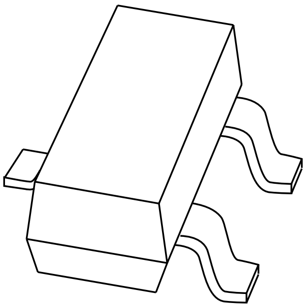
DATA SHEET



PBSS8110T
100 V, 1 A
NPN low V_{CEsat} (BISS) transistor

Product specification
Supersedes data of 2003 Jul 28

2003 Dec 22

Philips
Semiconductors

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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

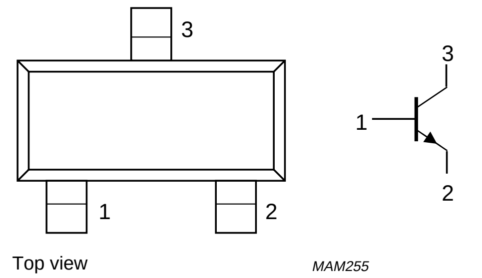


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

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

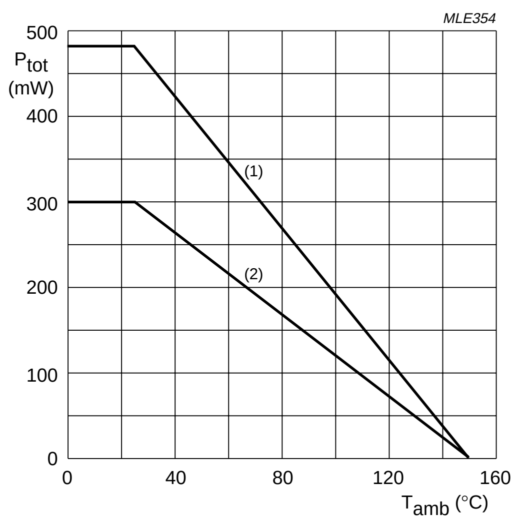
LIMITING VALUES

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.

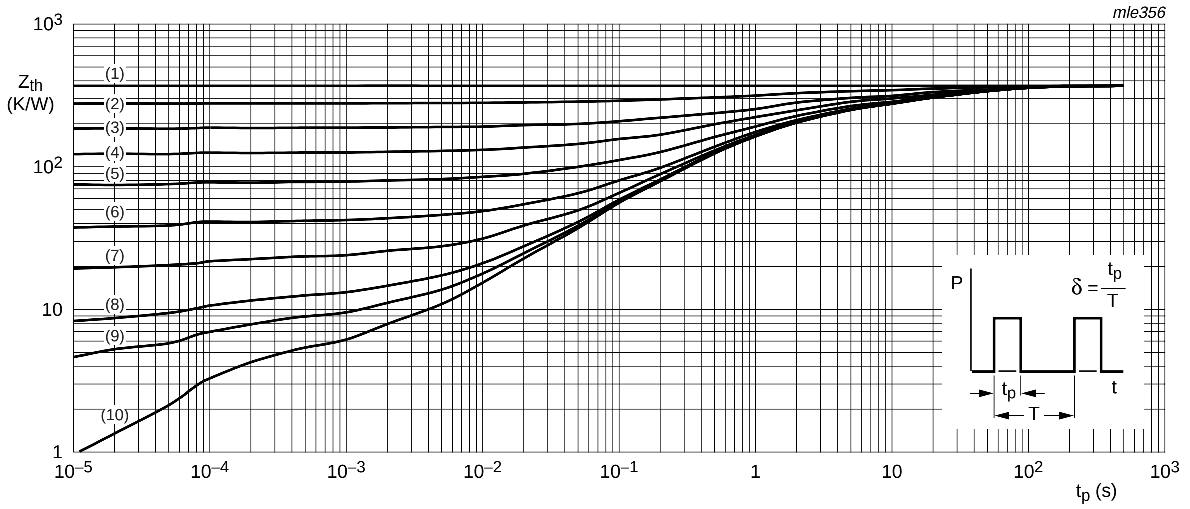
100 V, 1 A NPN low V_{CEsat} (BISS) transistor PBSS8110T

