

PBSS9110S

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

Rev. 03 — 22 November 2009

Product data sheet

1. Product profile

1.1 General description

PNP low V_{CEsat} transistor in a SOT54 (SC-43/TO-92) plastic package.

1.2 Features

- SOT54 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
- Peripheral driver:
 - ◆ Driver in low supply voltage applications (e.g. lamps and LEDs)
 - ◆ Inductive load driver (e.g. relays, buzzers and motors)
- DC-to-DC converter

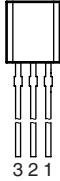
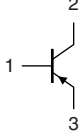
1.4 Quick reference data

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		-	-	320	m Ω

2. Pinning information

Table 2. Discrete pinning

Pin	Description	Simplified outline	Symbol
1	base		 sym029
2	collector		
3	emitter		

3. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
PBSS9110S	-	plastic single-ended leaded (through hole) package; 3 leads	SOT54

4. Marking

Table 4. Marking

Type number	Marking code
PBSS9110S	S9110S ^[1]

[1] Made in China

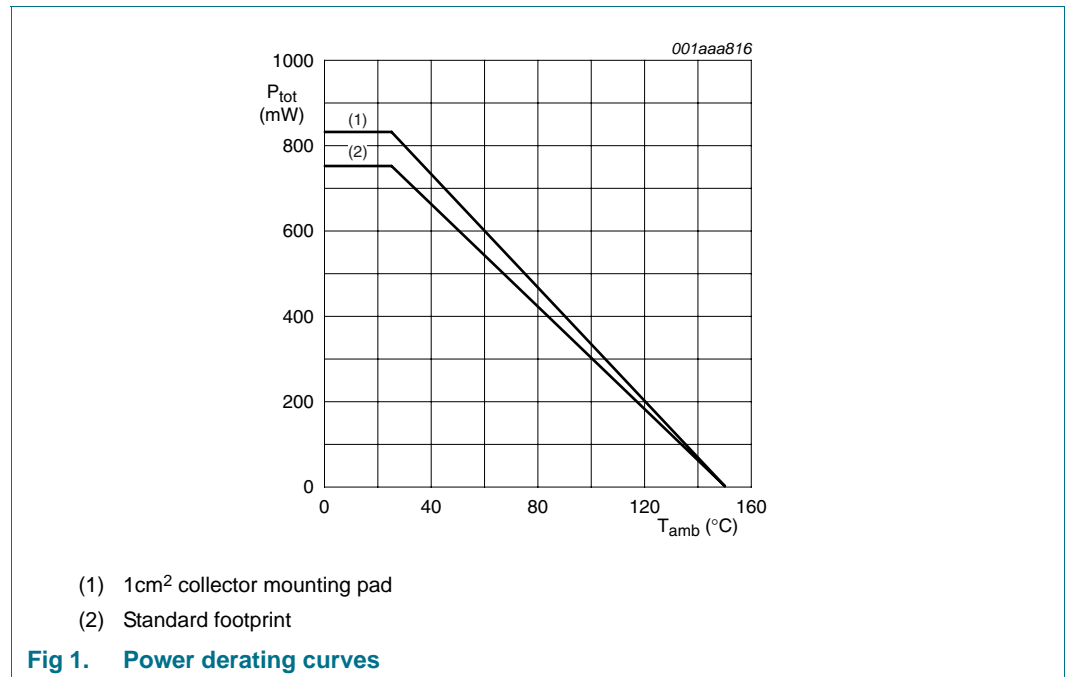
5. Limiting values

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	collector current (DC)		-	-1	A
I_B	base current (DC)		-	-0.3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$ [1]	-	830	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.

