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Kind regards,

Team Nexperia



# PBHV8115TLH

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

10 January 2017

Product data sheet

## 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.

PNP complement: PBHV9115TLH

## 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
- AEC-Q101 qualified

## 3. Applications

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

## 4. Quick reference data

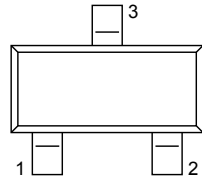
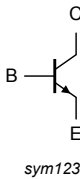
Table 1. Quick reference data

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	 TO-236AB (SOT23)	 sym123
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBHV8115TLH	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

## 7. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
PBHV8115TLH	FB%

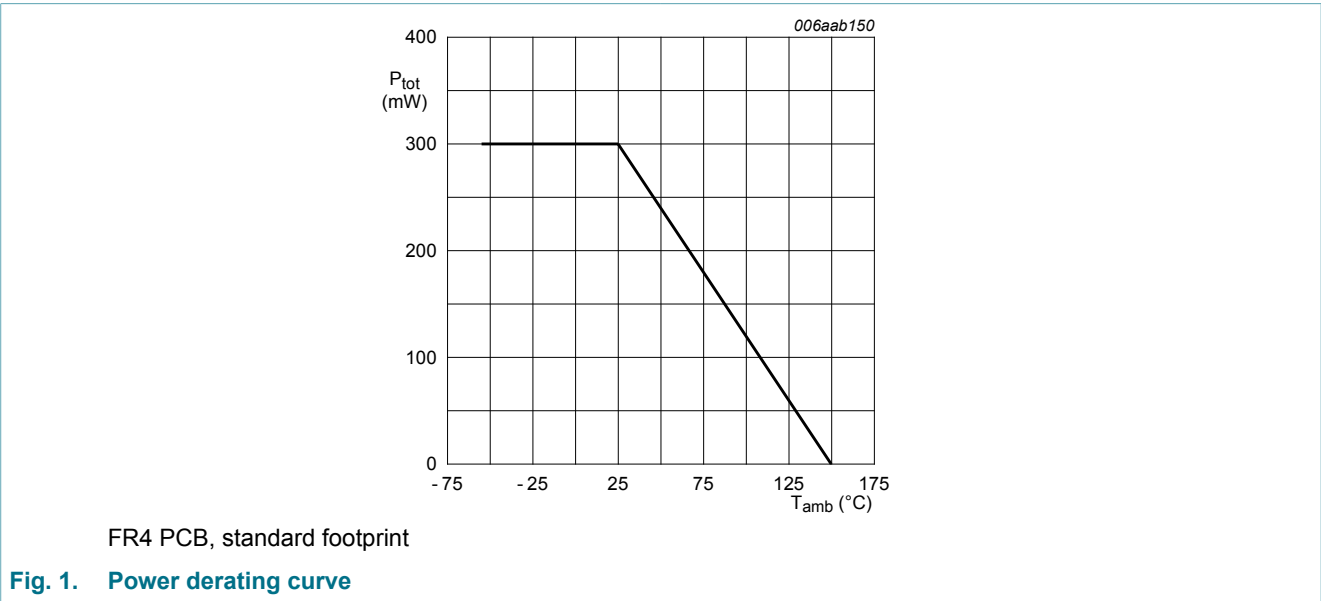
[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V <sub>CBO</sub>	collector-base voltage	open emitter		-	400	V
V <sub>CEO</sub>	collector-emitter voltage	open base		-	150	V
V <sub>CESM</sub>	collector-emitter peak voltage	V <sub>BE</sub> = 0 V		-	200	V
V <sub>EBO</sub>	emitter-base voltage	open collector		-	6	V
I <sub>C</sub>	collector current			-	1	A
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms		-	2	A
I <sub>BM</sub>	peak base current			-	400	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	300	mW
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C

