver for LED chain module
- LCD backlighting
- Automotive power management
- Hook switch for wired telecom
- Switch Mode Power Supply (SMPS)

1.4 Quick reference data

Table 1. Quick reference data

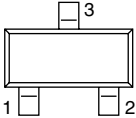
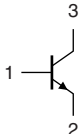
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	180	V
I_C	collector current		-	-	1	A
h_{FE}	DC current gain	$V_{CE} = 10\text{ V};$ $I_C = 50\text{ mA}$	[1] 100	250	-	

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



2. Pinning information

Table 2. Pinning

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

sym021

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBHV8118T	-	plastic surface-mounted package; 3 leads	SOT23

4. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PBHV8118T	LZ*

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

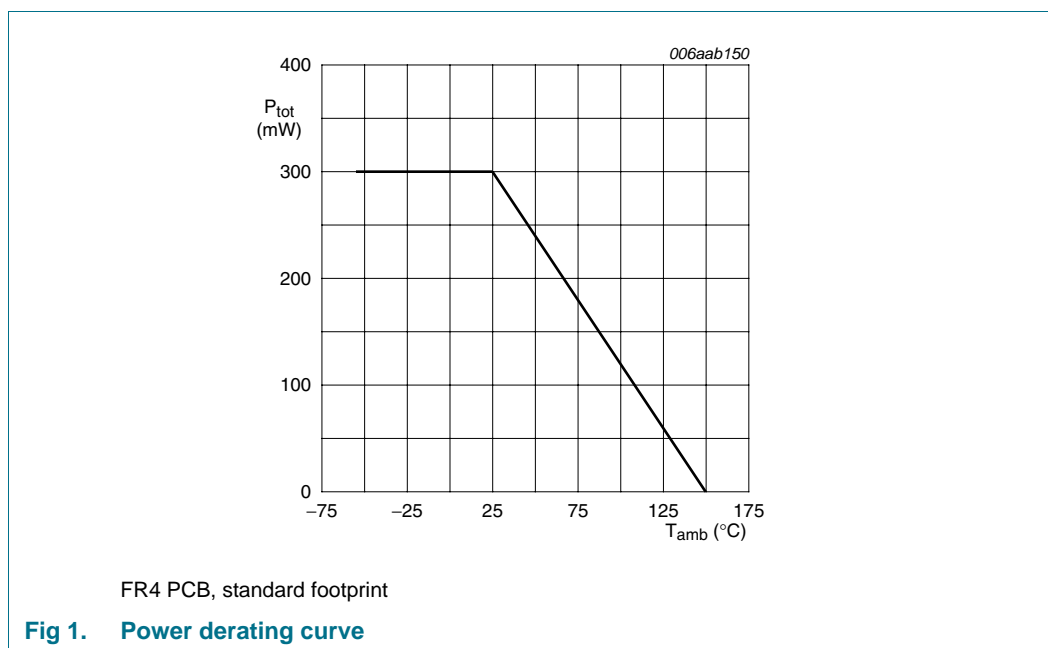
5. Limiting values

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	-	400	V
V_{CEO}	collector-emitter voltage	open base	-	180	V
V_{EBO}	emitter-base voltage	open collector	-	6	V
I_C	collector current		-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	2	A
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms	-	400	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	300	mW
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-55	+150	°C
T_{stg}	storage temperature		-65	+150	°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.

