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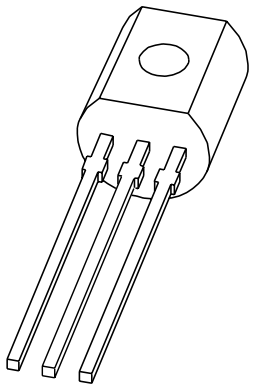
DATA SHEET



PBSS4350S

50 V low V_{CEsat} NPN transistor

Product specification

2001 Nov 19

Philips
Semiconductors

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50 V low V_{CEsat} NPN transistor PBSS4350S

FEATURES

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

APPLICATIONS

- Medium power switching and muting
- Linear regulators
- DC/DC convertor
- Supply line switching circuits
- Battery management applications
- Strobe flash units
- Heavy duty battery powered equipment (motor and lamp drivers).

DESCRIPTION

NPN low V_{CEsat} transistor in a SOT54 plastic package.
PNP complement: PBSS5350S.

MARKING

TYPE NUMBER	MARKING CODE
PBSS4350S	S4350S

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	50	V
I_C	collector current (DC)	3	A
I_{CM}	peak collector current	5	A
R_{CEsat}	equivalent on-resistance	<145	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter

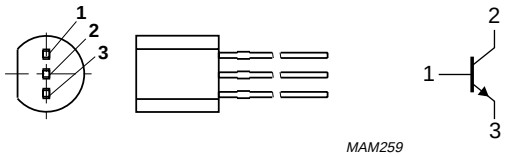


Fig.1 Simplified outline (SOT54) and symbol.

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	–	60	V
V_{CEO}	collector-emitter voltage	open base	–	50	V
V_{EBO}	emitter-base voltage	open collector	–	6	V
I_C	collector current (DC)		–	3	A
I_{CM}	peak collector current		–	5	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.

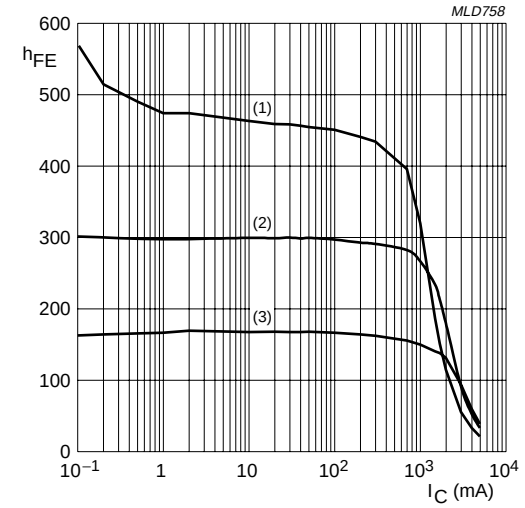
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	V_{CB} = 50 V; I_E = 0	–	–	100	nA
		V_{CB} = 50 V; I_E = 0; T_j = 150 °C	–	–	50	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I_C = 0	–	–	100	nA
h_{FE}	DC current gain	V_{CE} = 2 V; I_C = 500 mA	200	–	–	
		V_{CE} = 2 V; I_C = 1 A; note 1	200	–	–	
		V_{CE} = 2 V; I_C = 2 A; note 1	100	–	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 500 mA; I_B = 50 mA	–	–	90	mV
		I_C = 1 A; I_B = 50 mA	–	–	170	mV
		I_C = 2 A; I_B = 200 mA; note 1	–	–	290	mV
R_{CEsat}	equivalent on-resistance	I_C = 2 A; I_B = 200 mA; note 1	–	110	<145	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = 2 A; I_B = 200 mA; note 1	–	–	1.2	V
V_{BEon}	base-emitter turn-on voltage	V_{CE} = 2 V; I_C = 1 A; note 1	–	–	1.1	V
f_T	transition frequency	I_C = 100 mA; V_{CE} = 5 V; f = 100 MHz	100	–	–	MHz
C_c	collector capacitance	V_{CB} = 10 V; I_E = I_e = 0; f = 1 MHz	–	–	30	pF

