

ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number:	PBSS4540X,135
Manufacturer:	Nexperia USA Inc.
Package:	TO-243AA
Availability:	Please confirm with sales

Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/pbss4540x-135.html>

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Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



PBSS4540X

40 V, 5 A NPN low V_{CEsat} transistor

1 October 2025

Product data sheet

1. General description

NPN low V_{CEsat} transistor in a SOT89 (SC-62/TO-243) small and flat lead Surface-Mounted Device (SMD) plastic package.

PNP complement: PBSS5540X

2. Features and benefits

- High h_{FE} and low V_{CEsat} at high current operation
- High collector current capability: I_C maximum 4 A
- High efficiency leading to less heat generation

3. Applications

- Medium power peripheral drivers (e.g. fan and motor)
- Strobe flash units for DSC and mobile phones
- Inverter applications (e.g. TFT displays)
- Power switch for LAN and ADSL systems
- Medium power DC-to-DC conversion
- Battery chargers

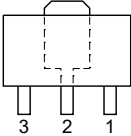
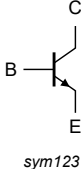
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	40	V
I_C	collector current		-	-	4	A
I_{CM}	peak collector current	single pulse; $t_p \leq 10$ ms	-	-	10	A
R_{CEsat}	collector-emitter saturation resistance	$I_C = 5$ A; $I_B = 500$ mA; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_{amb} = 25$ °C	-	40	71	m Ω

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E	emitter	 SOT89	 sym123
2	C	collector		
3	B	base		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS4540X	SOT89	plastic, surface-mounted package; 3 leads; 1.5 mm pitch; 4.5 mm x 2.5 mm x 1.5 mm body	SOT89

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PBSS4540X	%1B

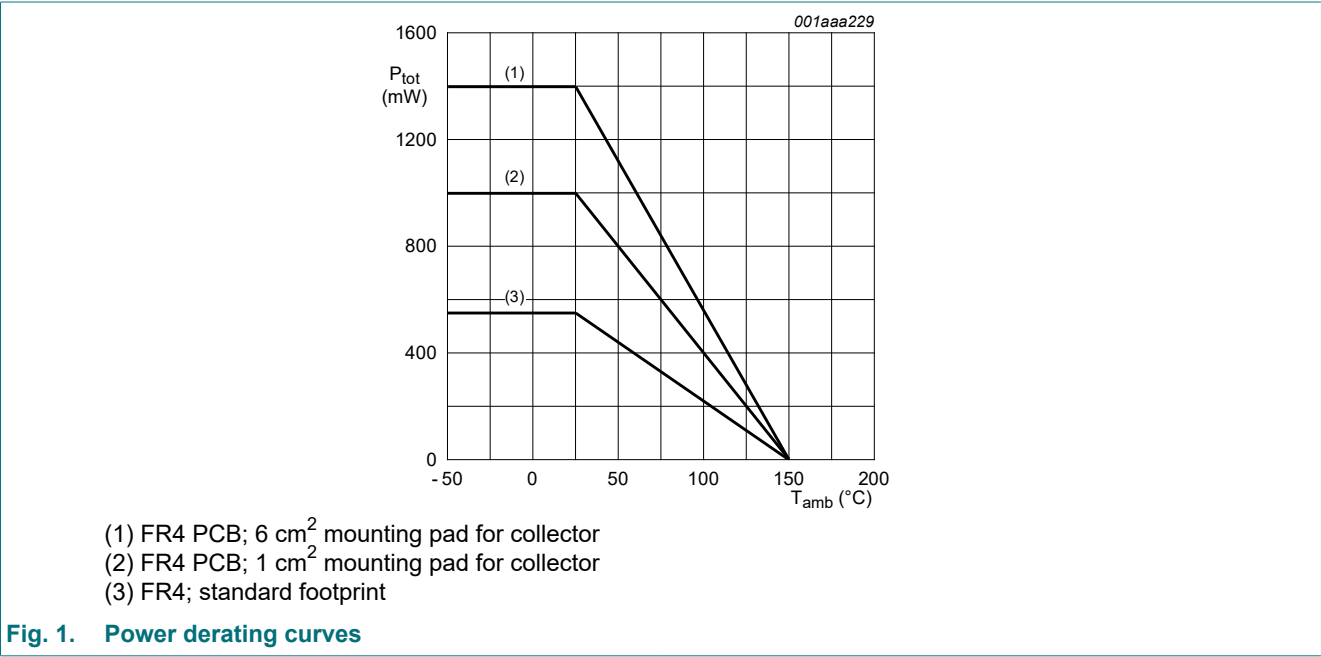
[1] % = placeholder for manufacturing site code