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

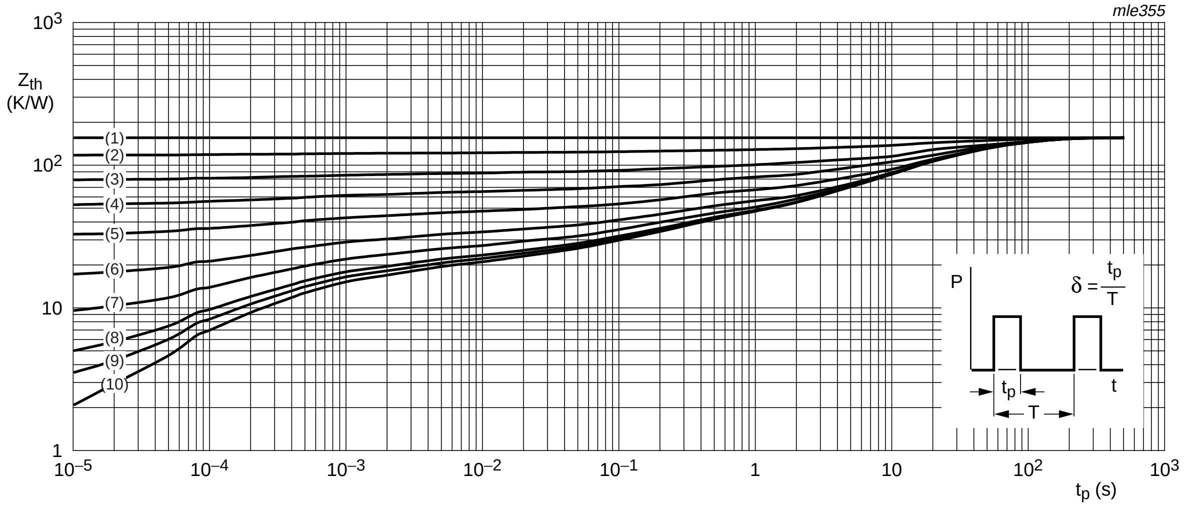
Notes

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

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



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

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

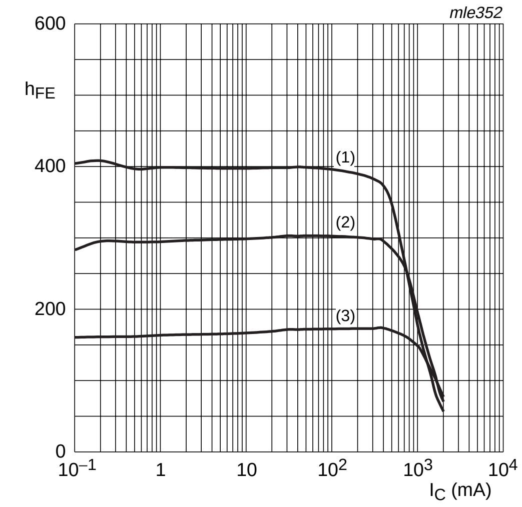
CHARACTERISTICS

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

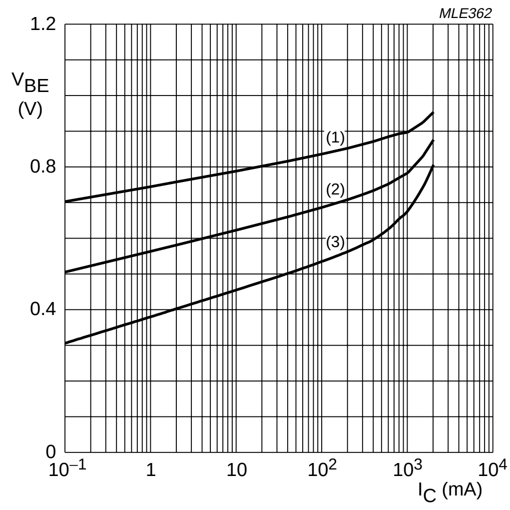
Note

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



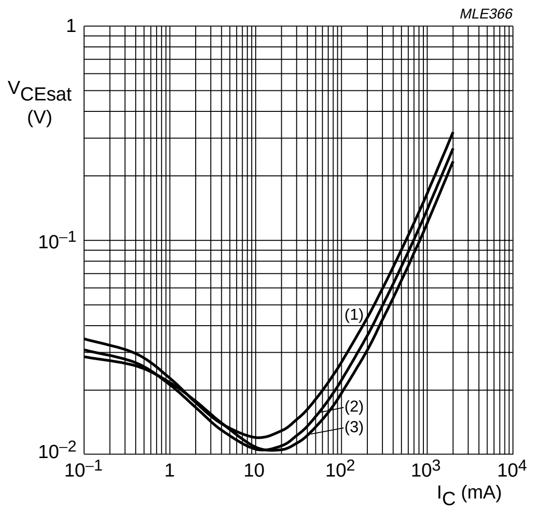
V_{CE} = 10 V.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

