

PBSS8110D

100 V, 1 A NPN low V_{CEsat} (BISS) transistor

Rev. 02 — 11 December 2009

Product data sheet

1. Product profile

1.1 General description

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

1.2 Features

- 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

1.3 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)

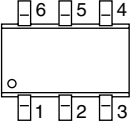
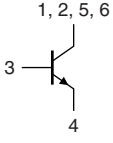
1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage		-	-	100	V
I_C	collector current (DC)		-	-	1	A
I_{CM}	peak collector current		-	-	3	A
R_{CEsat}	equivalent on-resistance		-	-	200	m Ω

2. Pinning information

Table 2. Discrete pinning

Pin	Description	Simplified outline	Symbol
1, 2, 5, 6	collector		 sym014
3	base		
4	emitter		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS8110D	-	plastic surface mounted package; 6 leads	SOT457

4. Marking

Table 4. Marking

Type number	Marking code ^[1]
PBSS8110D	A8

[1] Made in Malaysia

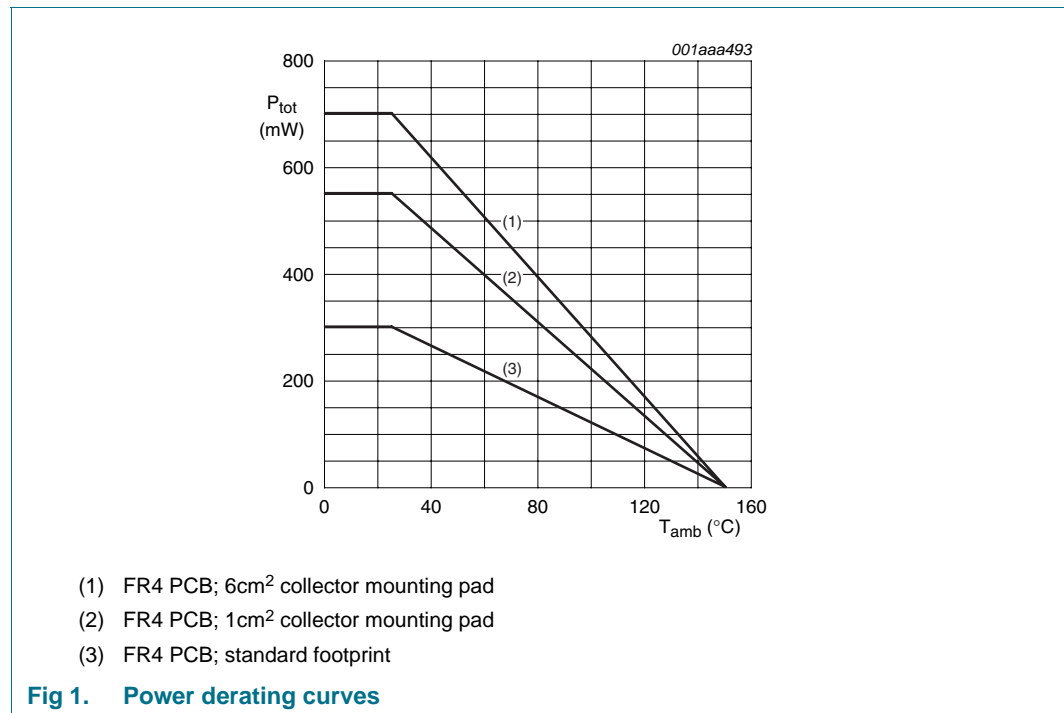
5. Limiting values

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

- [1] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, standard footprint.
- [2] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 1cm² collector mounting pad.
- [3] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 6cm² collector mounting pad.

