



PBSS4420D

20 V, 4 A NPN low V_{CEsat} transistor

30 September 2025

Product data sheet

1. General description

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

PNP complement: PBSS5420D

2. Features and benefits

- Very low collector-emitter saturation resistance
- Ultra low collector-emitter saturation voltage
- 4 A continuous collector current
- Up to 15 A peak current
- High efficiency due to less heat generation

3. Applications

- Power management functions
- Charging circuits
- DC-to-DC conversion
- MOSFET gate driving
- Power switches (e.g. motors, fans)
- Thin Film Transistor (TFT) backlight inverter

4. Quick reference data

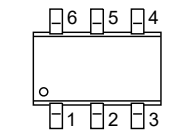
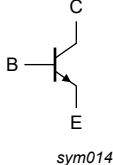
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base		-	-	20	V
I _C	collector current		[1]	-	-	4	A
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	-	15	A
R _{CEsat}	collector-emitter saturation resistance	I _C = 4 A; I _B = 400 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		-	50	70	mΩ

[1] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.

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. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS4420D	TSOP6	plastic, surface-mounted package (SC-74; TSOP6); 6 leads	SOT457

7. Marking

Table 4. Marking codes

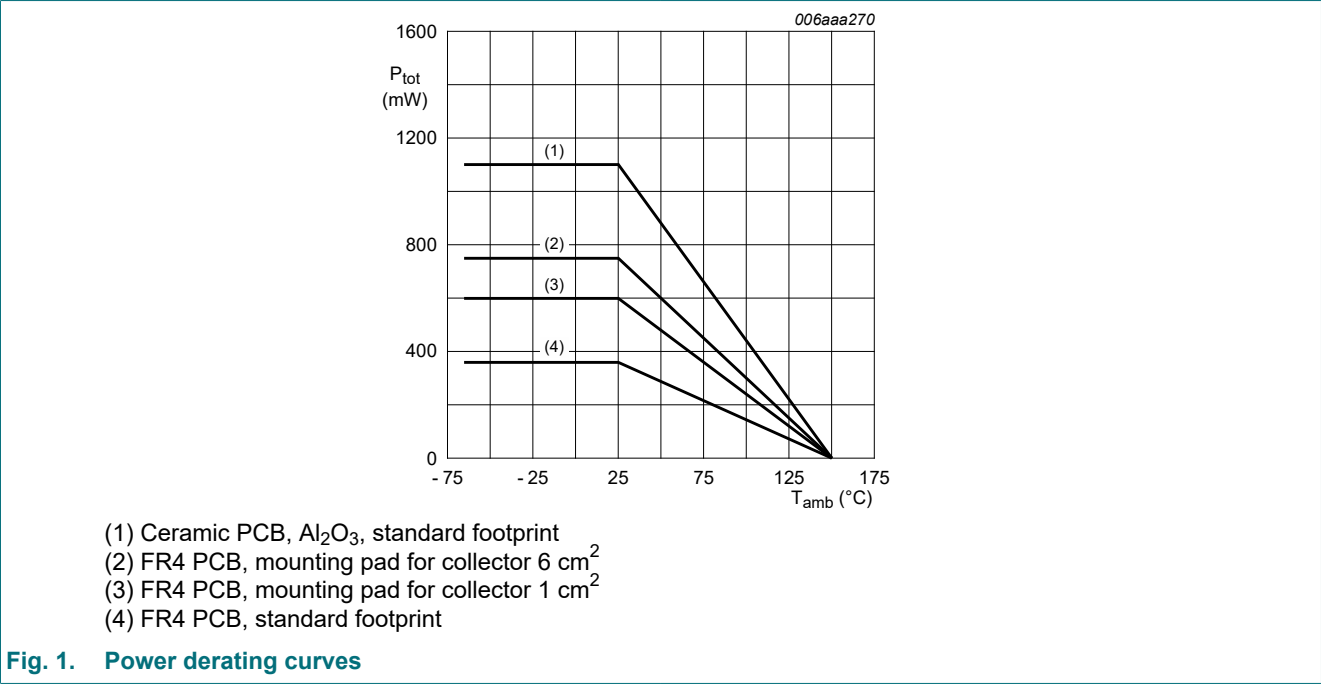
Type number	Marking code
PBSS4420D	D4

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		-	20	V
V _{CEO}	collector-emitter voltage	open base		-	20	V
V _{EBO}	emitter-base voltage	open collector		-	5	V
I _C	collector current		[1]	-	4	A
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	15	A
I _B	base current			-	0.8	A
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms		-	2	A
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[2]	-	360	mW
			[3]	-	600	mW
			[4]	-	750	mW
			[1]	-	1.1	W
			[2] [5]	-	2.5	W
T _j	junction temperature			-	150	°C
T _{amb}	ambient temperature			-65	150	°C
T _{stg}	storage temperature			-65	150	°C