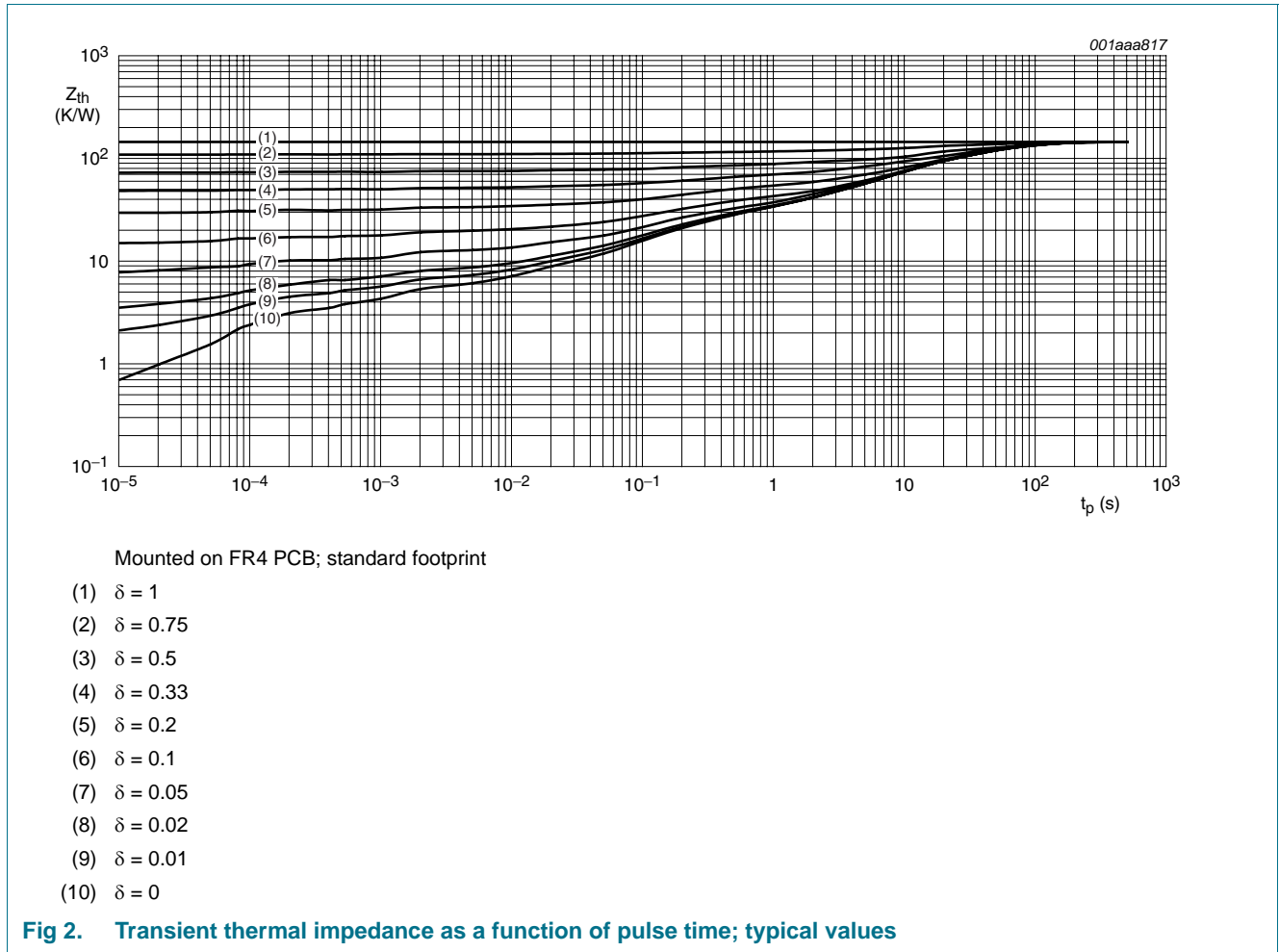


6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	150	K/W

[1] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, standard footprint.

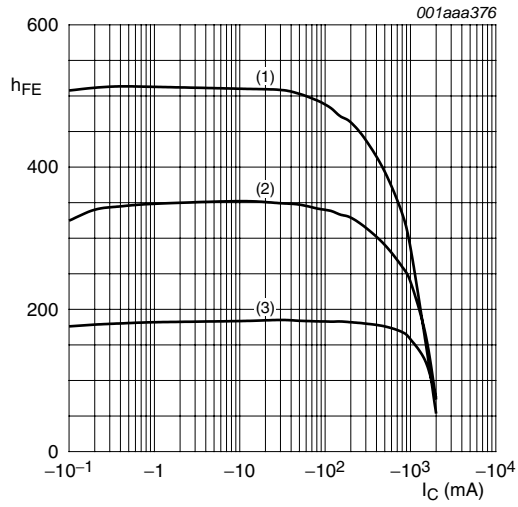


7. Characteristics

Table 7. Characteristics
 $T_{amb} = 25\text{ °C}$ unless otherwise specified.

