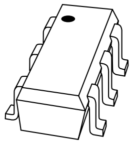


PBSS8110Y

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

Rev. 02 — 21 November 2009 Product data sheet

1. Product profile

1.1 General description

NPN 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 reduces 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

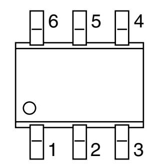
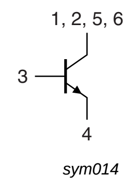
1.4 Quick reference data

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		-	-	200	mΩ

2. Pinning information

Table 2. Discrete pinning

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

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS8110Y	-	plastic surface mounted package; 6 leads	SOT363

4. Marking

Table 4. Marking

Type number	Marking code[1]
PPBSS8110Y	81*

[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	continuous collector current			-	1	A
I_B	continuous base current			-	0.3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	290	mW
			[2]	-	480	mW
			[3]	-	625	mW

Table 5. Limiting values *…continued*

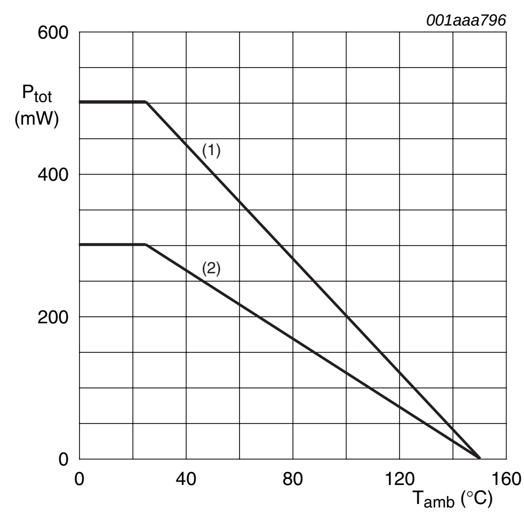
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
T_j	junction temperature		-	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C
T_{stg}	storage temperature			+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, 1cm^2 collector mounting pad.

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



(1) 1cm^2 collector mounting pad

(2) Standard footprint

Fig 1. Power derating curves

6. Thermal characteristics

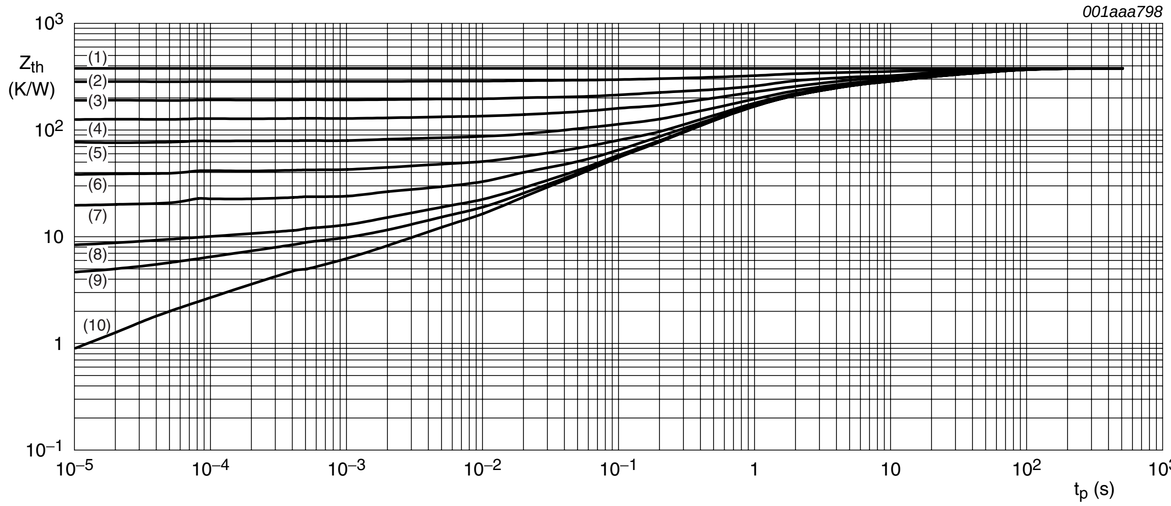
Table 6. Thermal characteristics

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 point	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, 1cm^2 collector mounting pad.