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

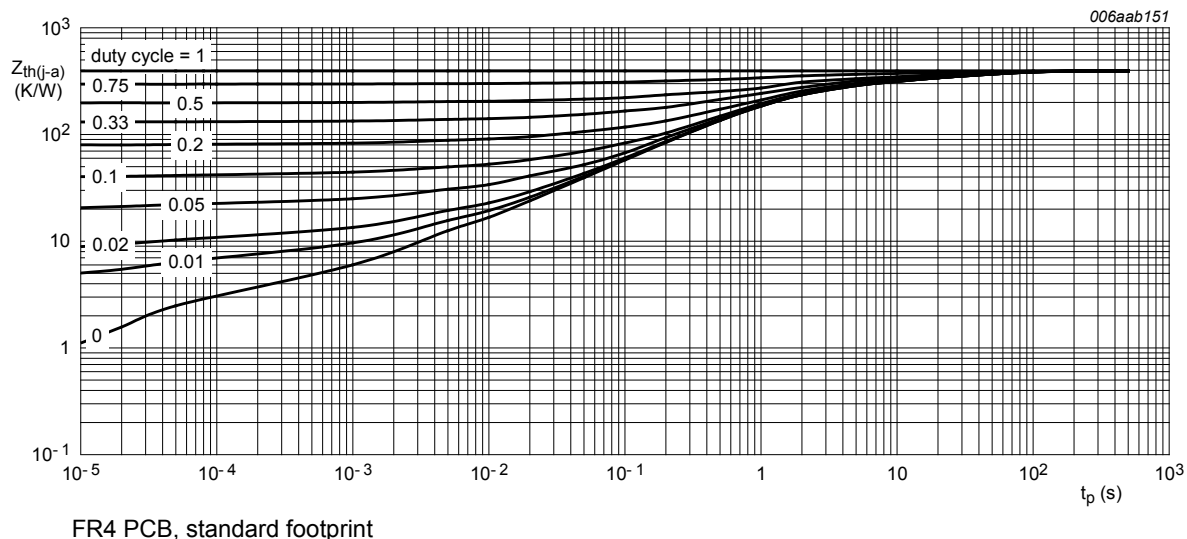


## 9. Thermal characteristics

### 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]	-	-	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**

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 120\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	100	nA
		$V_{CB} = 120\text{ V}; I_E = 0\text{ A}; T_J = 150\text{ }^{\circ}\text{C}$	-	-	10	$\mu\text{A}$
$I_{CES}$	collector-emitter cut-off current	$V_{CE} = 120\text{ V}; V_{BE} = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	100	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 10\text{ V}; I_C = 50\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	70	-	300	
		$V_{CE} = 10\text{ V}; I_C = 100\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	60	-	300	
		$V_{CE} = 10\text{ V}; I_C = 500\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	50	-	300	
		$V_{CE} = 10\text{ V}; I_C = 1\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	10	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 10\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	60	mV
		$I_C = 100\text{ mA}; I_B = 20\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	50	mV
		$I_C = 1\text{ A}; I_B = 200\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	350	mV
$V_{BEsat}$	base-emitter saturation voltage		-	-	1.2	V
$t_d$	delay time	$V_{CC} = 6\text{ V}; I_C = 0.5\text{ A}; I_{Bon} = 0.1\text{ mA}; I_{Boff} = -0.1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	10	-	ns
$t_r$	rise time		-	565	-	ns
$t_{on}$	turn-on time		-	575	-	ns
$t_s$	storage time		-	1530	-	ns
$t_f$	fall time		-	700	-	ns
$t_{off}$	turn-off time		-	2230	-	ns
$f_T$	transition frequency	$V_{CE} = 10\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	30	-	MHz
$C_c$	collector capacitance	$V_{CB} = 20\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	6	-	pF
$C_e$	emitter capacitance	$V_{EB} = 0.5\text{ V}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	150	-	pF

