



# PBHV9115TLH

150 V, 1 A PNP high-voltage low  $V_{CEsat}$  transistor

9 October 2024

Product data sheet

## 1. General description

PNP high-voltage low  $V_{CEsat}$  transistor in a small SOT23 Surface-Mounted Device (SMD) plastic package.

NPN complement: PBHV8115TLH

## 2. Features and benefits

- High voltage
- Low collector-emitter saturation voltage  $V_{CEsat}$
- High collector current capability  $I_C$  and  $I_{CM}$
- Small SMD plastic package

## 3. Applications

- Power management
- LCD backlighting
- LED driver for LED chain module
- Switch Mode Power Supply (SMPS)

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	-150	V
$I_C$	collector current		-	-	-1	A
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	-2	A
$h_{FE}$	DC current gain	$V_{CE} = -10$ V; $I_C = -50$ mA; $T_{amb} = 25$ °C	70	-	300	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	<p>SOT23</p>	<p>sym132</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBHV9115TLH	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]
PBHV9115TLH	FC%

[1] % = placeholder for manufacturing site code

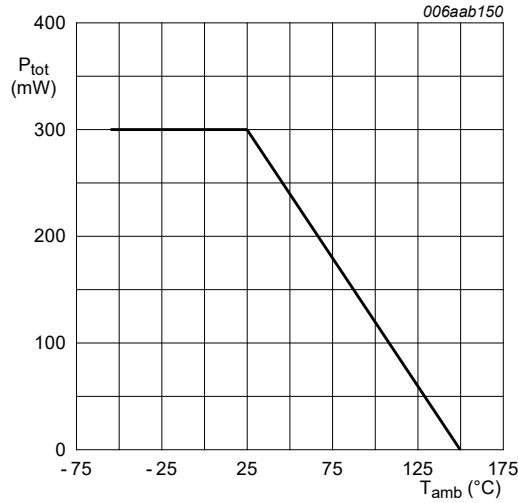
## 8. Limiting values

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		-	-200	V
$V_{CEO}$	collector-emitter voltage	open base		-	-150	V
$V_{CESM}$	collector-emitter peak voltage	$V_{BE} = 0$ V		-	-200	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			-	-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 PCB, single-sided copper, tin-plated and standard footprint.



FR4 PCB, standard footprint

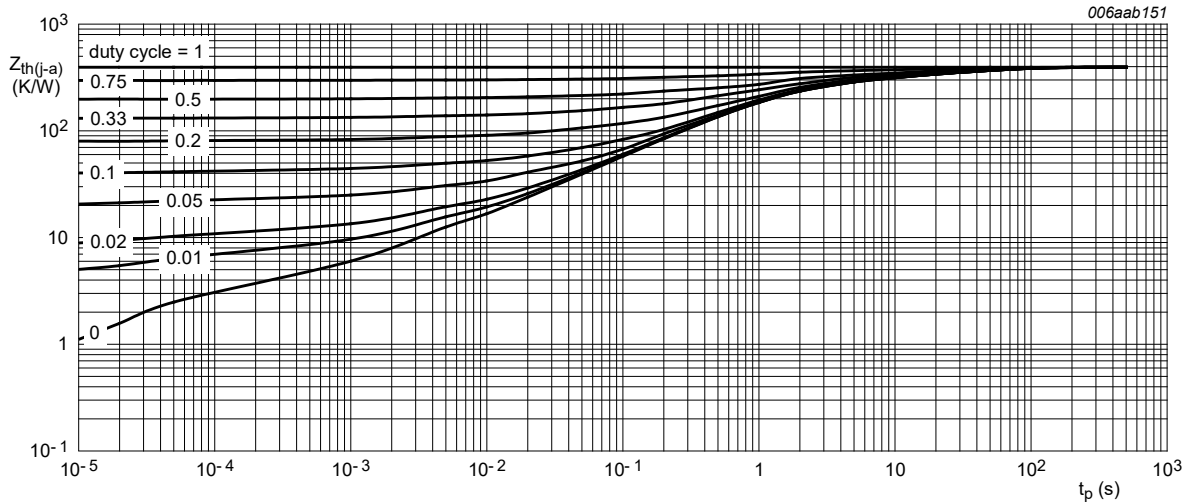
Fig. 1. Power derating curve

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	417	K/W
R <sub>th(j-sp)</sub>	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.