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



Mounted on FR4 PCB; standard footprint

(1) $\delta = 1$

(2) $\delta = 0.75$

(3) $\delta = 0.5$

(4) $\delta = 0.33$

(5) $\delta = 0.2$

(6) $\delta = 0.1$

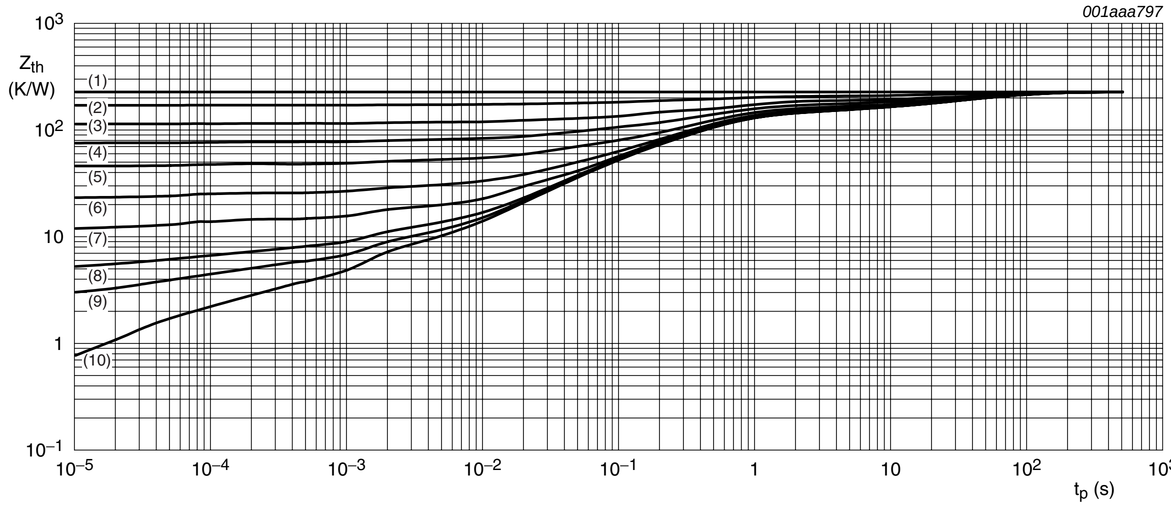
(7) $\delta = 0.05$

(8) $\delta = 0.02$

(9) $\delta = 0.01$

(10) $\delta = 0$

Fig 2. Transient thermal impedance as a function of pulse time; typical values



Mounted on FR4 PCB; mounting pad for collector = 1cm^2

(1) δ = 1

(2) δ = 0.75

(3) δ = 0.5

(4) δ = 0.33

(5) δ = 0.2

(6) δ = 0.1

(7) δ = 0.05

(8) δ = 0.02

(9) δ = 0.01

(10) δ = 0

Fig 3. Transient thermal impedance as a function of pulse time; typical values

7. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

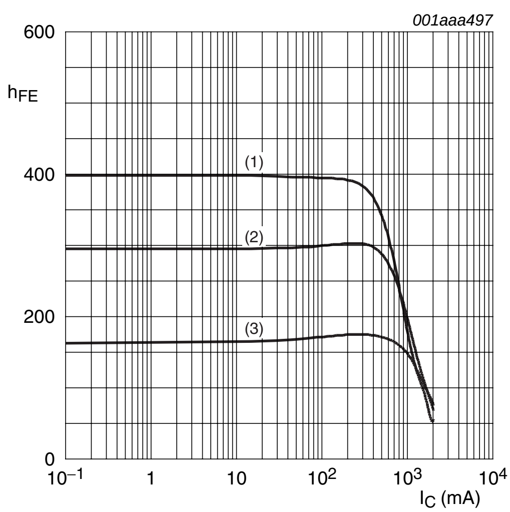
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = 80 V; I_E = 0 A		-	-	100	nA
		V_{CB} = 80 V; I_E = 0 A; T_j = 150 °C		-	-	50	μA
I_{CES}	collector-emitter cut-off current	V_{CE} = 80 V; V_{BE} = 0 V		-	-	100	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = 4 V; I_C = 0 A		-	-	100	nA
h_{FE}	DC current gain	V_{CE} = 10 V; I_C = 1 mA		150	-	-	
		V_{CE} = 10 V; I_C = 250 mA		150	-	500	
		V_{CE} = 10 V; I_C = 0.5 A	[1]	100	-	-	
		V_{CE} = 10 V; I_C = 1 A	[1]	80	-	-	

