PBSS8110D-Q

100 V, 1 A NPN low VCEsat transistor

4 July 2025 **Product data sheet**

1. General description

NPN low V_{CEsat} transistor in a small SOT457 (SC-74) Surface Mounted Device (SMD) plastic package.

2. Features and benefits

- SOT457 package
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High efficiency, leading to less heat generation
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Major application segments:
  - Automotive 42 V power
  - Telecom infrastructure
  - Industrial
- DC-to-DC converter
- Peripheral driver
  - Driver in low supply voltage applications (e.g. lamps and LEDs)
  - Inductive load drivers (e.g. relays, buzzers and motors)

4. Quick reference data

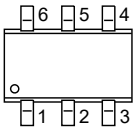
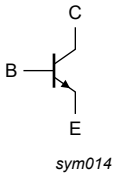
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	100	V
I_C	collector current			-	-	1	A
I_{CM}	peak collector current			-	-	3	A
R_{CEsat}	collector-emitter saturation resistance	I_C = 1 A; I_B = 100 mA; $t_p \leq$ 300 µs; δ = 0.02		-	160	200	mΩ

nexperia

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	C	collector	 TSOP6 (SOT457)	 sym014
2	C	collector		
3	B	base		
4	E	emitter		
5	C	collector		
6	C	collector		

6. Marking

Table 3. Marking codes

Type number	Marking code
PBSS8110D-Q	A8

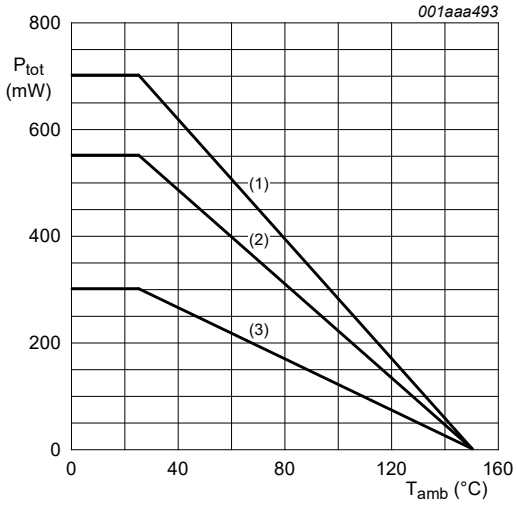
7. Limiting values

Table 4. 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		-	120	V
V_{CEO}	collector-emitter voltage	open base		-	100	V
V_{EBO}	emitter-base voltage	open collector		-	5	V
I_C	collector current			-	1	A
I_{CM}	peak collector current			-	3	A
I_B	base current			-	0.3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	300	mW
			[2]	-	550	mW
			[3]	-	700	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm^2.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm^2.



(1) FR4 PCB; 6 cm^2 collector mounting pad
(2) FR4 PCB; 1 cm^2 collector mounting pad
(3) FR4 PCB; standard footprint