- [1] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².
- [4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².
- [5] Operated under pulsed conditions: δ ≤ 10 %; t_p ≤ 10 ms.



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]	-	-	350	K/W
			[2]	-	-	208	K/W
			[3]	-	-	160	K/W
			[4]	-	-	113	K/W
			[1] [5]	-	-	50	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	45	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 cm².
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².
[4] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.
[5] Operated under pulsed conditions: $\delta \leq 10\%$; $t_p \leq 10$ ms.

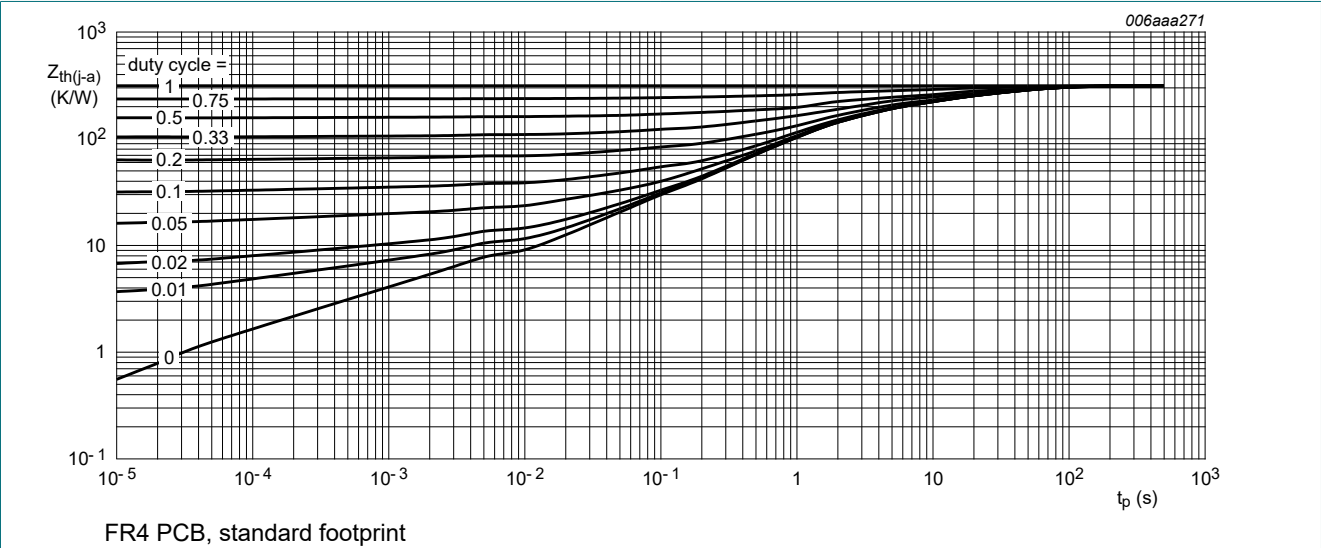


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

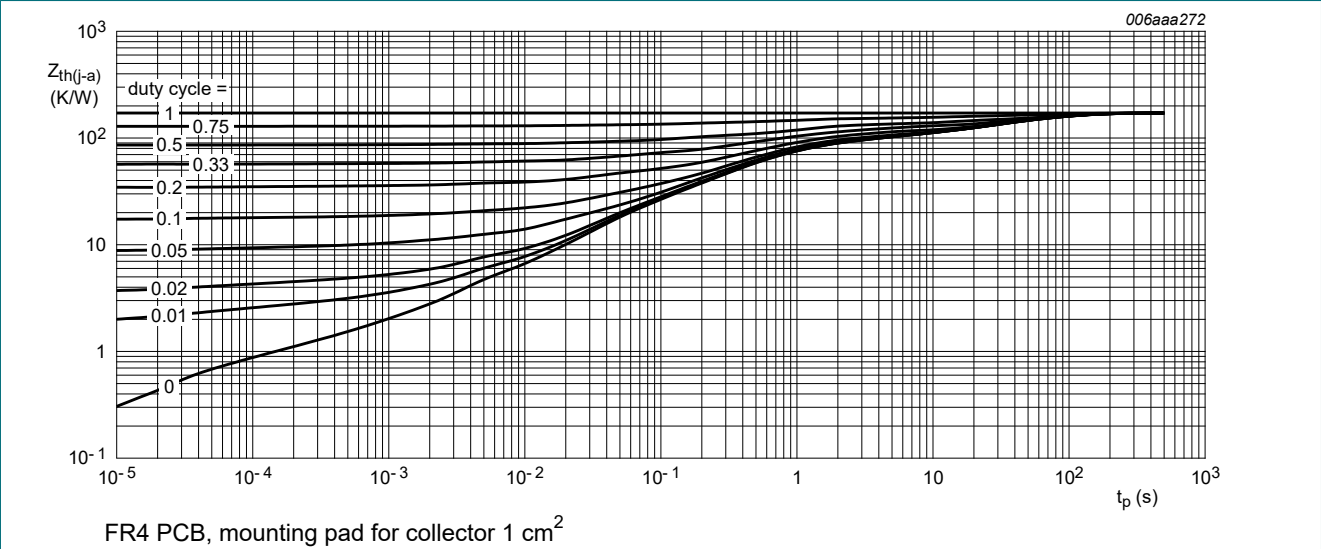
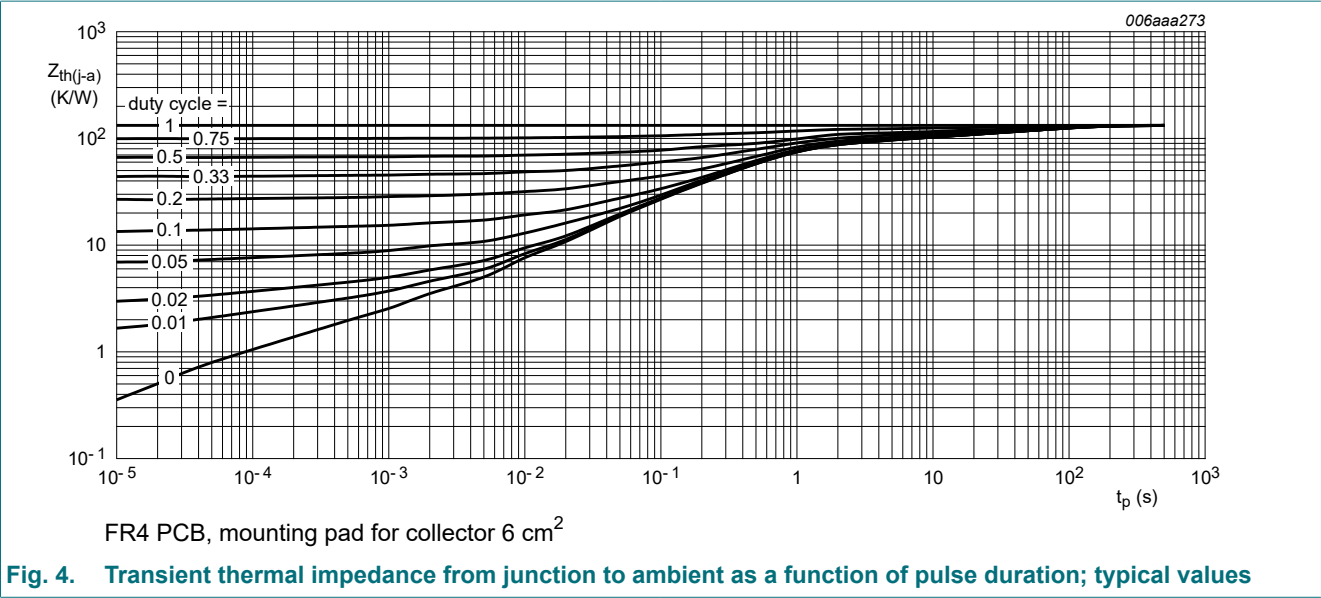


