



**THE DATASHEET OF  
PBSS4350D,125**





# PBSS4350D

50 V low  $V_{CEsat}$  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; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_{amb} = 25$ °C	-	110	145	m $\Omega$

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	C	collector	<p>TSOP6 (SOT457)</p>	<p>sym014</p>
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
<a href="#">PBSS4350D</a>	TSOP6	plastic, surface-mounted package (SC-74; TSOP6); 6 leads	<a href="#">SOT457</a>

## 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<sup>2</sup>.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.

## 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

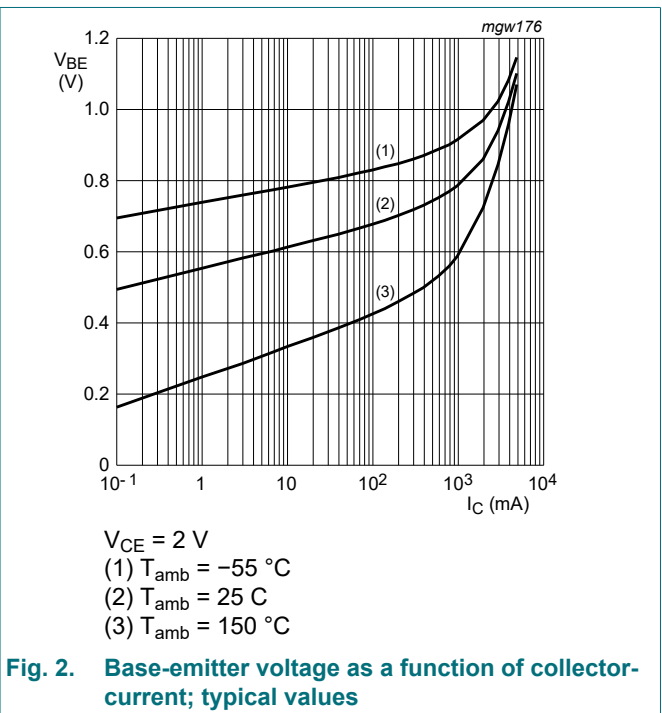
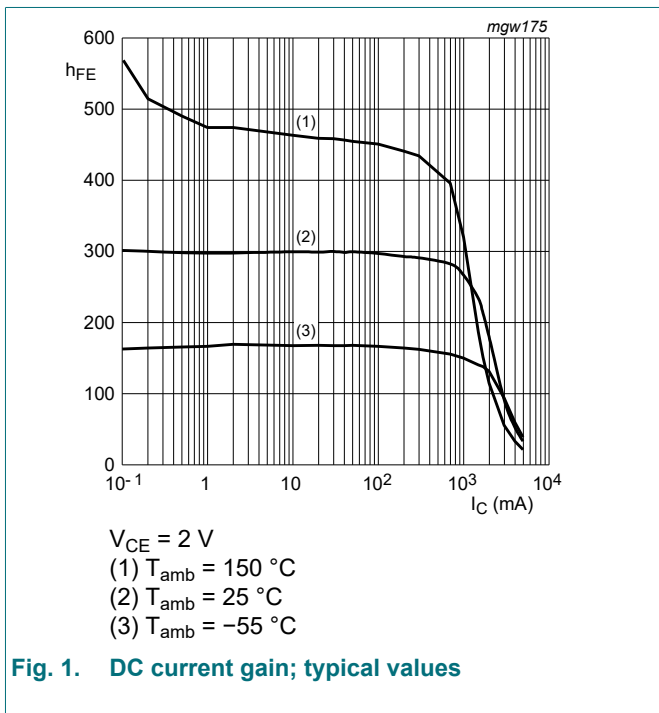
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

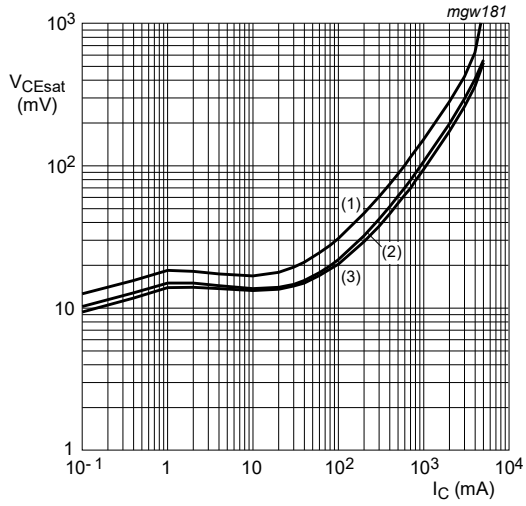
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.