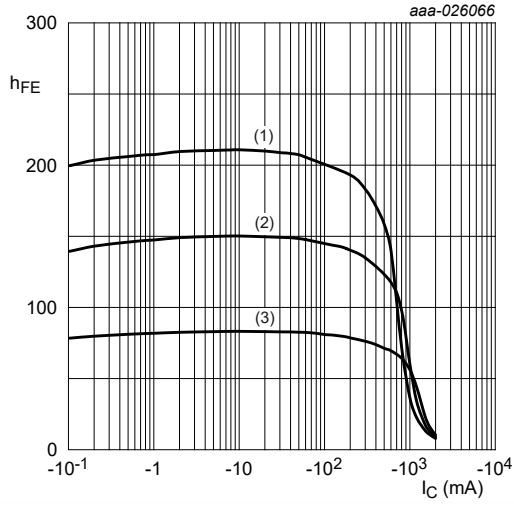
FR4 PCB, standard footprint

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

## 10. Characteristics

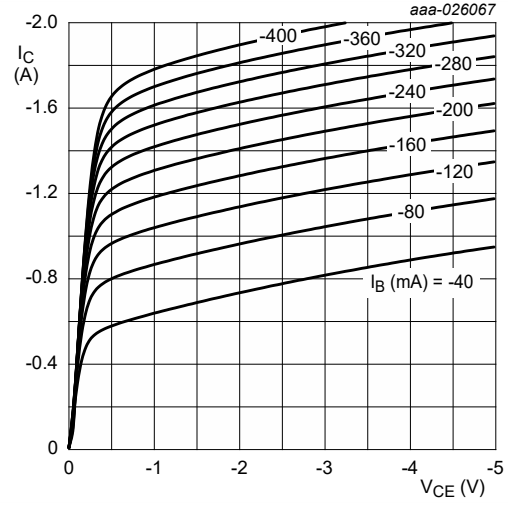
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -120\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	-100	nA
		$V_{CB} = -120\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$	-	-	-10	$\mu\text{A}$
$I_{CES}$	collector-emitter cut-off current	$V_{CE} = -120\text{ V}; V_{BE} = 0\text{ V}; T_{amb} = 25\text{ °C}$	-	-	-100	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	-100	nA
$h_{FE}$	DC current gain	$V_{CE} = -10\text{ V}; I_C = -50\text{ mA}; T_{amb} = 25\text{ °C}$	70	-	300	
		$V_{CE} = -10\text{ V}; I_C = -100\text{ mA}; T_{amb} = 25\text{ °C}$	60	-	300	
		$V_{CE} = -10\text{ V}; I_C = -500\text{ mA};$ pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ °C}$	50	-	300	
		$V_{CE} = -10\text{ V}; I_C = -1\text{ A};$ pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ °C}$	10	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -100\text{ mA}; I_B = -10\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	-120	mV
		$I_C = -100\text{ mA}; I_B = -20\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	-100	mV
		$I_C = -500\text{ mA}; I_B = -100\text{ mA};$ pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ °C}$	-	-	-300	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -1\text{ A}; I_B = -200\text{ mA};$ pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ °C}$	-	-	-1.2	V
$t_d$	delay time	$V_{CC} = -6\text{ V}; I_C = -0.5\text{ A}; I_{Bon} = -0.1\text{ mA}; I_{Boff} = 0.1\text{ mA}; T_{amb} = 25\text{ °C}$	-	10	-	ns
$t_r$	rise time		-	285	-	ns
$t_{on}$	turn-on time		-	295	-	ns
$t_s$	storage time		-	430	-	ns
$t_f$	fall time		-	300	-	ns
$t_{off}$	turn-off time		-	730	-	ns
$f_T$	transition frequency		$V_{CE} = -10\text{ V}; I_C = -10\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}$	-	55	-
$C_c$	collector capacitance	$V_{CB} = -20\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$	-	10	-	pF
$C_e$	emitter capacitance	$V_{EB} = -0.5\text{ V}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$	-	150	-	pF