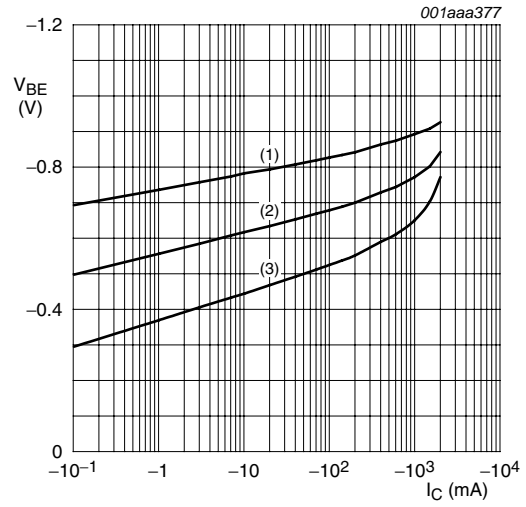
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = -80\text{ V}; I_E = 0\text{ A}$	-	-	-100	nA
		$V_{CB} = -80\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$	-	-	-50	μA
I_{CES}	collector-emitter cut-off current	$V_{CE} = -80\text{ V}; V_{BE} = 0\text{ V}$	-	-	-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	$V_{CE} = -5\text{ V}; I_C = -1\text{ mA}$	150	-	-	
		$V_{CE} = -5\text{ V}; I_C = -250\text{ mA}$	150	-	-	
		$V_{CE} = -5\text{ V}; I_C = -0.5\text{ A}$ [1]	150	-	450	
		$V_{CE} = -5\text{ V}; I_C = -1\text{ A}$ [1]	125	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -250\text{ mA}; I_B = -25\text{ mA}$	-	-	-120	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}$	-	-	-180	mV
		$I_C = -1\text{ A}; I_B = -100\text{ mA}$	-	-	-320	mV
R_{CEsat}	equivalent on-resistance	$I_C = -1\text{ A}; I_B = -100\text{ mA}$ [1]	-	170	320	$\text{m}\Omega$
V_{BEsat}	base-emitter saturation voltage	$I_C = -1\text{ A}; I_B = -100\text{ mA}$	-	-	-1.1	V
V_{BEon}	base-emitter turn-on voltage	$I_C = -1\text{ A}; V_{CE} = -5\text{ V}$	-	-	-1.0	V
f_T	transition frequency	$I_C = -50\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$	100	-	-	MHz
C_c	collector capacitance	$I_E = I_e = 0\text{ A}; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$	-	-	17	pF

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



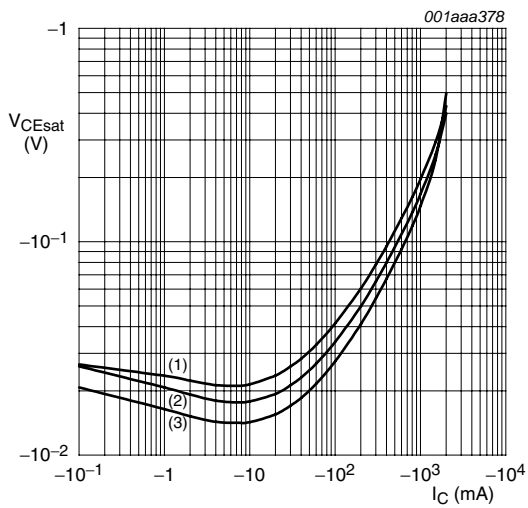
$V_{CE} = -10\text{ V}$
 (1) $T_{amb} = 100\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

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



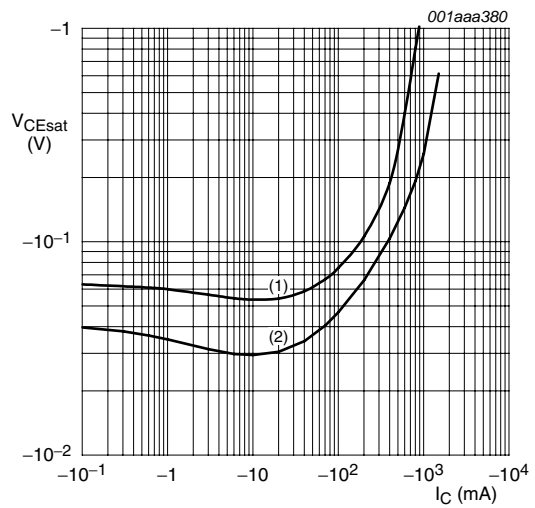
$V_{CE} = -10\text{ V}$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 100\text{ }^\circ\text{C}$

