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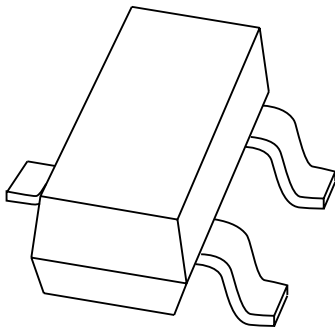
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Kind regards,

Team Nexperia

# DATA SHEET



**PBSS4120T**

20 V, 1 A

NPN low  $V_{CEsat}$  (BISS) transistor

Product data sheet

2003 Sep 29

# 20 V, 1 A NPN low $V_{CEsat}$ (BISS) transistor

**PBSS4120T**

### FEATURES

- Low collector-emitter saturation voltage  $V_{CEsat}$
- High collector current capability  $I_C$  and  $I_{CM}$
- High efficiency leading to less heat generation
- Reduced printed-circuit board requirements
- Cost effective alternative to MOSFETs in specific applications.

### APPLICATIONS

- Power management
  - DC/DC conversion
  - Supply line switching
  - Battery charger
  - LCD backlighting.
- Peripheral driver
  - Driver in low supply voltage applications (e.g. lamps and LEDs)
  - Inductive load drivers (e.g. relays, buzzers and motors).

### DESCRIPTION

NPN BISS transistor in a SOT23 plastic package providing ultra low  $V_{CEsat}$  and  $R_{CEsat}$  parameters.  
PNP complement: PBSS5120T.

### MARKING

TYPE NUMBER	MARKING CODE <sup>(1)</sup>
PBSS4120T	*3B

### Note

1. \* = p: made in Hong Kong.  
\* = t: made in Malaysia.  
\* = W: made in China.

### ORDERING INFORMATION

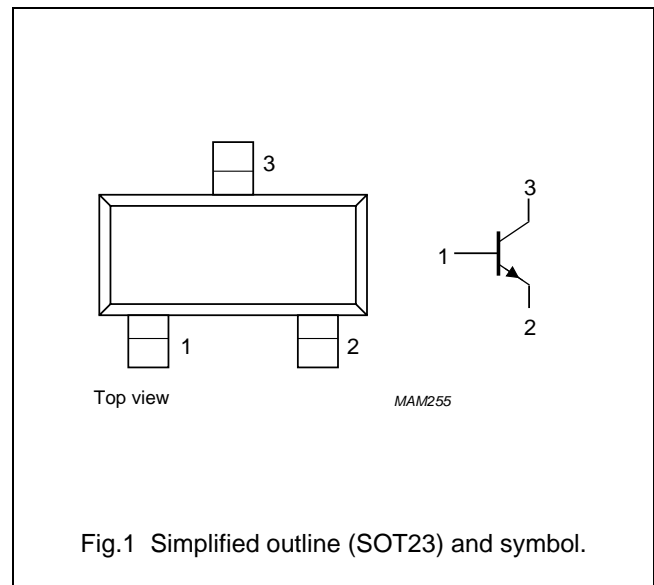
TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS4120T	–	plastic surface mounted package; 3 leads	SOT23

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	20	V
$I_C$	collector current (DC)	1	A
$I_{CM}$	peak collector current	3	A
$R_{CEsat}$	equivalent on-resistance	200	m $\Omega$

### PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



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PBSS4120T

**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	–	30	V
$V_{CEO}$	collector-emitter voltage	open base	–	20	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	V
$I_C$	collector current (DC)		–	1	A
$I_{CM}$	peak collector current		–	3	A
$I_{BM}$	peak base current		–	300	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; note 1	–	300	mW
		$T_{amb} \leq 25\text{ °C}$ ; note 2	–	480	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	operating ambient temperature		–65	+150	°C

**Notes**

1. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated, standard footprint.
2. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.

**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 FR4 printed-circuit board, single-sided copper, tinplated, standard footprint.
2. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.

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**CHARACTERISTICS** $T_{amb} = 25\text{ °C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0$	–	–	100	nA
		$V_{CB} = 30\text{ V}; I_E = 0; T_j = 150\text{ °C}$	–	–	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0$	–	–	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 2\text{ V}; I_C = 100\text{ mA}$	350	470	–	
		$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}$	300	450	–	
		$V_{CE} = 2\text{ V}; I_C = 1\text{ A}$	280	420	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 1\text{ mA}$	–	–	80	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	–	110	mV
		$I_C = 750\text{ mA}; I_B = 15\text{ mA}$	–	–	200	mV
		$I_C = 1\text{ A}; I_B = 50\text{ mA}; \text{note 1}$	–	–	250	mV
$R_{CEsat}$	equivalent on-resistance	$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$	–	–	220	$\text{m}\Omega$
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 100\text{ mA}; \text{note 1}$	–	–	1.1	V
$V_{BEon}$	base-emitter turn-on voltage	$V_{CE} = 2\text{ V}; I_C = 100\text{ mA}$	–	–	0.75	V
$f_T$	transition frequency	$I_C = 100\text{ mA}; V_{CE} = 10\text{ V};$ $f = 100\text{ MHz}$	100	–	–	MHz
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0;$ $f = 1\text{ MHz}$	–	–	20	pF

