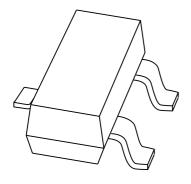
# **DISCRETE SEMICONDUCTORS**

# DATA SHEET



PBSS4120T 20 V, 1 A NPN low V<sub>CEsat</sub> (BISS) transistor

Product data sheet 2003 Sep 29



# 20 V, 1 A NPN low V<sub>CEsat</sub> (BISS) transistor

# **PBSS4120T**

#### **FEATURES**

- Low collector-emitter saturation voltage V<sub>CEsat</sub>
- High collector current capability I<sub>C</sub> and I<sub>CM</sub>
- · 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  $\rm V_{CEsat}$  and  $\rm R_{CEsat}$  parameters.

PNP complement: PBSS5120T.

#### **MARKING**

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

## Note

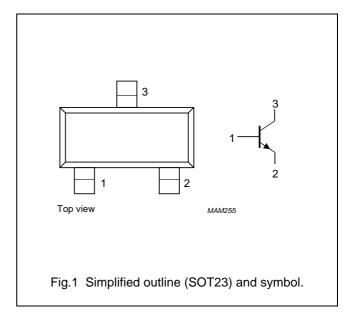
- 1. \* = p: made in Hong Kong.
  - \* = t: made in Malaysia.
  - \* = W: made in China.

#### **QUICK REFERENCE DATA**

SYMBOL	PARAMETER	MAX.	UNIT
V <sub>CEO</sub>	collector-emitter voltage	20	V
I <sub>C</sub>	collector current (DC)	1	Α
I <sub>CM</sub>	peak collector current	3	Α
R <sub>CEsat</sub>	equivalent on-resistance	200	$m\Omega$

#### **PINNING**

PIN	DESCRIPTION	
1	base	
2	emitter	
3	collector	



### **ORDERING INFORMATION**

TVDE NIIMDED	TYPE NUMBER PACKAGE  NAME DESCRIPTION VERSION		
ITPE NUMBER			VERSION
PBSS4120T	<ul> <li>plastic surface mounted package; 3 leads</li> </ul>		SOT23

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**PBSS4120T** 

#### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter	_	30	V
V <sub>CEO</sub>	collector-emitter voltage	open base	_	20	V
V <sub>EBO</sub>	emitter-base voltage	open collector	_	5	V
I <sub>C</sub>	collector current (DC)		_	1	Α
I <sub>CM</sub>	peak collector current		_	3	Α
I <sub>BM</sub>	peak base current		_	300	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	_	300	mW
		T <sub>amb</sub> ≤ 25 °C; note 2	_	480	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C
T <sub>j</sub>	junction temperature		_	150	°C
T <sub>amb</sub>	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 <sub>th j-a</sub>	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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# 20 V, 1 A NPN low $V_{CEsat}$ (BISS) transistor

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## **CHARACTERISTICS**

 $T_{amb}$  = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 30 V; I <sub>E</sub> = 0	_	_	100	nA
		V <sub>CB</sub> = 30 V; I <sub>E</sub> = 0; T <sub>j</sub> = 150 °C	_	_	50	μΑ
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 4 V; I <sub>C</sub> = 0	_	_	100	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 2 V; I <sub>C</sub> = 100 mA	350	470	-	
		V <sub>CE</sub> = 2 V; I <sub>C</sub> = 500 mA	300	450	_	
		V <sub>CE</sub> = 2 V; I <sub>C</sub> = 1 A	280	420	-	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 100 mA; I <sub>B</sub> = 1 mA	-	_	80	mV
		I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA	_	_	110	mV
		I <sub>C</sub> = 750 mA; I <sub>B</sub> = 15 mA	_	_	200	mV
		I <sub>C</sub> = 1 A; I <sub>B</sub> = 50 mA; note 1	_	_	250	mV
R <sub>CEsat</sub>	equivalent on-resistance	$I_C = 500 \text{ mA}$ ; $I_B = 50 \text{ mA}$ ; note 1	_	_	220	mΩ
V <sub>BEsat</sub>	base-emitter saturation voltage	I <sub>C</sub> = 1 A; I <sub>B</sub> = 100 mA; note 1	_	_	1.1	V
V <sub>BEon</sub>	base-emitter turn-on voltage	V <sub>CE</sub> = 2 V; I <sub>C</sub> = 100 mA	-	_	0.75	V
f <sub>T</sub>	transition frequency	I <sub>C</sub> = 100 mA; V <sub>CE</sub> = 10 V; f = 100 MHz	100	_	_	MHz
C <sub>c</sub>	collector capacitance	$V_{CB} = 10 \text{ V}; I_E = I_e = 0;$ f = 1 MHz	_	_	20	pF

## Note

1. Pulse test:  $t_p \le 300~\mu s;~\delta \le 0.02.$ 

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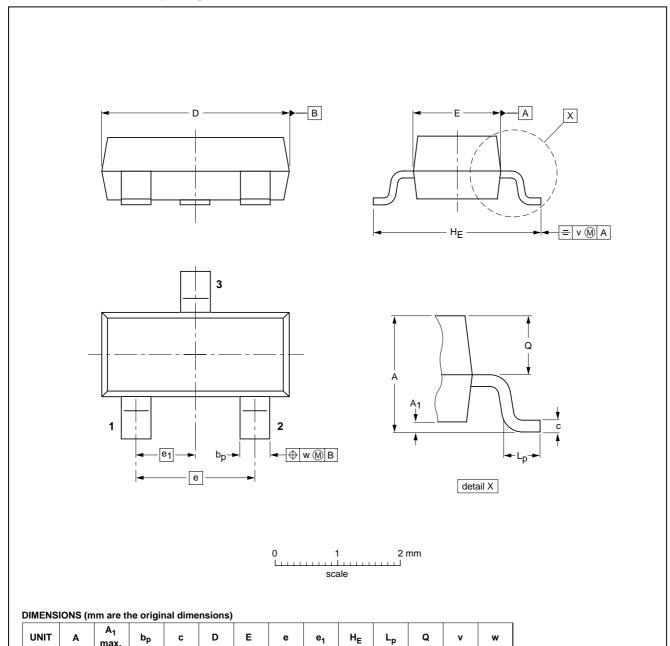
# 20 V, 1 A NPN low $V_{CEsat}$ (BISS) transistor

PBSS4120T

### **PACKAGE OUTLINE**

Plastic surface mounted package; 3 leads

SOT23



OUTLINE	REFERENCES		EUROPEAN	ISSUE DATE		
VERSION	IEC	JEDEC	EIAJ		PROJECTION	1330E DATE
SOT23		TO-236AB				<del>97-02-28</del> 99-09-13

0.95

0.45

0.15

0.55

0.45

0.1

1.4 1.2

1.9

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0.48

0.38

0.1

mm

0.15

0.09

3.0

2.8

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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.

#### **Notes**

- 1. Please consult the most recently issued document before initiating or completing a design.
- 2. 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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### **Contact information**

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