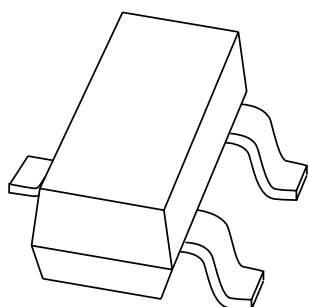


DATA SHEET



PBSS4350T

50 V low V_{CEsat} NPN transistor

Product specification

2002 Aug 08

50 V low V_{CEsat} NPN transistor

PBSS4350T

FEATURES

- Low collector-emitter saturation voltage V_{CEsat} and corresponding low R_{CEsat}
- High collector current capability
- High collector current gain
- Improved efficiency due to reduced heat generation.

APPLICATIONS

- Power management applications
- Low and medium power DC/DC convertors
- Supply line switching
- Battery chargers
- Linear voltage regulation with low voltage drop-out (LDO).

DESCRIPTION

NPN low V_{CEsat} transistor in a SOT23 plastic package.
PNP complement: PBSS5350T.

MARKING

TYPE NUMBER	MARKING CODE ⁽¹⁾
PBSS4350T	ZC*

Note

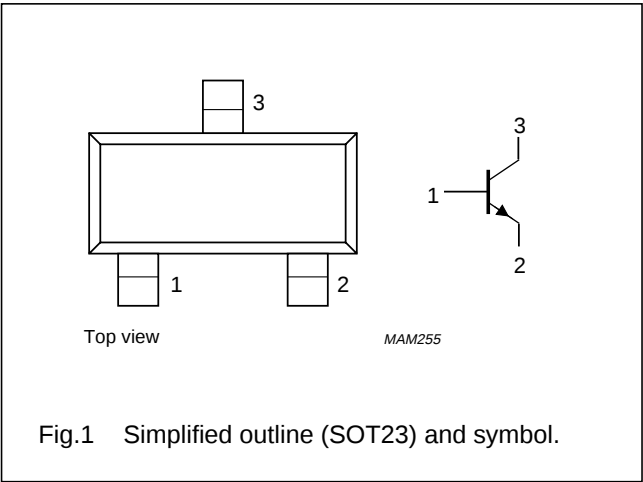
1. * = p: Made in Hong Kong.
* = t: Made in Malaysia.
* = w: Made in China.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	50	V
I_C	collector current (DC)	2	A
I_{CRP}	repetitive peak collector current	3	A
R_{CEsat}	equivalent on-resistance	130	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



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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	–	50	V
V_{CEO}	collector-emitter voltage	open base	–	50	V
V_{EBO}	emitter-base voltage	open collector	–	5	V
I_C	collector current (DC)		–	2	A
I_{CRP}	repetitive peak collector current	note 1	–	3	A
I_{CM}	peak collector current	single peak	–	5	A
I_B	base current (DC)		–	0.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 2	–	300	mW
		$T_{amb} \leq 25\text{ °C}$; note 3	–	480	mW
		$T_{amb} \leq 25\text{ °C}$; note 4	–	540	mW
		$T_{amb} \leq 25\text{ °C}$; notes 1 and 2	–	1.2	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

Notes

1. Operated under pulsed conditions: pulse width $t_p \leq 100\text{ ms}$; duty cycle $\delta \leq 0.25$.
2. Device mounted on a printed-circuit board; single sided copper; tinplated; standard footprint.
3. Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector 1 cm^2 .
4. Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector 6 cm^2 .

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
		in free air; note 3	230	K/W
		in free air; notes 1 and 4	104	K/W

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 .
3. Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector 6 cm^2 .
4. Operated under pulsed conditions: pulse width $t_p \leq 100\text{ ms}$; duty cycle $\delta \leq 0.25$.

