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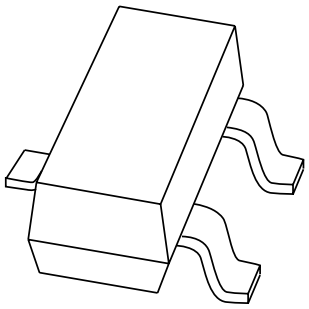
Team Nexperia

DATA SHEET



PBSS8110T

100 V, 1 A

NPN low V_{CEsat} (BISS) transistor

Product data sheet
Supersedes data of 2003 Jul 28

2003 Dec 22

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

PBSS8110T

FEATURES

- SOT23 package
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- Higher efficiency leading to less heat generation
- Reduced printed-circuit board requirements.

APPLICATIONS

- Major application segments
  - Automotive 42 V power
  - Telecom infrastructure
  - Industrial
- Power management
  - DC/DC converters
  - Supply line switching
  - Battery charger
  - LCD backlighting.
- Peripheral drivers
  - Driver in low supply voltage applications (e.g. lamps and LEDs).
  - Inductive load driver (e.g. relays, buzzers and motors).

DESCRIPTION

NPN low V_{CEsat} transistor in a SOT23 plastic package.
PNP complement: PBSS9110T.

MARKING

TYPE NUMBER	MARKING CODE(1)
PBSS8110T	*U8

Note

1. ∗ = p : Made in Hong Kong.
   ∗ = t : Made in Malaysia.
   ∗ = W : Made in China.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	100	V
I_C	collector current (DC)	1	A
I_{CM}	repetitive peak collector current	3	A
R_{CEsat}	equivalent on-resistance	200	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

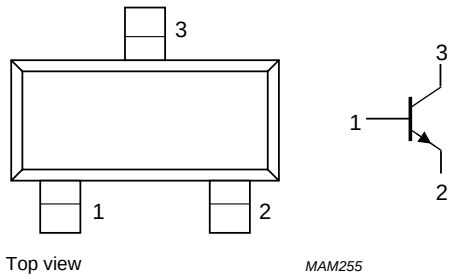


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS8110T	–	plastic surface mounted package; 3 leads	SOT23

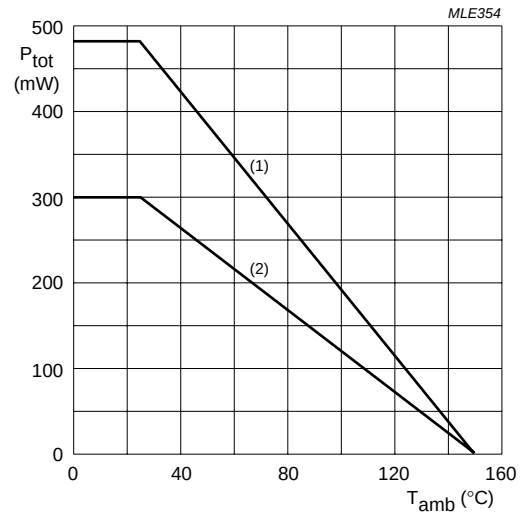
LIMITING VALUES

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_C	collector current (DC)		–	1	A
I_{CM}	peak collector current	limited by $T_{j\,max}$	–	3	A
I_B	base current (DC)		–	300	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	300	mW
		$T_{amb} \leq 25$ °C; note 2	–	480	mW
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		−65	+150	°C
T_{stg}	storage temperature		−65	+150	°C

Notes

1. Device mounted on a printed-circuit board, single sided copper, tinplated, standard footprint.
2. Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm^2.



(1) FR4 PCB; 1 cm^2 copper mounting pad for collector.
(2) Standard footprint.