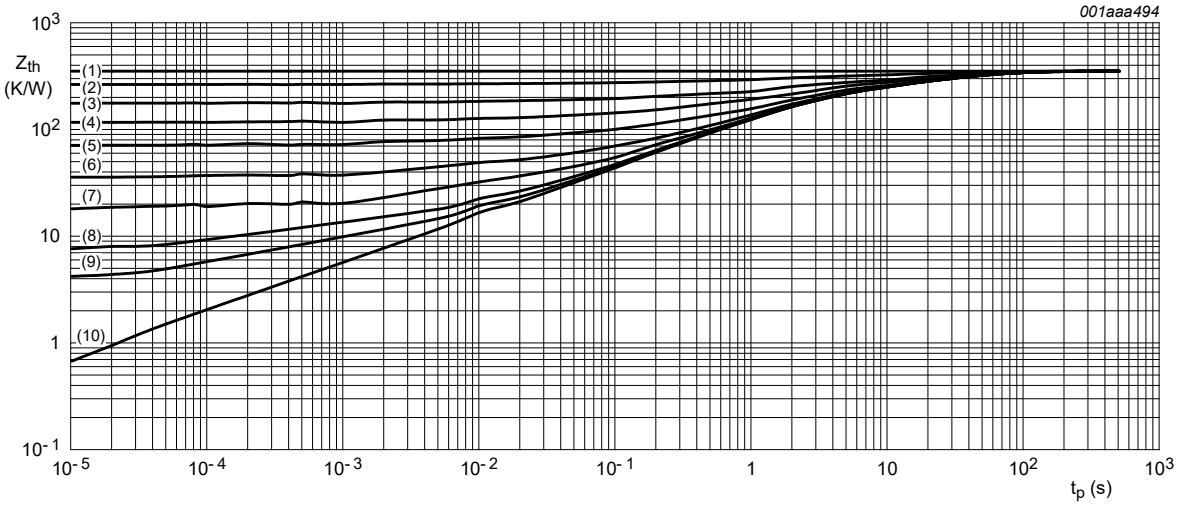
Fig. 1. Power derating curves

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	416	K/W
			[2]	-	-	227	K/W
			[3]	-	-	178	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	83	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm^2.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm^2.
[4] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, standard footprint.



Mounted on FR4 PCB; standard footprint
(1) δ = 1
(2) δ = 0.75
(3) δ = 0.5
(4) δ = 0.33
(5) δ = 0.2
(6) δ = 0.1
(7) δ = 0.05
(8) δ = 0.02
(9) δ = 0.01
(10) δ = 0

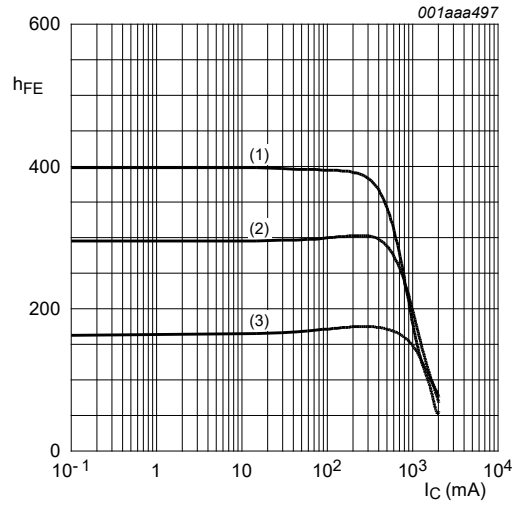
Fig. 2. Transient thermal impedance as a function of pulse time; typical values

9. Characteristics

Table 6. Characteristics

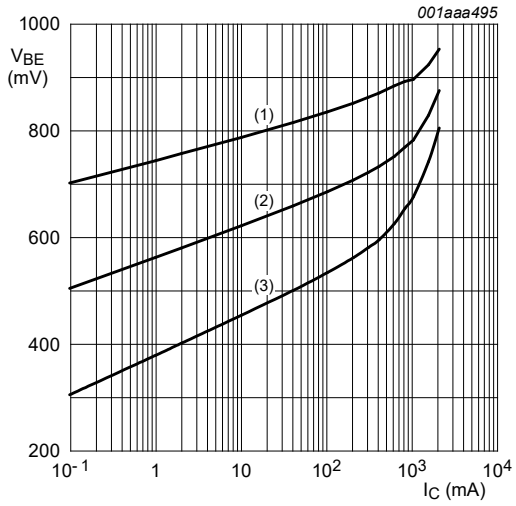
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = 80 V; I_E = 0 A; T_{amb} = 25 °C		-	-	100	nA
		V_{CB} = 80 V; I_E = 0 A; T_j = 150 °C		-	-	50	µA
I_{CES}	collector-emitter cut-off current	V_{CE} = 80 V; V_{BE} = 0 V; T_{amb} = 25 °C		-	-	100	nA
I_{EBO}	emitter-base 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 = 1 mA; T_{amb} = 25 °C		150	-	-	
		V_{CE} = 10 V; I_C = 250 mA; T_{amb} = 25 °C		150	-	500	
		V_{CE} = 10 V; I_C = 0.5 A; pulsed; $t_p \leq$ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C		100	-	-	
		V_{CE} = 10 V; I_C = 1 A; pulsed; $t_p \leq$ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C		80	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = 100 mA; I_B = 10 mA; T_{amb} = 25 °C		-	-	40	mV
		I_C = 500 mA; I_B = 50 mA; T_{amb} = 25 °C		-	-	120	mV
		I_C = 1 A; I_B = 100 mA; T_{amb} = 25 °C		-	-	200	mV
R_{CEsat}	collector-emitter saturation resistance	I_C = 1 A; I_B = 100 mA; $t_p \leq$ 300 µs; δ = 0.02		-	160	200	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = 1 A; I_B = 100 mA; T_{amb} = 25 °C		-	-	1.05	V

