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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

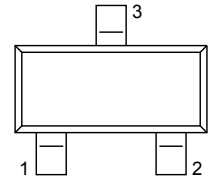
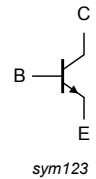
Table 1. Quick reference data

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 ≤ 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>TO-236AB (SOT23)</p>	 <p>sym123</p>
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 ^[1]
PBHV8115TLH	FB%

[1] % = placeholder for manufacturing site code

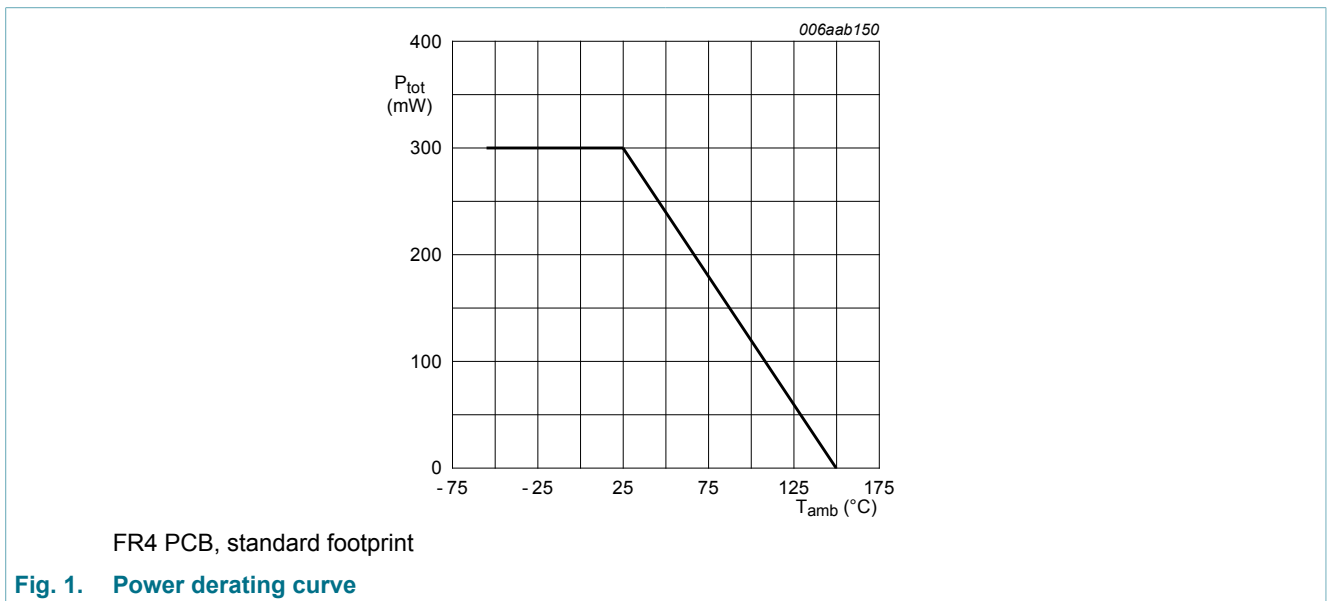
8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V _{CBO}	collector-base voltage	open emitter	-	400	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 ≤ 1 ms	-	2	A
I _{BM}	peak base current		-	400	mA
P _{tot}	total power dissipation	T _{amb} ≤ 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.



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	-	-	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.