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		-	40	V
V _{CEO}	collector-emitter voltage	open base		-	40	V
V _{EBO}	emitter-base voltage	open collector		-	6	V
I _C	collector current			-	4	A
I _{CRM}	repetitive peak collector current	$\delta \leq 0.02$; $t_p \leq 10$ ms	[1]	-	5	A
I _{CM}	peak collector current	single pulse; $t_p \leq 10$ ms		-	10	A
I _B	base current			-	1	A
I _{BM}	peak base current	single pulse; $t_p \leq 1$ ms		-	2	A
P _{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1] [2]	-	2.5	W
			[1]	-	0.55	W
			[3]	-	1	W
			[4]	-	1.4	W
			[5]	-	1.6	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 an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [2] Operated under pulsed conditions; $t_p \leq 10$ ms; $\delta \leq 0.2$.
- [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] Device mounted on a 7 cm² ceramic PCB, 1 cm² single-sided copper and tin-plated.

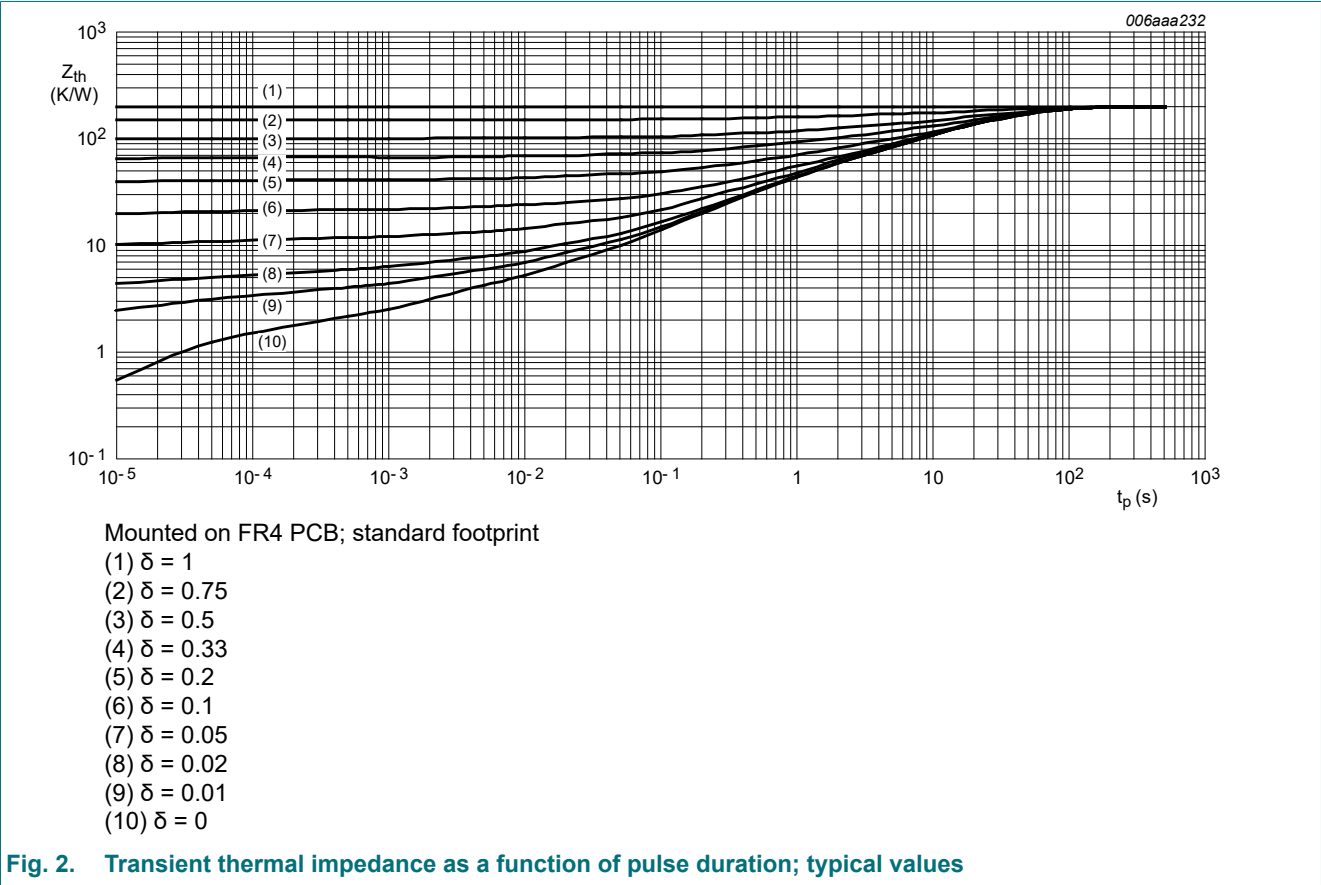


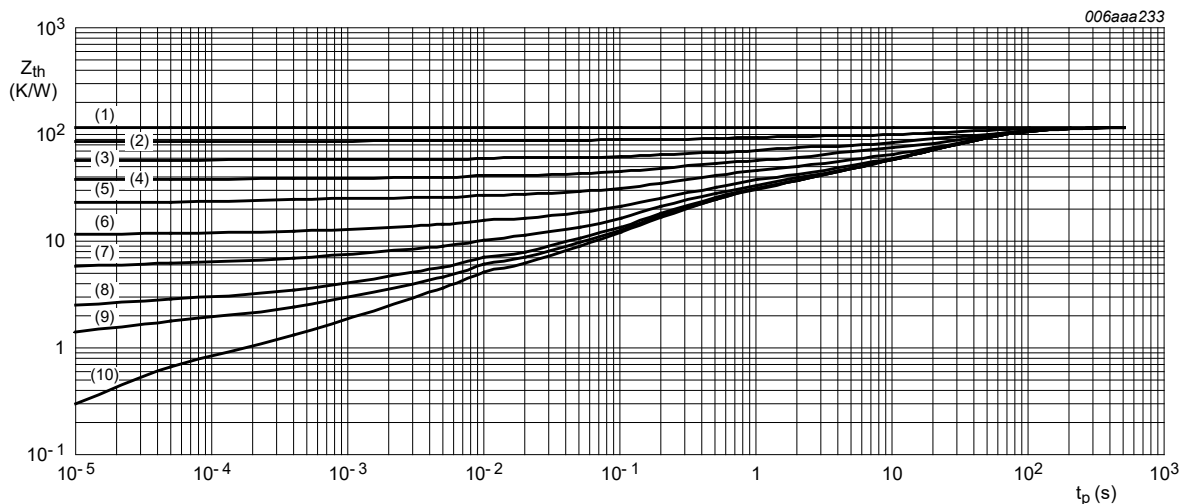
9. Thermal characteristics

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] [2]	-	-	50	K/W
			[1]	-	-	225	K/W
			[3]	-	-	125	K/W
			[4]	-	-	90	K/W
			[5]	-	-	80	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	16	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Operated under pulsed conditions; $t_p \leq 10$ ms; $\delta \leq 0.2$.
[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] Device mounted on a 7 cm² ceramic PCB, 1 cm² single-sided copper and tin-plated.

