

PBSS9110Y

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

Rev. 02 — 22 November 2009

Product data sheet

1. Product profile

1.1 General description

PNP low V_{CEsat} transistor in a SOT363 (SC-88) plastic package.

1.2 Features

- SOT363 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

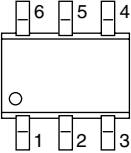
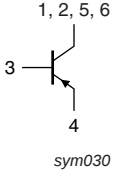
1.4 Quick reference data

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, 2, 5, 6	collector		 sym030
3	base		
4	emitter		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS9110Y	-	plastic surface mounted package; 6 leads	SOT363

4. Marking

Table 4. Marking

Type number	Marking code
PBSS9110Y	91*[1]

[1] * = p: made in Hong Kong
* = t: made in Malaysia
* = W: made in China

5. Limiting values

Table 5. Limiting values

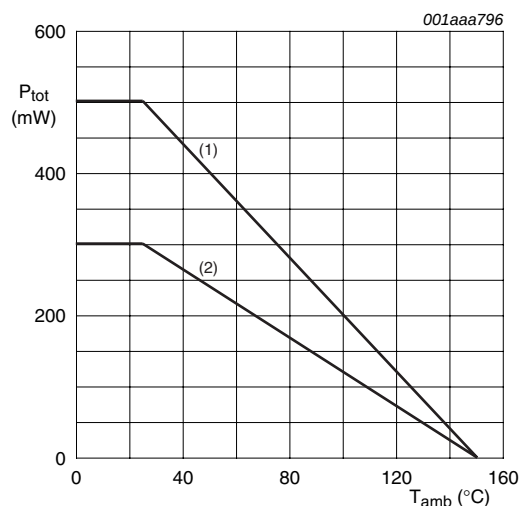
In accordance with the Absolute Maximum Rating System (IEC 60134).

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]	290	mW
			[2]	480	mW
			[3]	625	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.