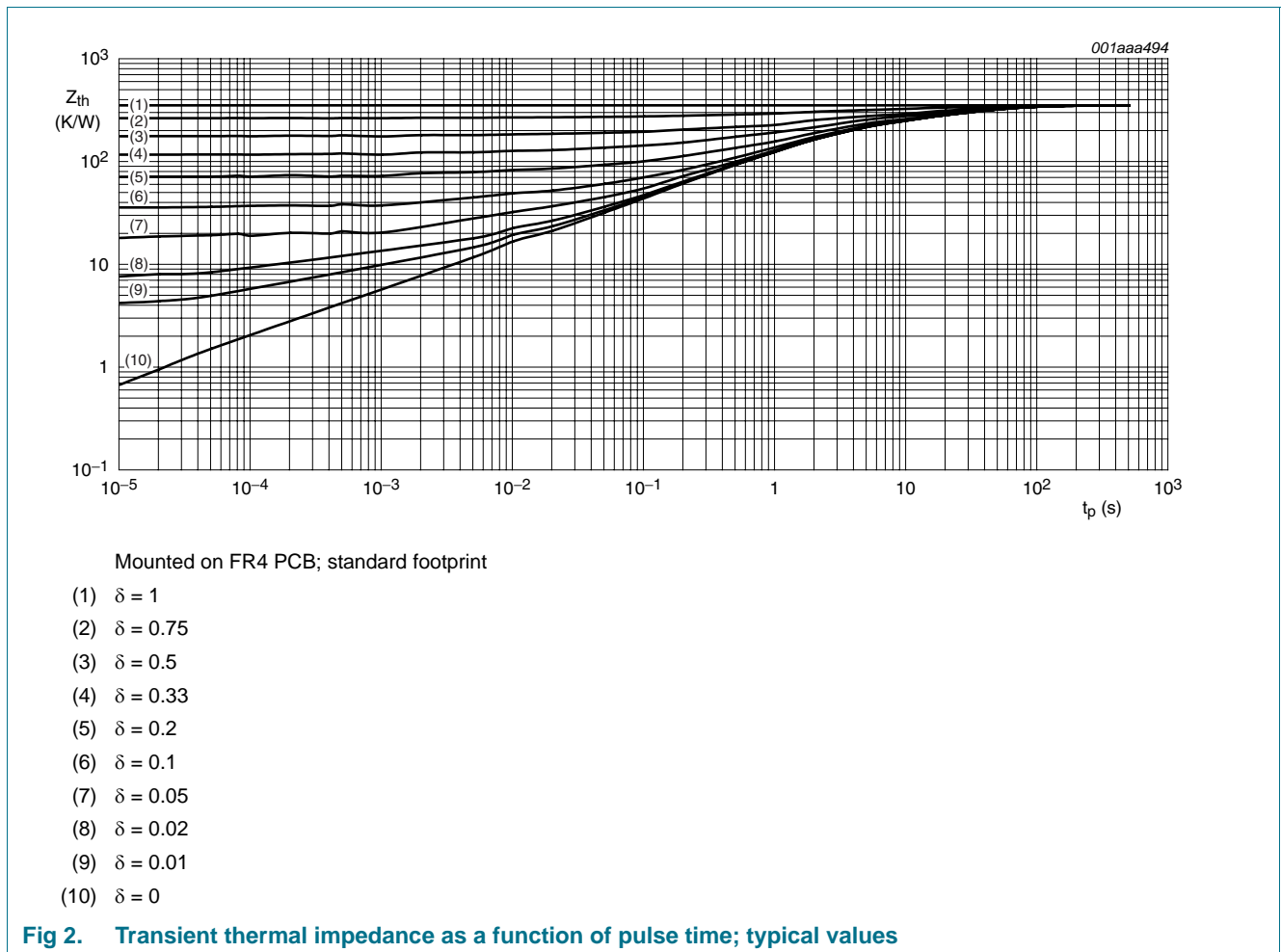


6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Typ	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
$R_{th(j-s)}$	thermal resistance from junction to soldering point	in free air	[1]	83	K/W

- [1] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, standard footprint.
- [2] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 1 cm² collector mounting pad.
- [3] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 6 cm² collector mounting pad.



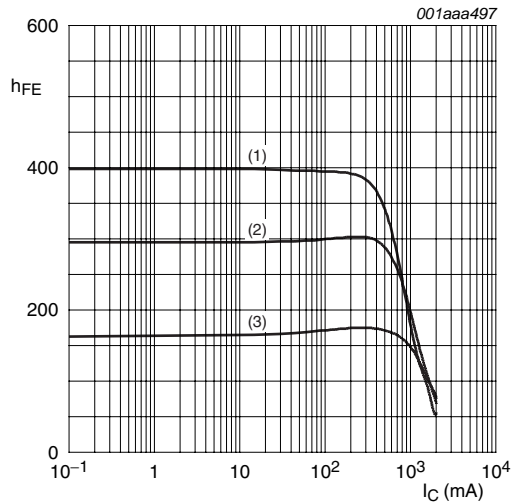
7. Characteristics

Table 7. Characteristics

$T_j = 25\text{ °C}$ unless otherwise specified.