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{BEon}	base-emitter turn-on voltage	V_{CE} = 10 V; I_C = 1 A; T_{amb} = 25 °C		-	-	0.9	V
f_T	transition frequency	V_{CE} = 10 V; I_C = 50 mA; f = 100 MHz; T_{amb} = 25 °C		100	-	-	MHz
C_c	collector capacitance	V_{CB} = 10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	7.5	pF



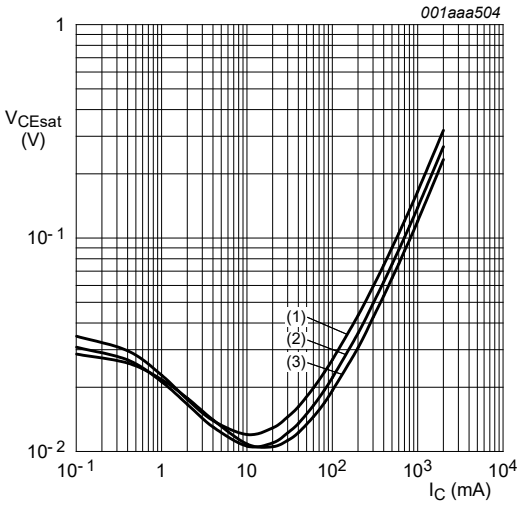
$V_{CE} = 10\ V$
(1) $T_{amb} = 100\ °C$
(2) $T_{amb} = 25\ °C$
(3) $T_{amb} = -55\ °C$

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



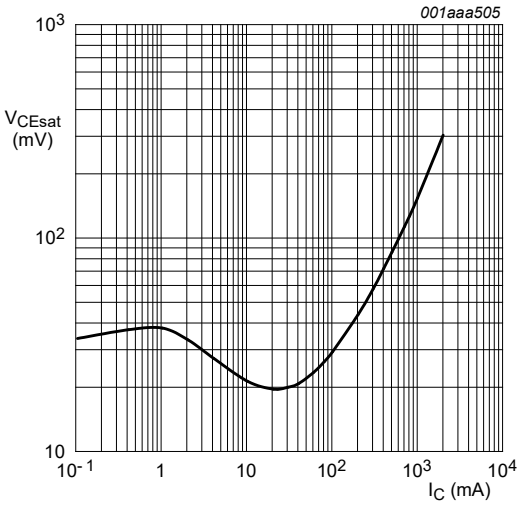
V_{CE} = 10 V
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 100 °C

