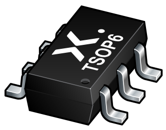


PBSS4350D

50 V low VCEsat NPN transistor

9 November 2023 **Product data sheet**

1. General description

NPN low V_{CEsat} transistor in a SOT457 (SC-74) plastic package.

PNP complement: PBSS5350D

2. Features and benefits

- Low collector-emitter saturation voltage
- High current capability
- Improved device reliability due to reduced heat generation
- Replacement for SOT89/SOT223 standard packaged transistors due to enhanced performance.
- AEC-Q101 qualified

3. Applications

- Supply line switching circuits
- Battery management applications
- DC/DC convertor applications
- Strobe flash units
- Heavy duty battery powered equipment (motor and lamp drivers)

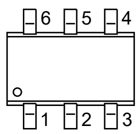
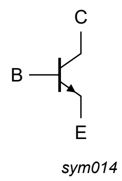
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	50	V
I_{CM}	peak collector current	single pulse; $t_p \leq$ 1 ms		-	-	5	A
R_{CEsat}	collector-emitter saturation resistance	I_C = 2 A; I_B = 200 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	110	145	mΩ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	C	collector	 TSOP6 (SOT457)	
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
PBSS4350D	TSOP6	plastic, surface-mounted package (SC-74; TSOP6); 6 leads	SOT457

7. Marking

Table 4. Marking codes

Type number	Marking code
PBSS4350D	43

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		-	60	V
V_{CEO}	collector-emitter voltage	open base		-	50	V
V_{EBO}	emitter-base voltage	open collector		-	6	V
I_C	collector current			-	3	A
I_{CM}	peak collector current	single pulse; $t_p \leq$ 1 ms		-	5	A
I_{BM}	peak base current			-	1	mA
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °C	[1]	-	600	mW
			[2]	-	750	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, mounting pad for collector 1 cm^2.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm^2.

9. Thermal characteristics

Table 6. Thermal characteristics

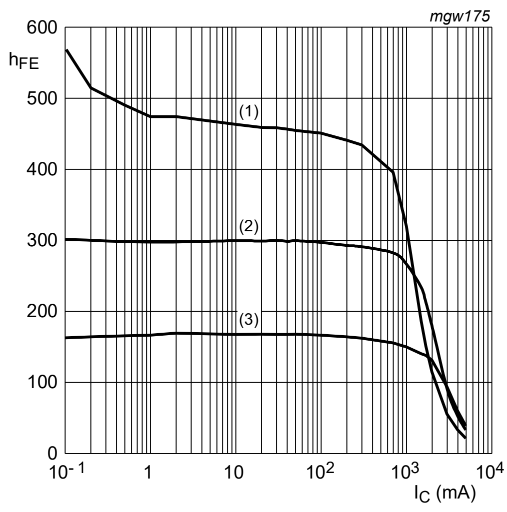
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	208	K/W
			[2]	-	-	160	K/W