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = 20 V; I _E = 0 A; T _{amb} = 25 °C		-	-	100	nA
		V _{CB} = 20 V; I _E = 0 A; T _j = 150 °C		-	-	50	µA
I _{CES}	collector-emitter cut-off current	V _{CE} = 20 V; V _{BE} = 0 V; T _{amb} = 25 °C		-	-	100	nA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A; T _{amb} = 25 °C		-	-	100	nA
h _{FE}	DC current gain	V _{CE} = 2 V; I _C = 0.5 A; T _{amb} = 25 °C		300	450	-	
		V _{CE} = 2 V; I _C = 1 A; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		300	430	-	
		V _{CE} = 2 V; I _C = 2 A; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		250	400	-	
		V _{CE} = 2 V; I _C = 4 A; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		200	310	-	
		V _{CE} = 2 V; I _C = 6 A; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		100	230	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = 0.5 A; I _B = 50 mA; T _{amb} = 25 °C		-	30	50	mV
		I _C = 1 A; I _B = 50 mA; T _{amb} = 25 °C		-	60	90	mV
		I _C = 2 A; I _B = 200 mA; T _{amb} = 25 °C		-	110	150	mV
		I _C = 4 A; I _B = 400 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	200	280	mV
		I _C = 6 A; I _B = 600 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	300	420	mV
R _{CEsat}	collector-emitter saturation resistance	I _C = 4 A; I _B = 400 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	50	70	mΩ
V _{BEsat}	base-emitter saturation voltage	I _C = 0.5 A; I _B = 50 mA; T _{amb} = 25 °C		-	0.79	0.85	V
		I _C = 1 A; I _B = 50 mA; T _{amb} = 25 °C		-	0.81	0.9	V
		I _C = 1 A; I _B = 100 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	0.83	1	V
		I _C = 4 A; I _B = 400 mA; pulsed; t _p ≤ 300 µs; δ ≤ 0.02; T _{amb} = 25 °C		-	1	1.1	V
V _{BEon}	base-emitter turn-on voltage	V _{CE} = 2 V; I _C = 2 A; T _{amb} = 25 °C		-	0.79	1	V
t _d	delay time	V _{CC} = 12.5 V; I _C = 3 A; I _{Bon} = 0.15 A; I _{Boff} = -0.15 A; T _{amb} = 25 °C		-	12	-	ns
t _r	rise time			-	36	-	ns
t _{on}	turn-on time			-	48	-	ns
t _s	storage time			-	230	-	ns
t _f	fall time			-	50	-	ns
t _{off}	turn-off time			-	280	-	ns
f _T	transition frequency	V _{CE} = 10 V; I _C = 0.1 A; 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		-	60	-	pF