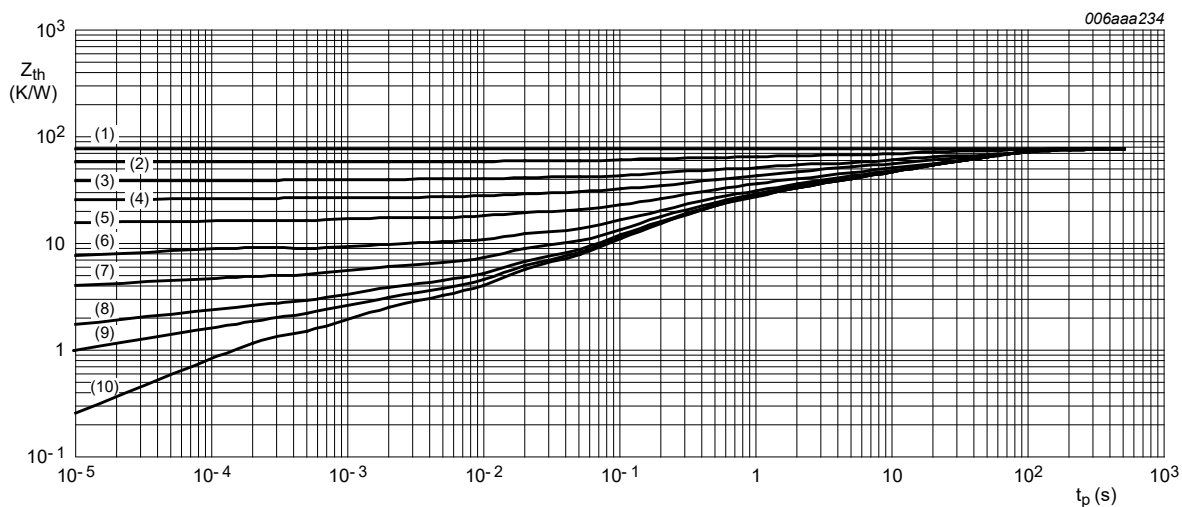




Mounted on FR4 PCB; mounting pad for collector 1 cm^2

- (1) $\delta = 1$
- (2) $\delta = 0.75$
- (3) $\delta = 0.5$
- (4) $\delta = 0.33$
- (5) $\delta = 0.2$
- (6) $\delta = 0.1$
- (7) $\delta = 0.05$
- (8) $\delta = 0.02$
- (9) $\delta = 0.01$
- (10) $\delta = 0$

Fig. 3. Transient thermal impedance as a function of pulse duration; typical values



Mounted on FR4 printed-circuit board; mounting pad for collector 6 cm^2

- (1) $\delta = 1$
- (2) $\delta = 0.75$
- (3) $\delta = 0.5$
- (4) $\delta = 0.33$
- (5) $\delta = 0.2$
- (6) $\delta = 0.1$
- (7) $\delta = 0.05$
- (8) $\delta = 0.02$
- (9) $\delta = 0.01$
- (10) $\delta = 0$

Fig. 4. Transient thermal impedance 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} = 30 V; I _E = 0 A; T _{amb} = 25 °C		-	-	100	nA
		V _{CB} = 30 V; I _E = 0 A; T _j = 150 °C		-	-	50	μA
I _{CES}	collector-emitter cut-off current	V _{CE} = 30 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	-	-	
		V _{CE} = 2 V; I _C = 1 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		300	-	-	
		V _{CE} = 2 V; I _C = 2 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		250	-	-	
		V _{CE} = 2 V; I _C = 5 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		100	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = 0.5 A; I _B = 5 mA; T _{amb} = 25 °C		-	-	90	mV
		I _C = 1 A; I _B = 10 mA; T _{amb} = 25 °C		-	-	120	mV
		I _C = 2 A; I _B = 200 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	150	mV
		I _C = 4 A; I _B = 200 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	290	mV
		I _C = 5 A; I _B = 500 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	355	mV
R _{CEsat}	collector-emitter saturation resistance			-	40	71	mΩ
V _{BEsat}	base-emitter saturation voltage	I _C = 4 A; I _B = 200 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	1.1	V
		I _C = 5 A; I _B = 500 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	1.2	V
V _{BEon}	base-emitter turn-on voltage	V _{CE} = 2 V; I _C = 2 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C		-	-	1.1	V
f _T	transition frequency	V _{CE} = 10 V; I _C = 0.1 A; f = 100 MHz; T _{amb} = 25 °C		70	-	-	MHz
C _c	collector capacitance	V _{CB} = 10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C		-	-	75	pF