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

10. Characteristics

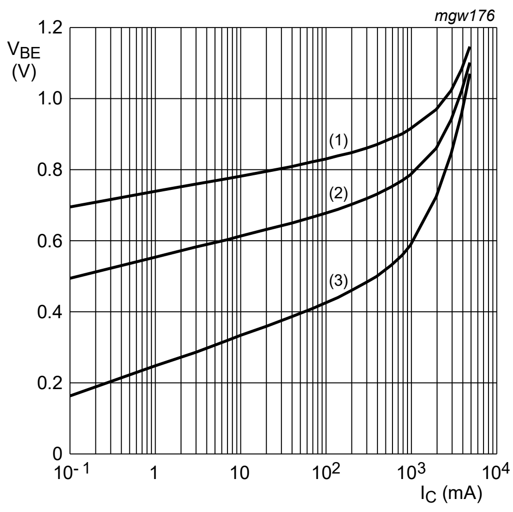
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = 50 V; I_E = 0 A; T_{amb} = 25 °C	-	-	100	nA
		V_{CB} = 50 V; I_E = 0 A; T_j = 150 °C	-	-	50	µA
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 = 500 mA; T_{amb} = 25 °C	200	-	-	
		V_{CE} = 2 V; I_C = 1 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	200	-	-	
		V_{CE} = 2 V; I_C = 2 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	100	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = 500 mA; I_B = 50 mA; T_{amb} = 25 °C	-	-	90	mV
		I_C = 1 A; I_B = 50 mA; T_{amb} = 25 °C	-	-	170	mV
		I_C = 2 A; I_B = 200 mA; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	290	mV
R_{CEsat}	collector-emitter saturation resistance		-	110	145	mΩ
V_{BEsat}	base-emitter saturation voltage		-	-	1.2	V
V_{BEon}	base-emitter turn-on voltage	V_{CE} = 2 V; I_C = 1 A; pulsed; t_p ≤ 300 µs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	1.1	V
f_T	transition frequency	V_{CE} = 5 V; I_C = 100 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	-	-	30	pF



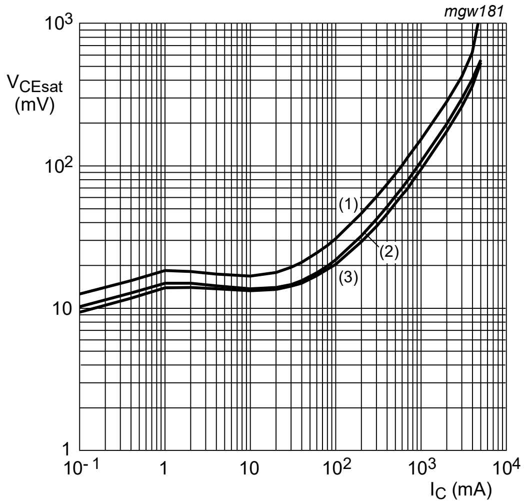
V_{CE} = 2 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 1. DC current gain; typical values



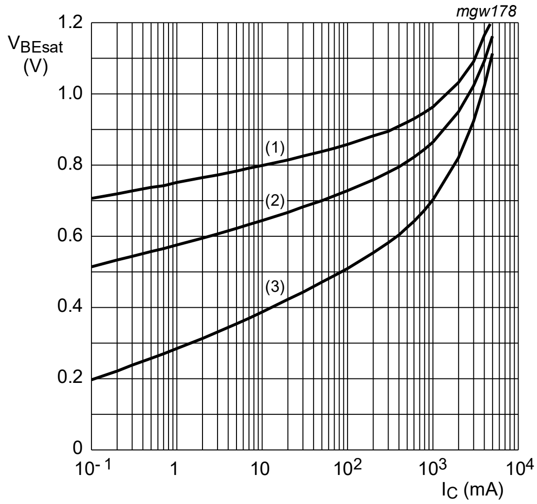
V_{CE} = 2 V
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 C
(3) T_{amb} = 150 °C

Fig. 2. Base-emitter voltage as a function of collector-current; typical values



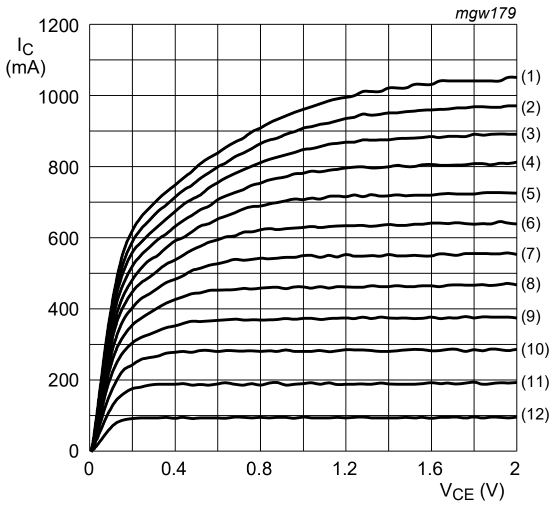
$I_C/I_B = 20$
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 3. Collector-emitter saturation as a function of collector current; typical values.