- (1) 1cm² collector mounting pad
(2) Standard footprint

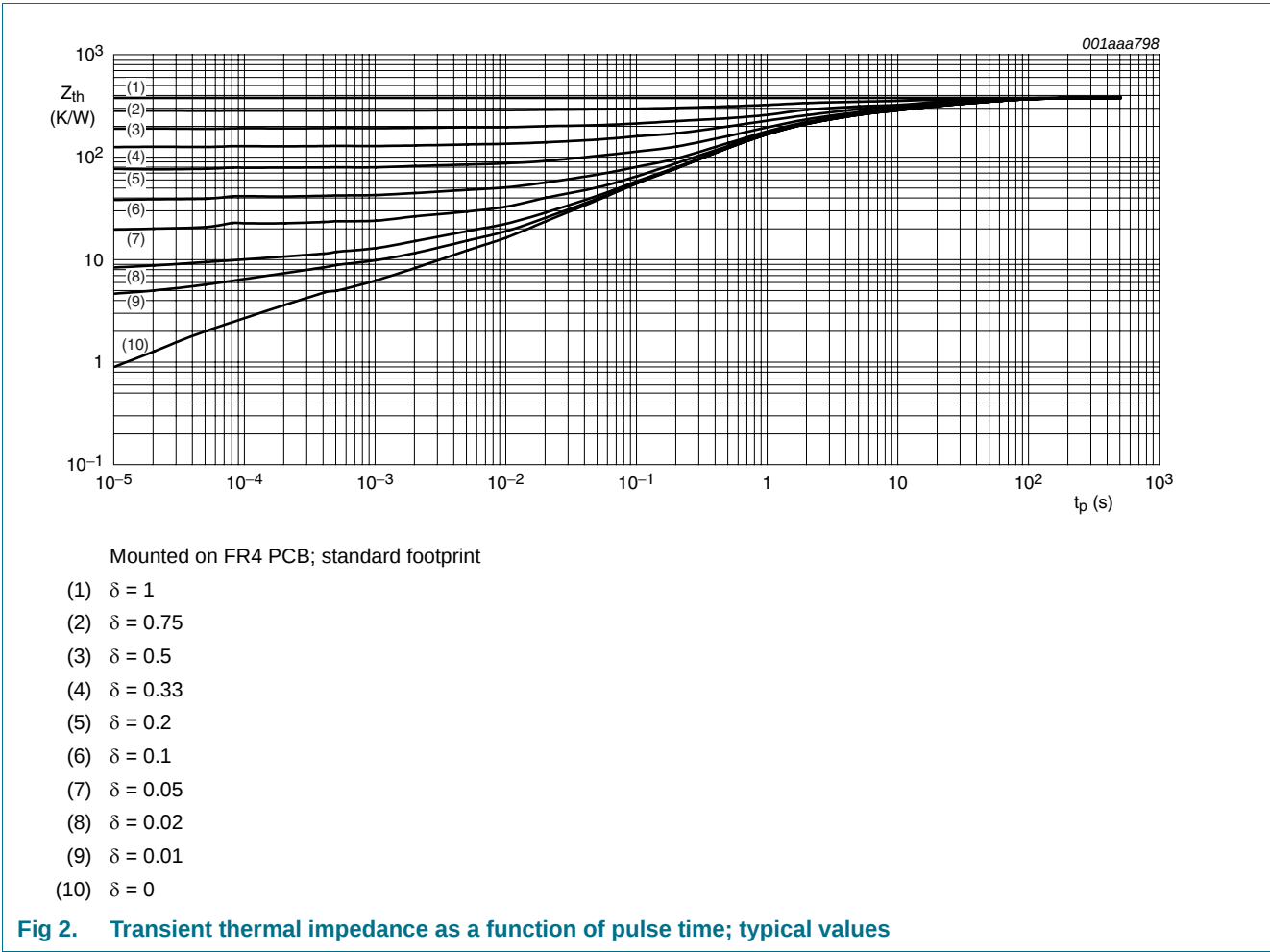
Fig 1. Power derating curves

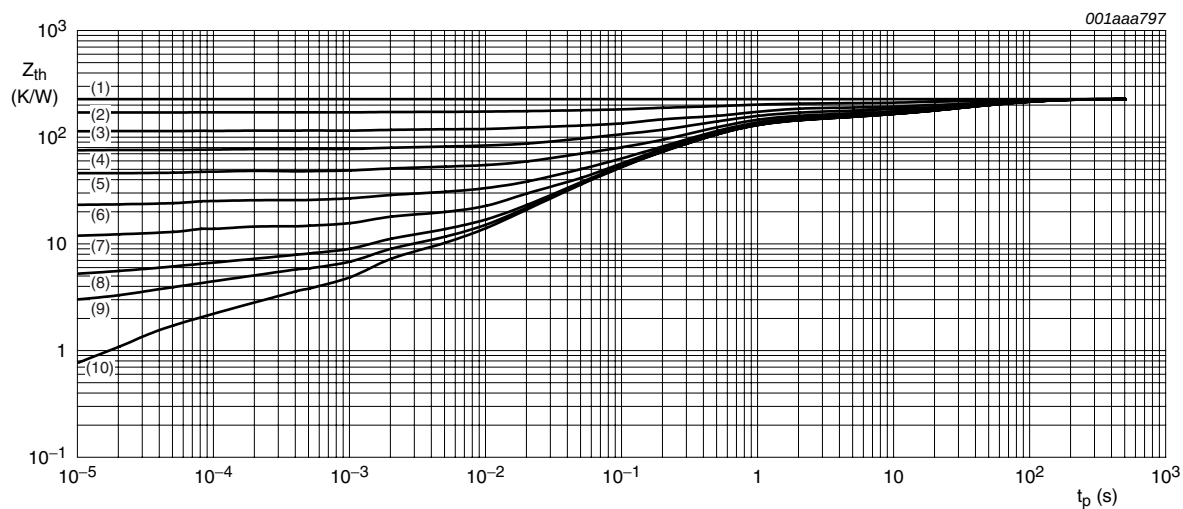
6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] 431	K/W
			[2] 260	K/W
			[3] 200	K/W
$R_{th(j-s)}$	thermal resistance from junction to soldering	in free air	[1] 85	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, 1cm² collector mounting pad.
- [3] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, 6cm² collector mounting pad.