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CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

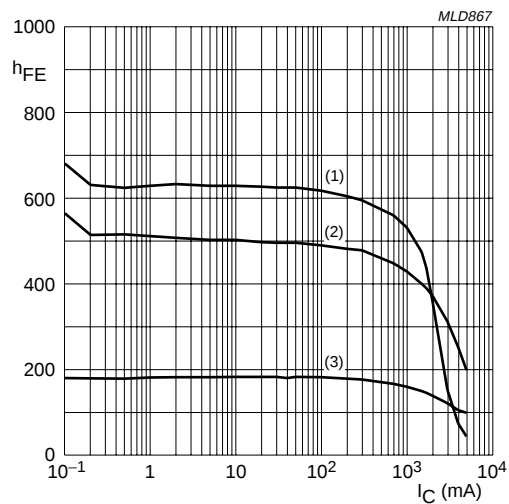
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	$V_{CB} = 50\text{ V}; I_E = 0$	–	–	100	nA
		$V_{CB} = 50\text{ V}; I_E = 0; T_j = 150\text{ }^{\circ}\text{C}$	–	–	50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	–	–	100	nA
h_{FE}	DC current gain	$V_{CE} = 2\text{ V}; I_C = 100\text{ mA}$	300	–	–	
		$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}$	300	–	–	
		$V_{CE} = 2\text{ V}; I_C = 1\text{ A}; \text{note 1}$	300	–	–	
		$V_{CE} = 2\text{ V}; I_C = 2\text{ A}; \text{note 1}$	200	–	–	
		$V_{CE} = 2\text{ V}; I_C = 3\text{ A}; \text{note 1}$	100	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	–	80	mV
		$I_C = 1\text{ A}; I_B = 50\text{ mA}$	–	–	160	mV
		$I_C = 2\text{ A}; I_B = 100\text{ mA}; \text{note 1}$	–	–	280	mV
		$I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{note 1}$	–	–	260	mV
		$I_C = 3\text{ A}; I_B = 300\text{ mA}; \text{note 1}$	–	–	370	mV
R_{CEsat}	equivalent on-resistance	$I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{note 1}$	–	100	130	$\text{m}\Omega$
V_{BEsat}	base-emitter saturation voltage	$I_C = 2\text{ A}; I_B = 100\text{ mA}; \text{note 1}$	–	–	1.1	V
		$I_C = 3\text{ A}; I_B = 300\text{ mA}; \text{note 1}$	–	–	1.2	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = 2\text{ V}; I_C = 1\text{ A}; \text{note 1}$	1.2	–	–	V
f_T	transition frequency	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	100	–	–	MHz
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$	–	–	25	pF

Note

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

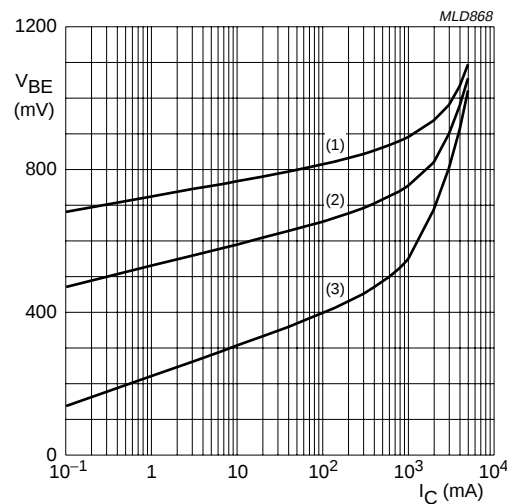
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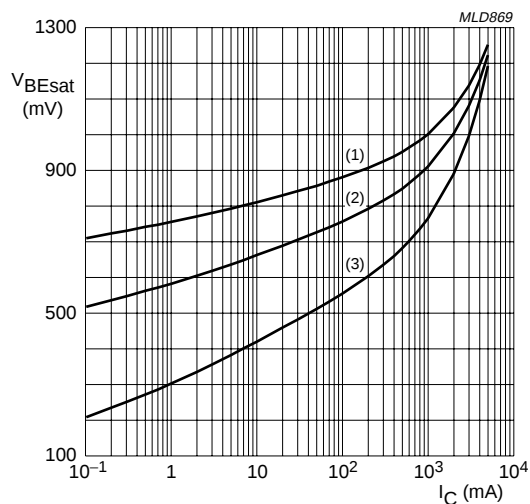
$V_{CE} = 2\text{ V}$.
(1) $T_{amb} = 150^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = -55^\circ\text{C}$.

Fig.2 DC current gain as a function of collector current; typical values.