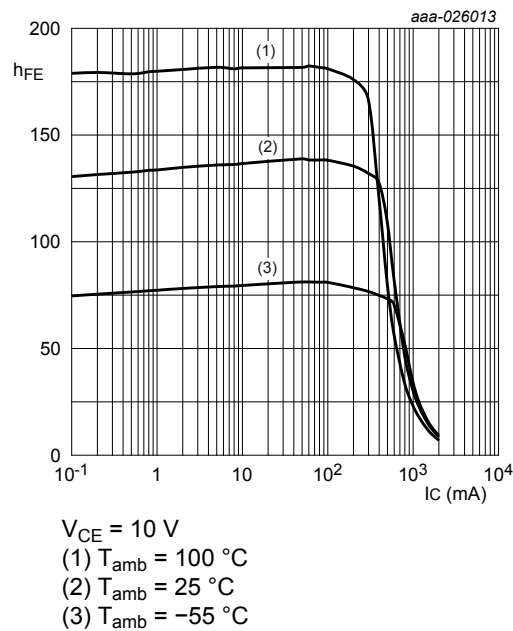


Fig. 3. DC current gain as a function of collector current; typical values

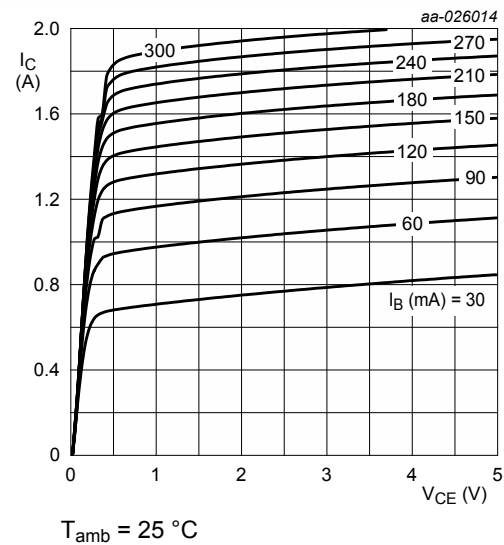


Fig. 4. Collector current as a function of collector-emitter voltage; typical values