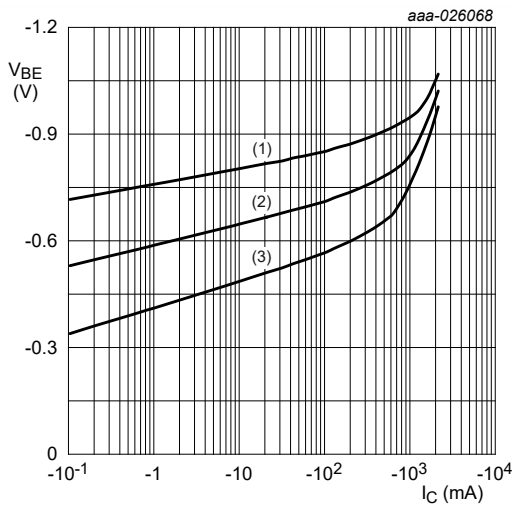
$V_{CE} = -10\text{ V}$   
 (1)  $T_{amb} = 100^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = -55^\circ\text{C}$

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



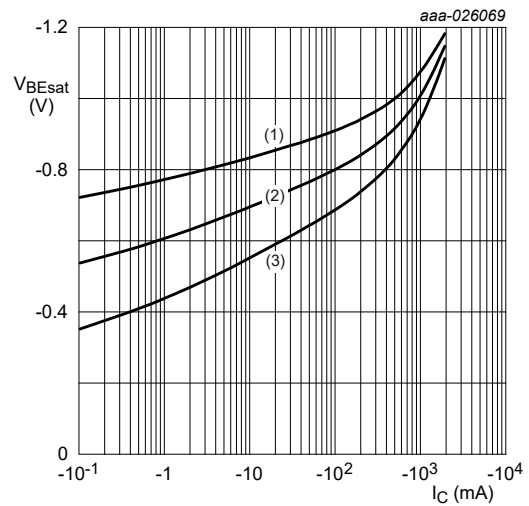
$T_{amb} = 25^\circ\text{C}$

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



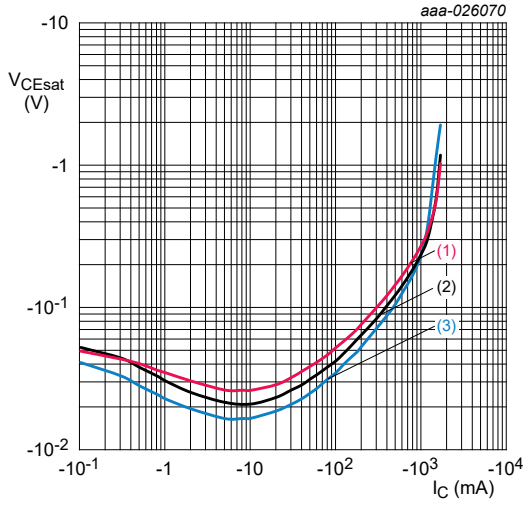
$V_{CE} = -10\text{ V}$   
 (1)  $T_{amb} = -55^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = 100^\circ\text{C}$

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



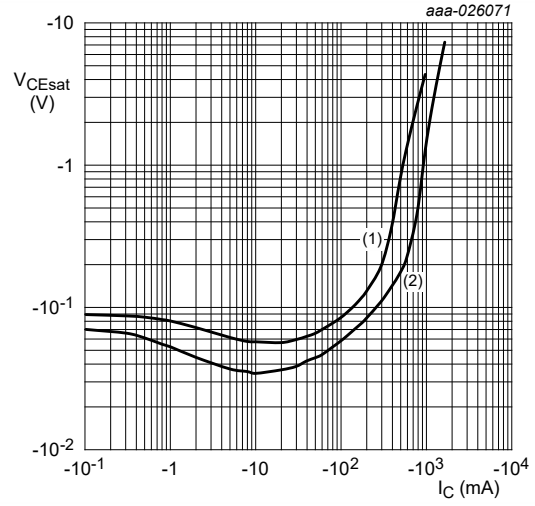
$I_C/I_B = 5$   
 (1)  $T_{amb} = -55^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = 100^\circ\text{C}$