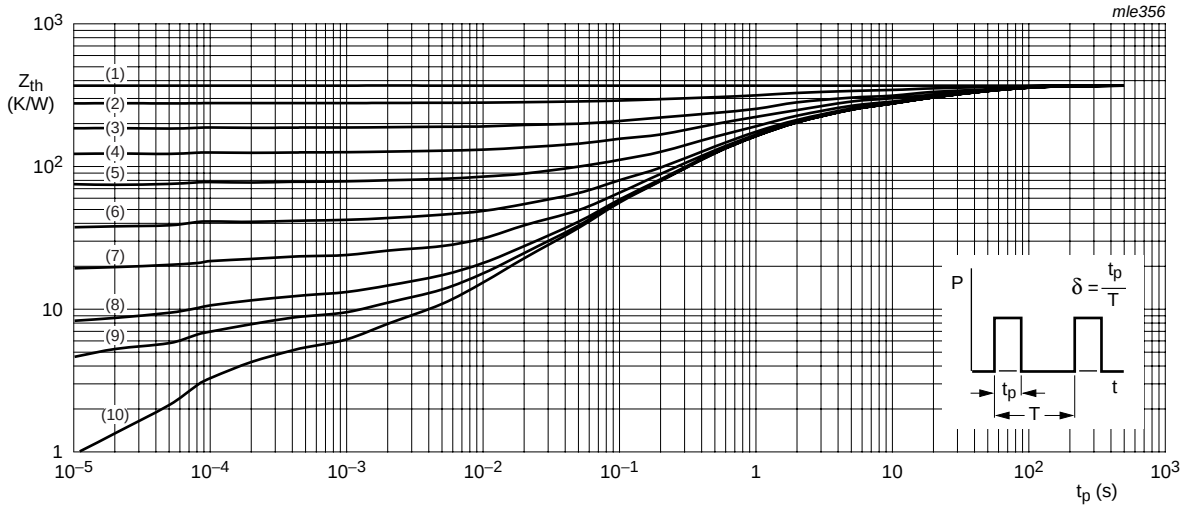
Fig.2 Power derating curves.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; note 1	417	K/W
		in free air; note 2	260	K/W

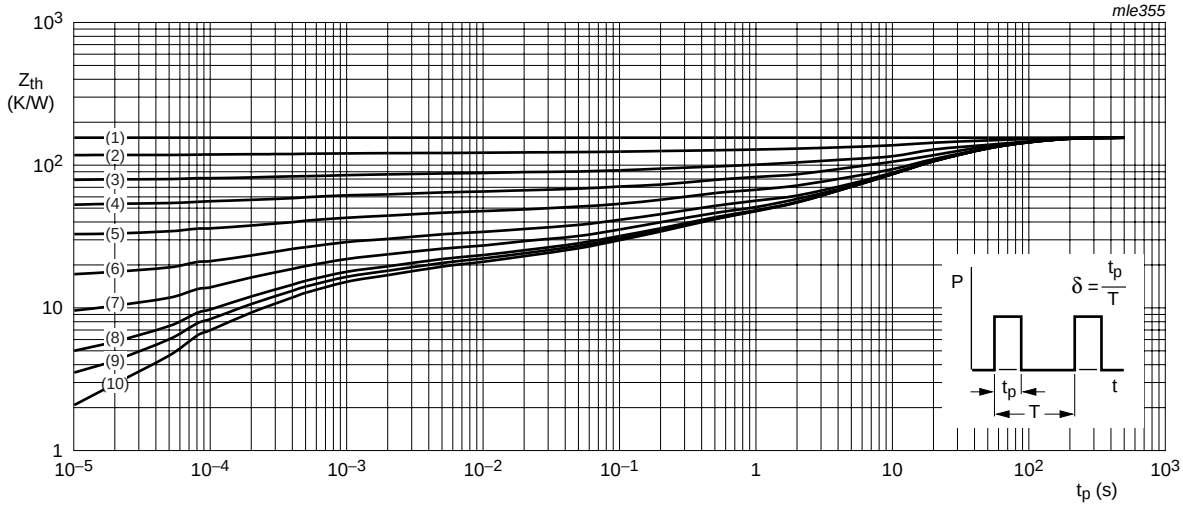
Notes

1. Device mounted on a printed-circuit board, single sided copper, tinplated and standard footprint.
2. Device mounted on a printed-circuit board, single sided copper, tinplated and mounting pad for collector 1 cm^2.



(1) δ = 1.0. (3) δ = 0.5. (5) δ = 0.2. (7) δ = 0.05. (9) δ = 0.01.
(2) δ = 0.75. (4) δ = 0.03. (6) δ = 0.1. (8) δ = 0.02. (10) δ = 0.0.

Fig.3 Transient thermal impedance as a function of pulse time for standard PCB footprint.



