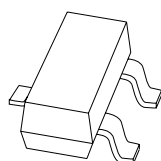


DATA SHEET



PBSS4140T

40 V, 1A

NPN low V_{CEsat} (BISS) transistor

Product specification
Supersedes data of 2001 Jul 13

2004 Mar 16

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

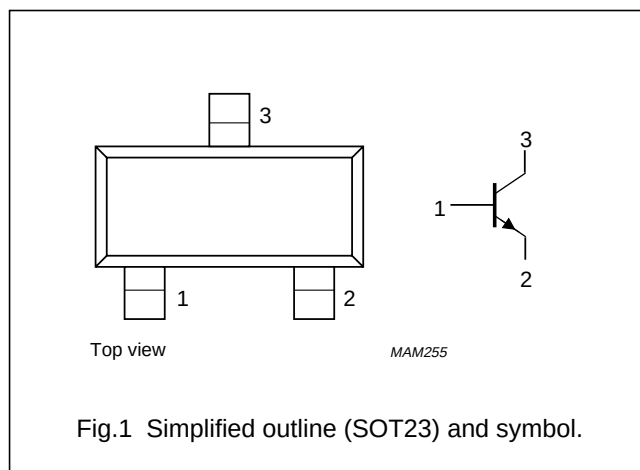
1. * = p: made in Hong Kong.
* = t: made in Malaysia.
* = W: made in China.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	40	V
I_{CM}	peak collector current	2	A
R_{CEsat}	equivalent on-resistance	<500	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

**ORDERING INFORMATION**

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

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

PBSS4140T

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	–	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	A
I_{CM}	peak collector current		–	2	A
I_{BM}	peak base current		–	1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	–	300	mW
		$T_{amb} \leq 25\text{ °C}$; 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 to ambient	in free air; note 1	417	K/W
		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. Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm².

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

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CHARACTERISTICS

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

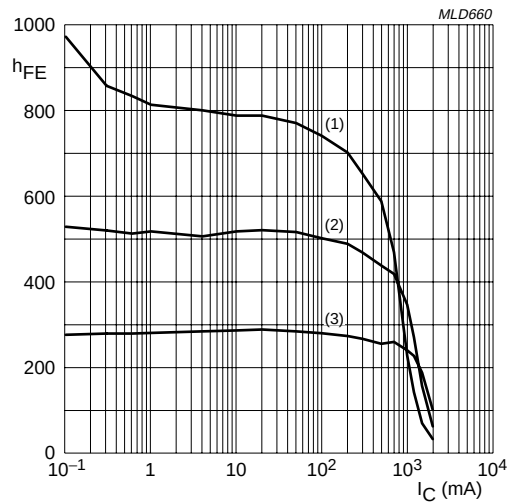
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	$V_{CB} = 40\text{ V}; I_E = 0\text{ A}$	–	–	100	nA
		$V_{CB} = 40\text{ V}; I_E = 0\text{ A}; T_{amb} = 150\text{ °C}$	–	–	50	μA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30\text{ V}; I_B = 0\text{ A}$	–	–	100	nA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	–	–	100	nA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 1\text{ mA}$	300	–	–	
		$V_{CE} = 5\text{ V}; I_C = 500\text{ mA}$	300	–	900	
		$V_{CE} = 5\text{ V}; I_C = 1\text{ A}$	200	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 1\text{ mA}$	–	–	200	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	–	250	mV
		$I_C = 1\text{ A}; I_B = 100\text{ mA}$	–	–	500	mV
R_{CEsat}	equivalent on-resistance	$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$	–	260	<500	$\text{m}\Omega$
V_{BEsat}	base-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 100\text{ mA}$	–	–	1.2	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = 5\text{ V}; I_C = 1\text{ A}$	–	–	1.1	V
f_T	transition frequency	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	150	–	–	MHz
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_C = 0\text{ A}; f = 1\text{ MHz}$	–	–	10	pF

Note

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

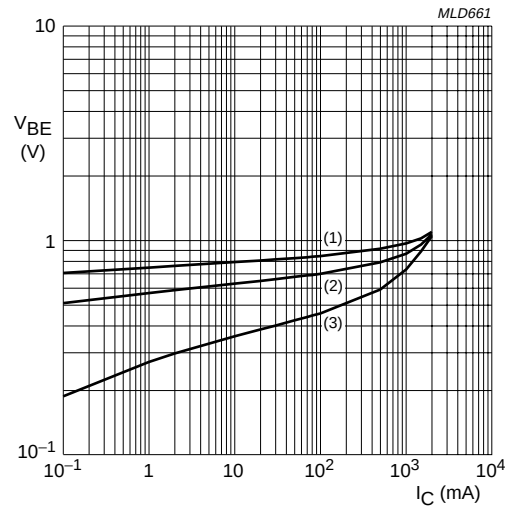
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PBSS4140T



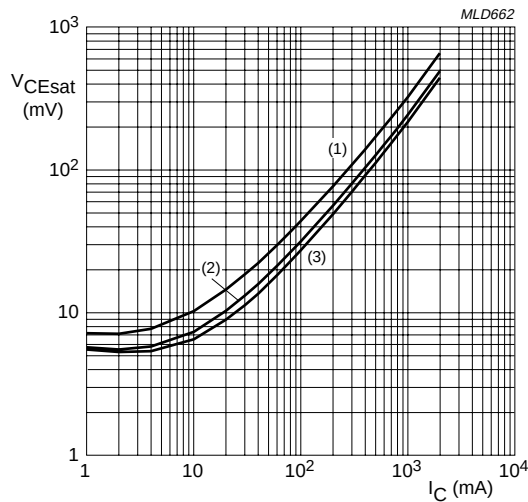
$V_{CE} = 5\text{ V}$.
(1) $T_{amb} = 150^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = -55^\circ\text{C}$.