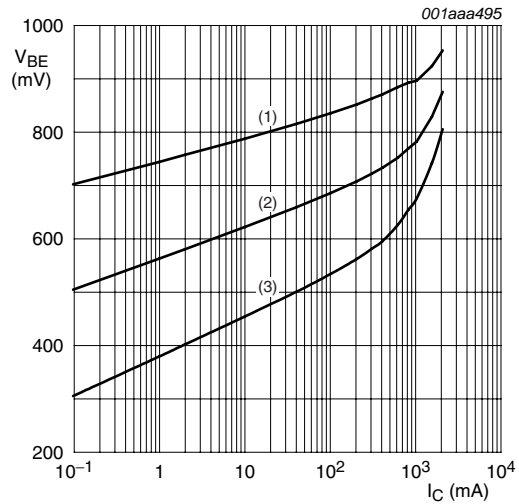
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
I_{CBO}	collector-base cut-off current	$V_{CB} = 80\text{ V}; I_E = 0\text{ A}$	-	-	100	nA	
		$V_{CB} = 80\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$	-	-	50	μA	
I_{CES}	collector-emitter cut-off current	$V_{CE} = 80\text{ V}; V_{BE} = 0\text{ V}$	-	-	100	nA	
I_{EBO}	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}$	-	-	100	nA	
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}; I_C = 1\text{ mA}$	150	-	-		
		$V_{CE} = 10\text{ V}; I_C = 250\text{ mA}$	150	-	500		
		$V_{CE} = 10\text{ V}; I_C = 0.5\text{ A}$	[1]	100	-	-	
		$V_{CE} = 10\text{ V}; I_C = 1\text{ A}$	[1]	80	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 10\text{ mA}$	-	-	40	mV	
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	-	-	120	mV	
		$I_C = 1\text{ A}; I_B = 100\text{ mA}$	-	-	200	mV	
R_{CEsat}	equivalent on-resistance	$I_C = 1\text{ A}; I_B = 100\text{ mA}$	[1]	160	200	$\text{m}\Omega$	
V_{BEsat}	base-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 100\text{ mA}$	-	-	1.05	V	
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = 10\text{ V}; I_C = 1\text{ A}$	-	-	0.9	V	
f_T	transition frequency	$V_{CE} = 10\text{ V}; I_C = 50\text{ mA}; f = 100\text{ MHz}$	100	-	-	MHz	
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0\text{ A}; f = 1\text{ MHz}$	-	-	7.5	pF	

[1] Pulse test $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.



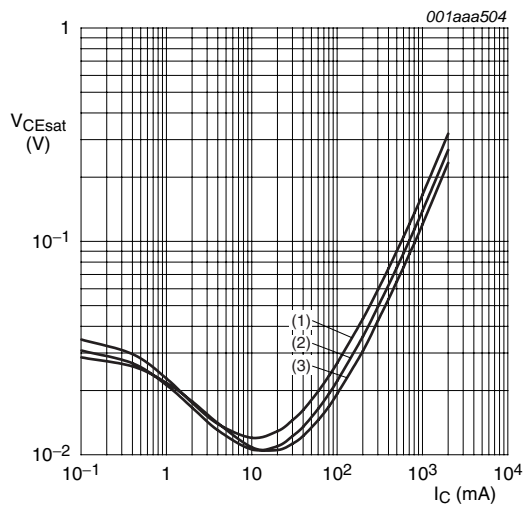
$V_{CE} = 10\text{ V}$
 (1) $T_{amb} = 100\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

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



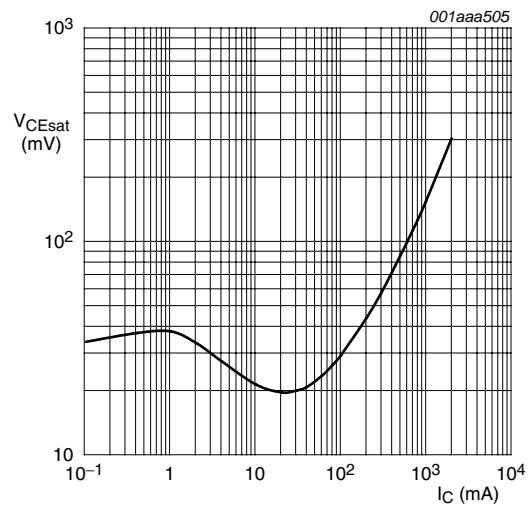
$V_{CE} = 10\text{ V}$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 100\text{ }^\circ\text{C}$

