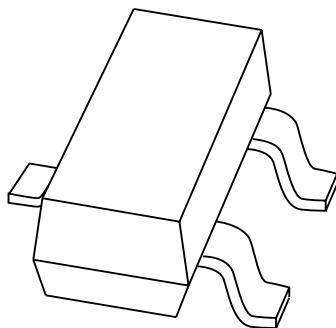


DATA SHEET



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 ⁽¹⁾
PBSS4120T	*3B

Note

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

ORDERING INFORMATION

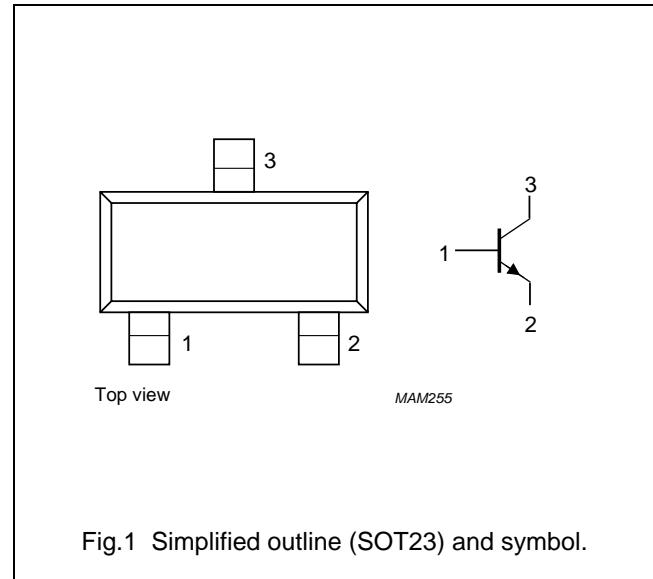
TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS4120T	–	plastic surface mounted package; 3 leads	SOT23

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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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	$T_{amb} \leq 25^\circ\text{C}$; note 1	–	300	mW
		$T_{amb} \leq 25^\circ\text{C}$; 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 cm².

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 cm².

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CHARACTERISTICS $T_{amb} = 25^\circ\text{C}$ 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
		$V_{CB} = 30\text{ V}; I_E = 0; T_j = 150^\circ\text{C}$	—	—	50	μA
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: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$.

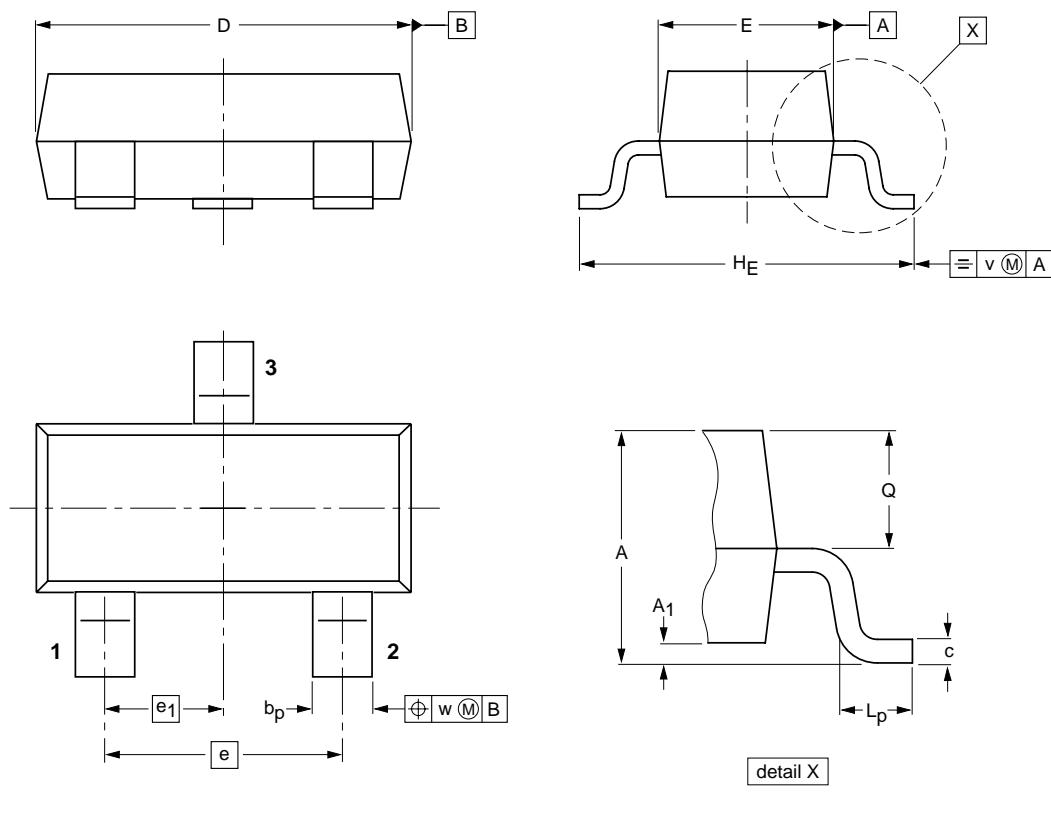
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



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

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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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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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