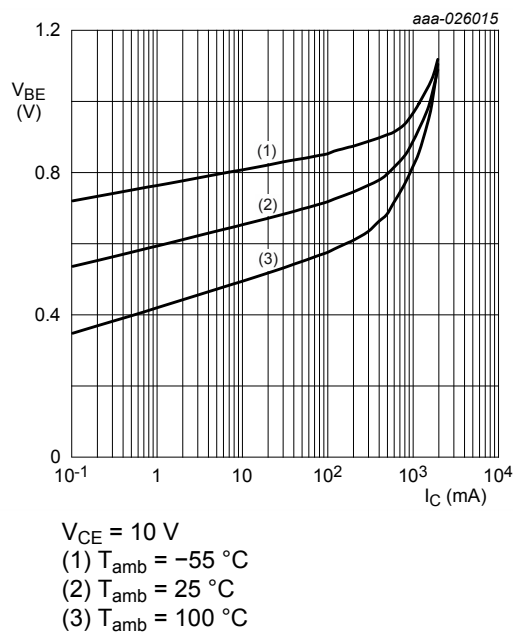


Fig. 5. Base-emitter voltage as a function of collector current; typical values

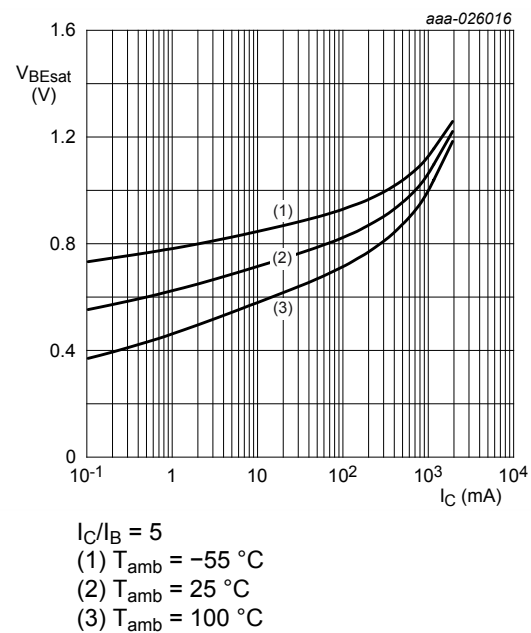


Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values

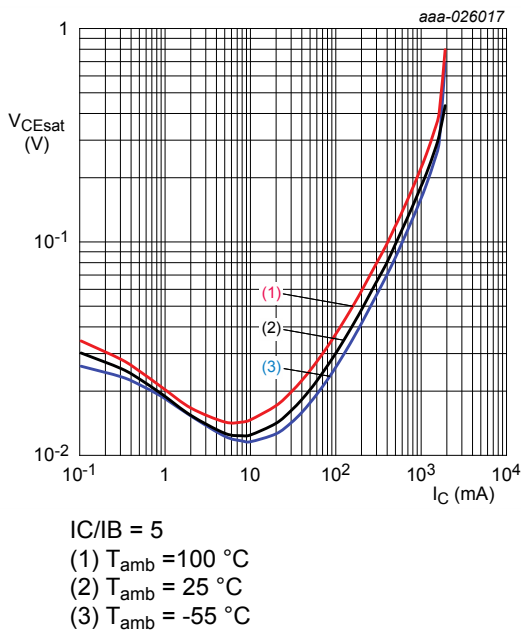


Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values

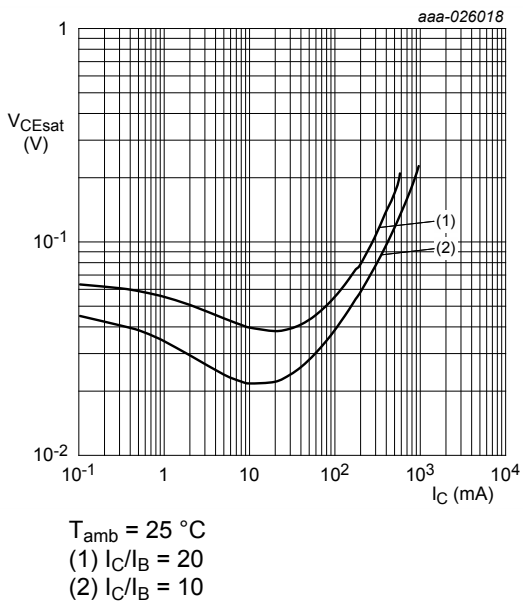


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

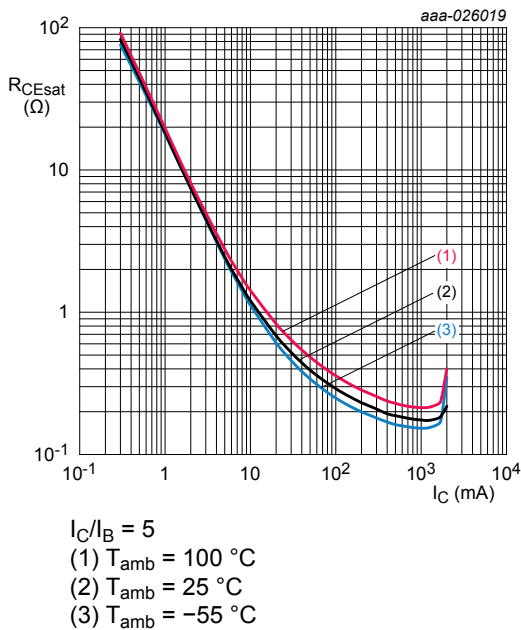


Fig. 9. Collector-emitter saturation resistance as a function of collector current; typical values