## 10. Characteristics

Table 7. Characteristics

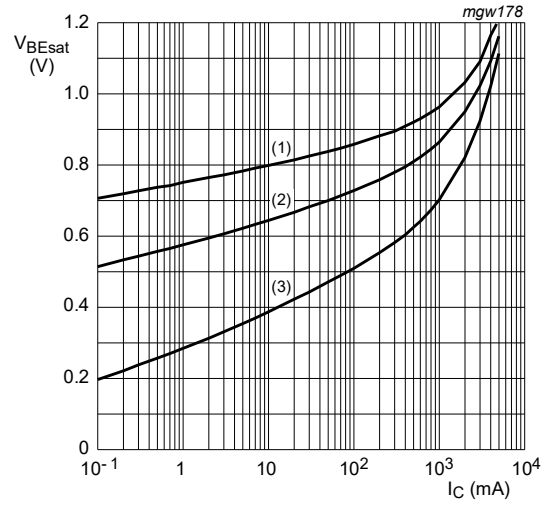
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 50\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	100	nA
		$V_{CB} = 50\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	-	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	200	-	-	
		$V_{CE} = 2\text{ V}; I_C = 1\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	200	-	-	
		$V_{CE} = 2\text{ V}; I_C = 2\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	100	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	90	mV
		$I_C = 1\text{ A}; I_B = 50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	170	mV
		$I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	290	mV
$R_{CEsat}$	collector-emitter saturation resistance		-	110	145	$\text{m}\Omega$
$V_{BEsat}$	base-emitter saturation voltage		-	-	1.2	V
$V_{BEon}$	base-emitter turn-on voltage	$V_{CE} = 2\text{ V}; I_C = 1\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	1.1	V
$f_T$	transition frequency	$V_{CE} = 5\text{ V}; I_C = 100\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	100	-	-	MHz
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	30	$\text{pF}$





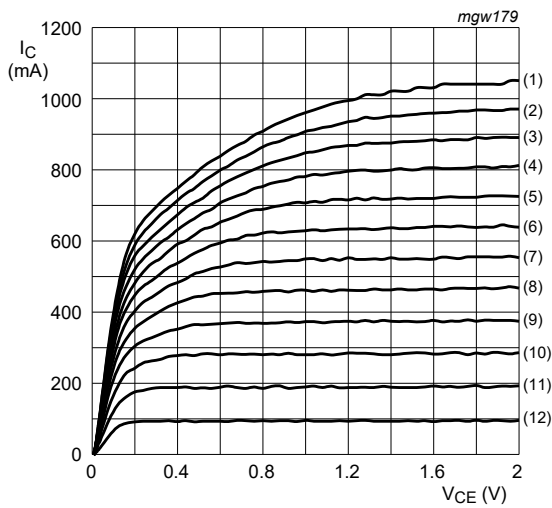
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ }^\circ\text{C}$   
 (2)  $T_{amb} = 25\text{ }^\circ\text{C}$   
 (3)  $T_{amb} = -55\text{ }^\circ\text{C}$