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



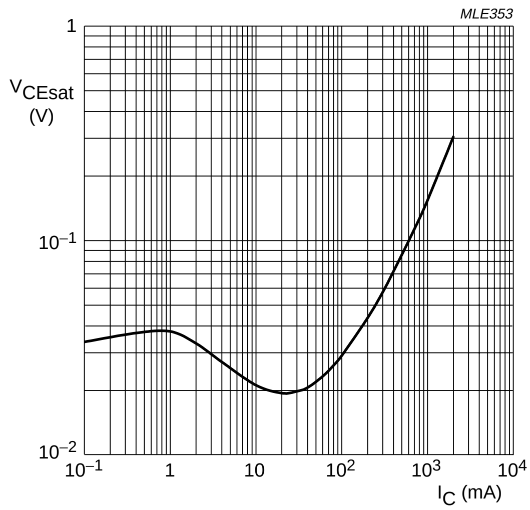
V_{CE} = 10 V.
(1) T_{amb} = –55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

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



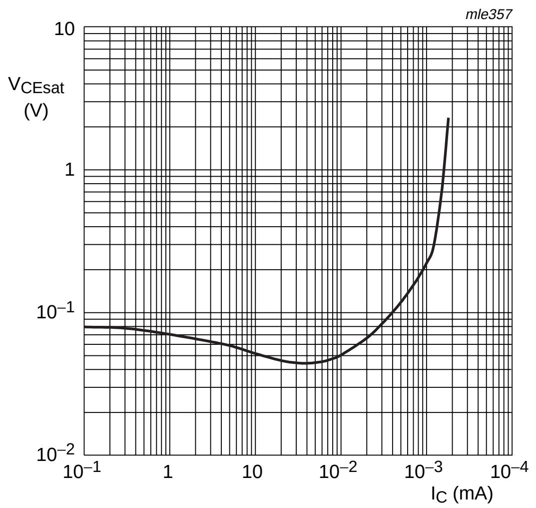
I_C/I_B = 10.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

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



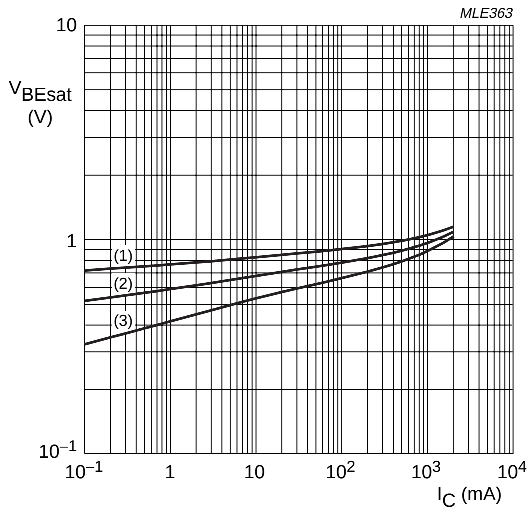
I_C/I_B = 20.
T_{amb} = 25 °C.

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



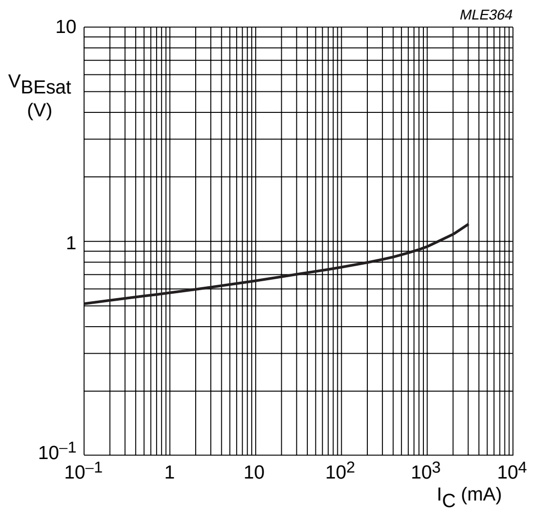
$I_C/I_B = 50$.
$T_{amb} = 25$ °C.