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



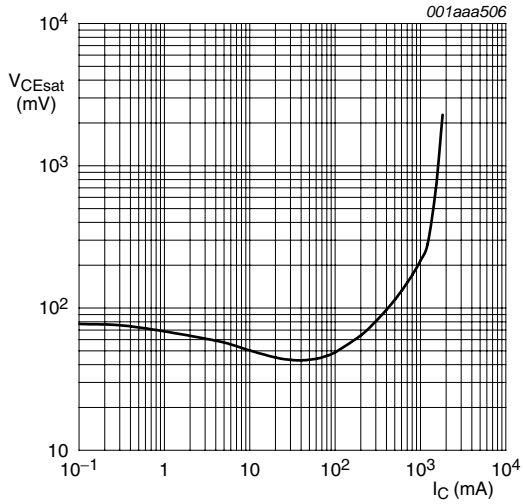
$I_C/I_B = 10$
 (1) $T_{amb} = 100\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

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



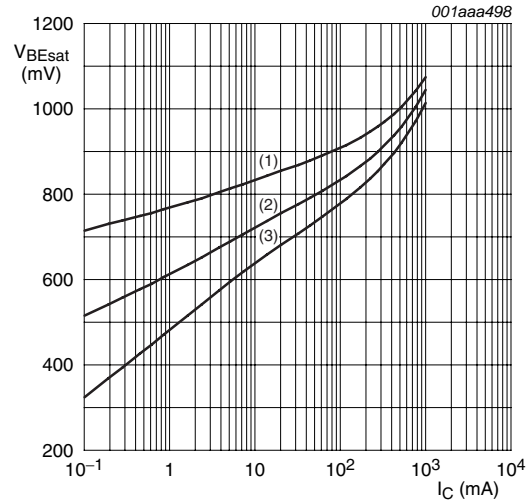
$I_C/I_B = 20; T_{amb} = 25\text{ }^\circ\text{C}$

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



$I_C/I_B = 50$; $T_{amb} = 25\text{ }^\circ\text{C}$

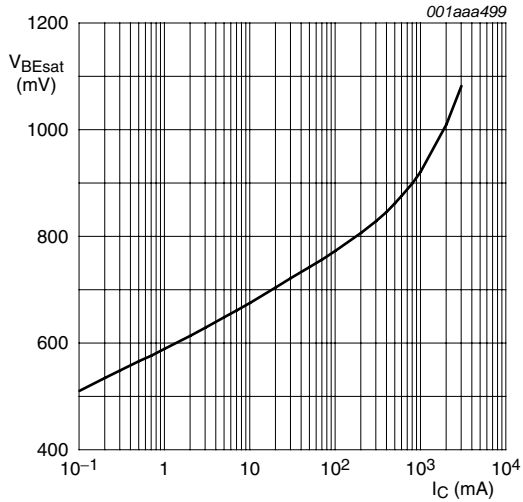
Fig 7. Collector-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 10$

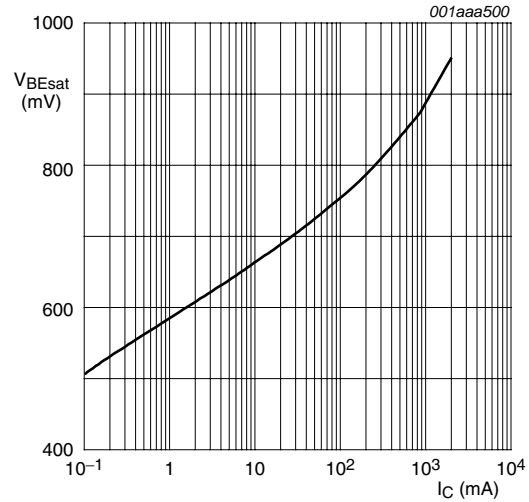
- (1) $T_{amb} = -55\text{ }^\circ\text{C}$
- (2) $T_{amb} = 25\text{ }^\circ\text{C}$
- (3) $T_{amb} = 100\text{ }^\circ\text{C}$