Table 7. Characteristics *…continued*

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEsat}	collector-emitter saturation voltage	I_C = 100 mA; I_B = 10 mA		-	-	40	mV
		I_C = 500 mA; I_B = 50 mA		-	-	120	mV
		I_C = 1 A; I_B = 100 mA		-	-	200	mV
R_{CEsat}	equivalent on-resistance	I_C = 1 A; I_B = 100 mA	[1]	-	160	200	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = 1 A; I_B = 100 mA		-	-	1.05	V
V_{BEon}	base-emitter turn-on voltage	V_{CE} = 10 V; I_C = 1 A		-	-	0.9	V
f_T	transition frequency	V_{CE} = 10 V; I_C = 50 mA; f = 100 MHz		100	-	-	MHz
C_c	collector capacitance	V_{CB} = 10 V; I_E = I_e = 0 A; f = 1 MHz		-	-	7.5	pF

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.



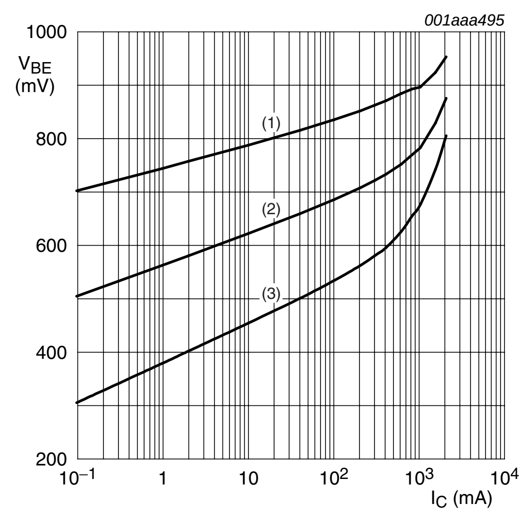
V_{CE} = 10 V

(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



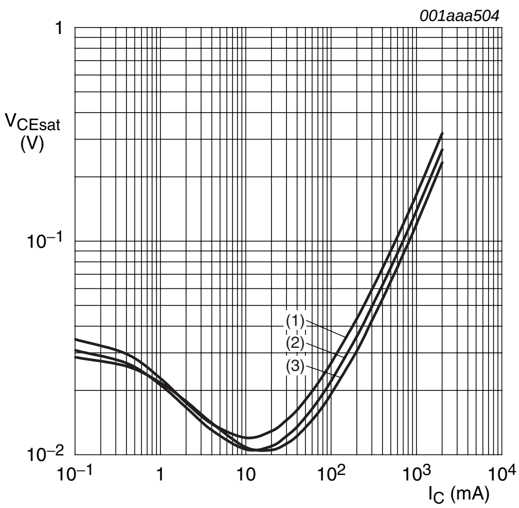