(1) δ = 1.0. (3) δ = 0.5. (5) δ = 0.2. (7) δ = 0.05. (9) δ = 0.01.
(2) δ = 0.75. (4) δ = 0.03. (6) δ = 0.1. (8) δ = 0.02. (10) δ = 0.0.

Fig.4 Transient thermal impedance as a function of pulse time for collector 1 cm^2 copper mounting pad.

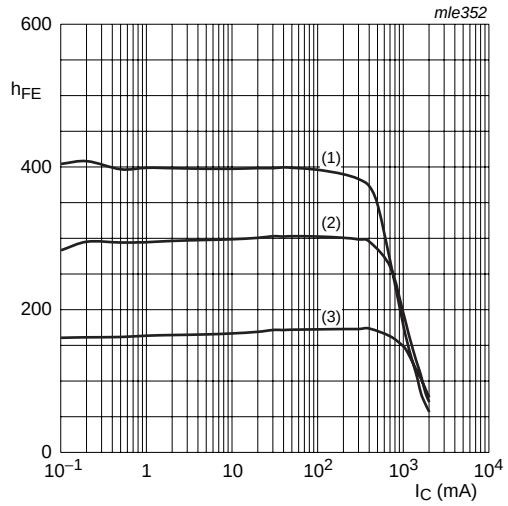
CHARACTERISTICS

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	–	–	100	nA
		V_{CB} = 80 V; I_E = 0; T_j = 150 °C	–	–	50	μA
I_{CES}	collector-emitter cut-off current	V_{CE} = 80 V; V_{BE} = 0	–	–	100	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = 4 V; I_C = 0	–	–	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 = 500 mA; note 1	100	–	–	
		V_{CE} = 10 V; I_C = 1 A; note 1	80	–	–	
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; note 1	–	–	200	mV
R_{CEsat}	equivalent on-resistance	I_C = 1 A; I_B = 100 mA; note 1	–	165	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	I_C = 50 mA; V_{CE} = 10 V; f = 100 MHz	100	–	–	MHz
C_c	collector capacitance	V_{CB} = 10 V; I_E = I_e = 0; f = 1 MHz	–	–	7.5	pF

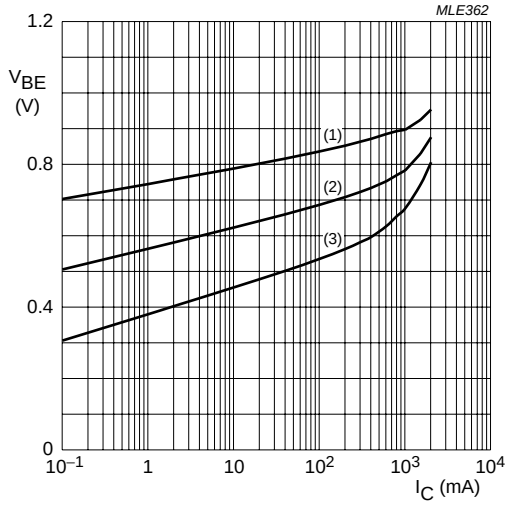
Note

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



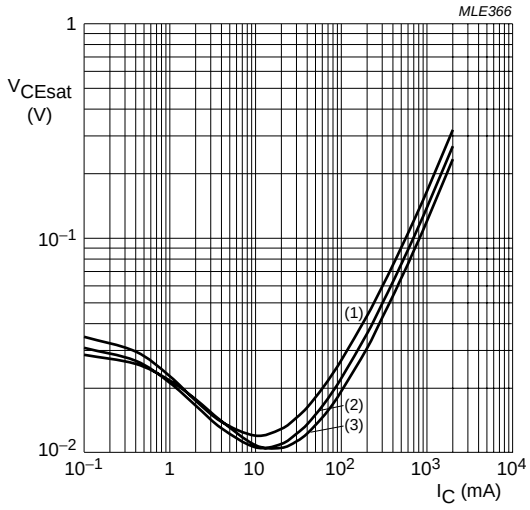
V_{CE} = 10 V.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

Fig.5 DC current gain as a function of collector current; typical values.