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



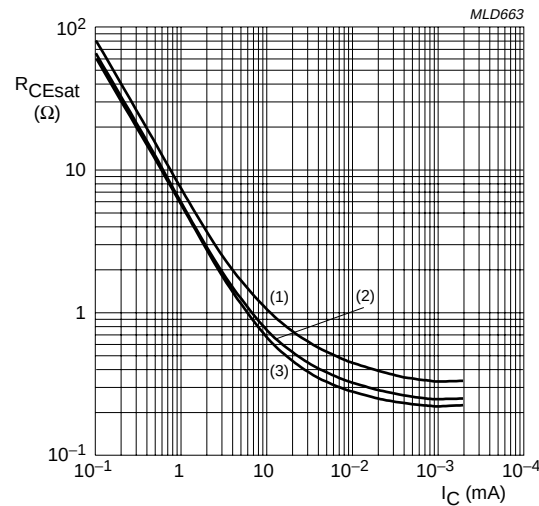
$V_{CE} = 5\text{ V}$.
(1) $T_{amb} = -55^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = 150^\circ\text{C}$.

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



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

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

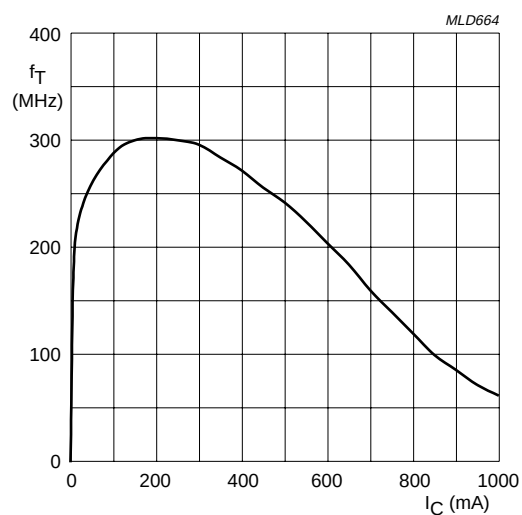


$I_C/I_B = 10$.
(1) $T_{amb} = 150^\circ\text{C}$.
(2) $T_{amb} = 25^\circ\text{C}$.
(3) $T_{amb} = -55^\circ\text{C}$.

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

40 V, 1A
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$V_{CE} = 10$ V.

Fig.6 Transition frequency as a function of collector current.

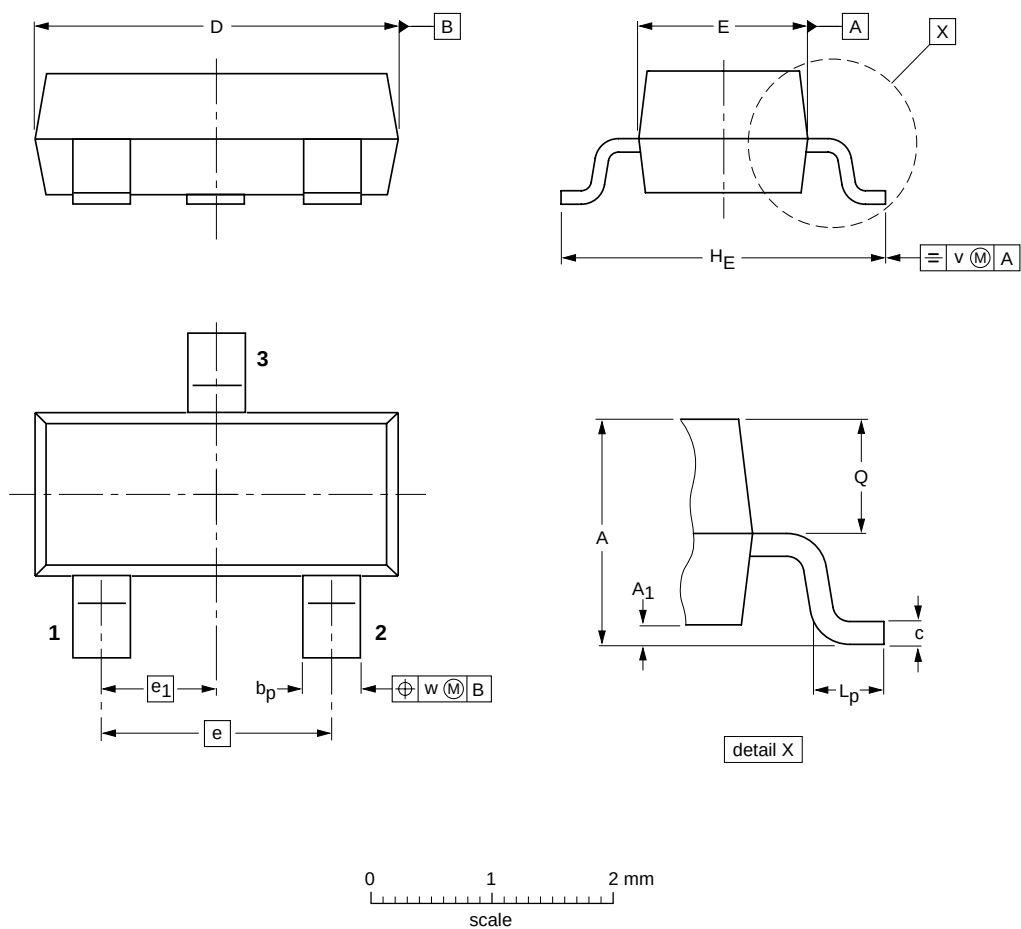
40 V, 1A
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PACKAGE OUTLINE

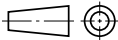
Plastic surface mounted package; 3 leads

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

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

PBSS4140T

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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