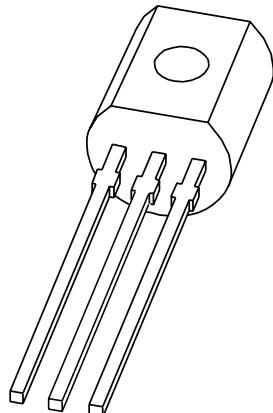


DATA SHEET



PBSS4140S 40 V low V_{CEsat} NPN transistor

Product data sheet
Supersedes data of 2001 Nov 27

2004 Aug 20

40 V low V_{CEsat} NPN transistor

PBSS4140S

FEATURES

- High power dissipation (830 mW)
- Ultra low collector-emitter saturation voltage
- 1 A continuous current
- High current switching
- Improved device reliability due to reduced heat generation.

APPLICATIONS

- Medium power switching and muting
- Linear regulators
- DC/DC converter
- LCD back-lighting
- Supply line switching circuits
- Battery driven equipment (mobile phones, video cameras and hand-held devices).

DESCRIPTION

NPN low V_{CEsat} transistor in a SOT54 plastic package.
PNP complement: PBSS5140S.

MARKING

TYPE NUMBER	MARKING CODE
PBSS4140S	S4140S

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	40	V
I_C	collector current (DC)	1	A
I_{CM}	peak collector current	2	A
R_{CEsat}	equivalent on-resistance	<500	$m\Omega$

PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter

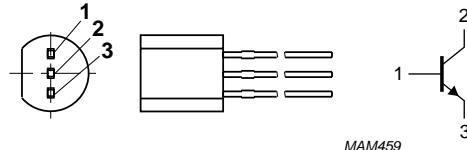


Fig.1 Simplified outline (SOT54) and symbol.

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	$T_{amb} \leq 25^\circ\text{C}$; note 1	–	830	mW
T_{stg}	storage temperature		–65	+150	$^\circ\text{C}$
T_j	junction temperature		–	150	$^\circ\text{C}$
T_{amb}	operating ambient temperature		–65	+150	$^\circ\text{C}$

Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated and standard footprint.

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air; note 1	150	K/W

Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated and standard footprint.

CHARACTERISTICS

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

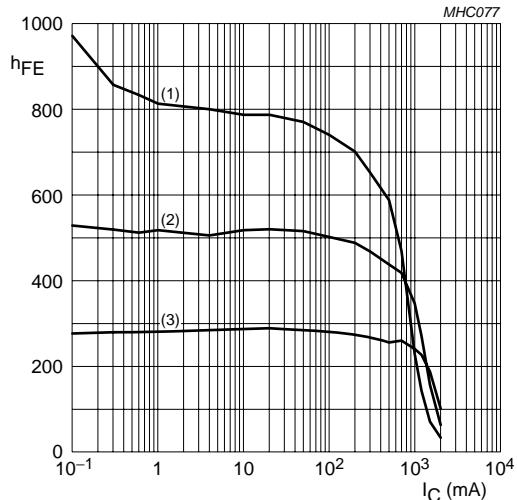
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	$V_{CB} = 40\text{ V}; I_C = 0$	—	—	100	nA
		$V_{CB} = 40\text{ V}; I_C = 0; T_{amb} = 150^\circ\text{C}$	—	—	50	μA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30\text{ V}; I_B = 0$	—	—	100	nA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	—	—	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	$V_{CB} = 10\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$	—	—	10	pF

Note

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

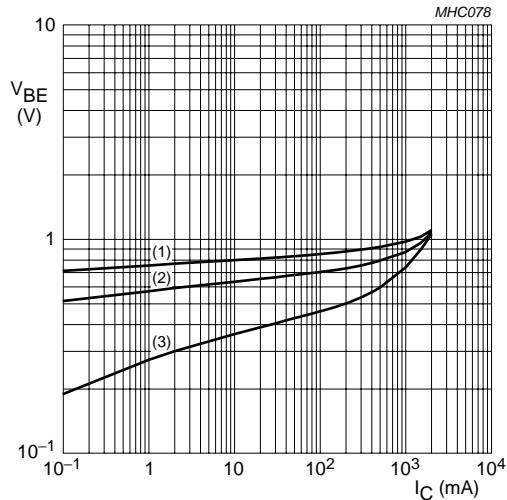
40 V low V_{CEsat} NPN transistor

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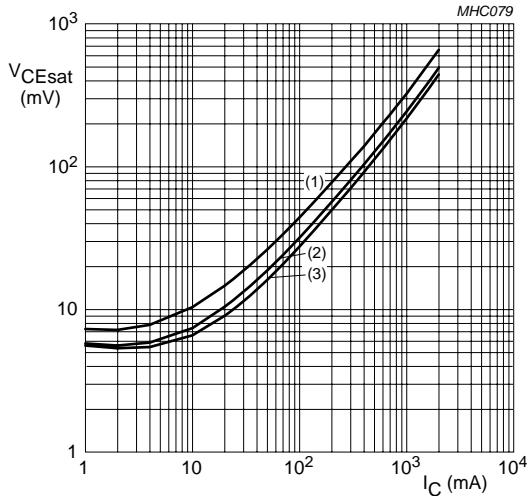
$V_{CE} = 5 \text{ V}$.
 (1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$.
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$.
 (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$.