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



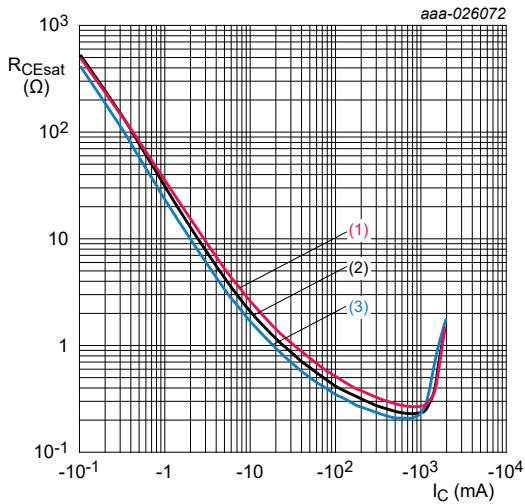
$I_C/I_B = 5$   
 (1)  $T_{amb} = 100\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



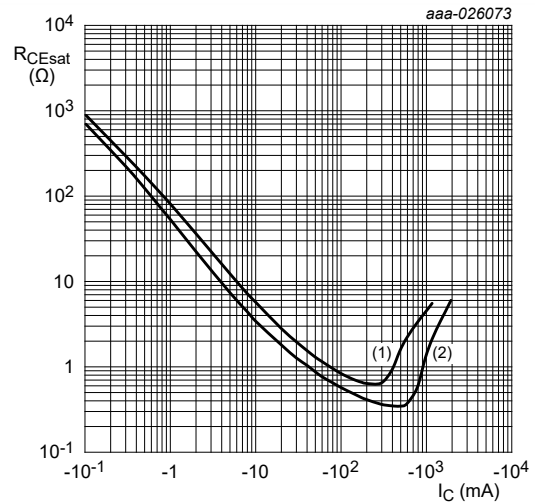
$T_{amb} = 25\text{ °C}$   
 (1)  $I_C/I_B = 20$   
 (2)  $I_C/I_B = 10$