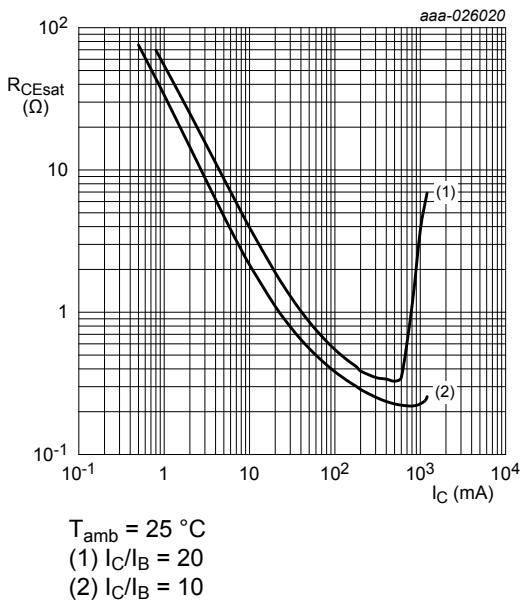
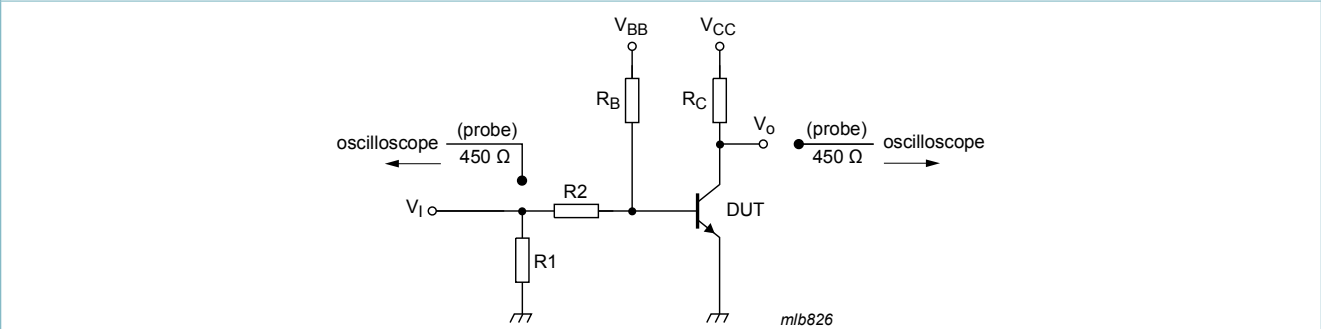
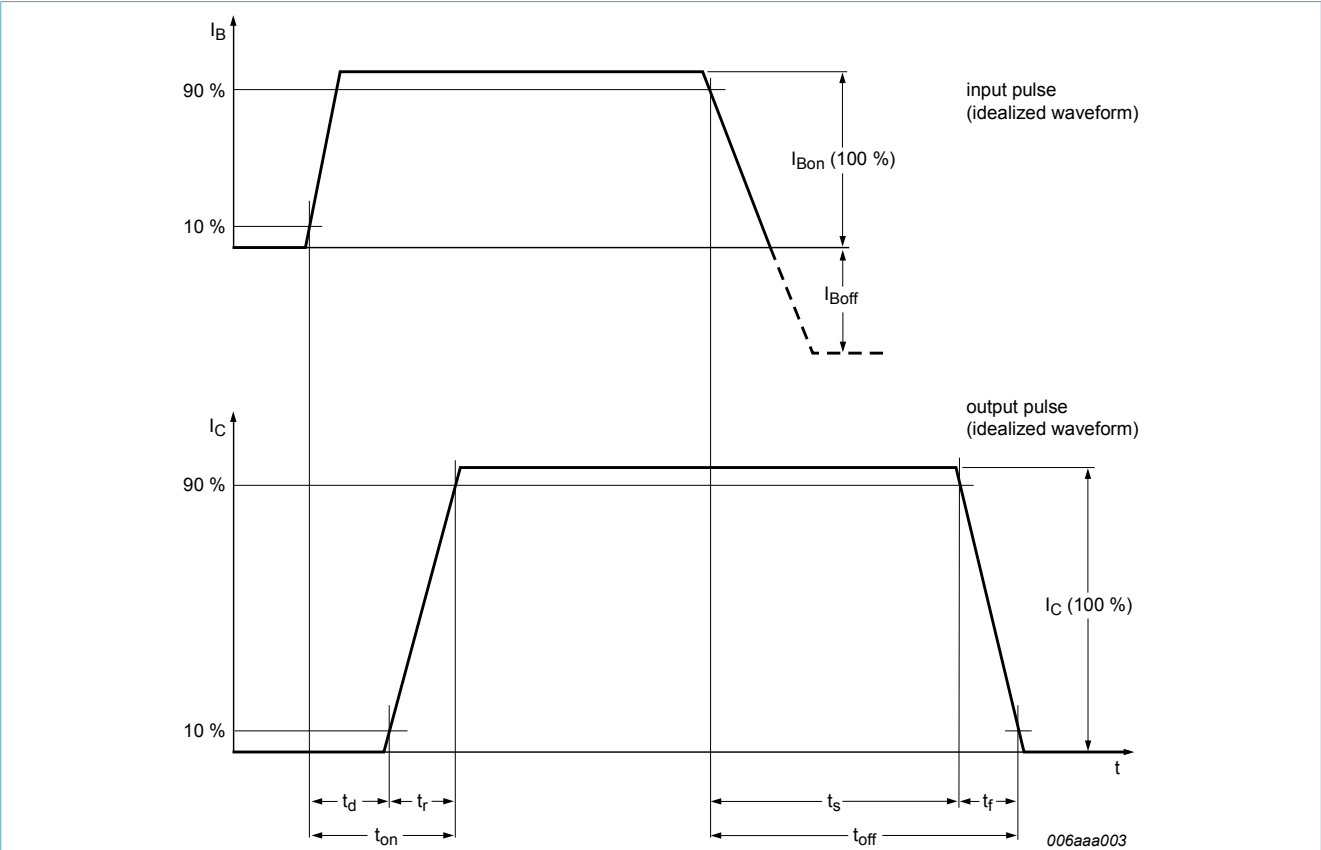


Fig. 10. Collector-emitter saturation resistance as a function of collector current; typical values