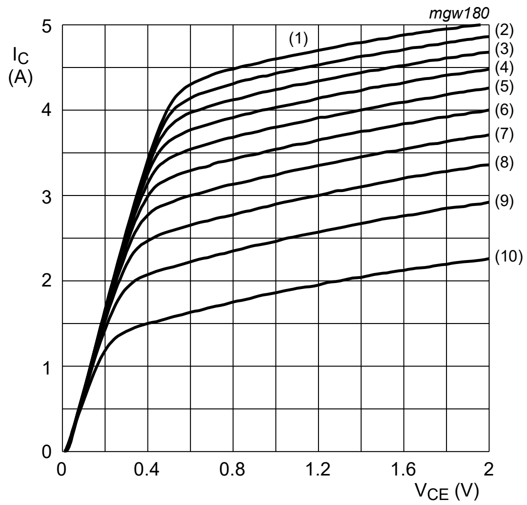
$I_C/I_B = 20$
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

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



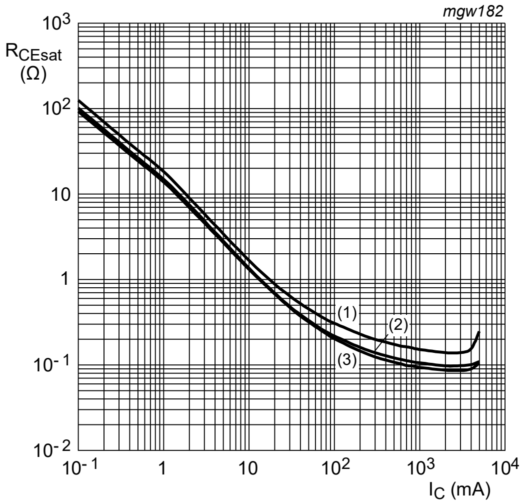
T_{amb} = 25 °C
(1) I_B = 3.96 mA
(2) I_B = 3.63 mA
(3) I_B = 3.30 mA
(4) I_B = 2.97 mA
(5) I_B = 2.64 mA
(6) I_B = 2.31 mA
(7) I_B = 1.98 mA
(8) I_B = 1.65 mA
(9) I_B = 1.32 mA
(10) I_B = 0.99 mA
(11) I_B = 0.66 mA
(12) I_B = 0.33 mA

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



T_{amb} = 25 °C
(1) I_B = 150 mA
(2) I_B= 135 mA
(3) I_B = 120 mA
(4) I_B = 105 mA
(5) I_B = 90 mA
(6) I_B = 75 mA
(7) I_B = 60 mA
(8) I_B = 45 mA
(9) I_B = 30 mA
(10) I_B = 15 mA

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



$I_C/I_B = 20$
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 7. Collector-emitter equivalent on-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

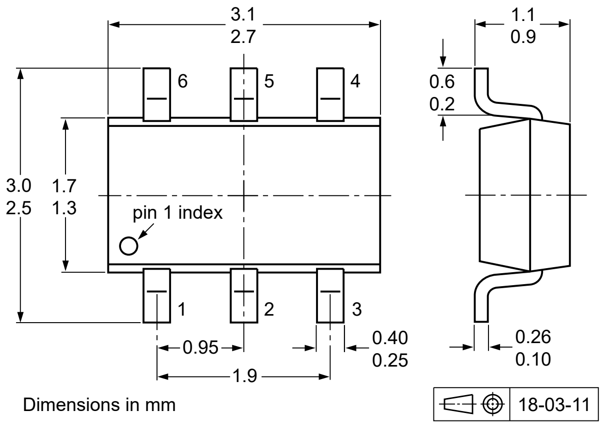


Fig. 8. Package outline TSOP6 (SOT457)