**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)  $I_C/I_B = 10$

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

### 11. Test information

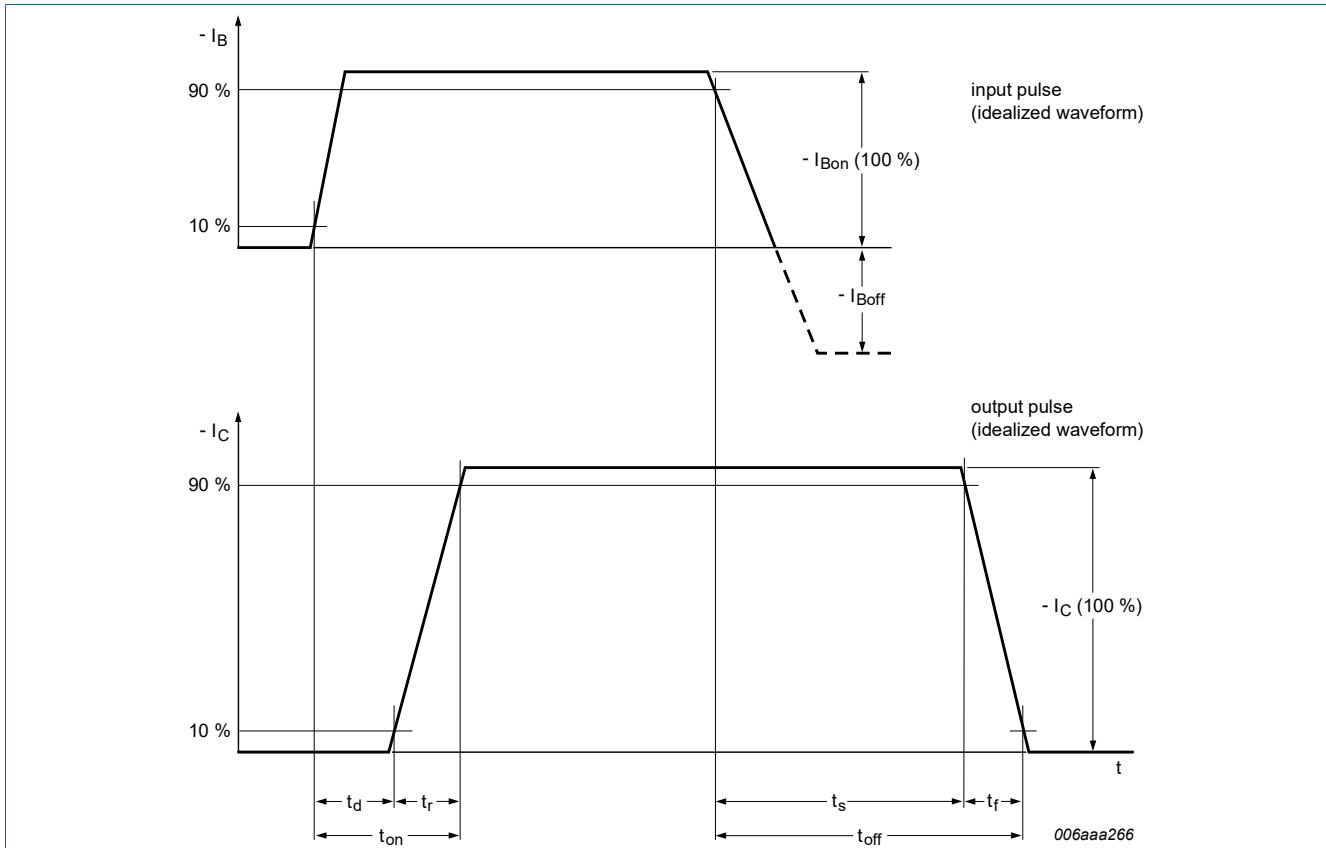


Fig. 11. Transistor switching time definition

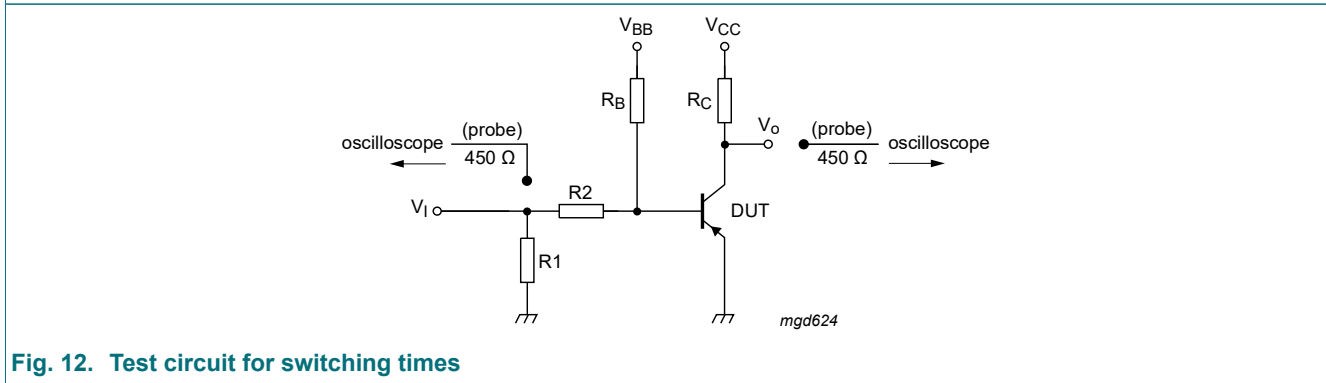


Fig. 12. Test circuit for switching times

## 12. Package outline

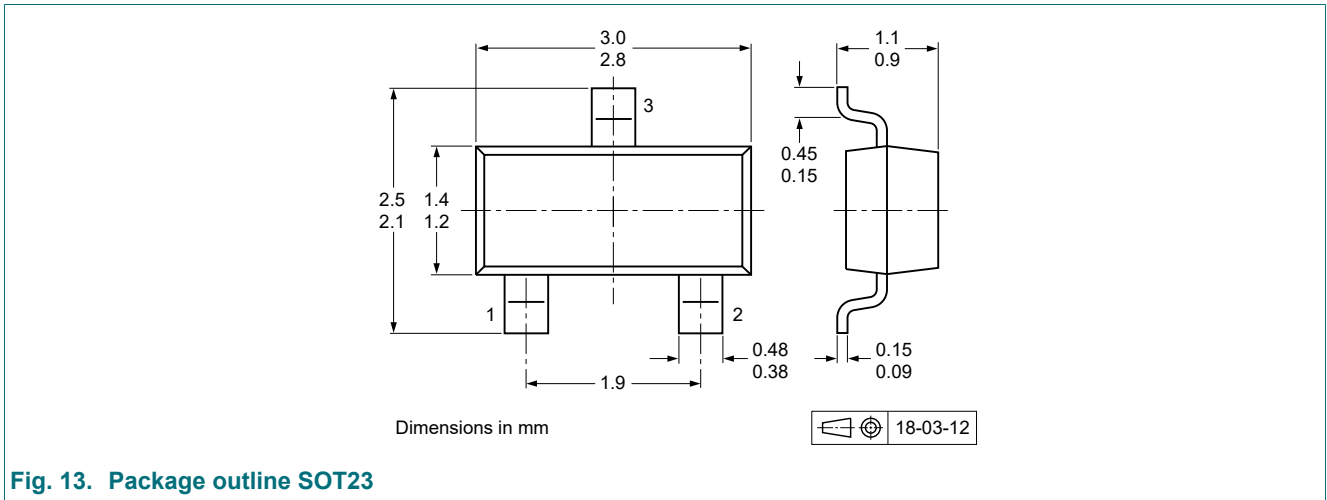


Fig. 13. Package outline SOT23

## 13. Soldering

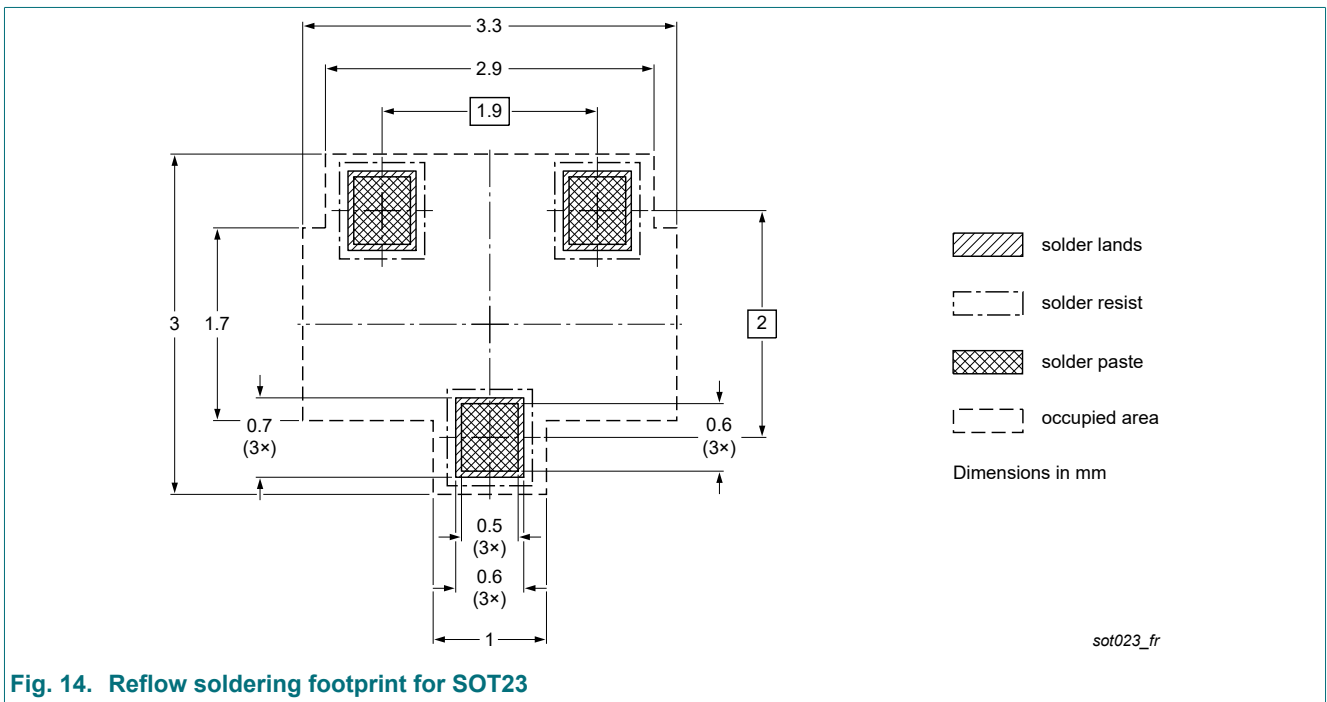


Fig. 14. Reflow soldering footprint for SOT23