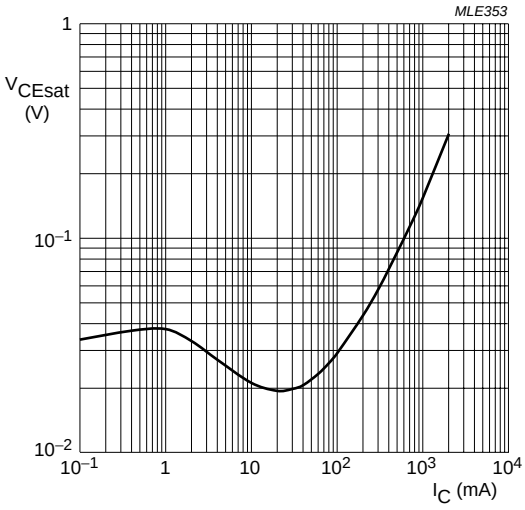
V_{CE} = 10 V.
(1) T_{amb} = –55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

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



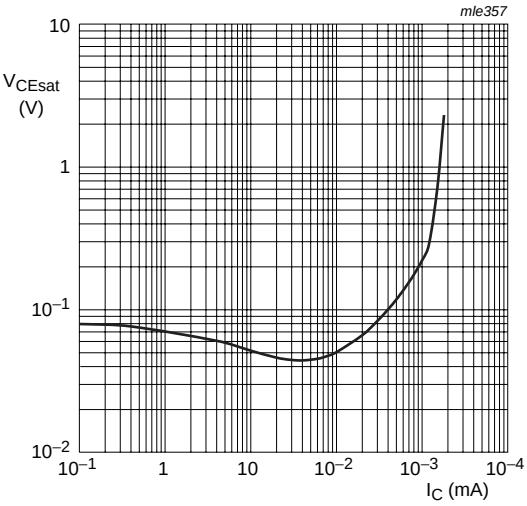
I_C/I_B = 10.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

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



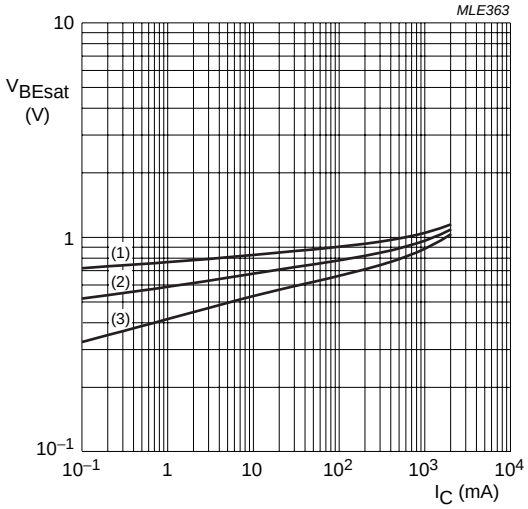
I_C/I_B = 20.
T_{amb} = 25 °C.

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



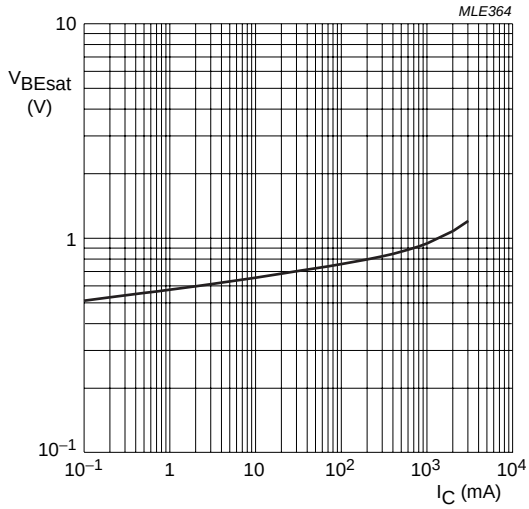
I_C/I_B = 50.
T_{amb} = 25 °C.

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



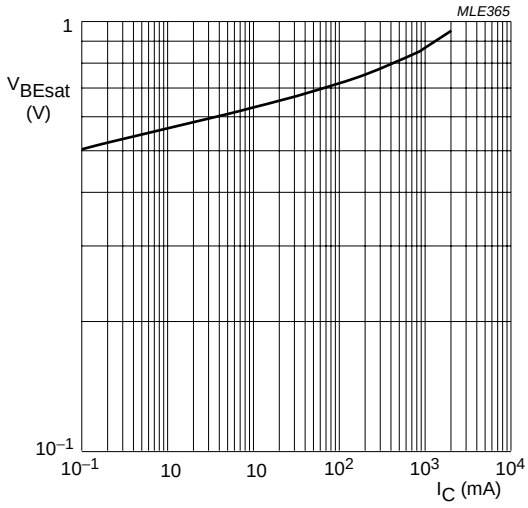
I_C/I_B = 10.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