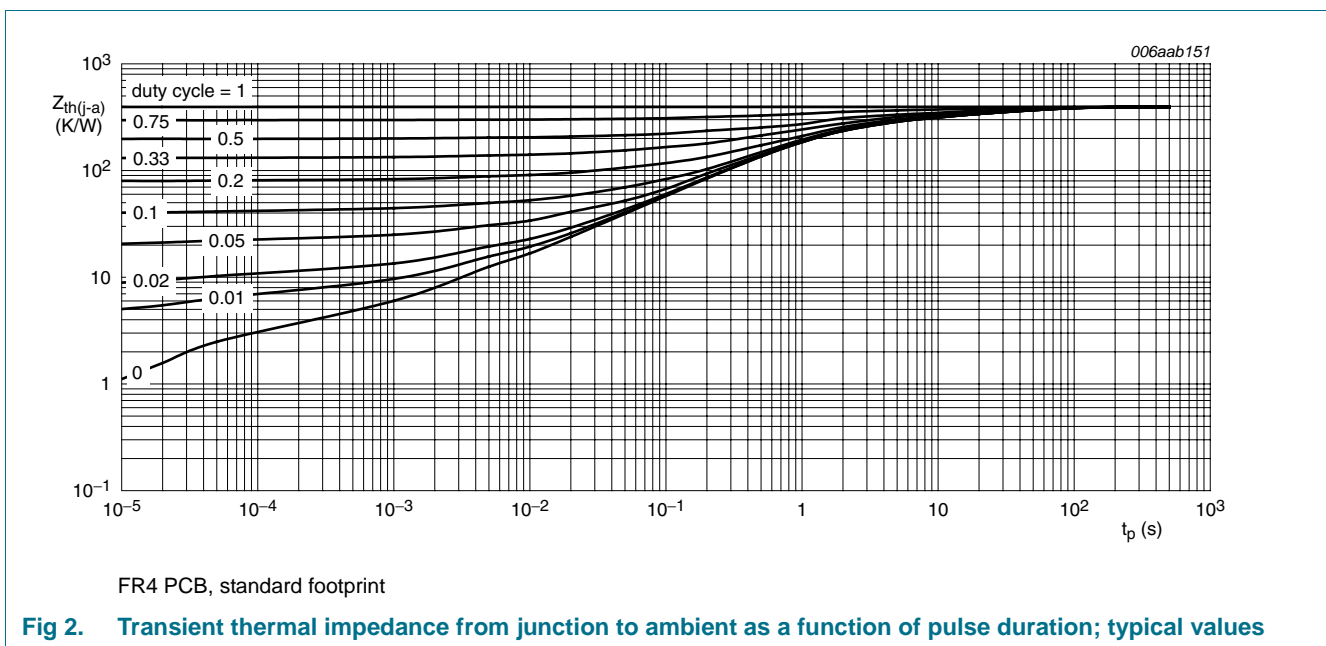


Fig 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

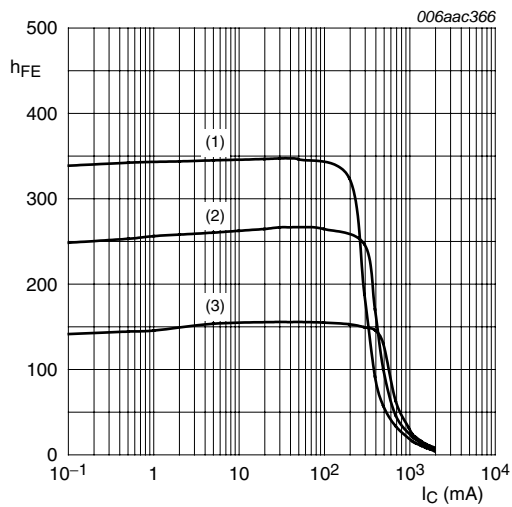
7. Characteristics

Table 7. Characteristics

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

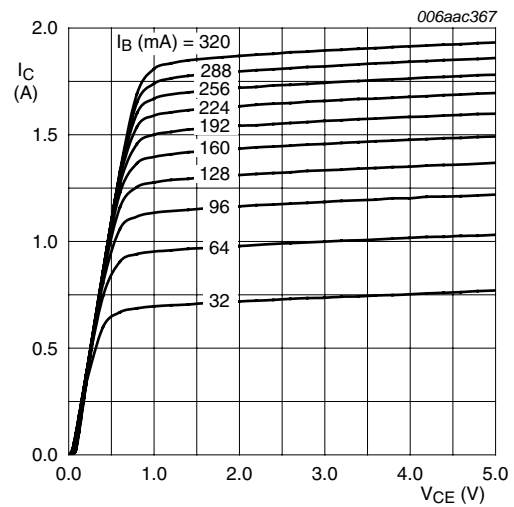
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
I_{CBO}	collector-base cut-off current	$V_{CB} = 144\text{ V}; I_E = 0\text{ A}$	-	-	100	nA	
		$V_{CB} = 144\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^{\circ}\text{C}$	-	-	10	μA	
I_{CES}	collector-emitter cut-off current	$V_{CE} = 144\text{ V}; V_{BE} = 0\text{ V}$	-	-	100	nA	
I_{EBO}	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}$	-	-	100	nA	
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}$	[1]				
		$I_C = 50\text{ mA}$	100	250	-		
		$I_C = 100\text{ mA}$	100	250	-		
		$I_C = 0.5\text{ A}$	50	100	-		
V_{CEsat}	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 10\text{ mA}$	[1]	-	40	60	mV
		$I_C = 100\text{ mA}; I_B = 20\text{ mA}$	[1]	-	33	50	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 0.5\text{ A}; I_B = 100\text{ mA}$	[1]	-	1	1.2	V
t_d	delay time	$V_{CC} = 6\text{ V}; I_C = 0.5\text{ A}; I_{Bon} = 0.1\text{ A}; I_{Boff} = -0.1\text{ A}$	-	7	-	ns	
t_r	rise time		-	565	-	ns	
t_{on}	turn-on time		-	572	-	ns	
t_s	storage time		-	1320	-	ns	
t_f	fall time		-	740	-	ns	
t_{off}	turn-off time		-	2060	-	ns	
f_T	transition frequency	$V_{CE} = 10\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$	-	30	-	MHz	
C_c	collector capacitance	$V_{CB} = 20\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	-	5.7	-	pF	
C_e	emitter capacitance	$V_{EB} = 0.5\text{ V}; I_C = i_c = 0\text{ A}; f = 1\text{ MHz}$	-	150	-	pF	