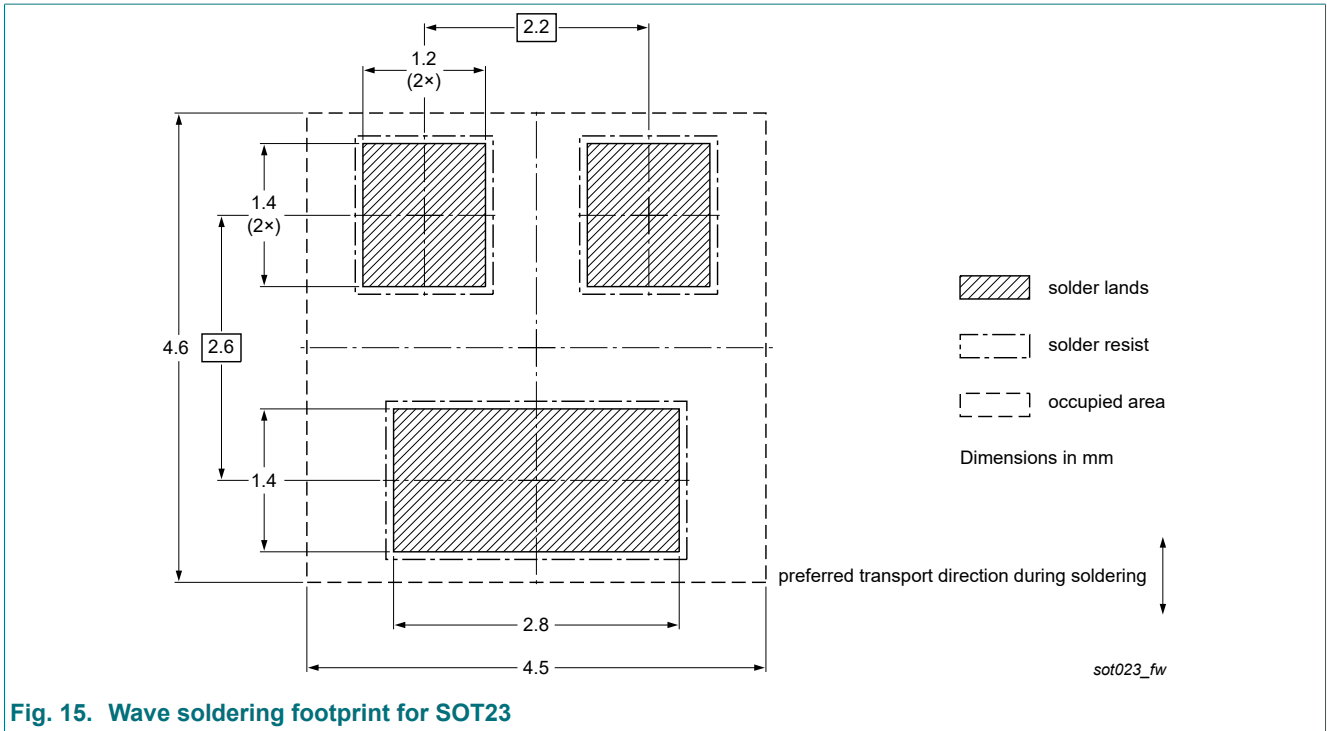


Fig. 15. Wave soldering footprint for SOT23

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBHV9115TLH v.3	20241009	Product data sheet	-	PBHV9115TLH v.2
Modifications:	<ul style="list-style-type: none"><li>Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li></ul>			
PBHV9115TLH v.2	20230717	Product data sheet	-	PBHV9115TLH v.1
PBHV9115TLH v.1	20170116	Product data sheet	-	-

## 150 V, 1 A PNP high-voltage low VCEsat transistor

## 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.

- [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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## Contents

---

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	1
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	2
9. Thermal characteristics.....	3
10. Characteristics.....	4
11. Test information.....	7
12. Package outline.....	8
13. Soldering.....	8
14. Revision history.....	10
15. Legal information.....	11

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