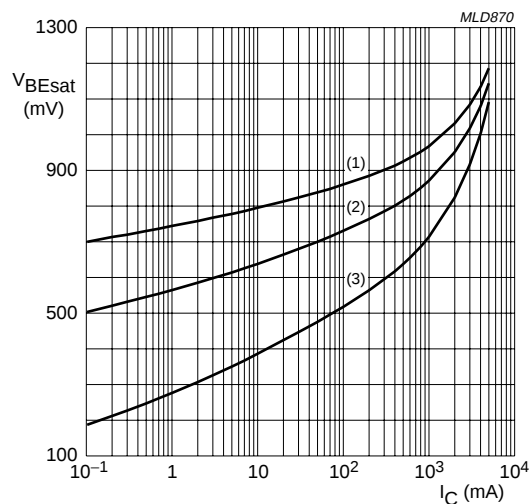
$V_{CE} = 2\text{ V}$.
(1) $T_{amb} = -55^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = 150^\circ\text{C}$.

Fig.3 Base-emitter voltage as a function of collector current; typical values.



$I_C/I_B = 10$.
(1) $T_{amb} = -55^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = 150^\circ\text{C}$.

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

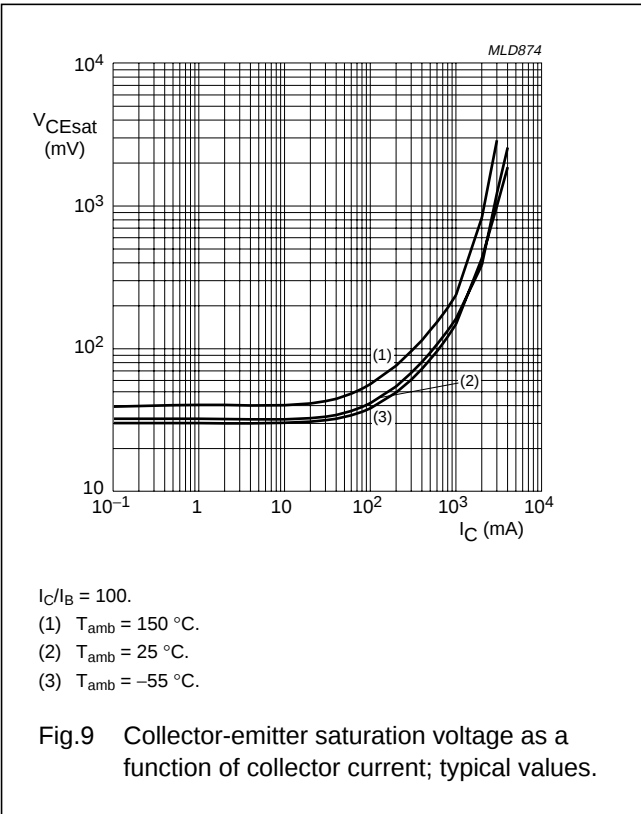
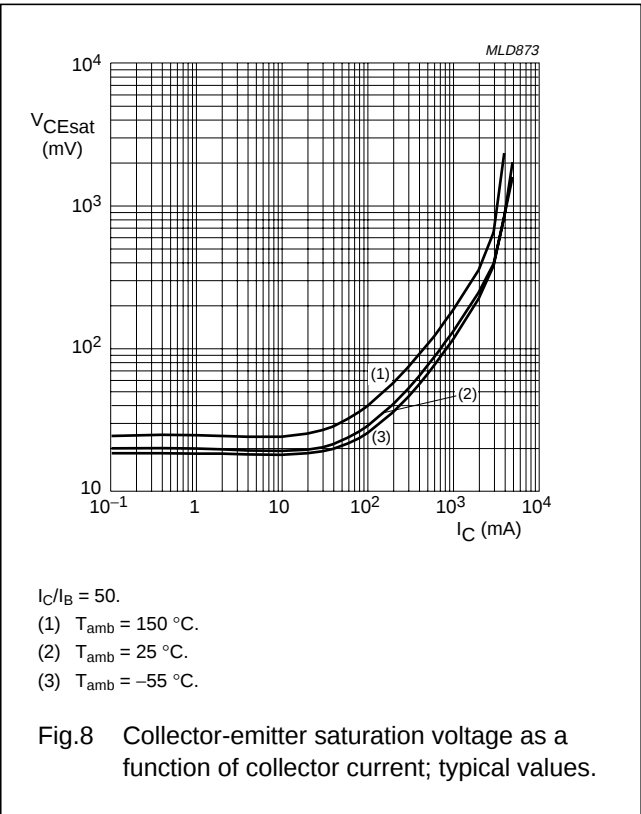