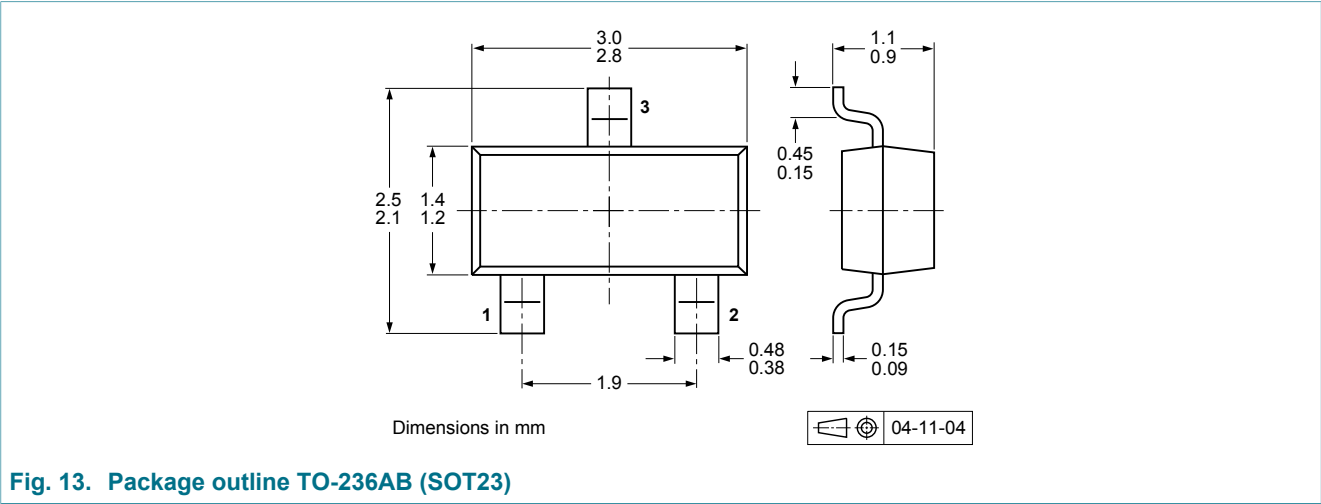
11. Test information



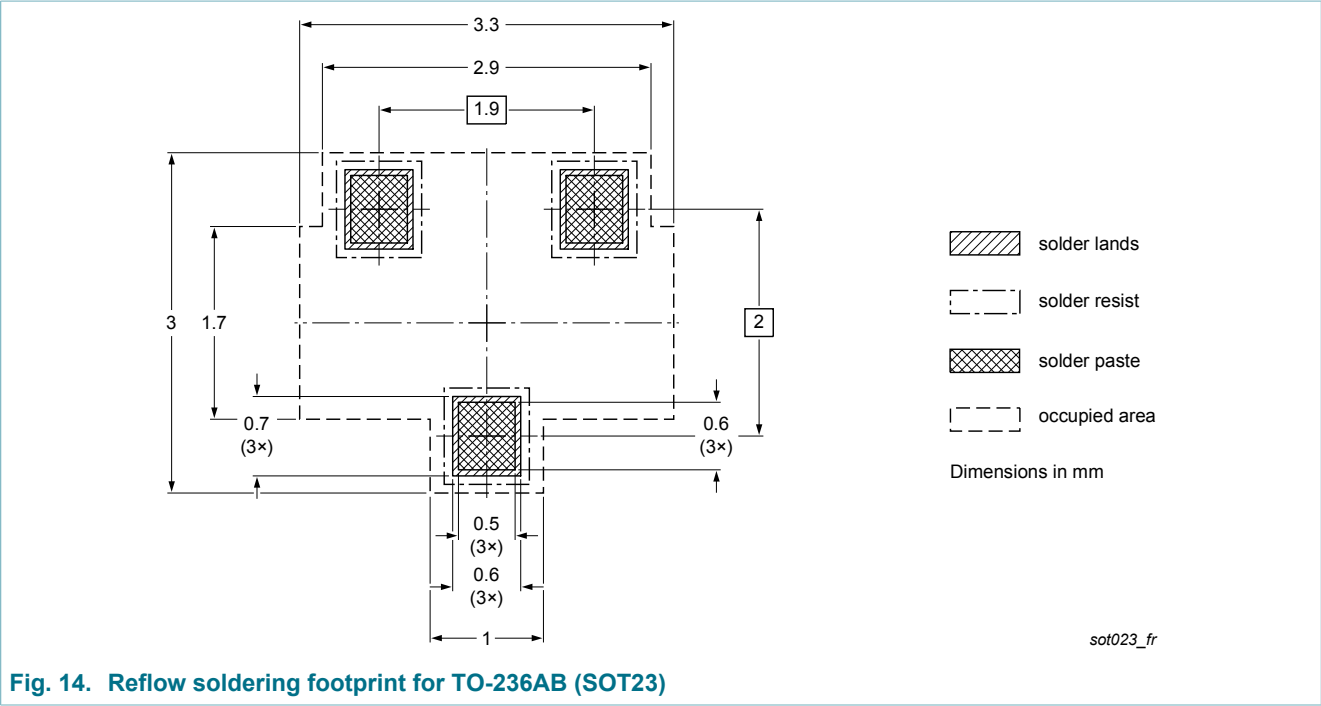
Quality information

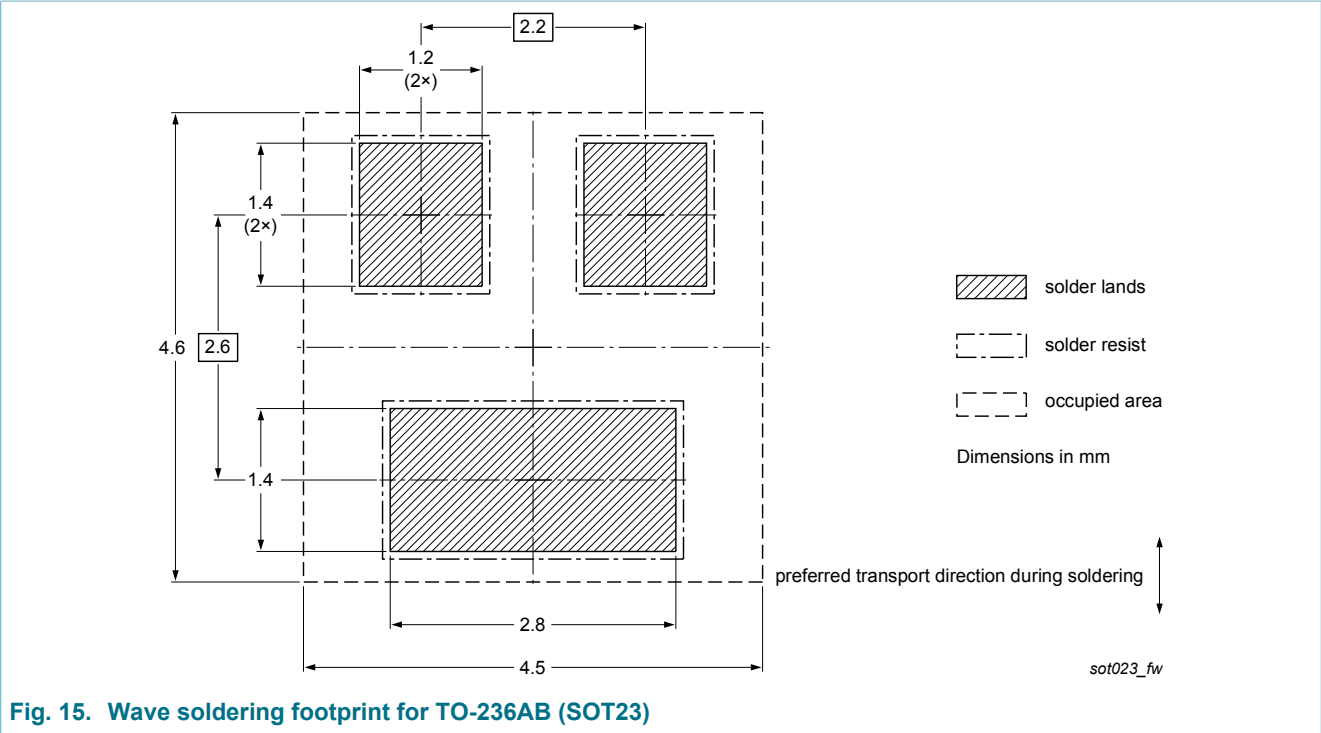
This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

12. Package outline



13. Soldering





## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBHV8115TLH v.1	2017010	Product data sheet	-	-

## 15. Legal information

### Data sheet status

Document status <sup>[1] [2]</sup>	Product status <sup>[3]</sup>	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.
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