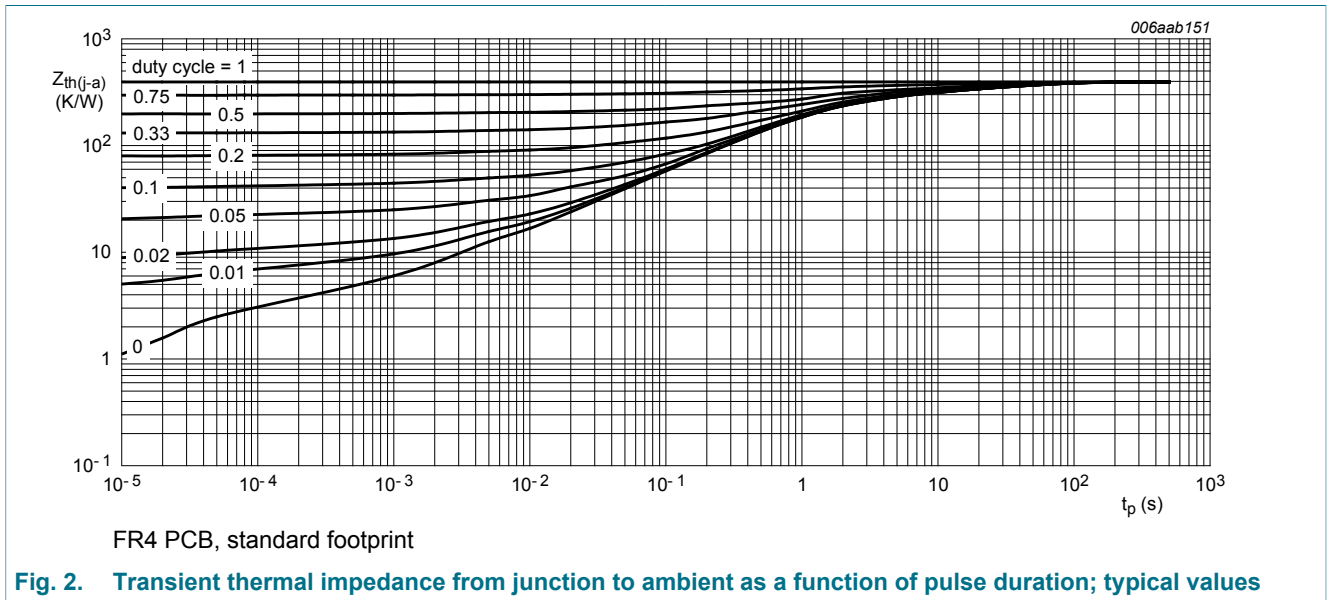


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = 120 V; I _E = 0 A; T _{amb} = 25 °C	-	-	100	nA
		V _{CB} = 120 V; I _E = 0 A; T _J = 150 °C	-	-	10	μA
I _{CES}	collector-emitter cut-off current	V _{CE} = 120 V; V _{BE} = 0 V; T _{amb} = 25 °C	-	-	100	nA
I _{EBO}	emitter-base cut-off current	V _{EB} = 4 V; I _C = 0 A; T _{amb} = 25 °C	-	-	100	nA
h _{FE}	DC current gain	V _{CE} = 10 V; I _C = 50 mA; T _{amb} = 25 °C	70	-	300	
		V _{CE} = 10 V; I _C = 100 mA; T _{amb} = 25 °C	60	-	300	
		V _{CE} = 10 V; I _C = 500 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02 ; T _{amb} = 25 °C	50	-	300	
		V _{CE} = 10 V; I _C = 1 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02 ; T _{amb} = 25 °C	10	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = 100 mA; I _B = 10 mA; T _{amb} = 25 °C	-	-	60	mV
		I _C = 100 mA; I _B = 20 mA; T _{amb} = 25 °C	-	-	50	mV
		I _C = 1 A; I _B = 200 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02 ; T _{amb} = 25 °C	-	-	350	mV
V _{BEsat}	base-emitter saturation voltage		-	-	1.2	V
t _d	delay time	V _{CC} = 6 V; I _C = 0.5 A; I _{Bon} = 0.1 mA; I _{Boff} = -0.1 mA; T _{amb} = 25 °C	-	10	-	ns
t _r	rise time		-	565	-	ns
t _{on}	turn-on time	V _{CC} = 6 V; I _C = 0.5 A; I _{Bon} = 0.1 mA; I _{Boff} = -0.1 mA; T _{amb} = 25 °C	-	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 V; I _C = 10 mA; f = 100 MHz; T _{amb} = 25 °C	-	30	-	MHz
C _c	collector capacitance	V _{CB} = 20 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	6	-	pF
C _e	emitter capacitance	V _{EB} = 0.5 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	150	-	pF

