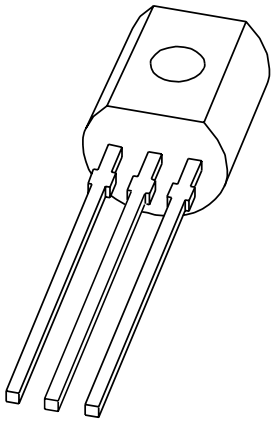
DATA SHEET



PBSS4140S
40 V low V_{CEsat} NPN transistor

Product data sheet
Supersedes data of 2001 Nov 27

2004 Aug 20

NXP founded by Philips

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	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter

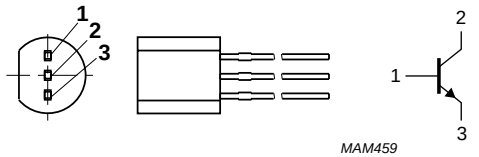


Fig.1 Simplified outline (SOT54) and symbol.

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

Note

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	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.

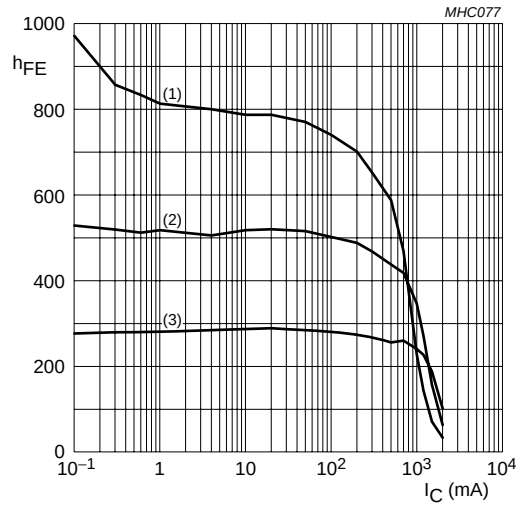
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	V_{CB} = 40 V; I_C = 0	–	–	100	nA
		V_{CB} = 40 V; I_C = 0; T_{amb} = 150 °C	–	–	50	μA
I_{CEO}	collector-emitter cut-off current	V_{CE} = 30 V; I_B = 0	–	–	100	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I_C = 0	–	–	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}	collector-emitter saturation voltage	I_C = 100 mA; I_B = 1 mA	–	–	200	mV
		I_C = 500 mA; I_B = 50 mA	–	–	250	mV
		I_C = 1 A; I_B = 100 mA	–	–	500	mV
R_{CEsat}	equivalent on-resistance	I_C = 500 mA; I_B = 50 mA; 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; f = 1 MHz	–	–	10	pF

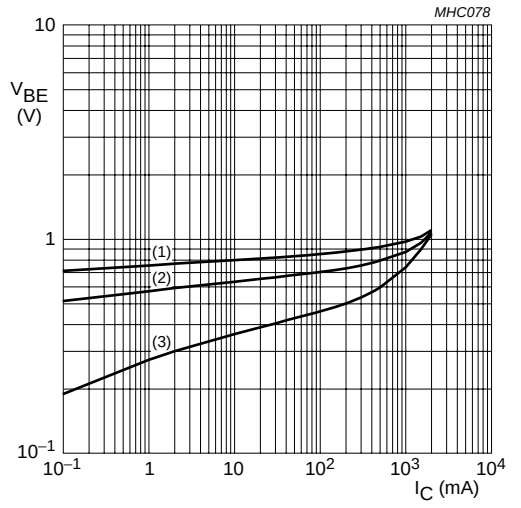
Note

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



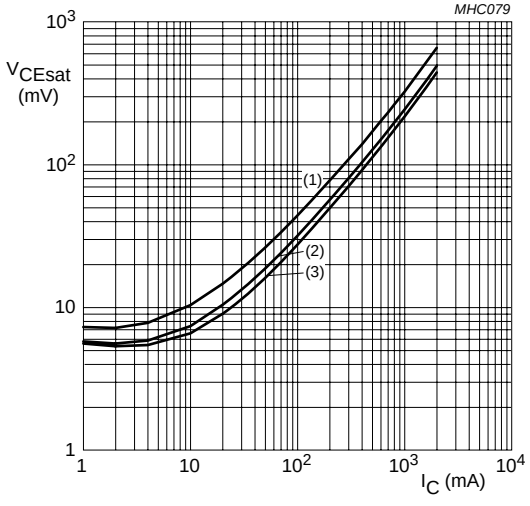
V_{CE} = 5 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