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



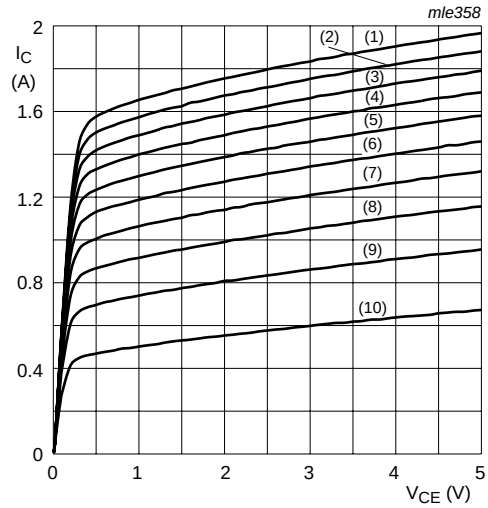
I_C/I_B = 20.
T_{amb} = 25 °C.

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



I_C/I_B = 50.
T_{amb} = 25 °C.

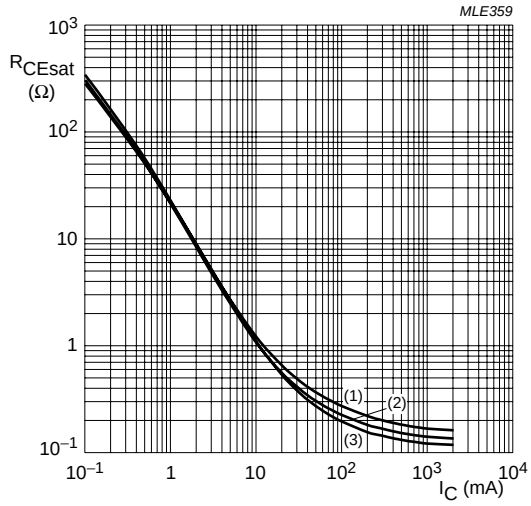
Fig.12 Base-emitter saturation voltage as a function of collector current; typical values.



T_{amb} = 25 °C.

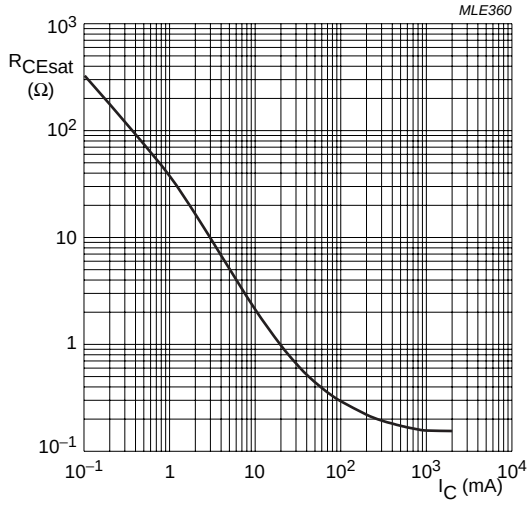
(1) I_B = 3500 μA.
(2) I_B = 3150 μA.
(3) I_B = 2800 μA.
(4) I_B = 2450 μA.
(5) I_B = 2100 μA.
(6) I_B = 1750 μA.
(7) I_B = 1400 μA.
(8) I_B = 1050 μA.
(9) I_B = 700 μA.
(10) I_B = 350 μA.

Fig.13 Collector current as a function of collector-emitter voltage; typical values.



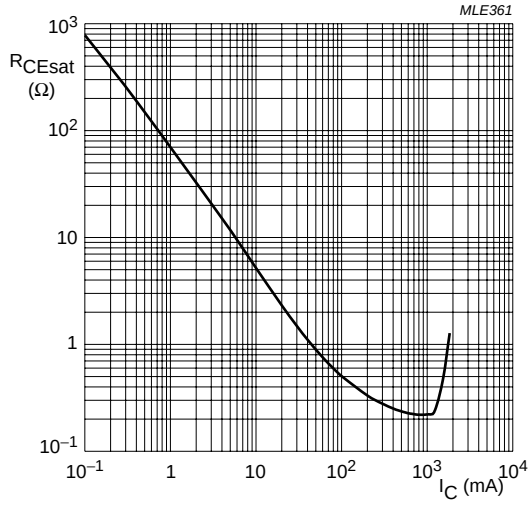
I_C/I_B = 10.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.14 Collector-emitter equivalent on-resistance as a function of collector current; typical values.