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



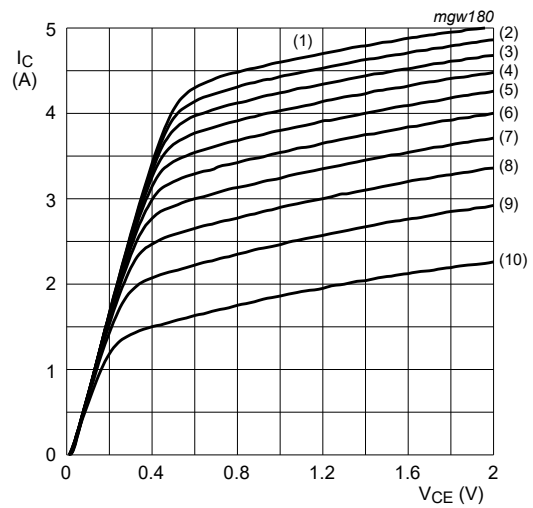
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ }^\circ\text{C}$   
 (2)  $T_{amb} = 25\text{ }^\circ\text{C}$   
 (3)  $T_{amb} = -55\text{ }^\circ\text{C}$

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



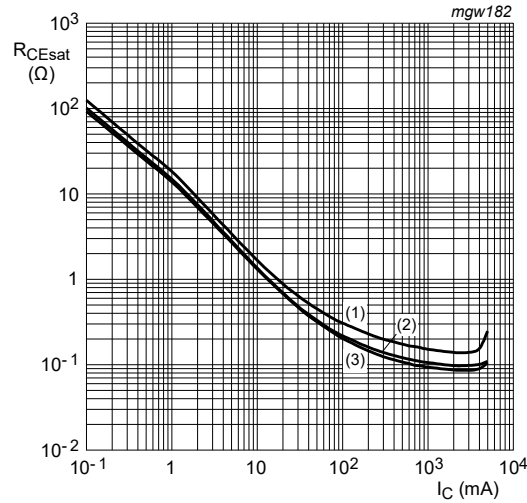
$T_{amb} = 25\text{ }^\circ\text{C}$   
 (1)  $I_B = 3.96\text{ mA}$   
 (2)  $I_B = 3.63\text{ mA}$   
 (3)  $I_B = 3.30\text{ mA}$   
 (4)  $I_B = 2.97\text{ mA}$   
 (5)  $I_B = 2.64\text{ mA}$   
 (6)  $I_B = 2.31\text{ mA}$   
 (7)  $I_B = 1.98\text{ mA}$   
 (8)  $I_B = 1.65\text{ mA}$   
 (9)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

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



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

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



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

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

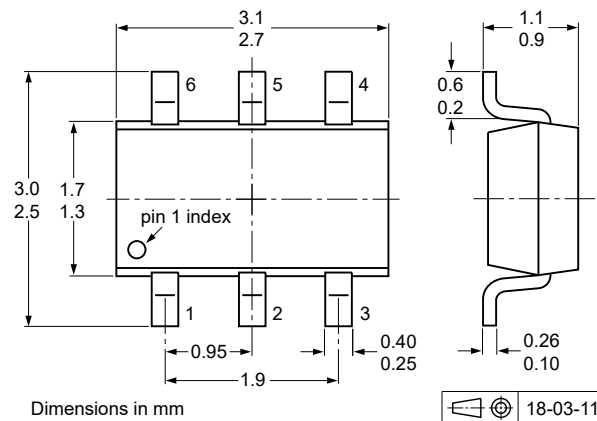


Fig. 8. Package outline TSOP6 (SOT457)