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



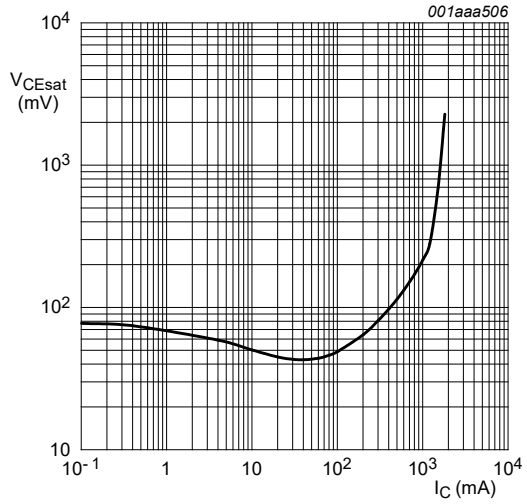
I_C/I_B = 10
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



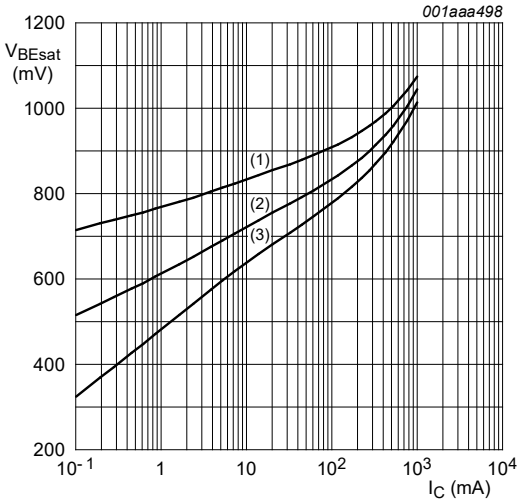
I_C/I_B = 20; Tamb = 25 °C

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



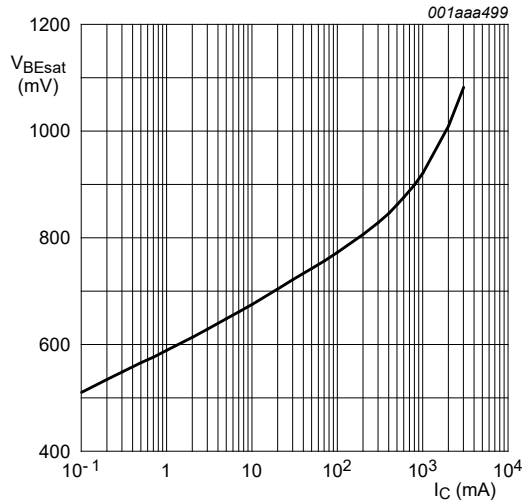
I_C/I_B = 50; T_{amb} = 25 °C

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



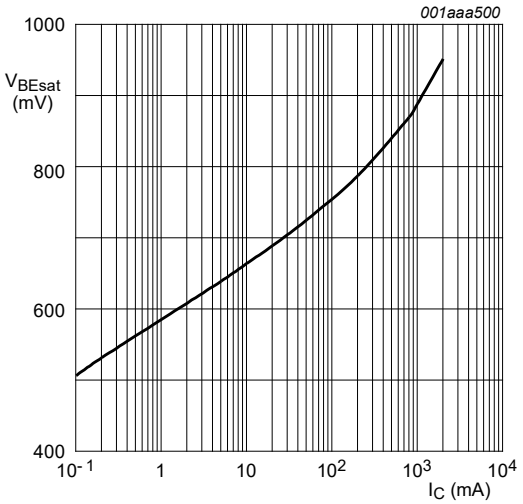
I_C/I_B = 10
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 100 °C

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



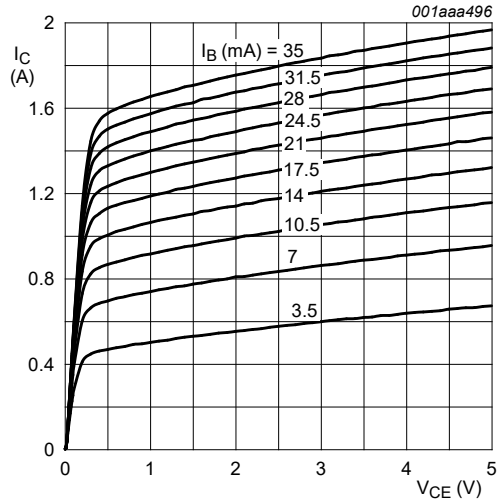
I_C/I_B = 20; T_{amb} = 25 °C

Fig. 9. Base-emitter saturation voltage as a function of collector current; typical values