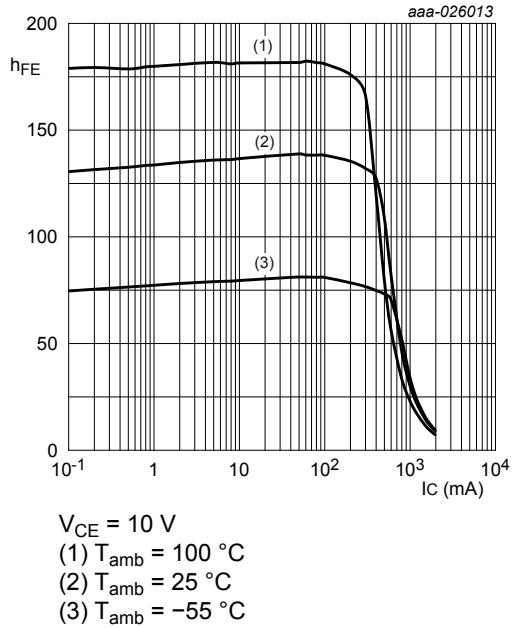


Fig. 3. DC current gain as a function of collector current; typical values

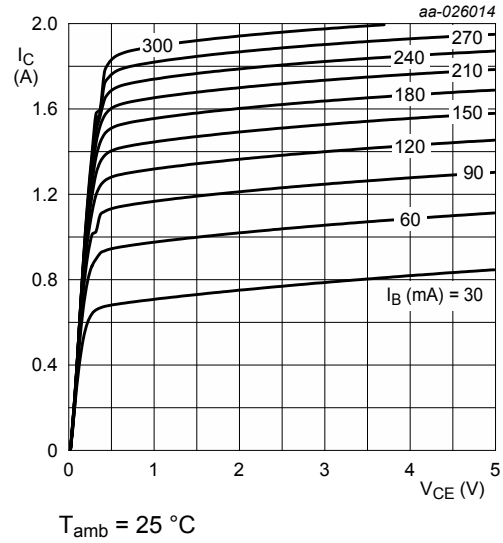


Fig. 4. Collector current as a function of collector-emitter voltage; typical values