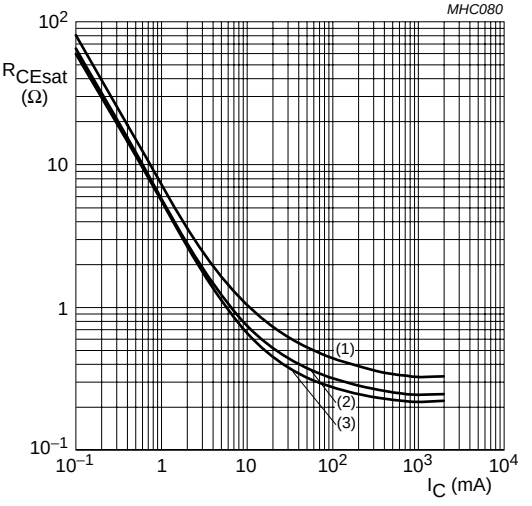
V_{CE} = 5 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



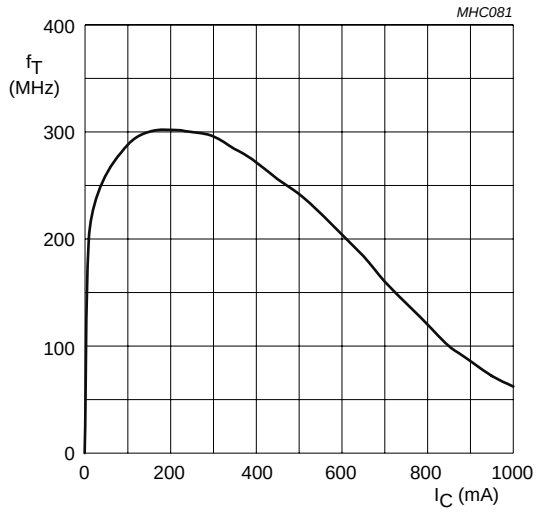
I_C/I_B = 10.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



I_C/I_B = 10.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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

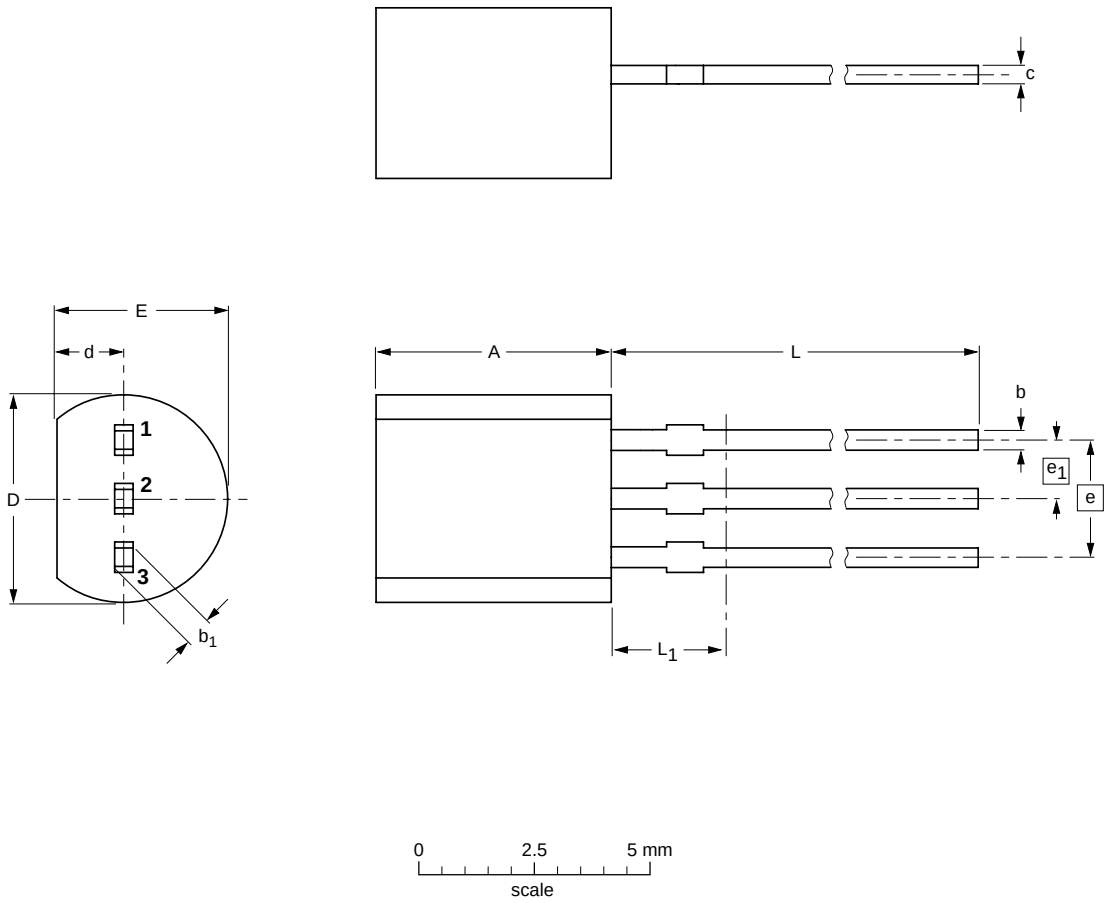


V_{CE} = 10 V.

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

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

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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Customer notification

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Contact information

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