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



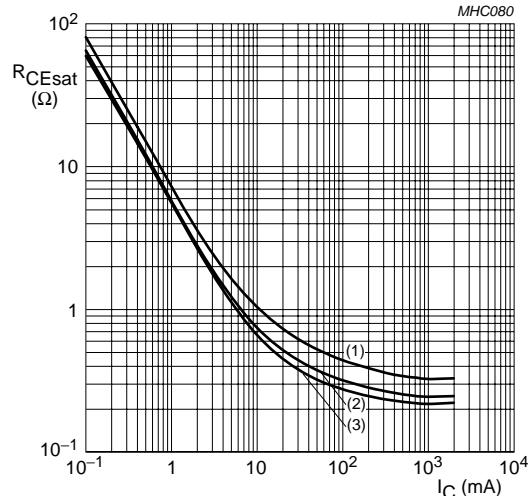
$V_{CE} = 5 \text{ V}$.
 (1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$.
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$.
 (3) $T_{amb} = 150 \text{ }^{\circ}\text{C}$.

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



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

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



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

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

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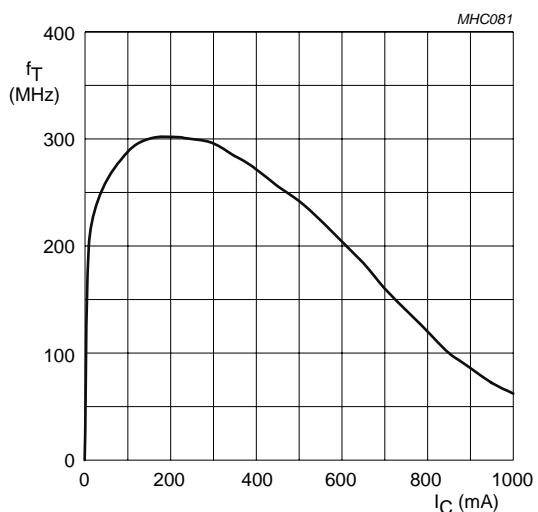
 $V_{CE} = 10$ V.

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

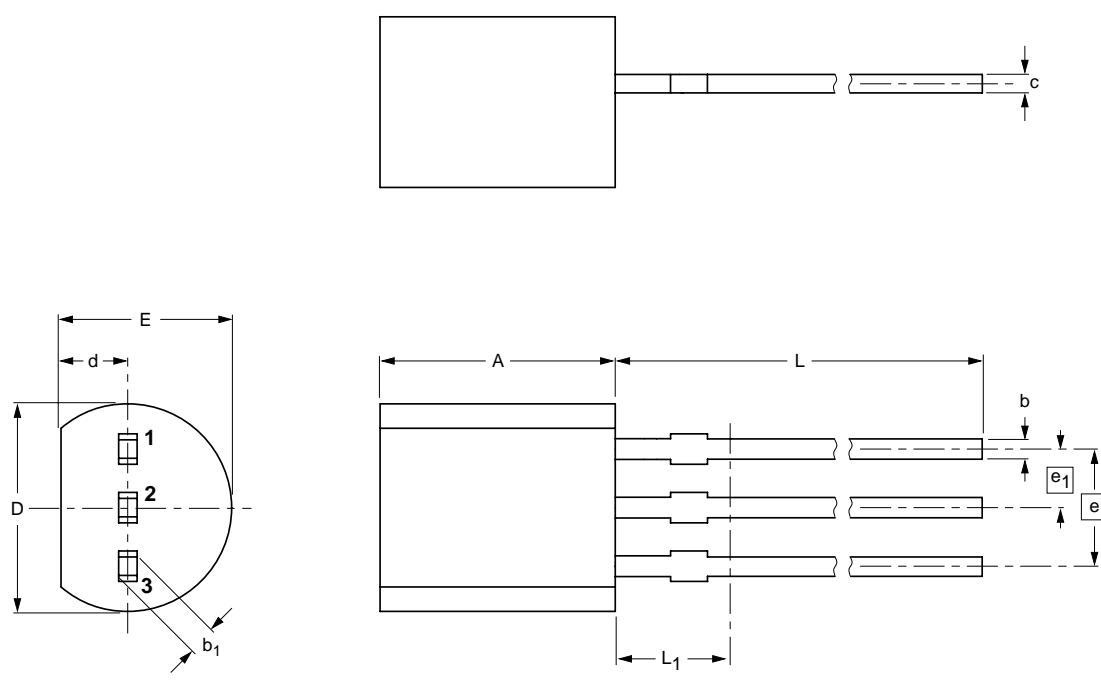
40 V low $V_{CE(sat)}$ NPN transistor

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PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54

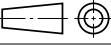


DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	$L_1^{(1)}$ max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT54		TO-92	SC-43A			-04-06-28- 04-11-16

40 V low $V_{CE(sat)}$ NPN transistor

PBSS4140S

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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Contact information

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Printed in The Netherlands

R75/02/PP8

Date of release: 2004 Aug 20

Document order number: 9397 750 13634

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