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



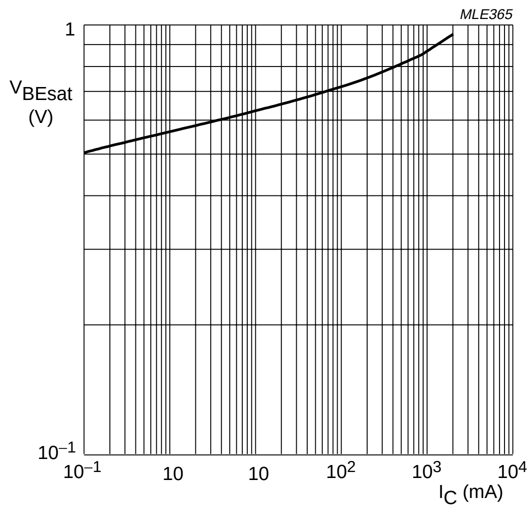
$I_C/I_B = 10$.
(1) $T_{amb} = -55$ °C.
(2) $T_{amb} = 25$ °C.
(3) $T_{amb} = 100$ °C.

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



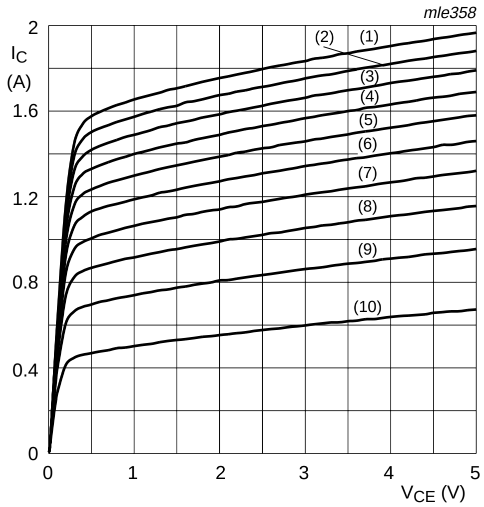
$I_C/I_B = 20$.
$T_{amb} = 25$ °C.

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



$I_C/I_B = 50$.
$T_{amb} = 25$ °C.

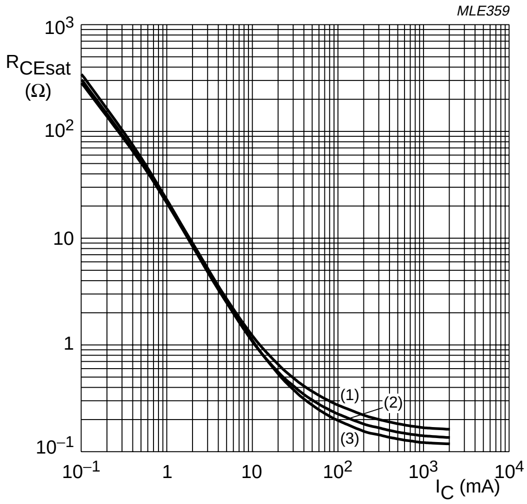
Fig.12 Base-emitter saturation voltage as a function of collector current; typical values.



T_{amb} = 25 °C.

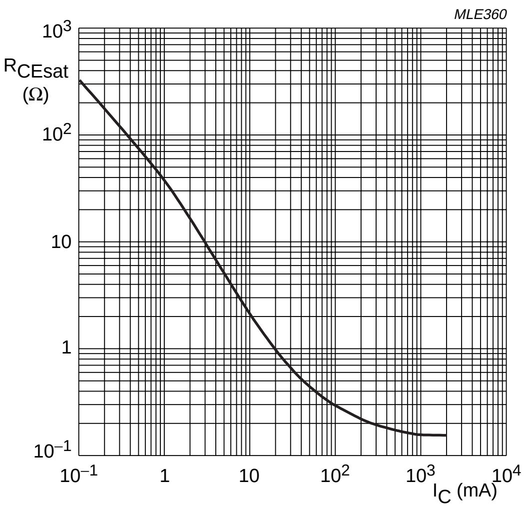
(1) I_B = 3500 μA.
(2) I_B = 3150 μA.
(3) I_B = 2800 μA.
(4) I_B = 2450 μA.
(5) I_B = 2100 μA.
(6) I_B = 1750 μA.
(7) I_B = 1400 μA.
(8) I_B = 1050 μA.
(9) I_B = 700 μA.
(10) I_B = 350 μA.