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



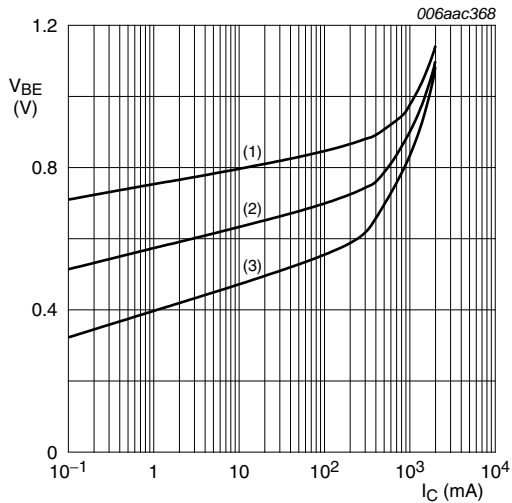
$V_{CE} = 10\text{ V}$
 (1) $T_{amb} = 100^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = -55^\circ C$

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



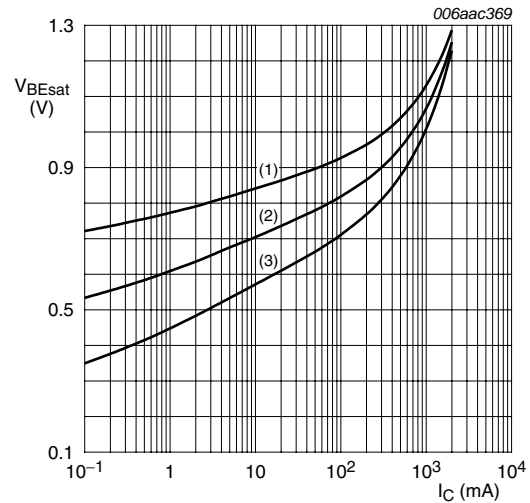
$T_{amb} = 25^\circ C$

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



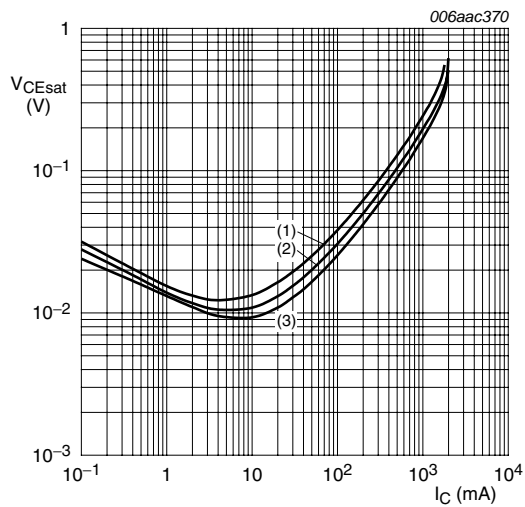
$V_{CE} = 10\text{ V}$
 (1) $T_{amb} = -55^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = 100^\circ C$

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



$I_C/I_B = 5$
 (1) $T_{amb} = -55^\circ C$
 (2) $T_{amb} = 25^\circ C$
 (3) $T_{amb} = 100^\circ C$