Mounted on FR4 PCB; mounting pad for collector = 1cm^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 time; typical values

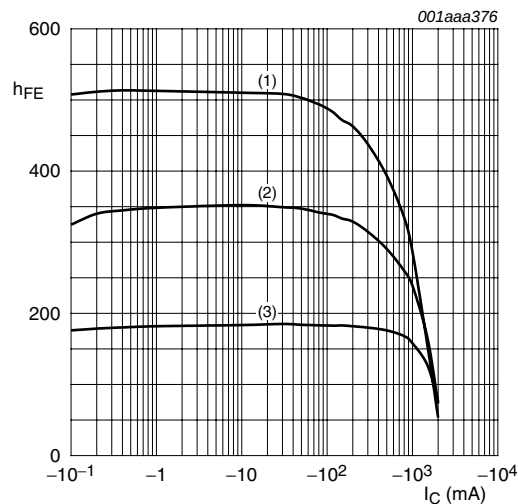
7. Characteristics

Table 7. Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ 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
		$V_{CB} = -80\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^{\circ}\text{C}$	-	-	-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

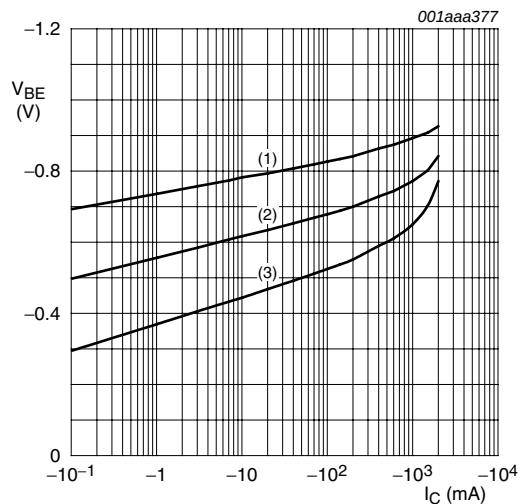
[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.



$V_{CE} = -10$ V

- (1) $T_{amb} = 100$ °C
- (2) $T_{amb} = 25$ °C
- (3) $T_{amb} = -55$ °C

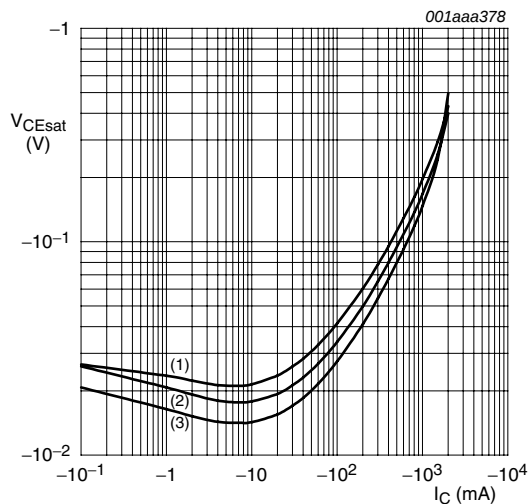
Fig 4. DC current gain as a function of collector current; typical values



$V_{CE} = -10$ V

- (1) $T_{amb} = -55$ °C
- (2) $T_{amb} = 25$ °C
- (3) $T_{amb} = 100$ °C

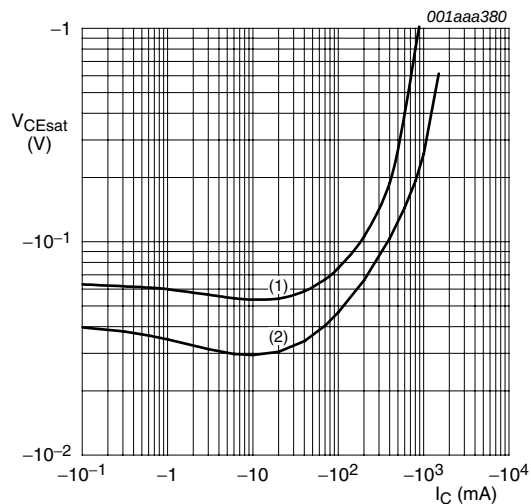
Fig 5. Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 10$

- (1) $T_{amb} = 100$ °C
- (2) $T_{amb} = 25$ °C
- (3) $T_{amb} = -55$ °C

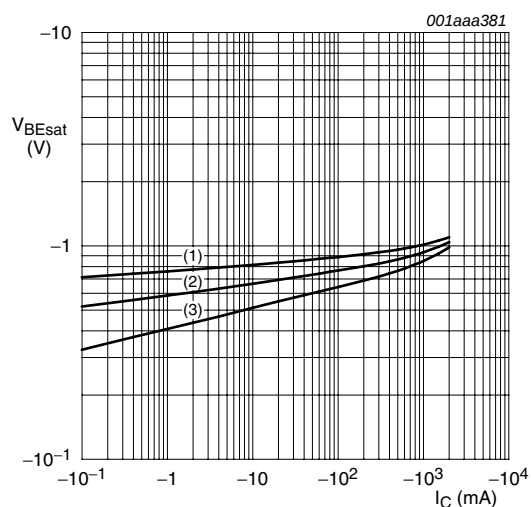
Fig 6. Collector-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25$ °C