**Note**

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

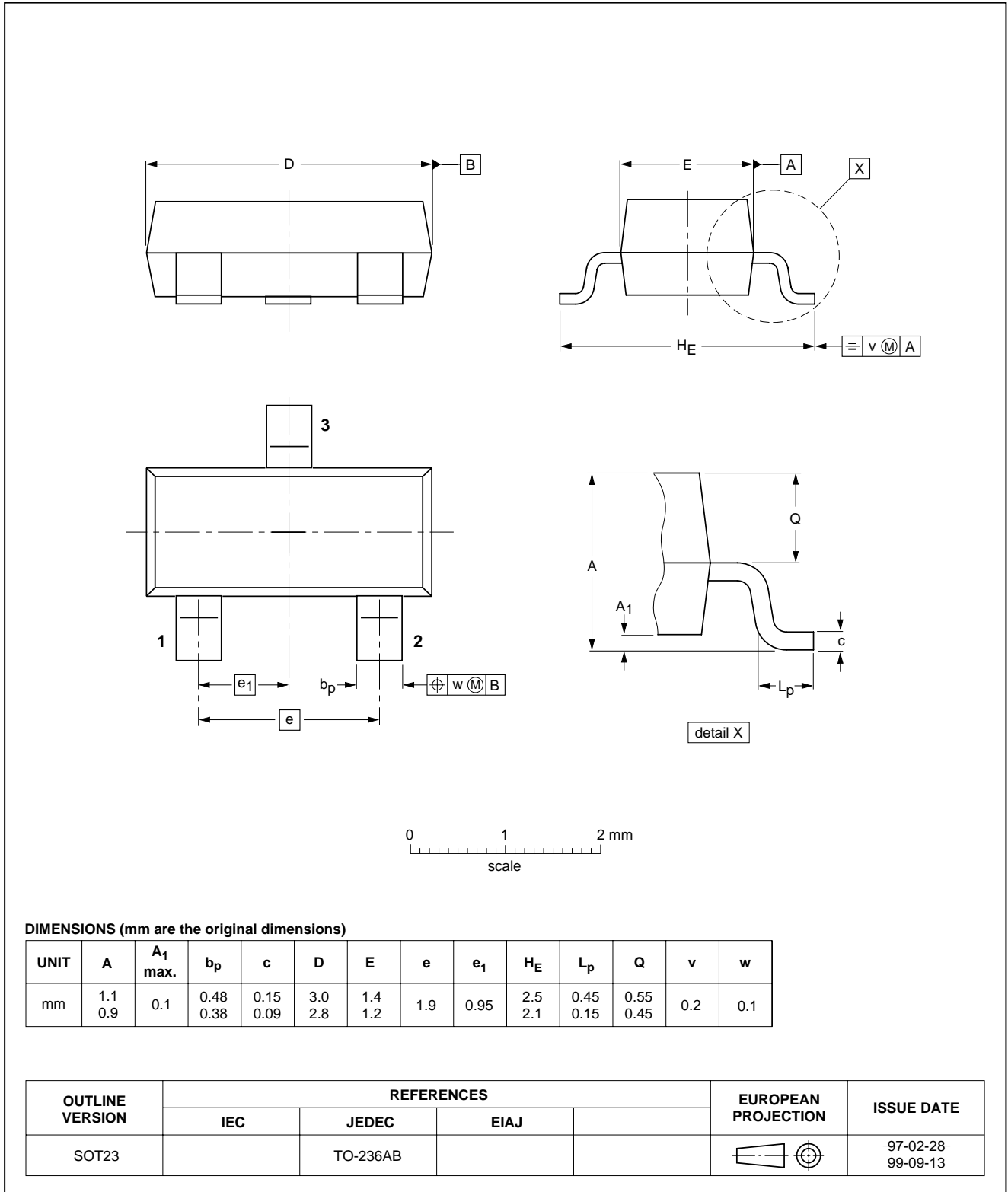
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



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

PBSS4120T

## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	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***

## **Customer notification**

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## **Contact information**

For additional information please visit: <http://www.nxp.com>

For sales offices addresses send e-mail to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

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