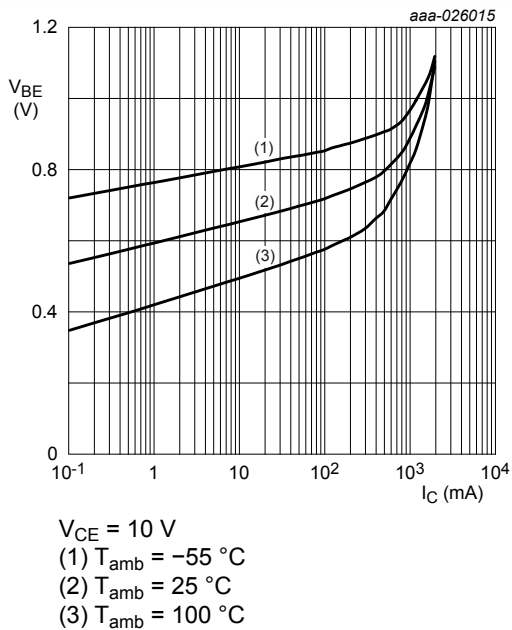


Fig. 5. Base-emitter voltage as a function of collector current; typical values

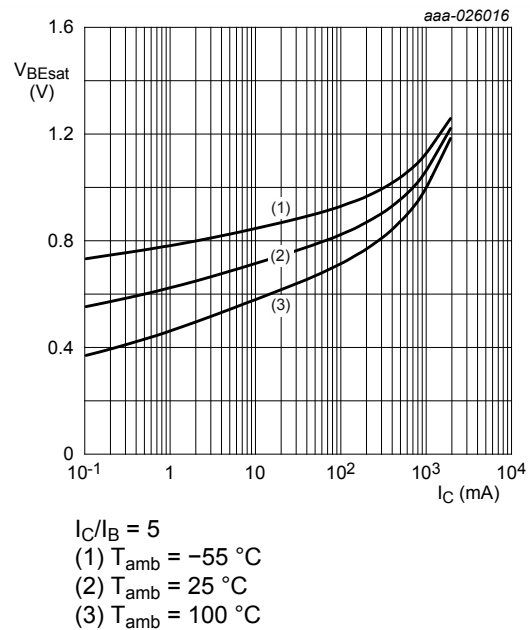


Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values

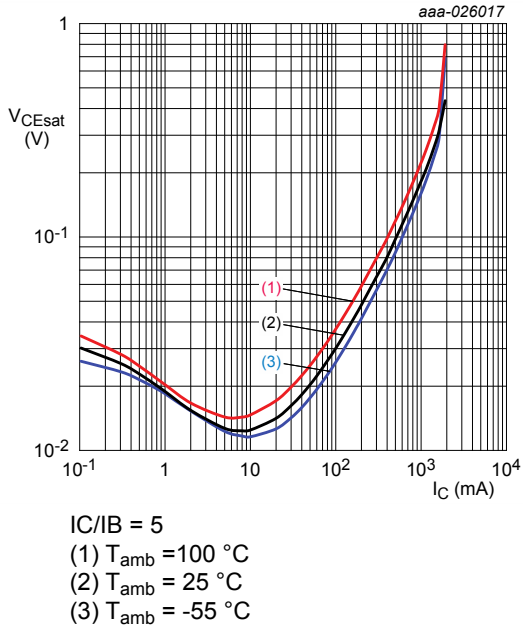


Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values

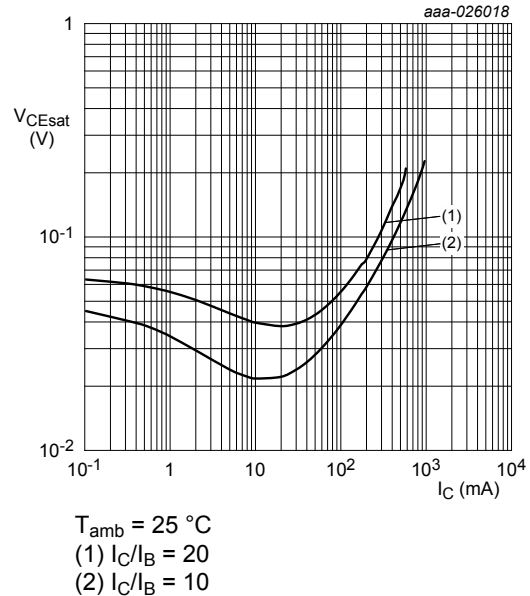


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

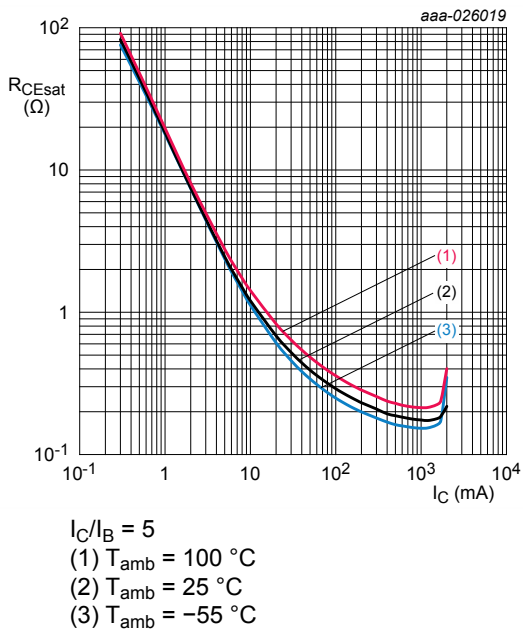


Fig. 9. Collector-emitter saturation resistance as a function of collector current; typical values