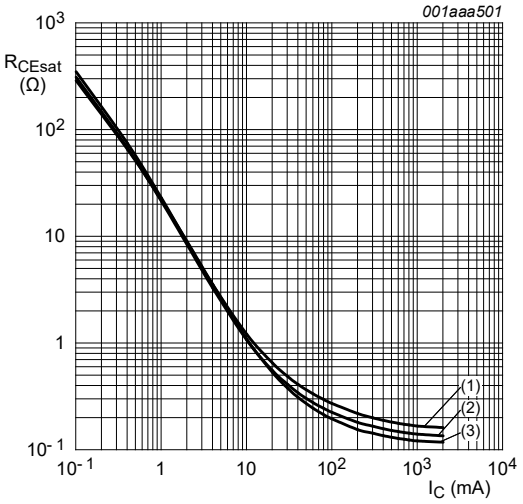
I_C/I_B = 50; T_{amb} = 25 °C

Fig. 10. Base-emitter saturation voltage as a function of collector current; typical values



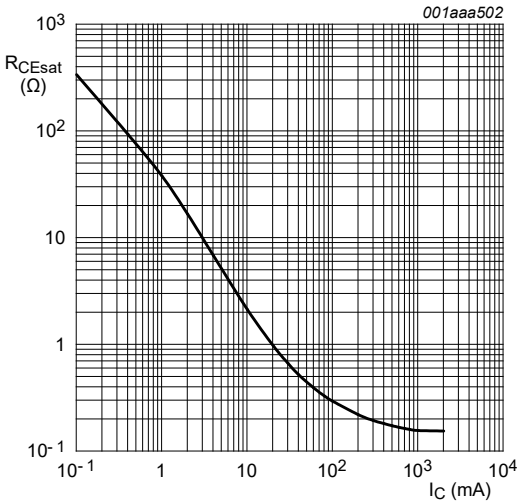
T_{amb} = 25 °C

Fig. 11. Collector current as a function of collector-emitter voltage; typical values



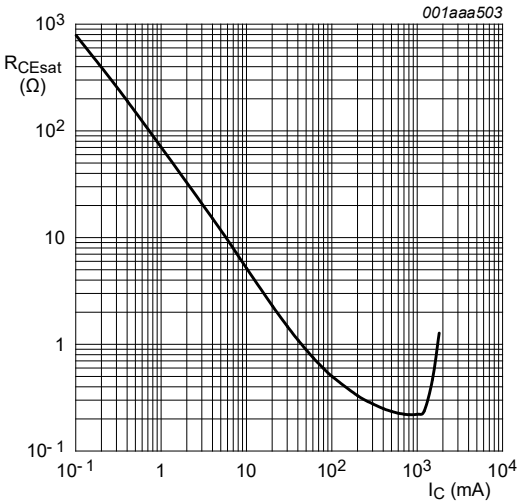
I_C/I_B = 10
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Fig. 12. Collector-emitter saturation resistance as a function of collector current; typical values



I_C/I_B = 20; T_{amb} = 25 °C

Fig. 13. Equivalent on-resistance as a function of collector current; typical values



I_C/I_B = 50; T_{amb} = 25 °C

Fig. 14. Equivalent on-resistance as a function of collector current; typical values