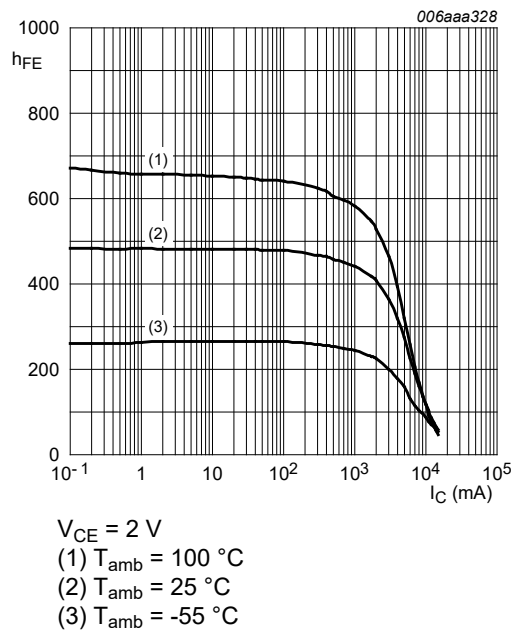


Fig. 5. DC current gain as a function of collector current; typical values

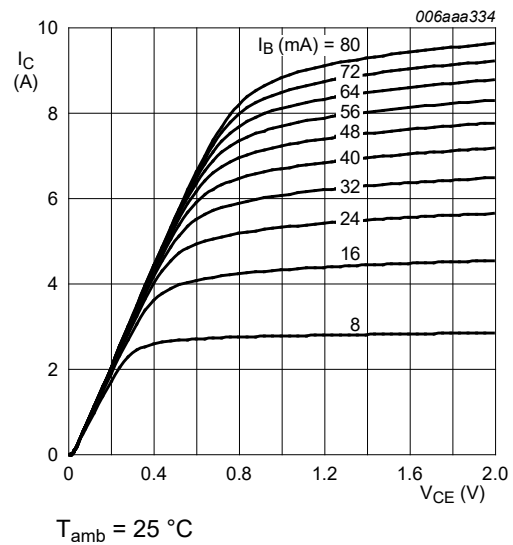


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

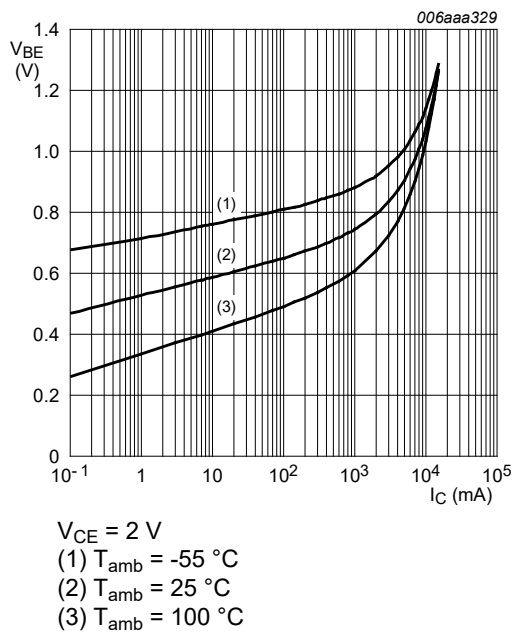


Fig. 7. Base-emitter voltage as a function of collector current; typical values

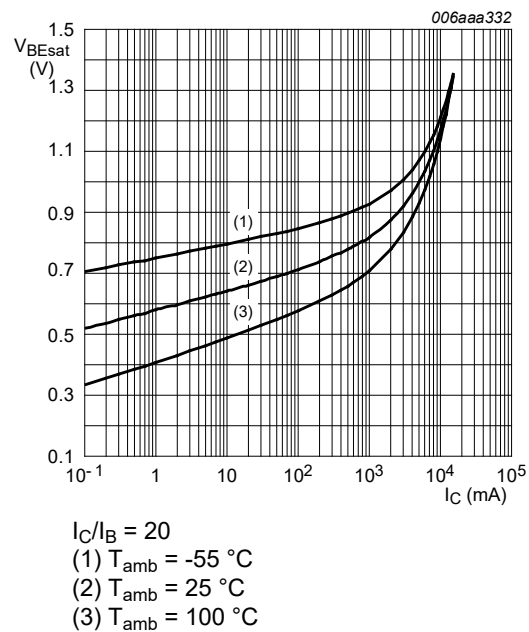


Fig. 8. Base-emitter saturation voltage as a function of collector current; typical values