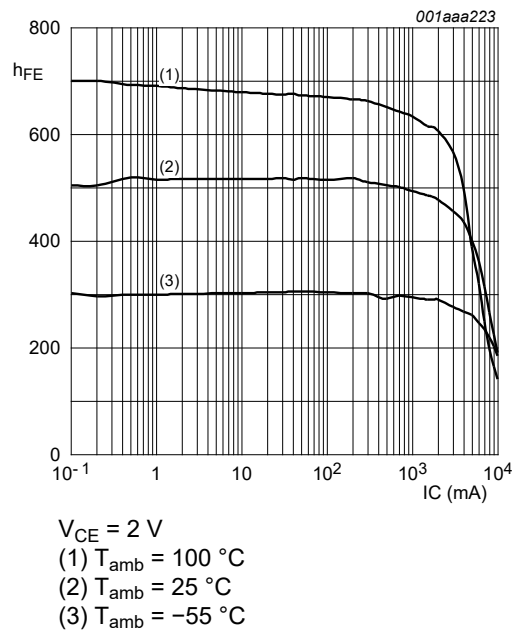


Fig. 5. DC current gain as a function of collector current; typical values

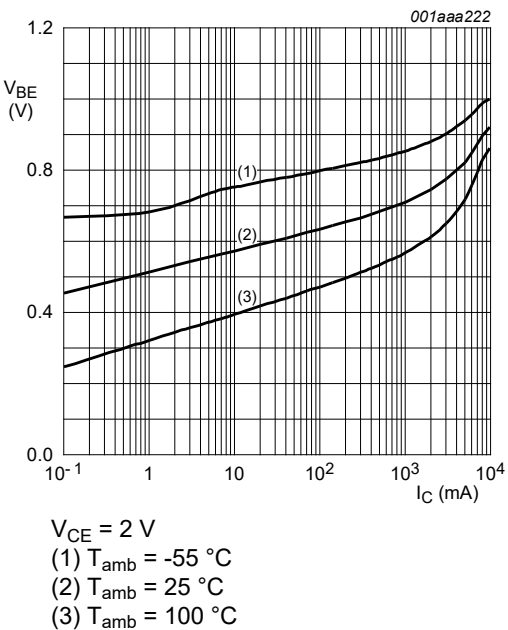


Fig. 6. Base-emitter voltage as a function of collector current; typical values

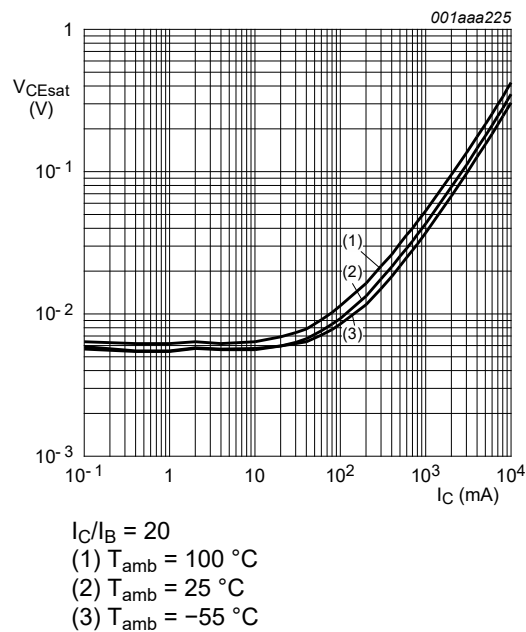


Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values

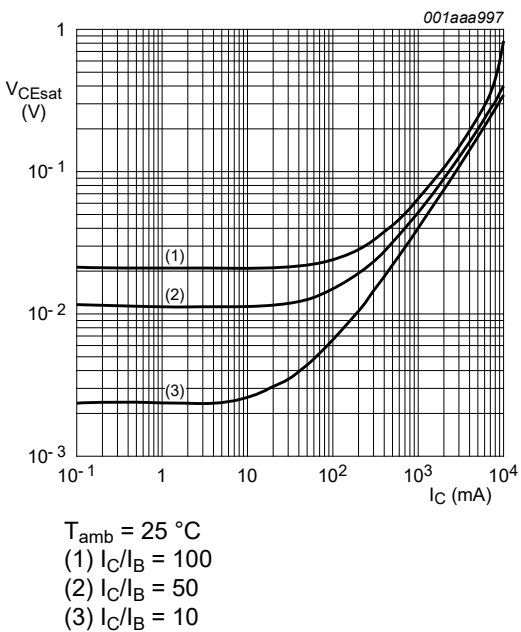


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