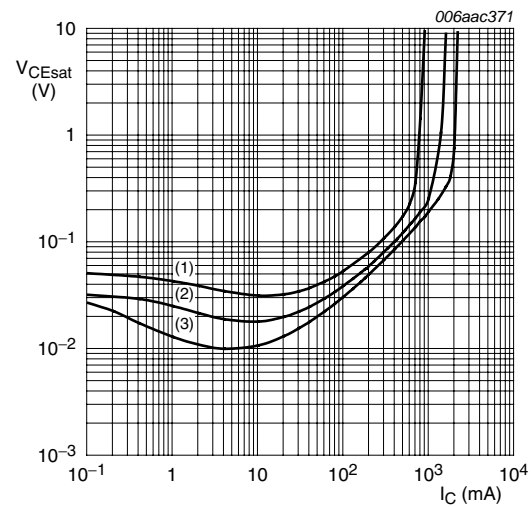
Fig 6. Base-emitter saturation voltage as a function of collector current; typical values



$$I_C/I_B = 5$$

- (1) $T_{amb} = 100\text{ °C}$
- (2) $T_{amb} = 25\text{ °C}$
- (3) $T_{amb} = -55\text{ °C}$

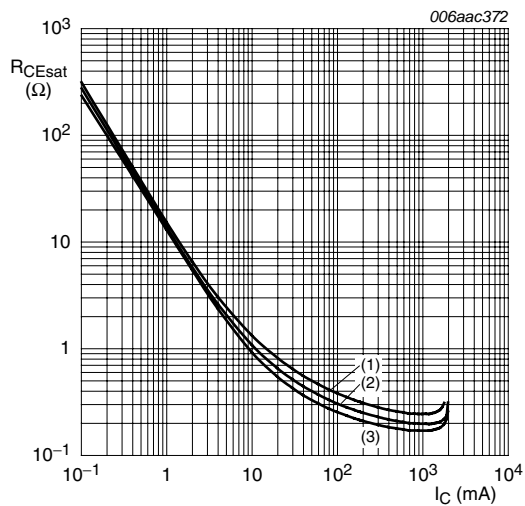
Fig 7. Collector-emitter saturation voltage as a function of collector current; typical values



$$T_{amb} = 25\text{ °C}$$

- (1) $I_C/I_B = 20$
- (2) $I_C/I_B = 10$
- (3) $I_C/I_B = 5$

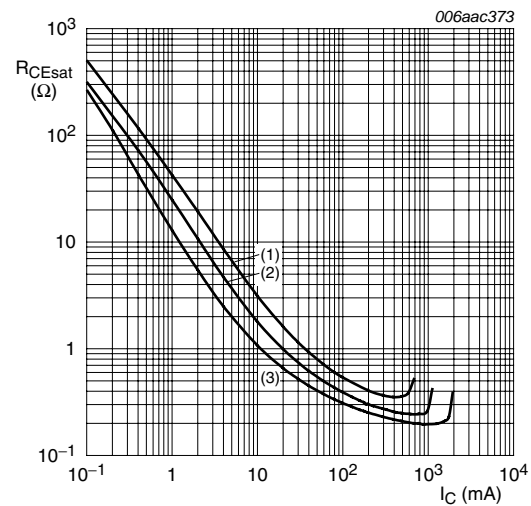
Fig 8. Collector-emitter saturation voltage as a function of collector current; typical values



$$I_C/I_B = 5$$

- (1) $T_{amb} = 100\text{ °C}$
- (2) $T_{amb} = 25\text{ °C}$
- (3) $T_{amb} = -55\text{ °C}$