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



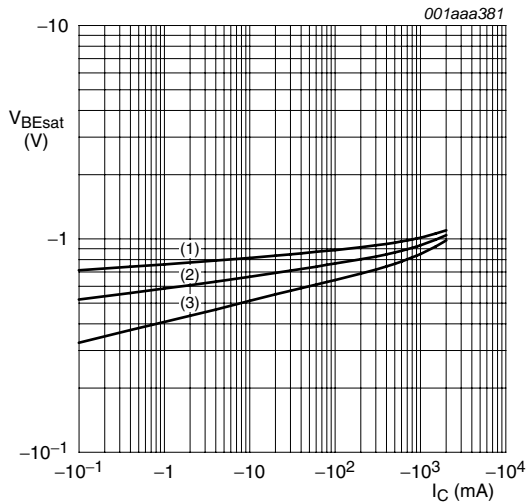
$I_C/I_B = 10$
 (1) $T_{amb} = 100\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

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



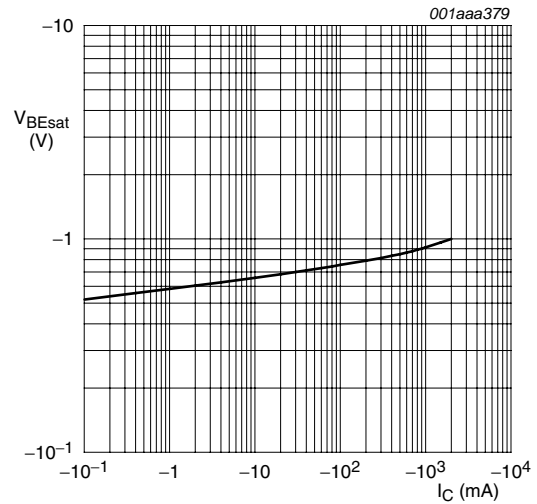
$T_{amb} = 25\text{ }^\circ\text{C}$
 (1) $I_C/I_B = 50$
 (2) $I_C/I_B = 20$

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



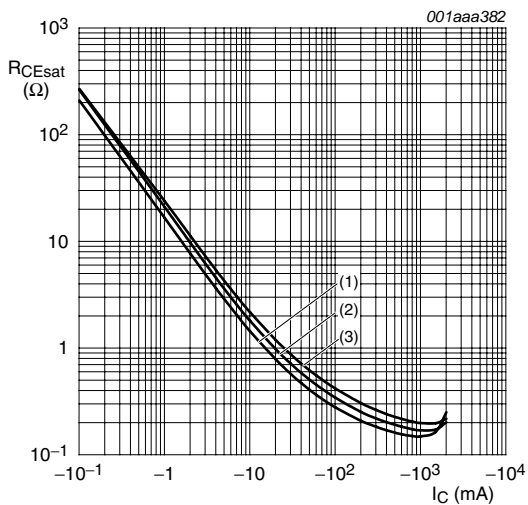
$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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



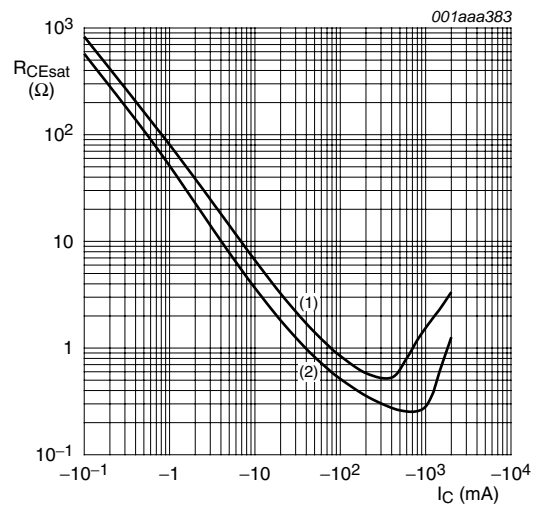
$I_C/I_B = 20$
 $T_{amb} = 25\text{ °C}$

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



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

Fig 9. Equivalent on-resistance as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$
 (1) $I_C/I_B = 50$
 (2) $I_C/I_B = 20$

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

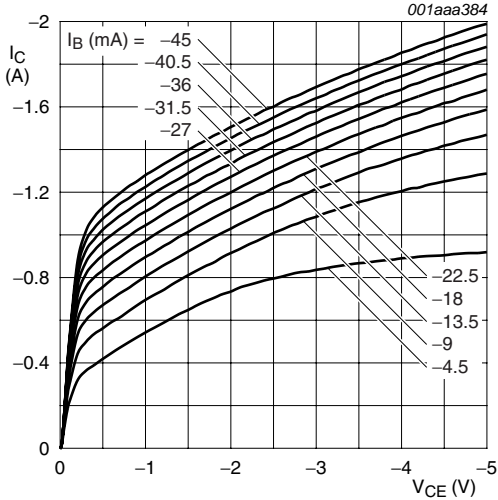


Fig 11. Collector current as a function of collector-emitter voltage; typical values