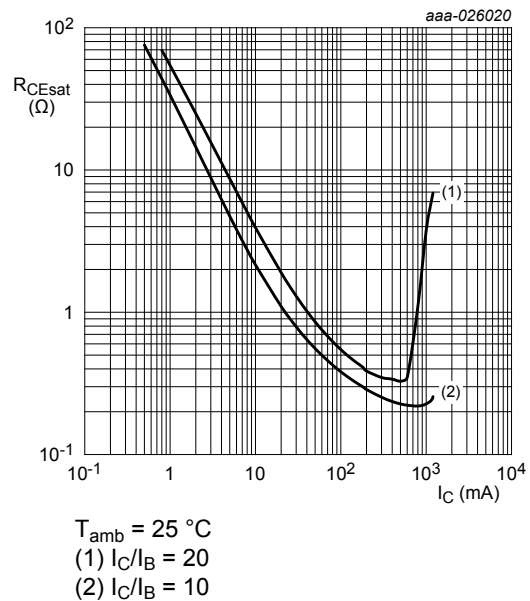


Fig. 10. Collector-emitter saturation resistance as a function of collector current; typical values

11. Test information

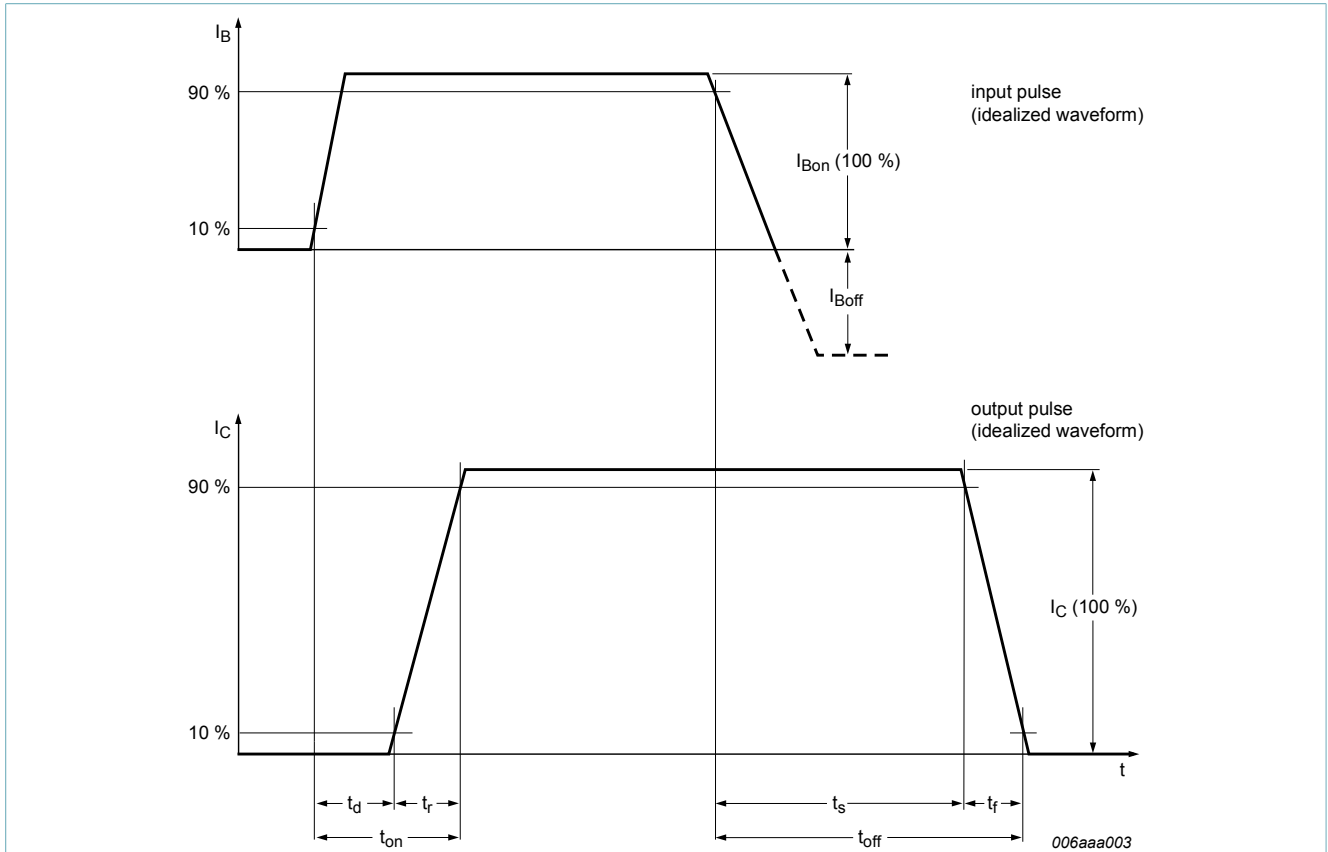