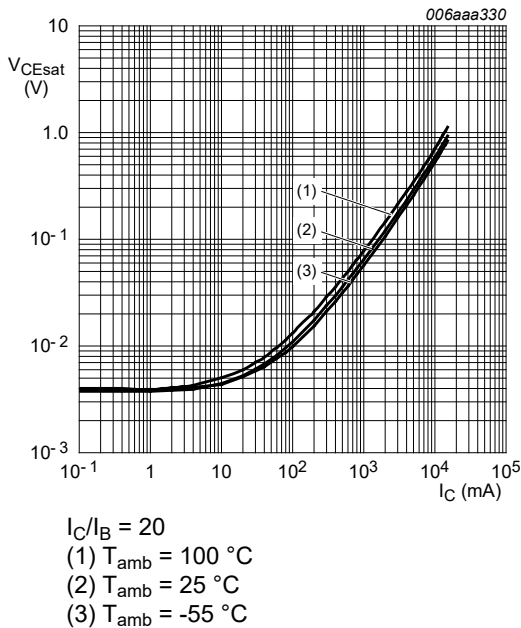


Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values

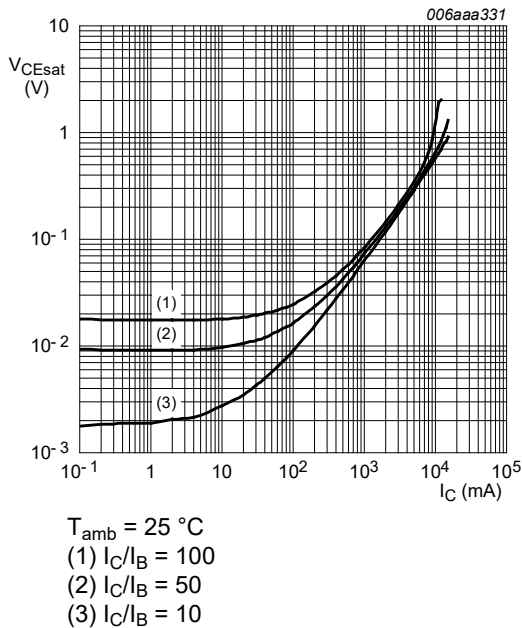


Fig. 10. Collector-emitter saturation voltage as a function of collector current; typical values

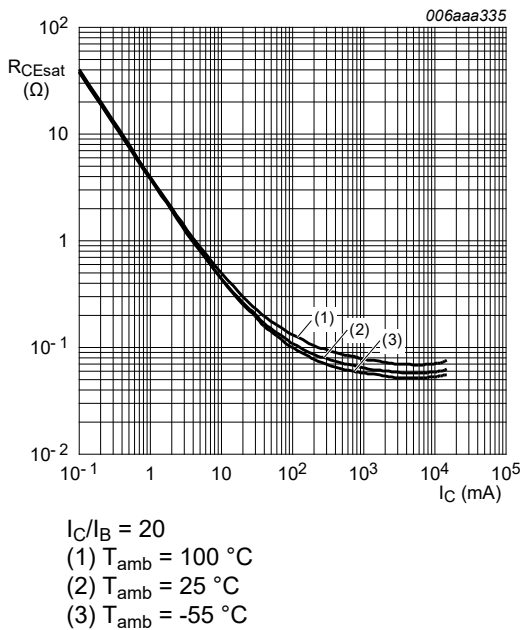


Fig. 11. Collector-emitter saturation resistance as a function of collector current; typical values

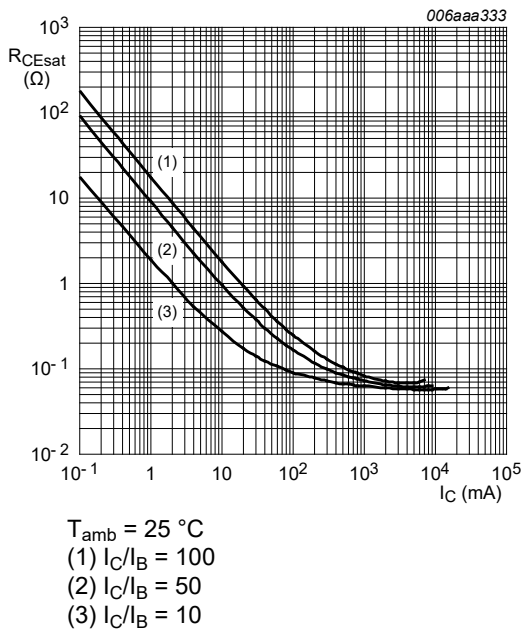


Fig. 12. Collector-emitter saturation resistance as a function of collector current; typical values