10. Test information

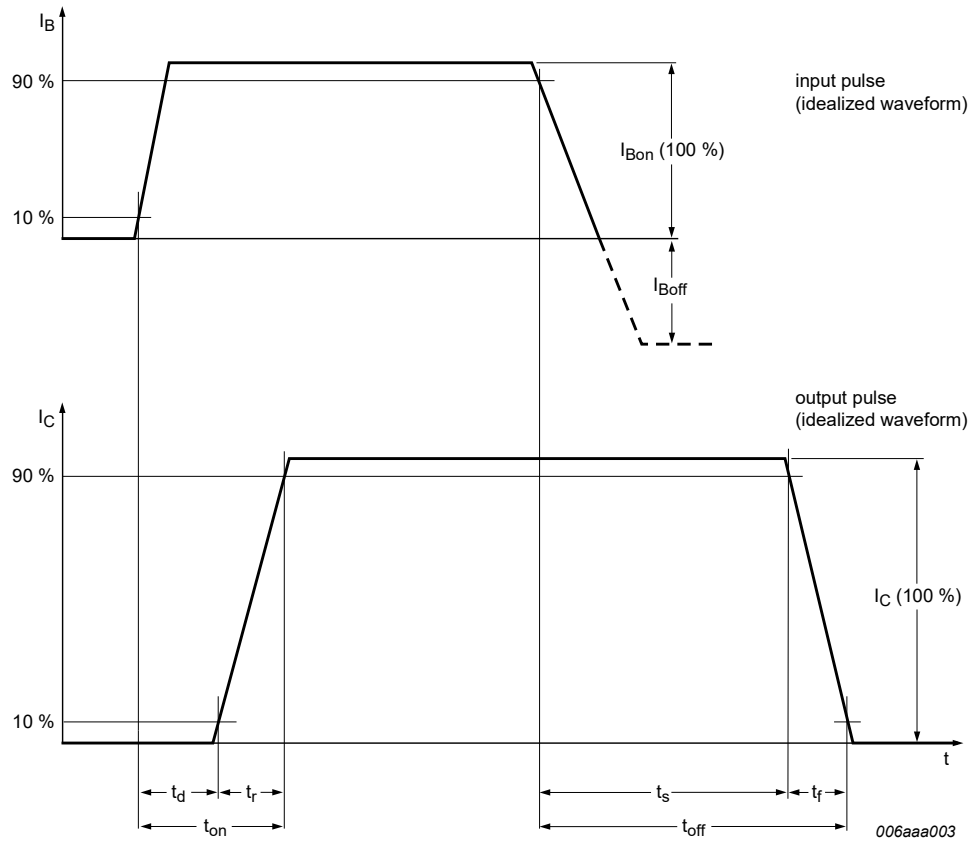


Fig. 15. Transistor switching time definition

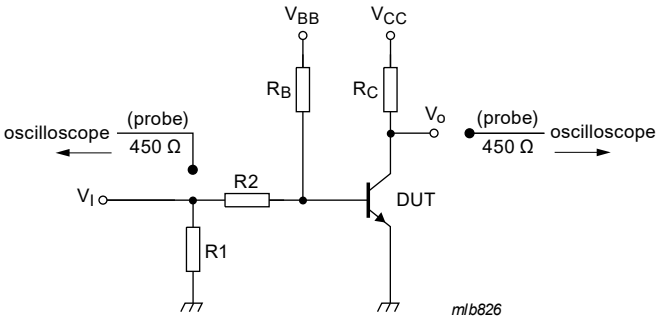


Fig. 16. Test circuit for switching times

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.

11. Package outline

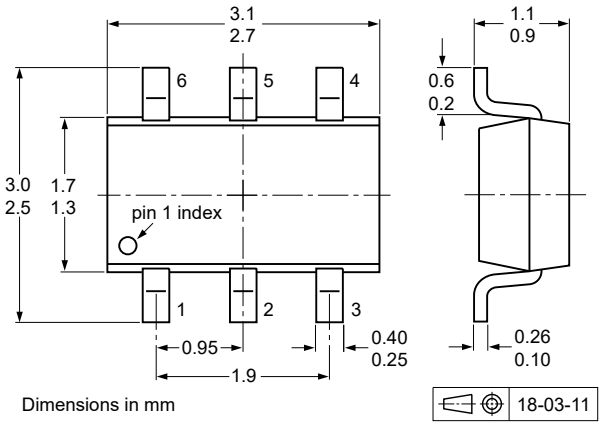


Fig. 17. Package outline TSOP6 (SOT457)