Fig. 11. BISS transistor switching time definition

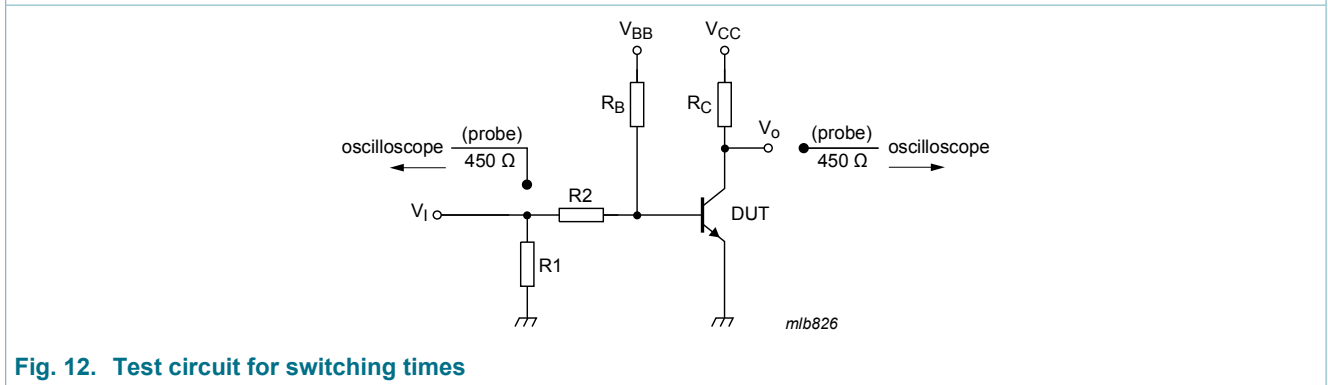


Fig. 12. Test circuit for switching times

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

