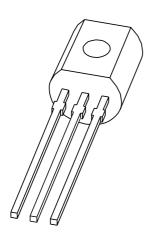
DISCRETE SEMICONDUCTORS

DATA SHEET



PBSS4140S40 V low V_{CEsat} NPN transistor

Product specification

2001 Nov 27





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

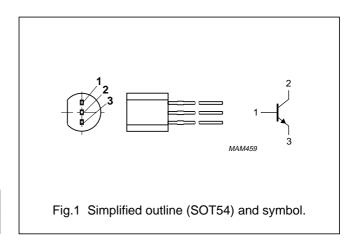
TYPE NUMBER	MARKING CODE
PBSS4140S	S4140S

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V _{CEO}	collector-emitter voltage	40	V
I _C	collector current (DC)	1	Α
I _{CM}	peak collector current	2	Α
R _{CEsat}	equivalent on-resistance	<500	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter



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
Ic	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	_	830	mW
T _{stg}	storage temperature		-65	+150	°C
Tj	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.

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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 °C unless otherwise specified.

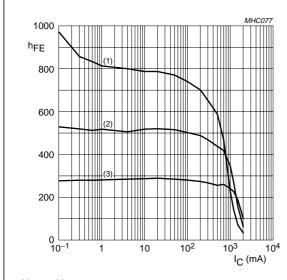
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CBO}	collector-base cut-off	V _{CB} = 40 V; I _C = 0	_	_	100	nA
	current	V _{CB} = 40 V; I _C = 0; T _{amb} = 150 °C	_	_	50	μΑ
I _{CEO}	collector-emitter cut-off current	$V_{CE} = 30 \text{ V}; I_{B} = 0$	_	_	100	nA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 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	I _C = 100 mA; I _B = 1 mA	_	_	200	mV
	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 _{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	$V_{CB} = 10 \text{ V}; I_E = I_e = 0; f = 1 \text{ MHz}$	_	_	10	pF

Note

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

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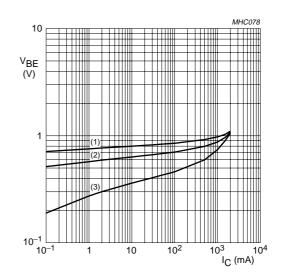
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 $V_{CE} = 5 V$.

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

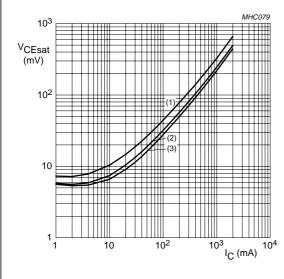
Fig.2 DC current gain as a function of collector current; typical values.



 $V_{CE} = 5 V.$

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

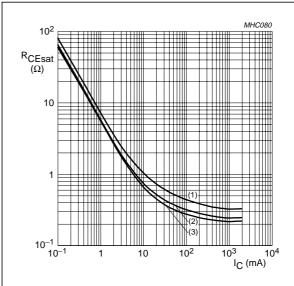
Fig.3 Base-emitter voltage as a function of collector current; typical values.



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

- (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.



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

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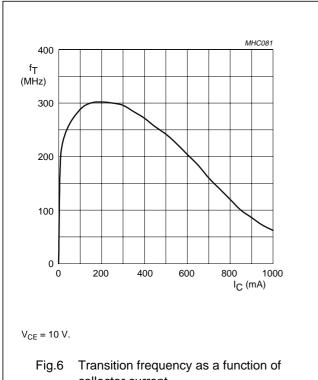
- (1) $T_{amb} = 150 \, ^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = -55 \, ^{\circ}C$.

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

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collector current.

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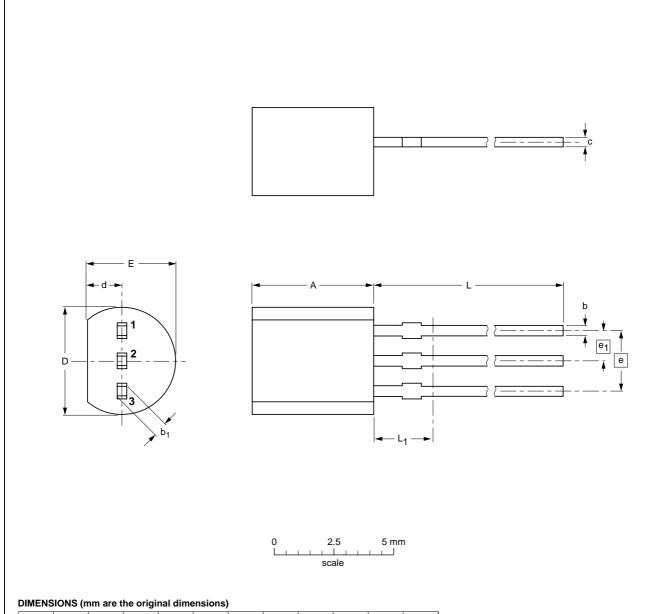
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PACKAGE OUTLINE

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

SOT54



UNIT	Α	b	b ₁	С	D	d	E	е	e ₁	L	L ₁ ⁽¹⁾
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	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	REFERENCES				EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	EIAJ		PROJECTION ISSUE DA		
SOT54		TO-92	SC-43			97-02-28	

40 V low V_{CEsat} NPN transistor

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DATA SHEET STATUS

DATA SHEET STATUS(1)	PRODUCT STATUS ⁽²⁾	DEFINITIONS
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