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



$I_C/I_B = 20$; $T_{amb} = 25\text{ }^\circ\text{C}$

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



$I_C/I_B = 50$; $T_{amb} = 25\text{ }^\circ\text{C}$

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

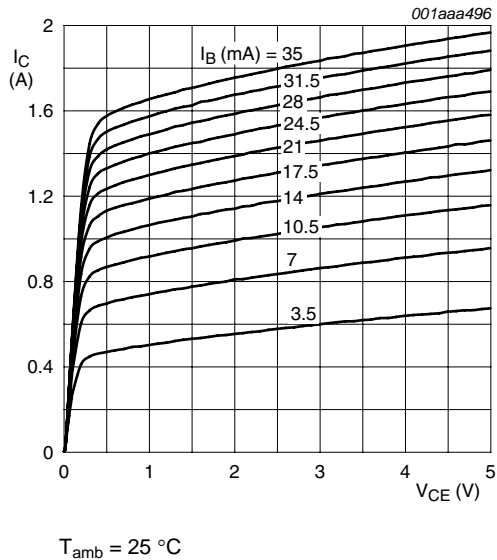


Fig 11. Collector current as a function of collector-emitter voltage; typical values

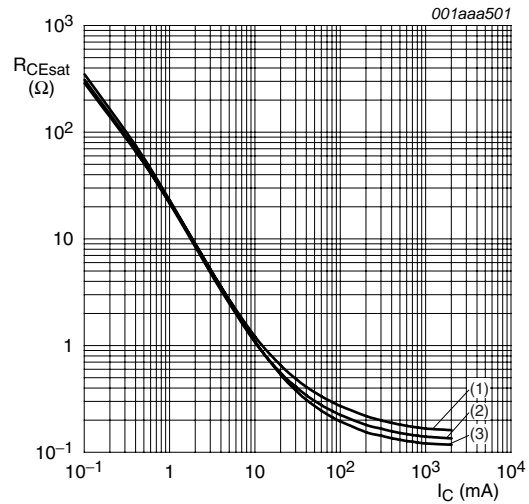


Fig 12. Equivalent on-resistance as a function of collector current; typical values

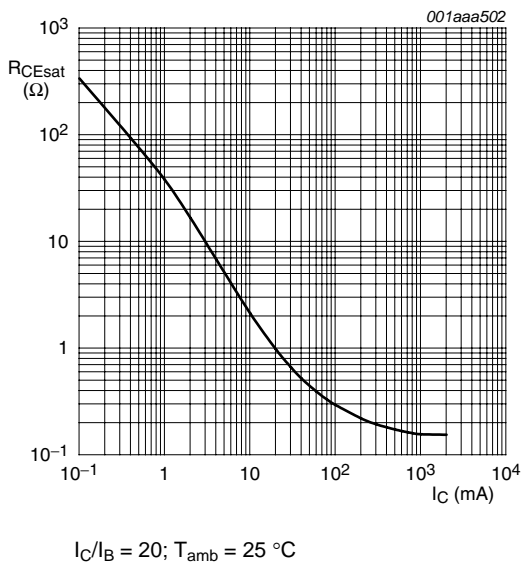


Fig 13. Equivalent on-resistance as a function of collector current; typical values

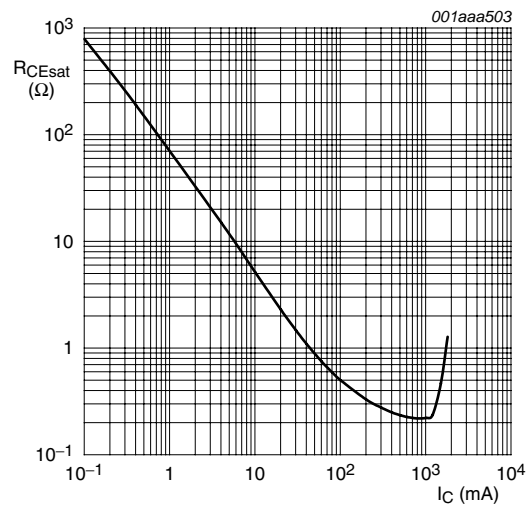


Fig 14. Equivalent on-resistance as a function of collector current; typical values