12. Soldering

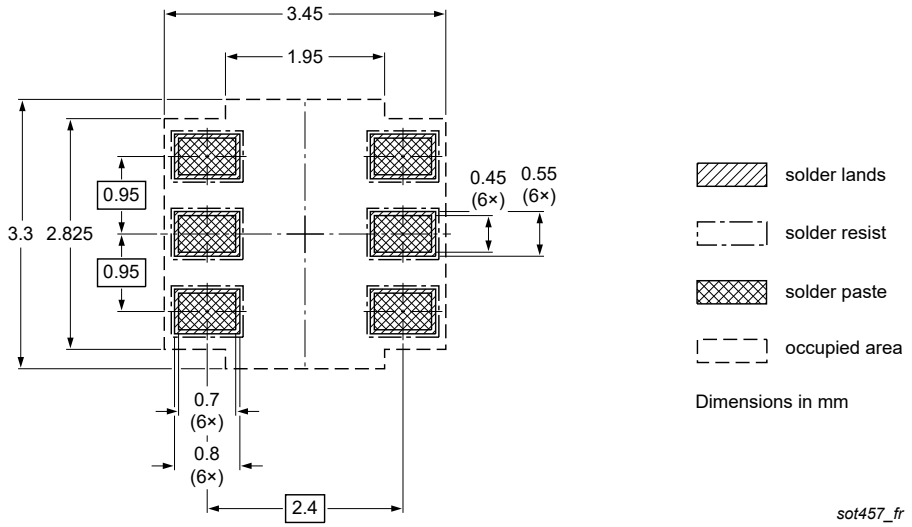


Fig. 18. Reflow soldering footprint for TSOP6 (SOT457)

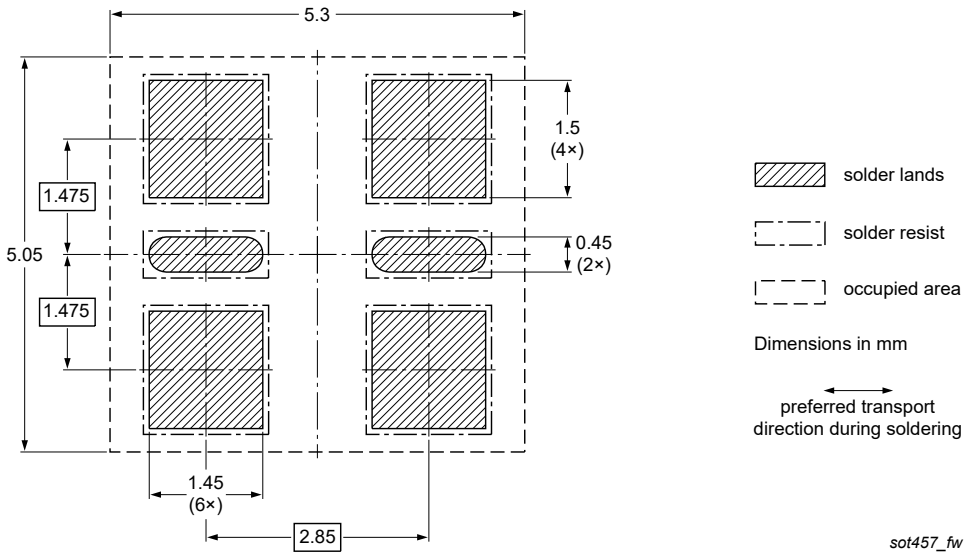


Fig. 19. Wave soldering footprint for TSOP6 (SOT457)

13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS8110D-Q v.1	20250704	Product data sheet	-	-

14. 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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Date of release: 4 July 2025