11. Test information



Fig. 13. Switching time definition

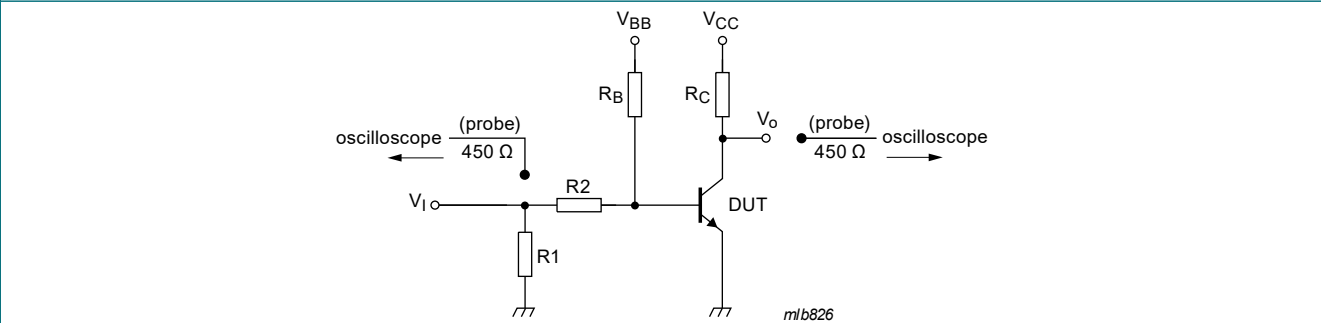
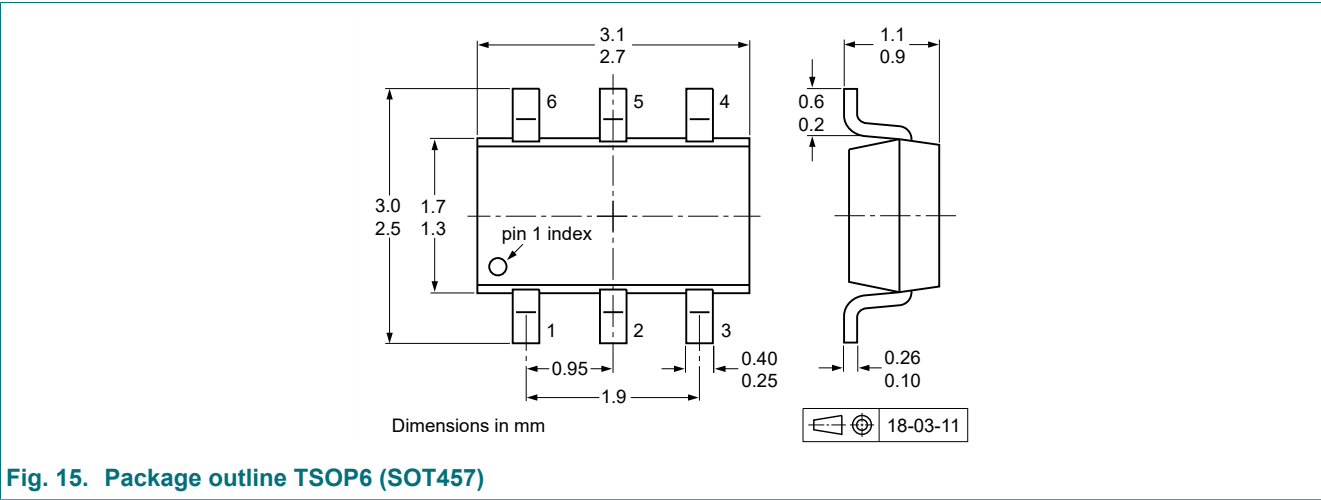


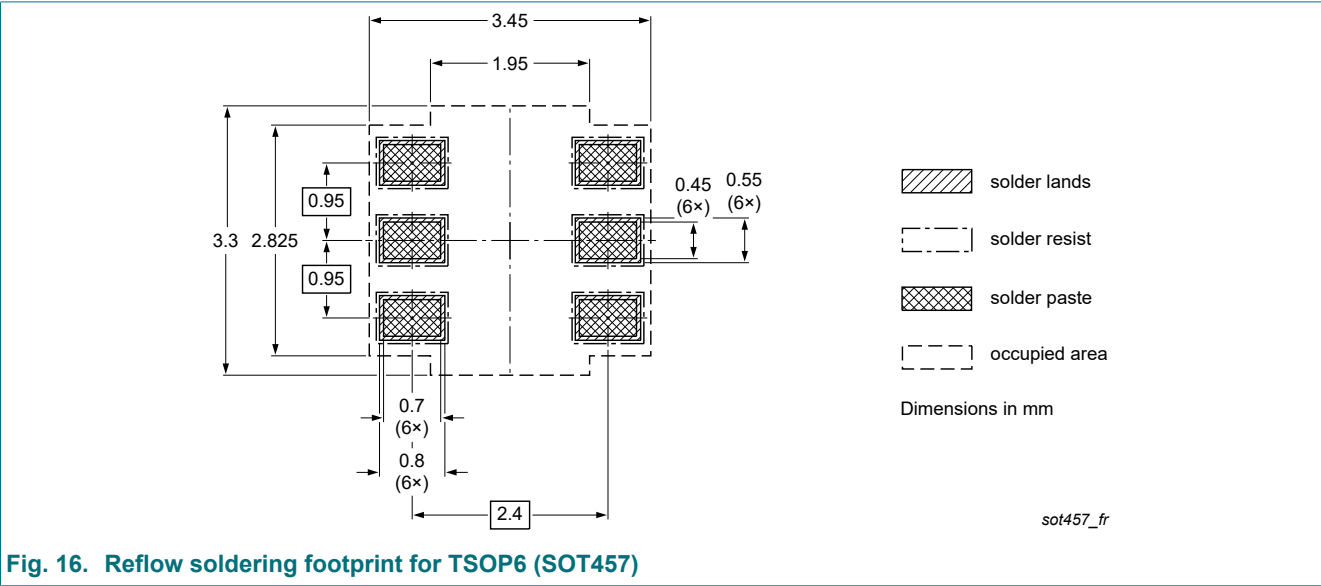
Fig. 14. Test circuit for switching times