8. Package outline

Plastic single-ended leaded (through hole) package; 3 leads

SOT54

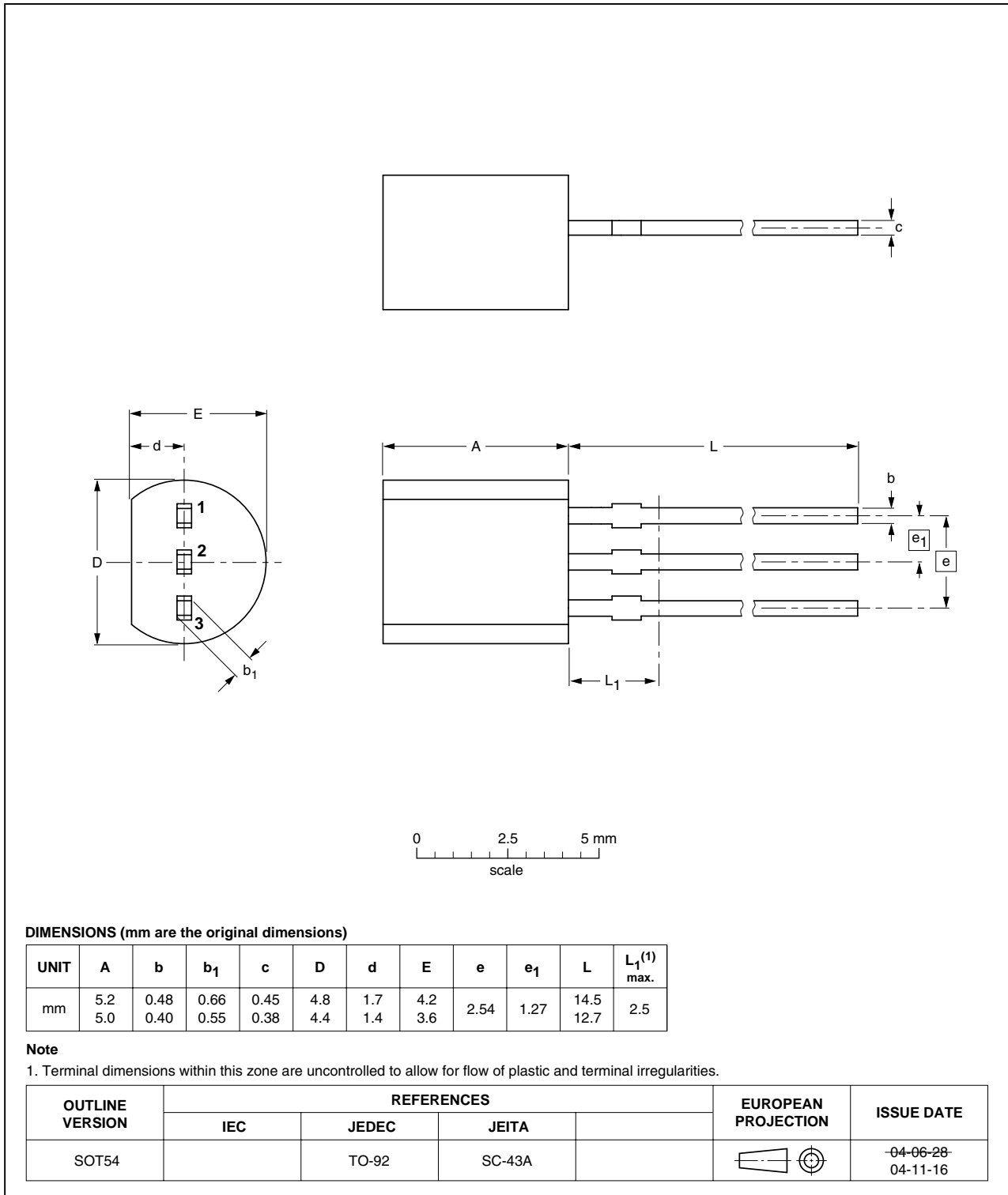


Fig 12. Package outline

9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PBSS9110S_3	20091122	Product data sheet	-	PBSS9110S_2
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 9 “Equivalent on-resistance as a function of collector current; typical values”: updated • Figure 10 “Equivalent on-resistance as a function of collector current; typical values”: updated • Figure 11 “Collector current as a function of collector-emitter voltage; typical values”: updated • Figure 12 “Package outline”: updated 			
PBSS9110S_2	20040810	Product data	-	PBSS9110S_1
PBSS9110S_1	20040607	Product data	-	-

10. Legal information

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.
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[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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