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



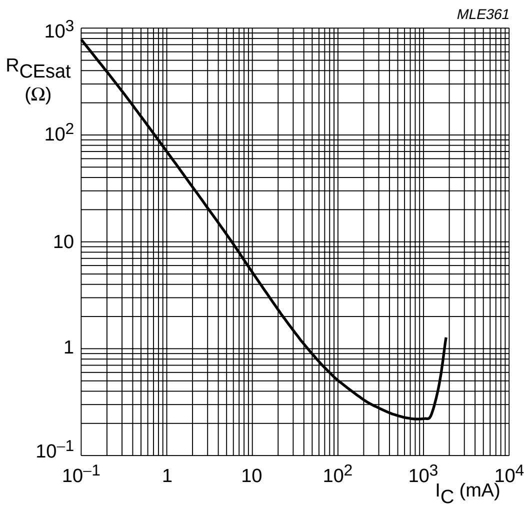
I_C/I_B = 10.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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.

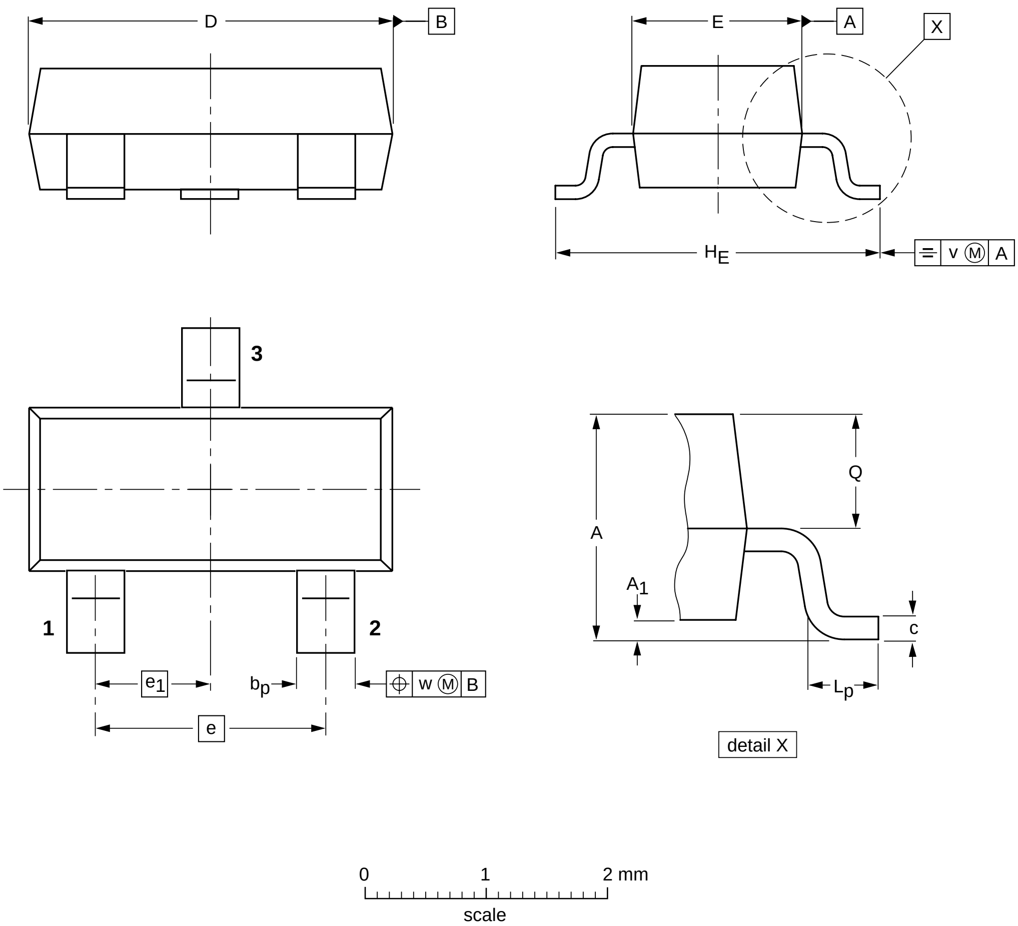


I_C/I_B = 50.
T_{amb} = 25 °C.

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	EIAJ			
SOT23		TO-236AB				~~97-02-28~~ 99-09-13

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS[1]	PRODUCT STATUS[2][3]	DEFINITION
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