DISCRETE SEMICONDUCTORS

DATA SHEET



PBSS4140T 40 V, 1A NPN low V_{CEsat} (BISS) transistor

Product specification Supersedes data of 2005 Feb 14 2005 Feb 24





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

PBSS4140T

FEATURES

- · Low collector-emitter saturation voltage
- · High current capabilities.
- Improved device reliability due to reduced heat generation.

APPLICATIONS

- · General purpose switching and muting
- LCD backlighting
- Supply line switching circuits
- Battery driven equipment (mobile phones, video cameras and hand-held devices).

DESCRIPTION

NPN low V_{CEsat} transistor in a SOT23 plastic package. PNP complement: PBSS5140T.

MARKING

TYPE NUMBER	MARKING CODE ⁽¹⁾
PBSS4140T	ZT*

Note

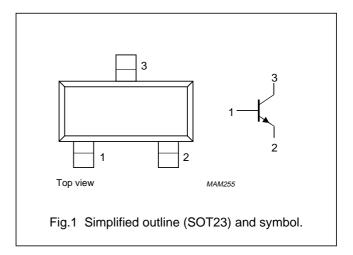
- 1. * = p: made in Hong Kong.
 - * = t: made in Malaysia.
 - * = W: made in China.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	40	V
I _{CM}	peak collector current	2	Α
R _{CEsat}	equivalent on-resistance	<500	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



ORDERING INFORMATION

TYPE	PACKAGE				
NUMBER	NAME	DESCRIPTION VERSION			
PBSS4140T	_	plastic surface mounted package; 3 leads	SOT23		

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LIMITING VALUES

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

SYMBOL	PARAMETER	PARAMETER CONDITIONS		MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter	_	40	V
V _{CEO}	collector-emitter voltage	open base	_	40	V
V _{EBO}	emitter-base voltage	open collector	_	5	V
I _C	collector current (DC)		_	1	Α
I _{CM}	peak collector current		_	2	Α
I _{BM}	peak base current		_	1	Α
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C; note 1	_	300	mW
		T _{amb} ≤ 25 °C; note 2	_	450	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 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 cm².

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	TYPICAL	UNIT
R _{th(j-a)}	thermal resistance from junction	in free air; note 1	417	K/W
	to ambient	in free air; note 2	278	K/W

Notes

- 1. Device mounted on a printed-circuit board, single sided copper, tinplated and standard footprint.
- $2. \quad \text{Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm2.}$

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CHARACTERISTICS

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

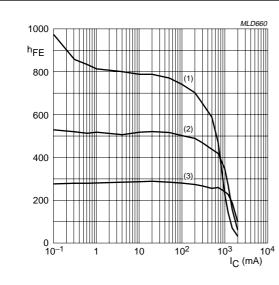
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CBO}	collector-base cut-off	V _{CB} = 40 V; I _E = 0 A	_	_	100	nA
	current	V _{CB} = 40 V; I _E = 0 A; T _{amb} = 150 °C	_	_	50	μΑ
I _{CEO}	collector-emitter cut-off current	V _{CE} = 30 V; I _B = 0 A	_	_	100	nA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A	_	_	100	nA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 1 mA	300	_	_	
		V _{CE} = 5 V; I _C = 500 mA	300	_	900	
		V _{CE} = 5 V; I _C = 1 A	200	_	_	
V_{CEsat}	V _{CEsat} collector-emitter saturation	I _C = 100 mA; I _B = 1 mA	_	_	200	mV
voltage	voltage	$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}$	_	_	250	mV
		I _C = 1 A; I _B = 100 mA	_	_	500	mV
R _{CEsat}	equivalent on-resistance	$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}; \text{ note 1}$	_	260	<500	mΩ
V _{BEsat}	base-emitter saturation voltage	I _C = 1 A; I _B = 100 mA	_	_	1.2	V
V _{BEon}	base-emitter turn-on voltage	V _{CE} = 5 V; I _C = 1 A	_	_	1.1	V
f _T	transition frequency	I _C = 50 mA; V _{CE} = 10 V; f = 100 MHz	150	_	_	MHz
C _c	collector capacitance	V _{CB} = 10 V; I _E = I _e = 0 A; f = 1 MHz	_	_	10	pF