V_{CE} = 10 V

(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



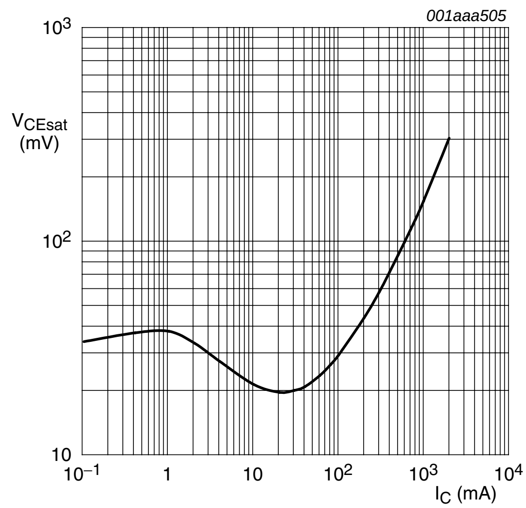
$I_C/I_B = 10$

(1) $T_{amb} = 100\ °C$

(2) $T_{amb} = 25\ °C$

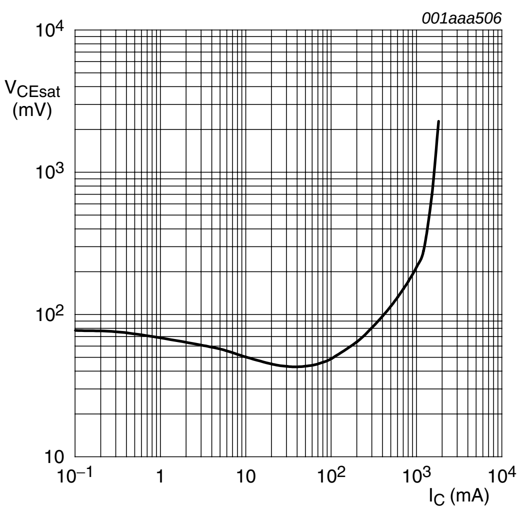
(3) $T_{amb} = -55\ °C$

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



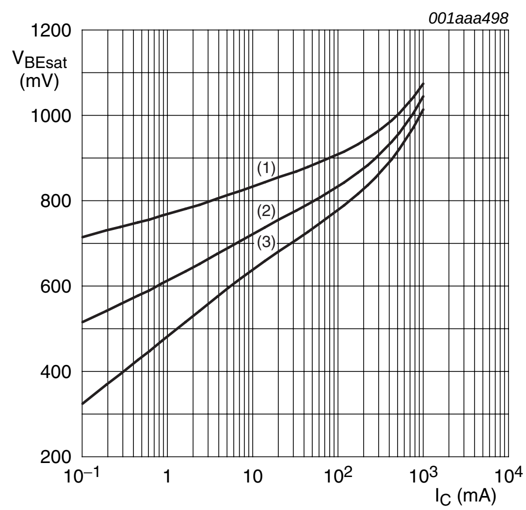
$I_C/I_B = 20$; $T_{amb} = 25\ °C$

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



$I_C/I_B = 50$; $T_{amb} = 25\ °C$

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



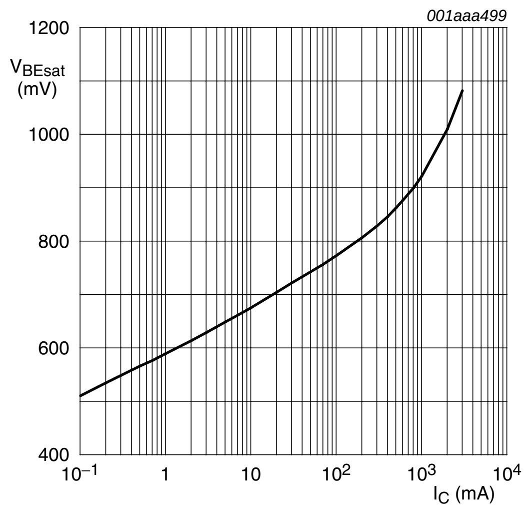
$I_C/I_B = 10$

(1) $T_{amb} = -55\ °C$

(2) $T_{amb} = 25\ °C$

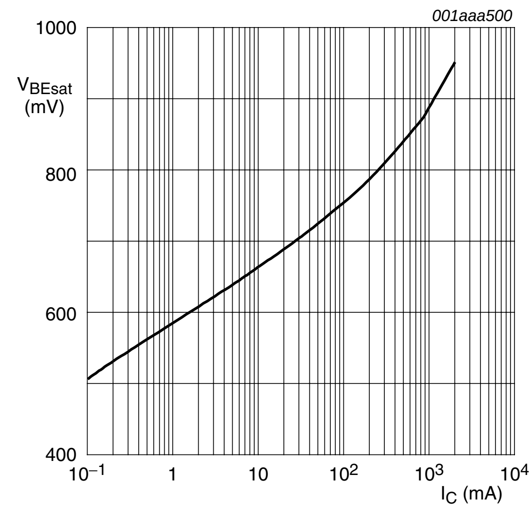
(3) $T_{amb} = 100\ °C$

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



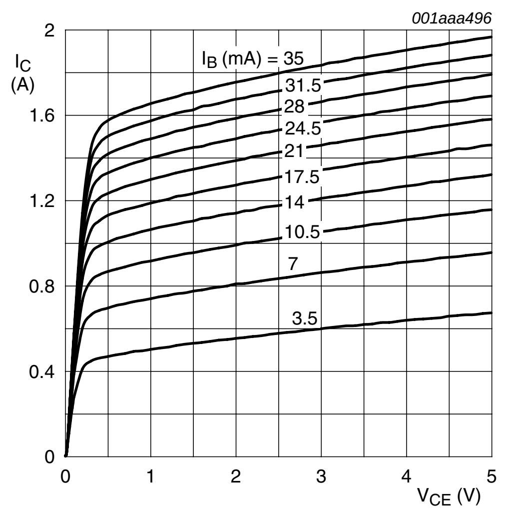
I_C/I_B = 20; T_{amb} = 25 °C