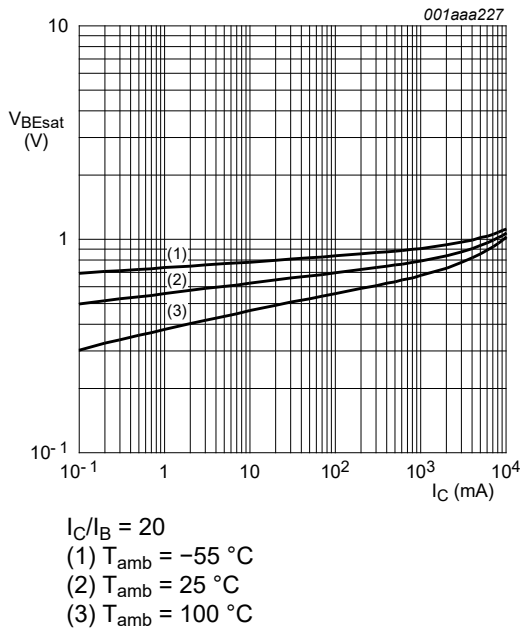


Fig. 9. Base-emitter saturation voltage as a function of collector current; typical values

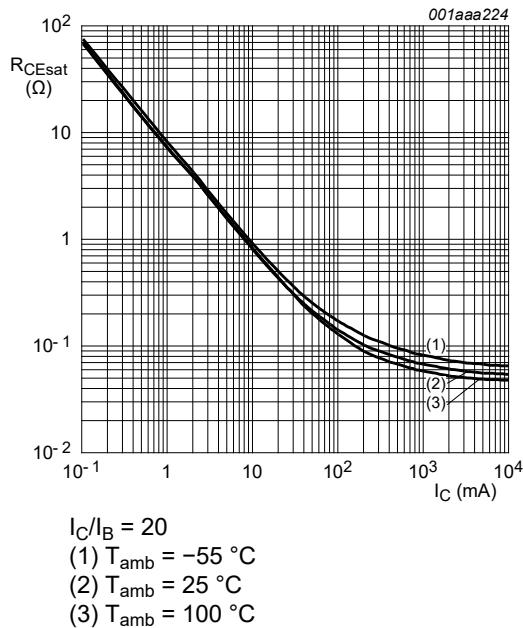


Fig. 10. Equivalent on-resistance as a function of collector current; typical values

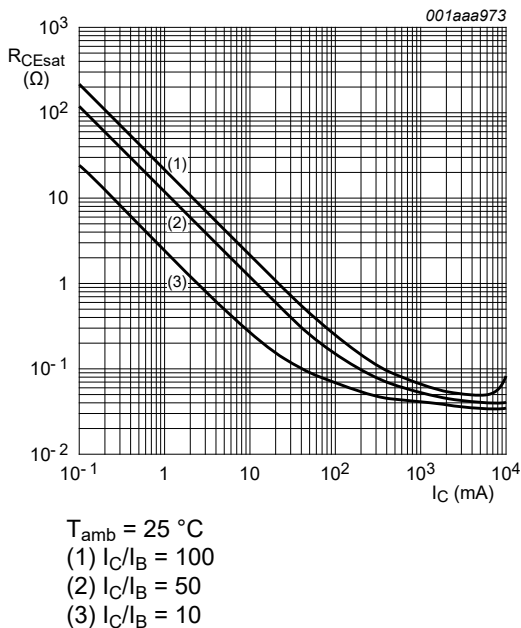


Fig. 11. Equivalent on-resistance as a function of collector current; typical values