- (1) $I_C/I_B = 50$
- (2) $I_C/I_B = 20$

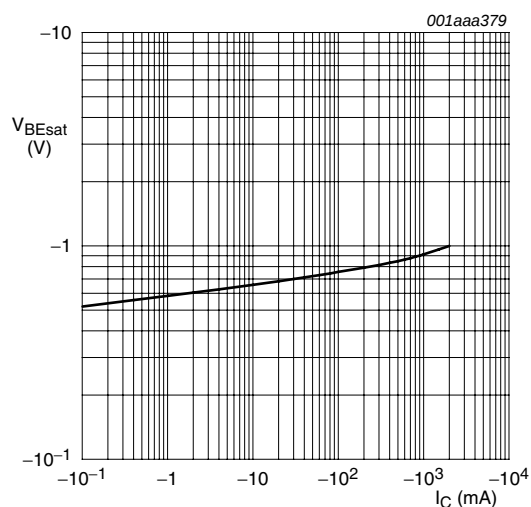
Fig 7. Collector-emitter saturation voltage as a function of collector current; typical values



$$I_C/I_B = 10$$

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

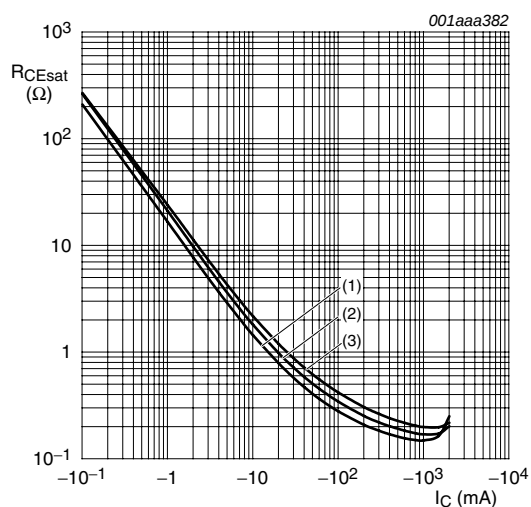
Fig 8. Base-emitter saturation voltage as a function of collector current; typical values



$$I_C/I_B = 20$$

$$T_{amb} = 25\text{ °C}$$

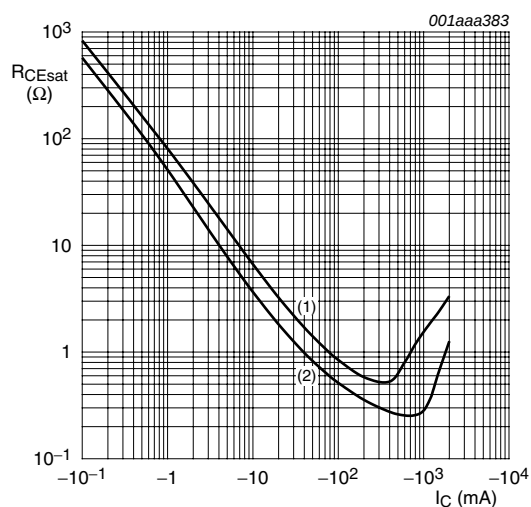
Fig 9. Base-emitter saturation voltage as a function of collector current; typical values



$$I_C/I_B = 10$$

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

Fig 10. 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 11. Equivalent on-resistance as a function of collector current; typical values

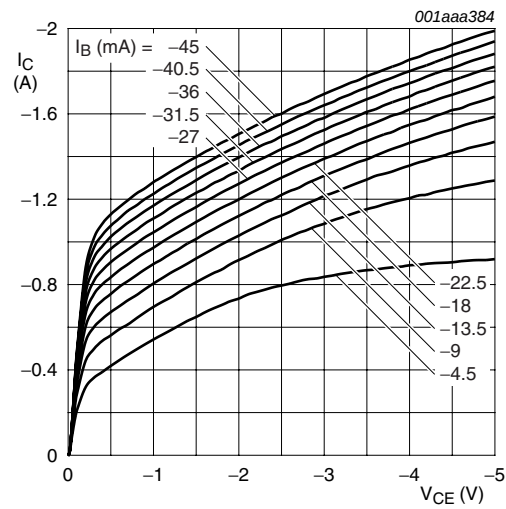


Fig 12. Collector current as a function of collector-emitter voltage; typical values