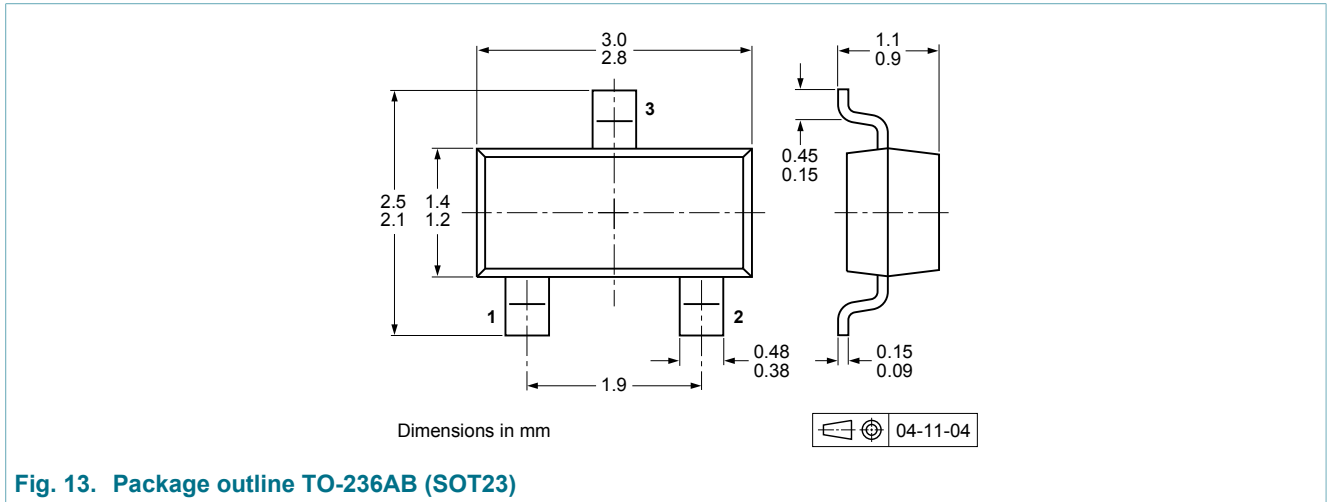


Fig. 13. Package outline TO-236AB (SOT23)

13. Soldering

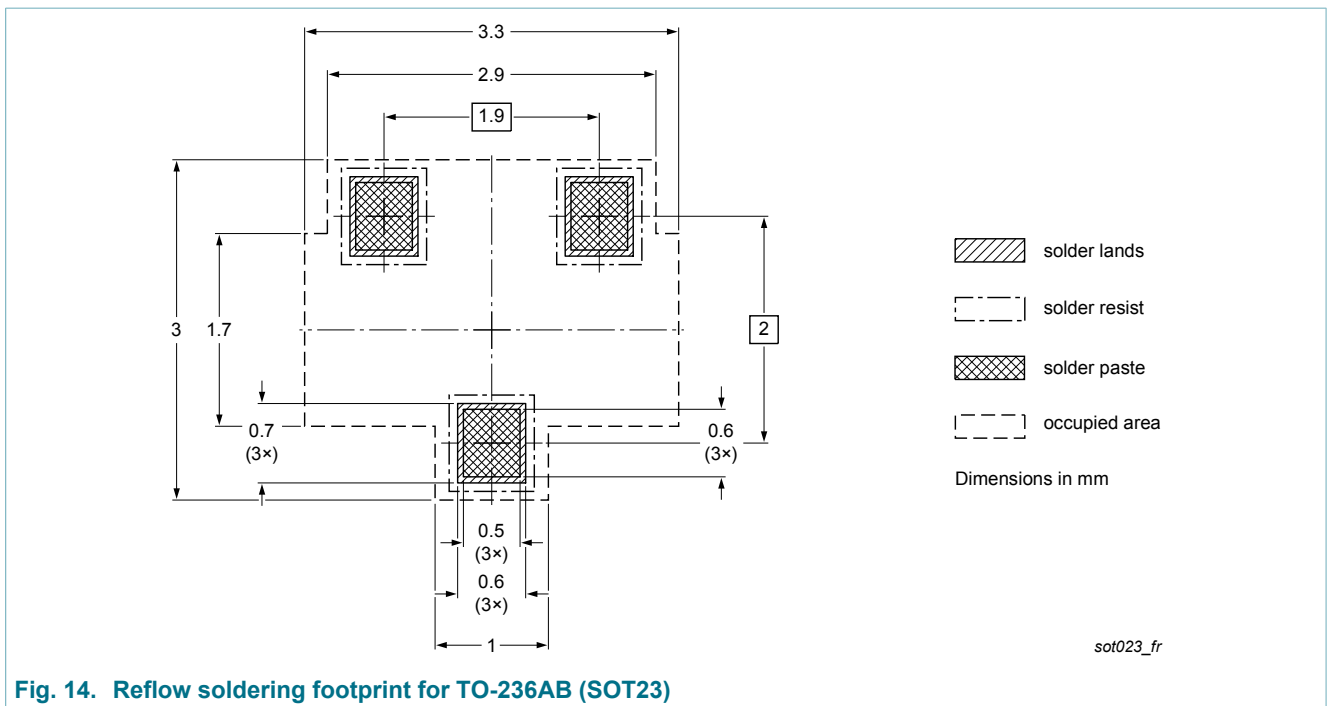


Fig. 14. Reflow soldering footprint for TO-236AB (SOT23)