$V_{CC} = 12.5\text{ V}$; $I_C = 3\text{ A}$; $I_{B\text{on}} = 0.15\text{ A}$; $I_{B\text{off}} = -0.15\text{ A}$

12. Package outline



13. Soldering



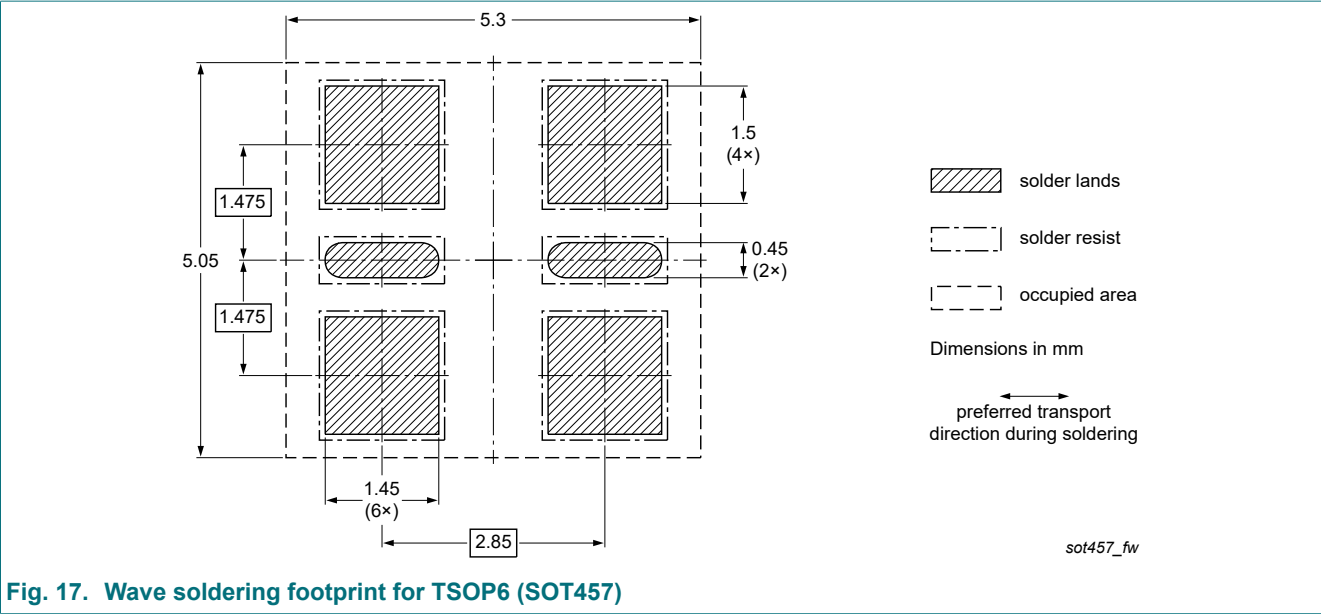


Fig. 17. Wave soldering footprint for TSOP6 (SOT457)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4420D v.3	20250930	Product data sheet	-	PBSS4420D_2
Modifications:	<ul style="list-style-type: none">Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
PBSS4420D_2	20080924	Product data sheet	-	PBSS4420D_1
PBSS4420D_1	20050421	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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- [2] The term 'short data sheet' is explained in section "Definitions".
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