Note

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

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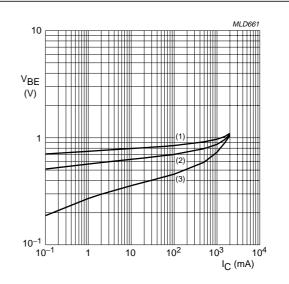
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 $V_{CE} = 5 V.$

- (1) $T_{amb} = 150 \, ^{\circ}C$.
- (2) T_{amb} = 25 °C.
- (3) $T_{amb} = -55$ °C.

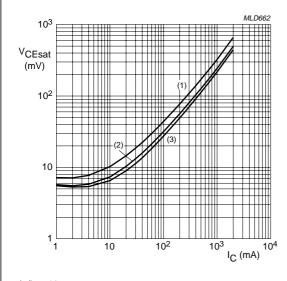
Fig.2 DC current gain as a function of collector current; typical values.



V_{CE} = 5 V.

- (1) $T_{amb} = -55 \, ^{\circ}C$.
- (2) T_{amb} = 25 °C.
- (3) $T_{amb} = 150 \, ^{\circ}C$.

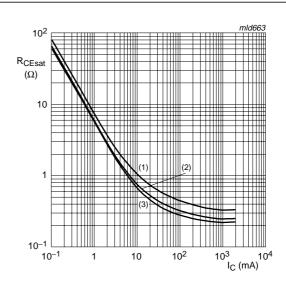
Fig.3 Base-emitter voltage as a function of collector current; typical values.



 $I_{\rm C}/I_{\rm B} = 10.$

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

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



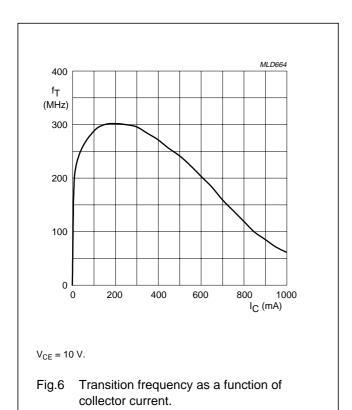
 $I_{\rm C}/I_{\rm B} = 10.$

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

Fig.5 Equivalent on-resistance as a function of collector current; typical values.

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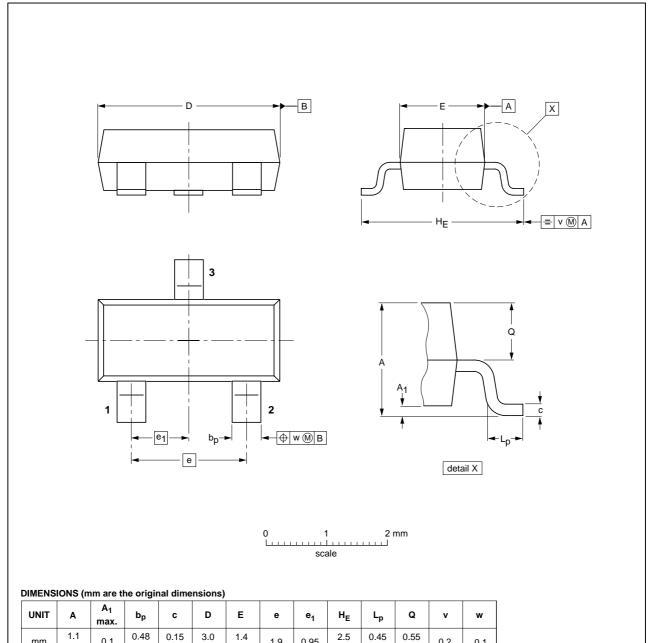
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PACKAGE OUTLINE



SOT23



OUTLINE	REFERENCES		EUROPEAN	ICCUE DATE		
VERSION	IEC	JEDEC	JEITA		PROJECTION ISSUE DA	
SOT23		TO-236AB				-99-09-13- 04-11-04

0.1

1.9

2005 Feb 24 7

0.38

0.9

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DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS(2)(3)	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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Notes

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- 3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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