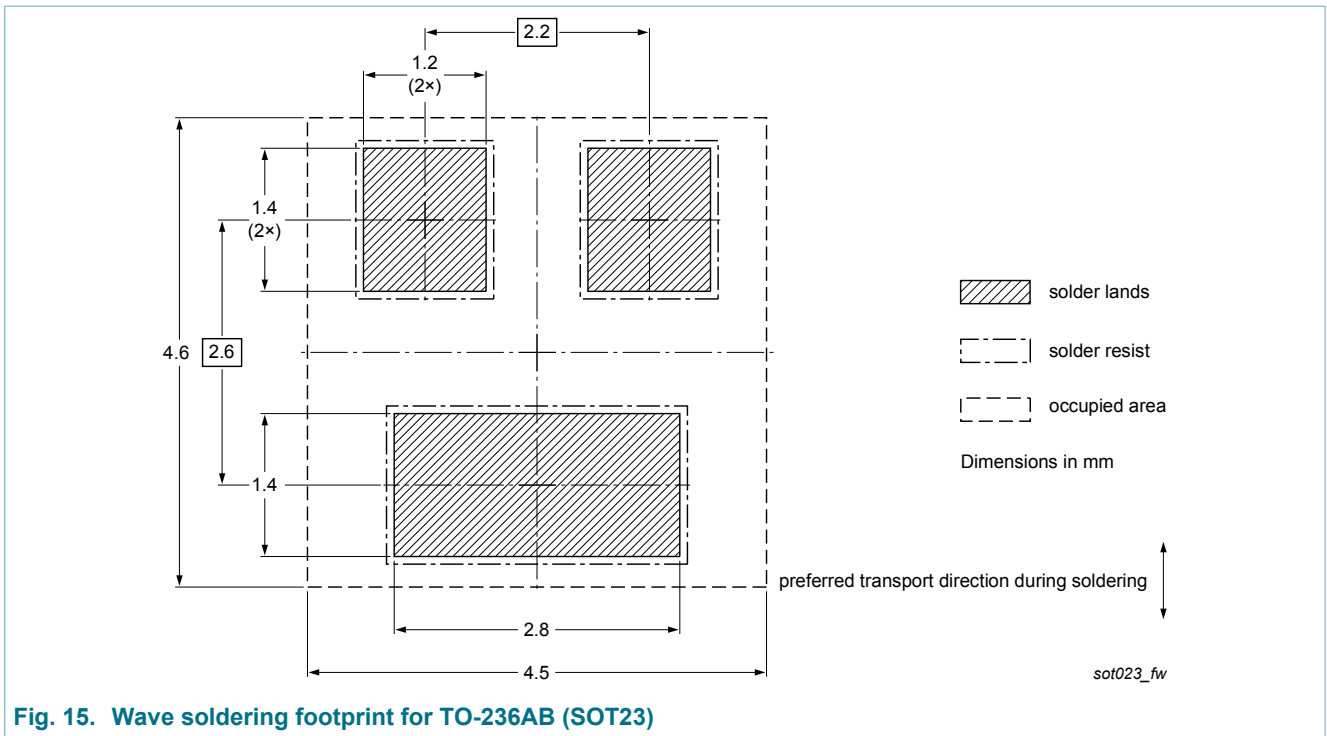


Fig. 15. Wave soldering footprint for TO-236AB (SOT23)

14. Revision history

Table 8. Revision history

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

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.

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