8. Package outline

Plastic surface-mounted package (TSOP6); 6 leads

SOT457

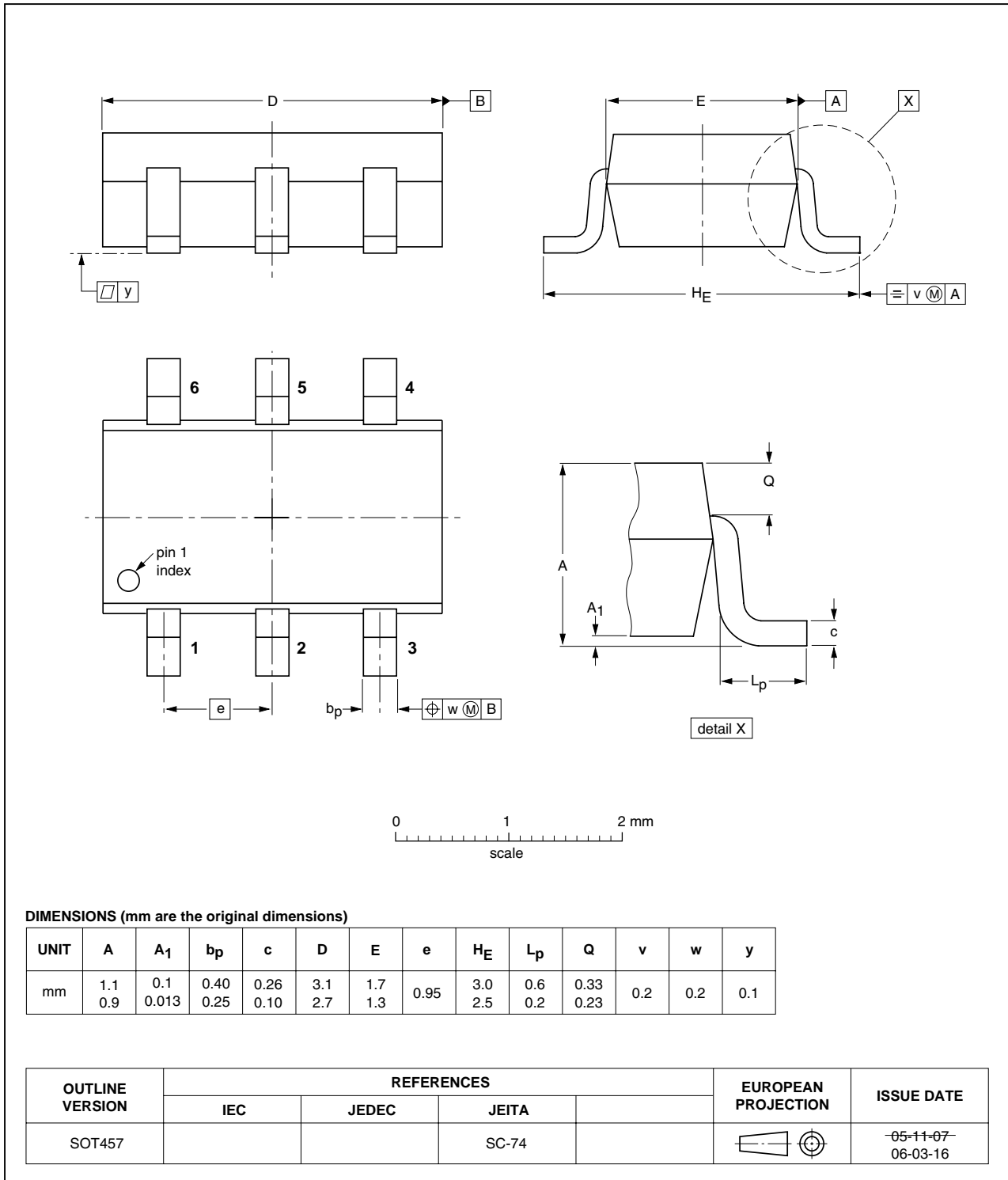


Fig 15. Package outline

9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PBSS8110D_2	20091211	Product data	-	PBSS8110D_1
Modifications:	<ul style="list-style-type: none"> • This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content. • Table 2 “Discrete pinning”: amended • Figure 3 “DC current gain as a function of collector current; typical values”: updated • Figure 11: updated • Figure 15 “Package outline”: updated 			
PBSS8110D_1	20040423	Product data	-	-

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10.1 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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12. Contents

1	Product profile	1
1.1	General description	1
1.2	Features	1
1.3	Applications	1
1.4	Quick reference data	1
2	Pinning information	2
3	Ordering information	2
4	Marking	2
5	Limiting values	3
6	Thermal characteristics	4
7	Characteristics	5
8	Package outline	9
9	Revision history	10
10	Legal information	11
10.1	Data sheet status	11
10.2	Definitions	11
10.3	Disclaimers	11
10.4	Trademarks	11
11	Contact information	11
12	Contents	12

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Date of release: 11 December 2009

Document identifier: PBSS8110D_2