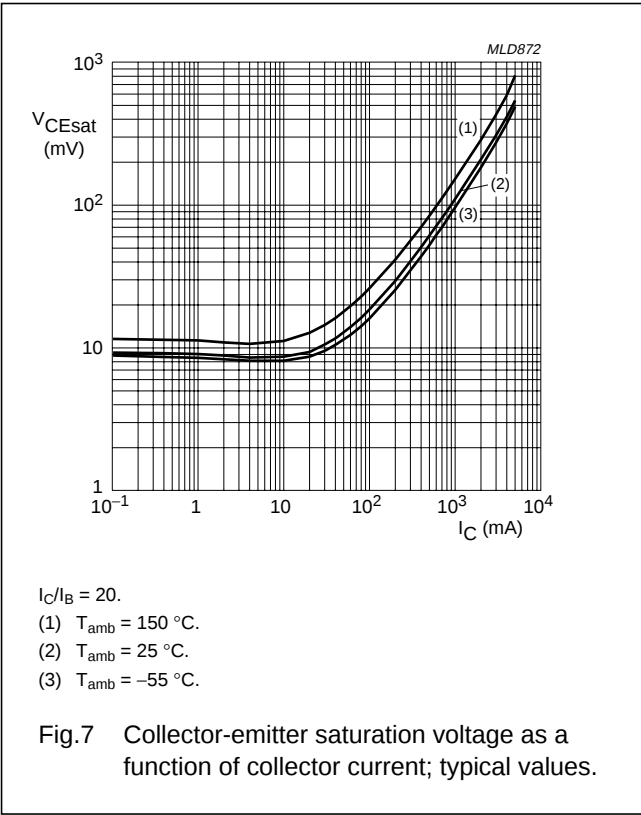
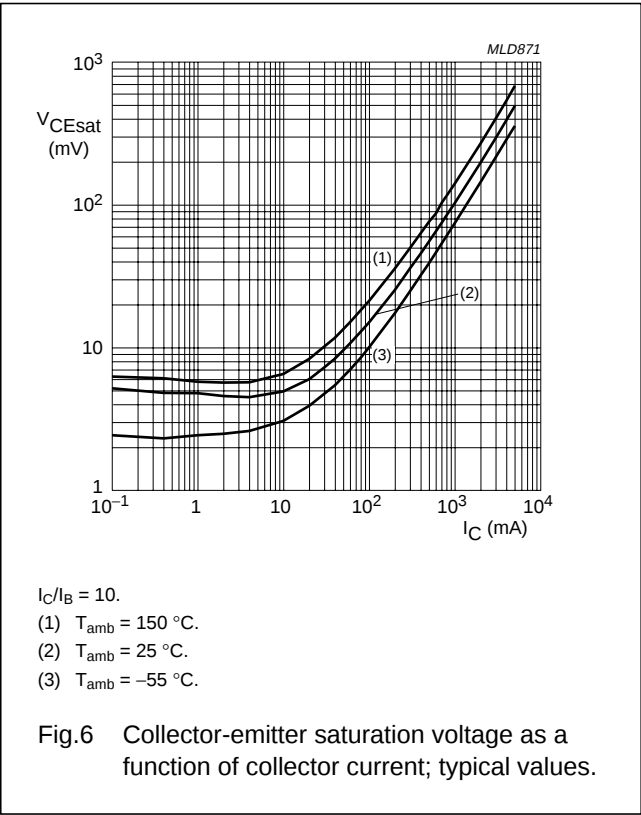


$I_C/I_B = 20$.
(1) $T_{amb} = -55^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = 150^\circ\text{C}$.

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

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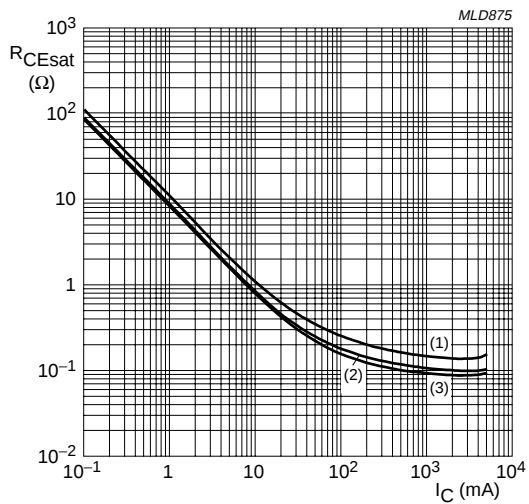
 $I_C/I_B = 20$.(1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.(3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