13. Soldering

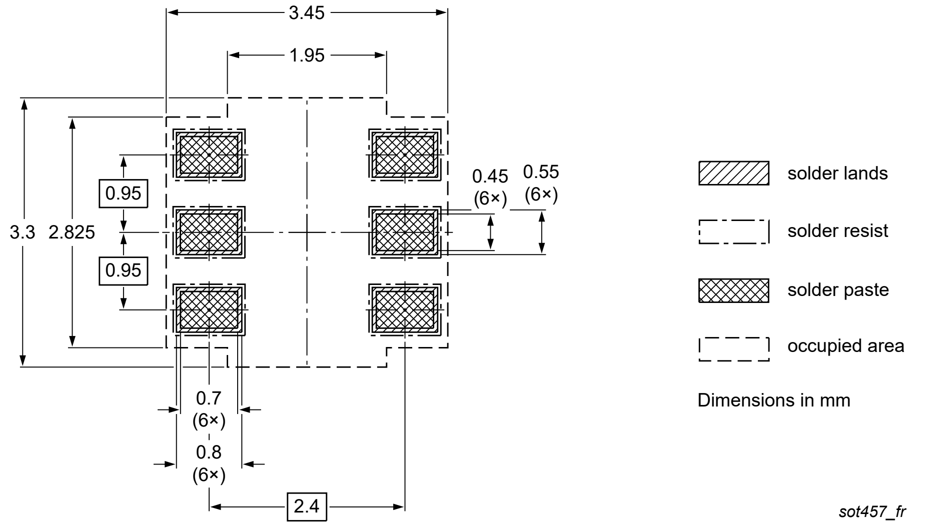


Fig. 9. Reflow soldering footprint for TSOP6 (SOT457)

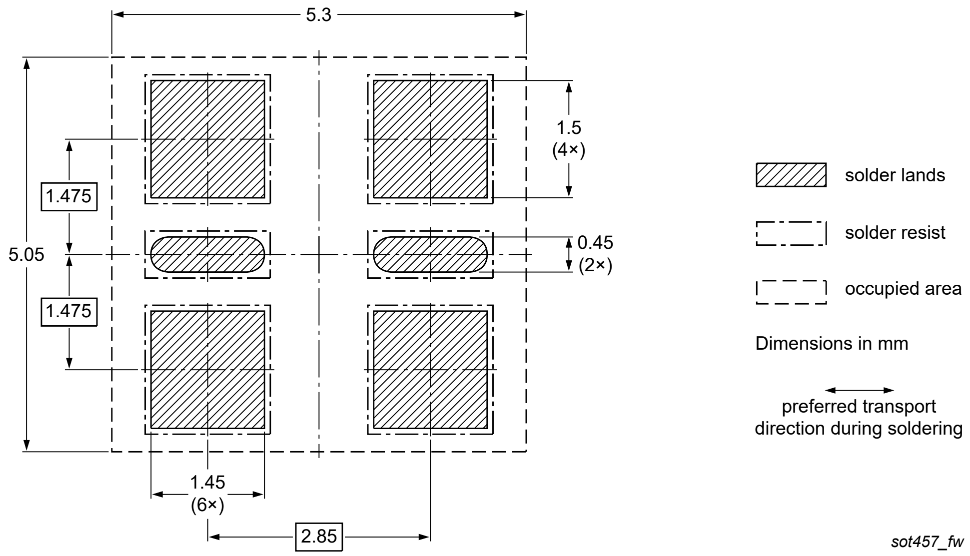


Fig. 10. Wave soldering footprint for TSOP6 (SOT457)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4350D v.3	20231109	Product data sheet	-	PBSS4350D v.2
Modifications:	• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate.			
PBSS4350D v.2	20010613	Product data sheet	-	PBSS4350D v.1
PBSS4350D v.1	20010126	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.

[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".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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Date of release: 9 November 2023