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



$$T_{amb} = 25\text{ °C}$$

- (1) $I_C/I_B = 20$
- (2) $I_C/I_B = 10$
- (3) $I_C/I_B = 5$

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

11. Soldering

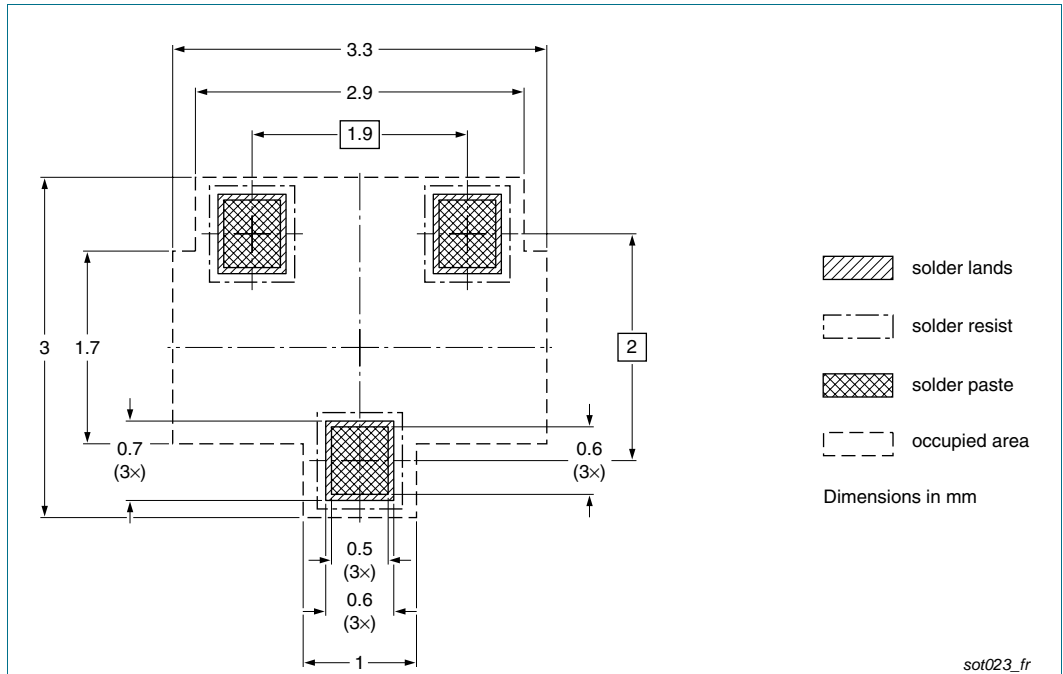


Fig 13. Reflow soldering footprint SOT23 (TO-236AB)

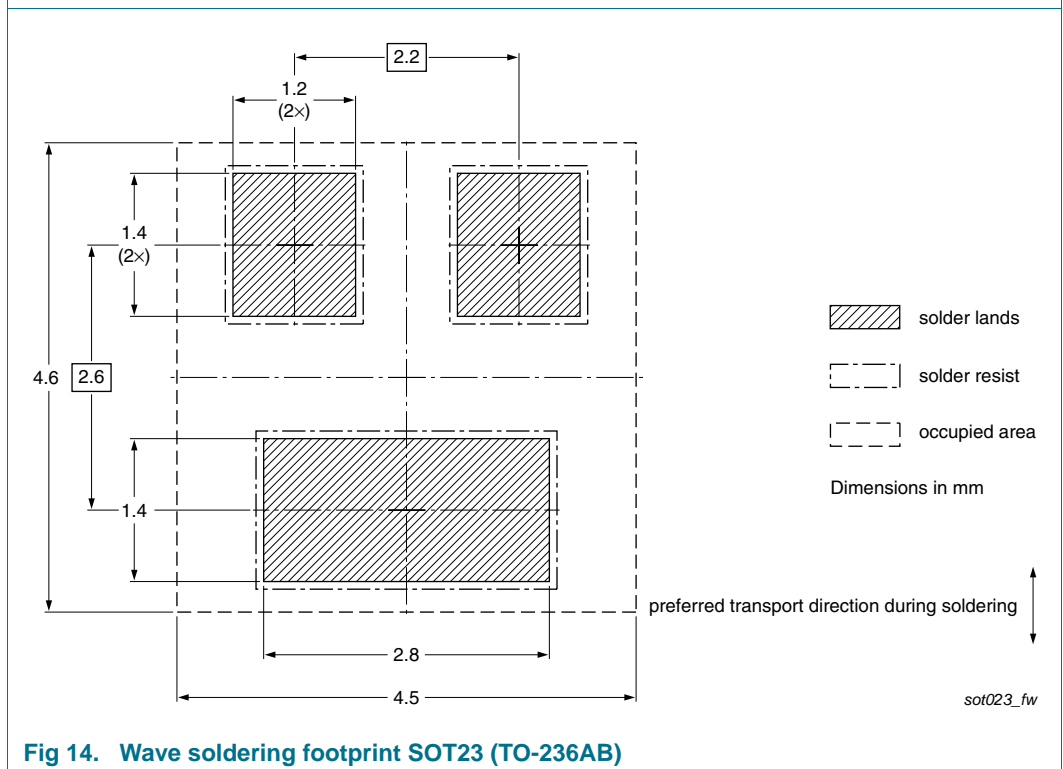


Fig 14. Wave soldering footprint SOT23 (TO-236AB)

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PBHV8118T v.1	20100507	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.

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