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



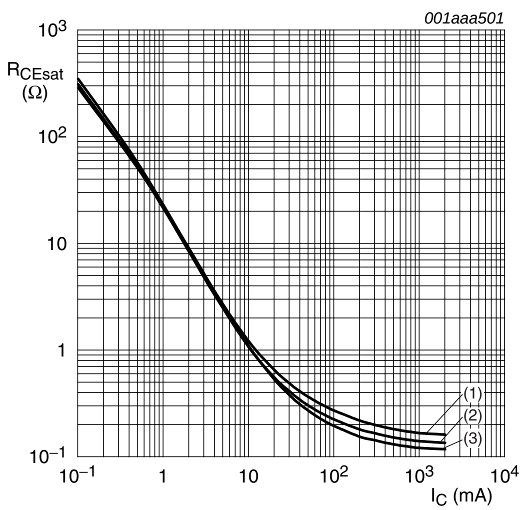
I_C/I_B = 50; T_{amb} = 25 °C

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



T_{amb} = 25 °C

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



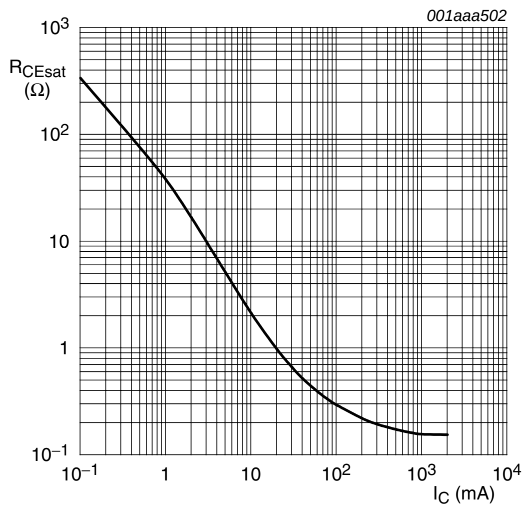
I_C/I_B = 10

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

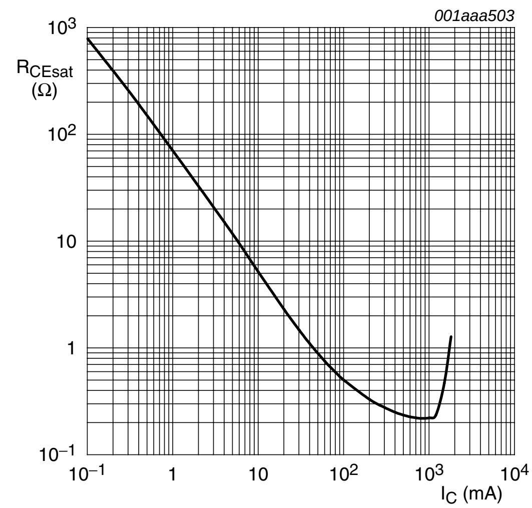
(3) T_{amb} = −55 °C

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



$I_C/I_B = 20$; $T_{amb} = 25$ °C

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

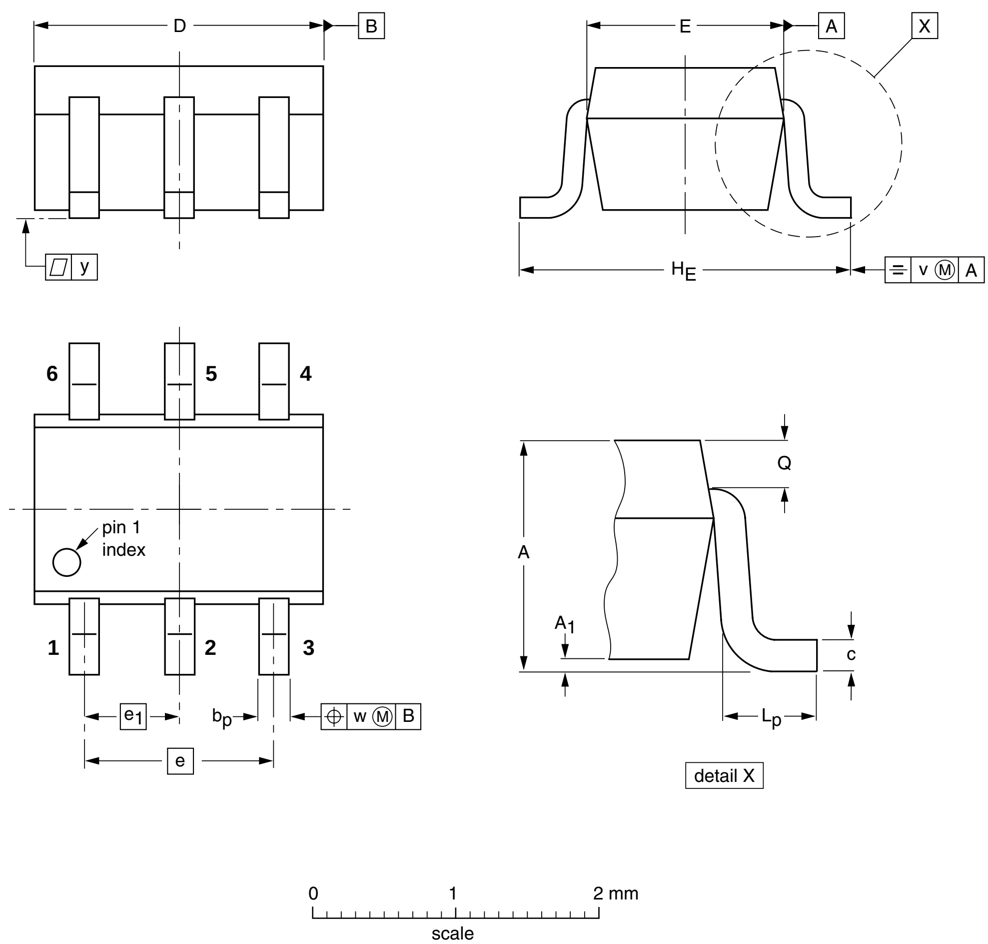


$I_C/I_B = 50$; $T_{amb} = 25$ °C

Fig 15. Equivalent on-resistance as a function of collector current; typical values

8. Package outline

Plastic surface-mounted package; 6 leads **SOT363**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT363			SC-88			~~04-11-08~~ 06-03-16

Fig 16. Package outline

9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PBSS8110Y_2	20091121	Product data	-	PBSS8110Y_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 4 “DC current gain as a function of collector current; typical values”: updated • Figure 6 “Collector-emitter saturation voltage as a function of collector current; typical values”: VCEsat unit amended from mV to V • Figure 12 “Collector current as a function of collector-emitter voltage; typical values”: updated • Figure 16 “Package outline”: updated			
PBSS8110Y_1	20040602	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.
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 URL http://www.nxp.com.

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12. Contents

Date of release: 21 November 2009
Document identifier: PBSS8110Y_2