### 13. Soldering

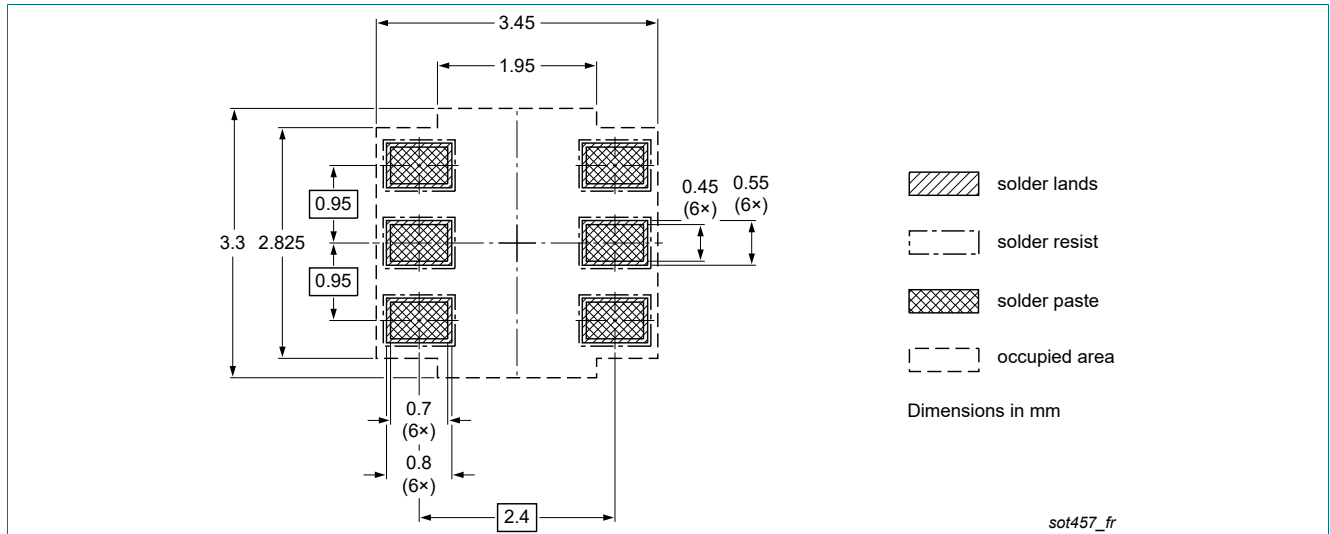


Fig. 9. Reflow soldering footprint for TSOP6 (SOT457)

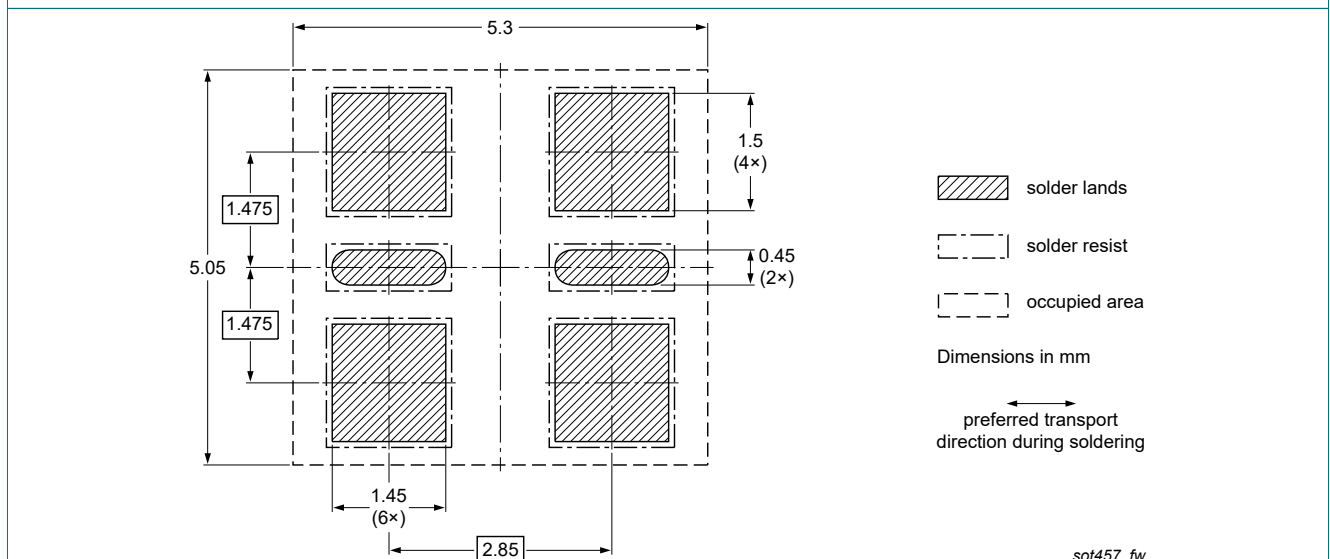


Fig. 10. Wave soldering footprint for TSOP6 (SOT457)

## 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:	<ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li></ul>			
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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