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

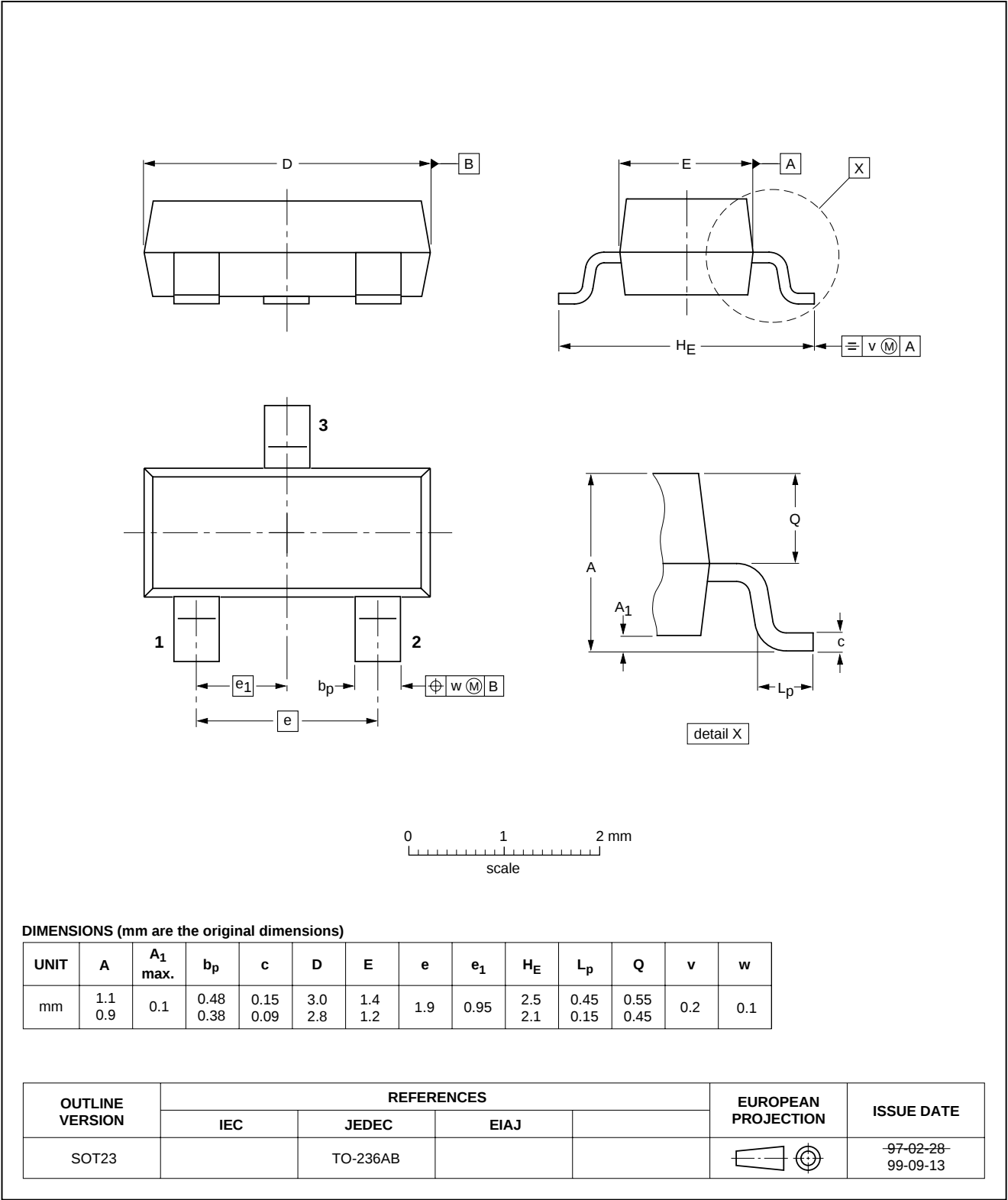
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



50 V low V_{CEsat} NPN transistor

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DATA SHEET STATUS

DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITIONS
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NOTES

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NOTES

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