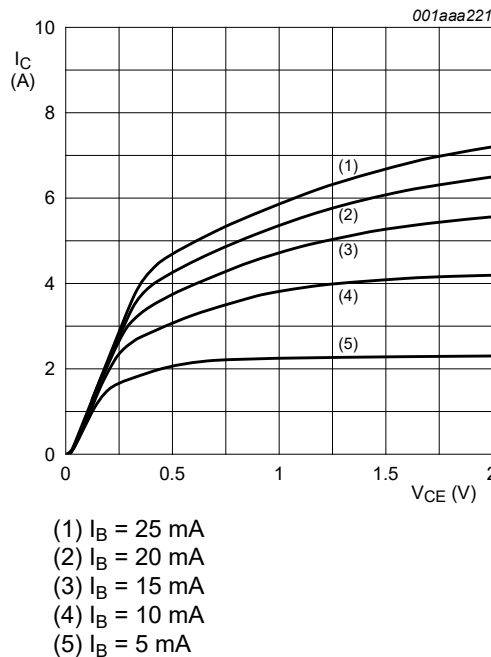
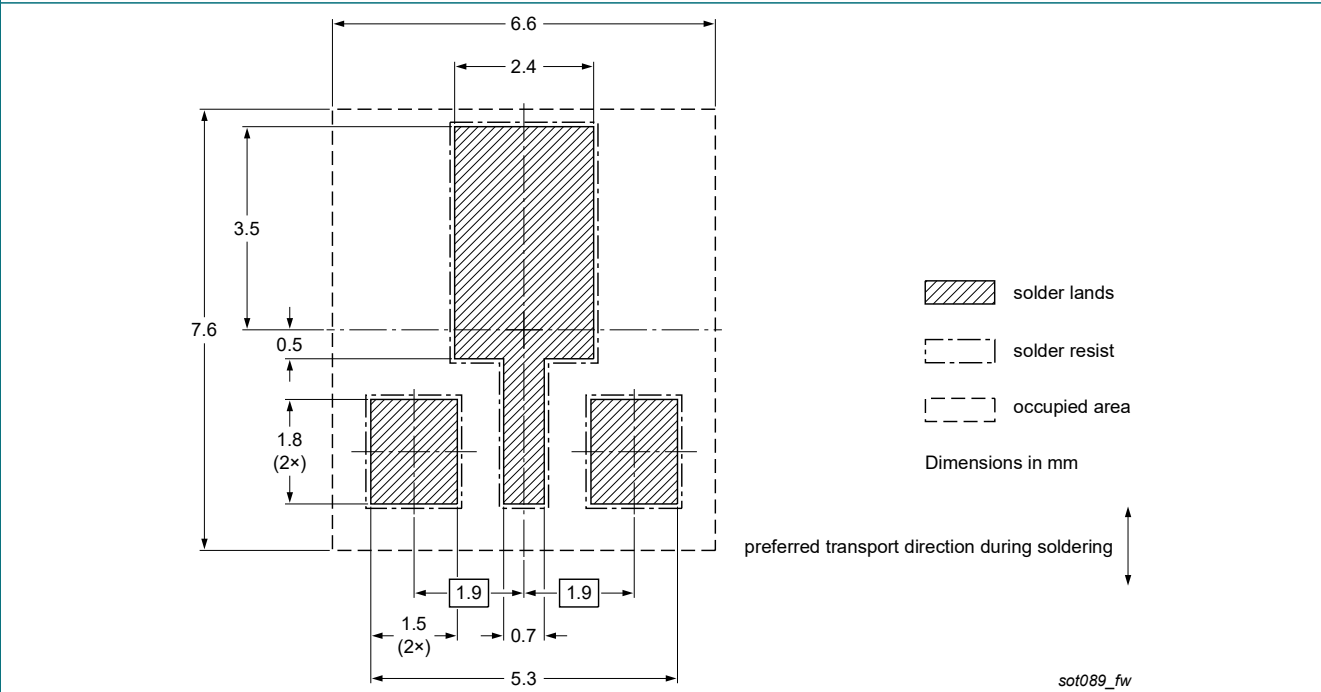
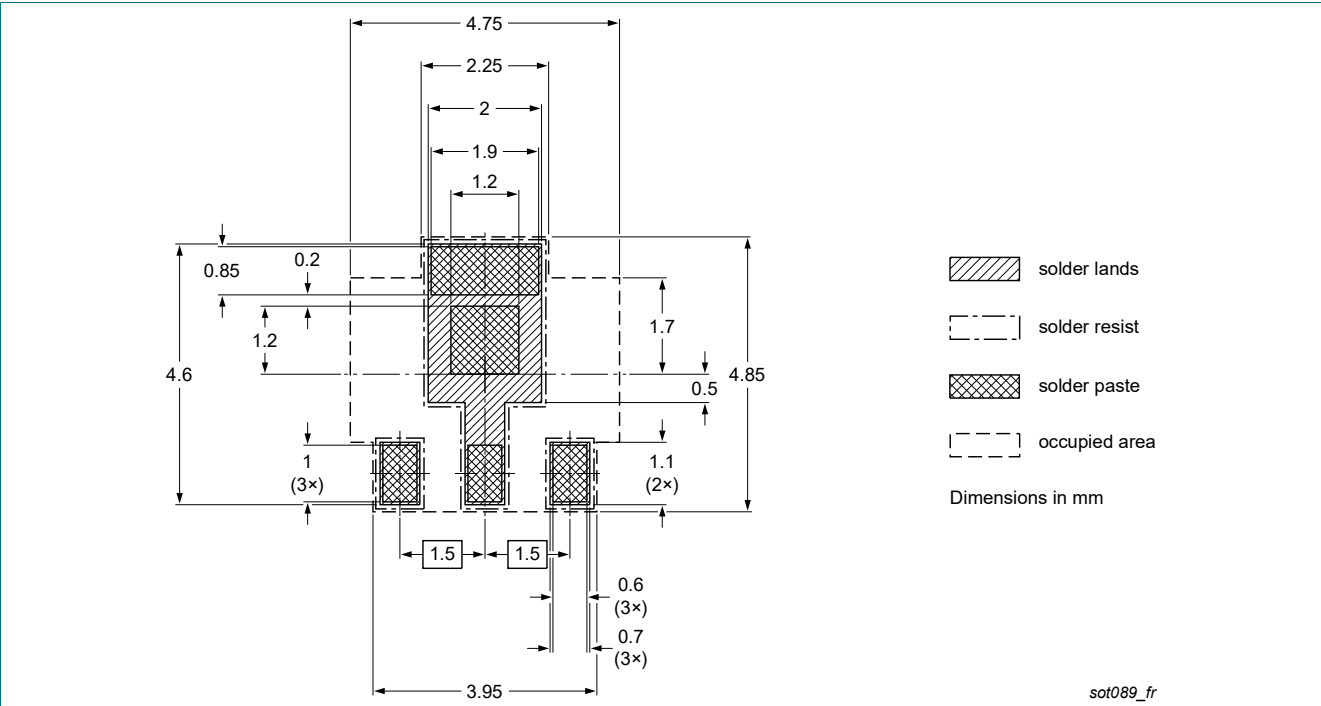


Fig. 12. Collector current as a function of collector-emitter voltage; typical values

11. Soldering



12. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4540X v.4	20251001	Product data sheet	-	PBSS4540X v.3
Modifications:	Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
PBSS4540X v.3	20200415	Product data sheet	-	PBSS4540X v.2
PBSS4540X v.2	20041104	Product data sheet	-	PBSS4540X v.1
PBSS4540X v.1	20040611	Product data sheet	-	-

13. 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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