8. Package outline

Plastic surface-mounted package; 6 leads

SOT363

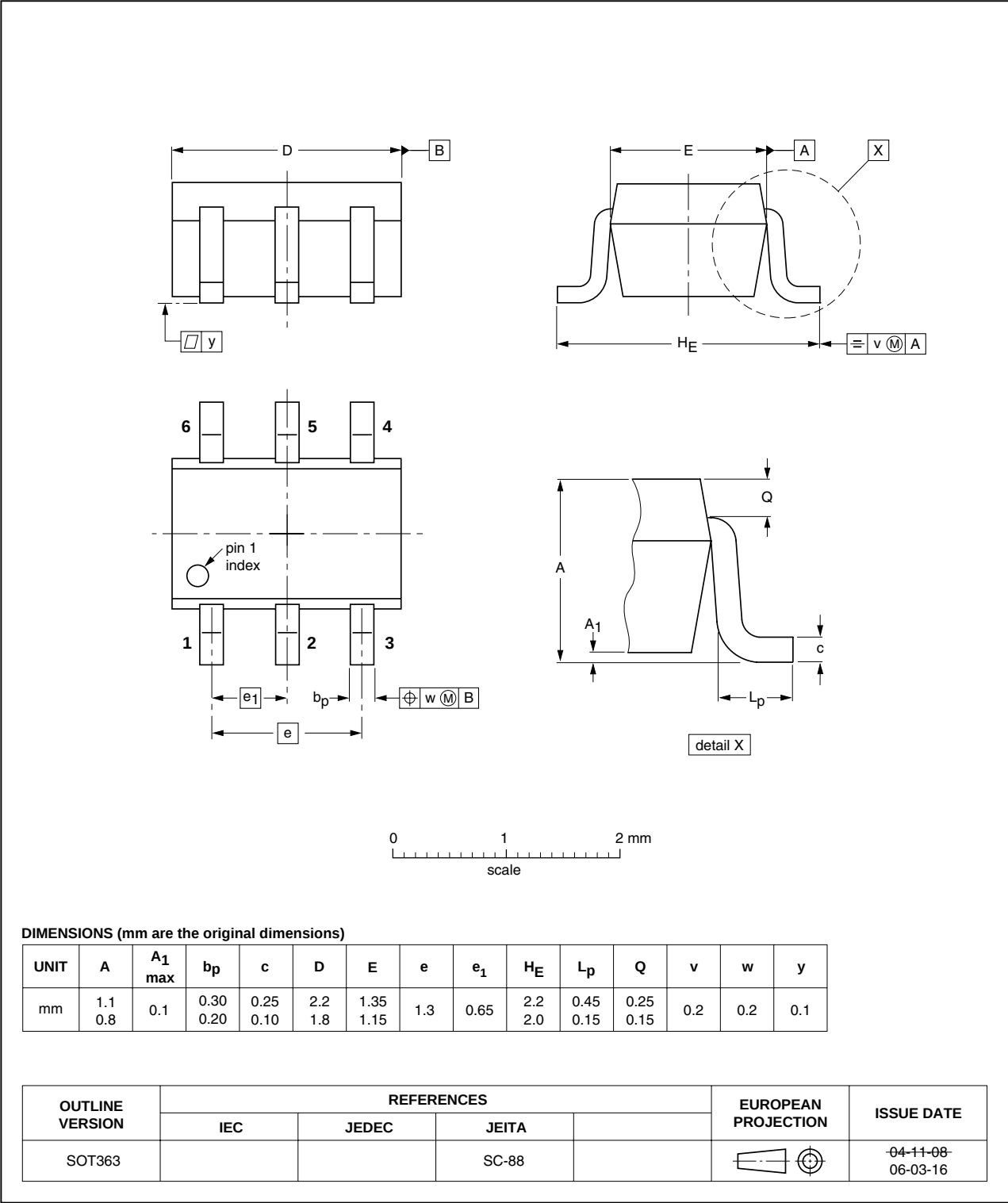


Fig 13. Package outline

9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PBSS9110Y_2	20091122	Product data	-	PBSS9110Y_1
Modifications:	• 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 10 "Equivalent on-resistance as a function of collector current; typical values": updated • Figure 11 "Equivalent on-resistance as a function of collector current; typical values": updated • Figure 12 "Collector current as a function of collector-emitter voltage; typical values": updated • Figure 13 "Package outline": updated			
PBSS9110Y_1	20040609	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.
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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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