I_C/I_B = 20.
T_{amb} = 25 °C.

Fig.15 Collector-emitter equivalent on-resistance as a function of collector current; typical values.

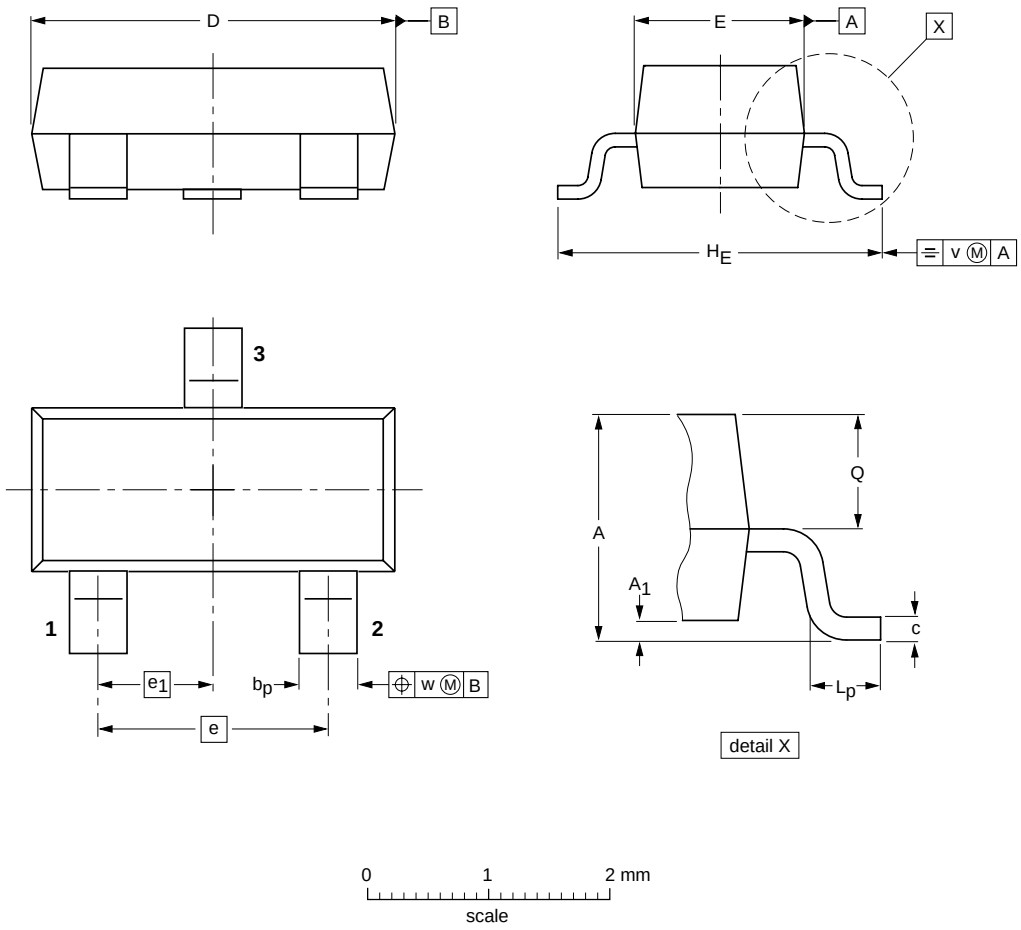


I_C/I_B = 50.
T_{amb} = 25 °C.

Fig.16 Collector-emitter equivalent on-resistance as a function of collector current; typical values.

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads **SOT23**



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
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT23		TO-236AB				~~04-11-04~~ 06-03-16

DATA SHEET STATUS

DOCUMENT STATUS[1]	PRODUCT STATUS[2]	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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NXP Semiconductors

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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, except for package outline drawings which were updated to the latest version.

Contact information

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Printed in The Netherlands R75/02/pp12 Date of release: 2003 Dec 22 Document order number: 9397 750 12008

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