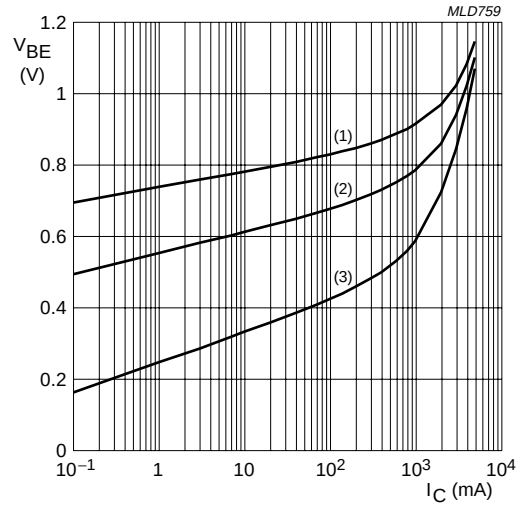
Note

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



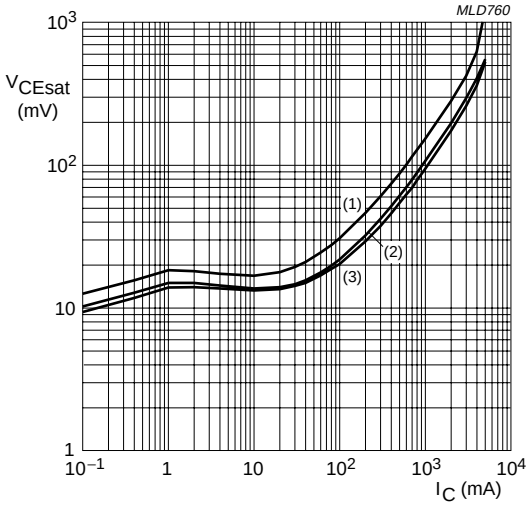
V_{CE} = 2 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

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



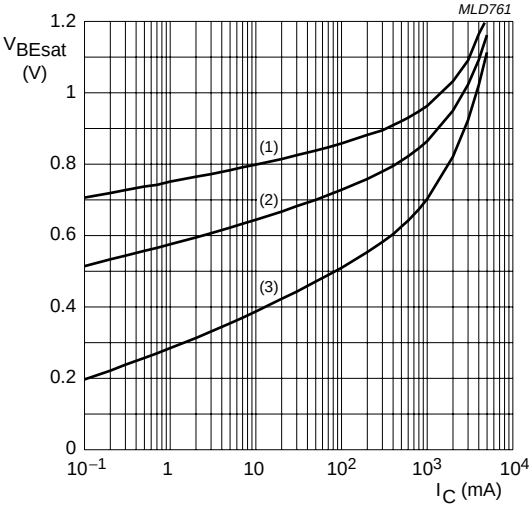
V_{CE} = 2 V.
(1) T_{amb} = –55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



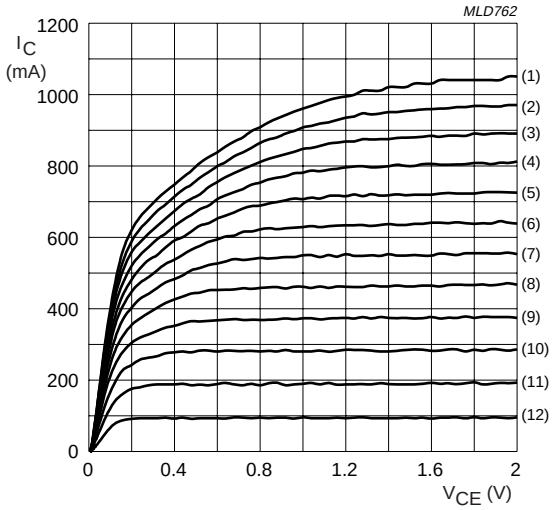
I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

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



I_C/I_B = 20.
(1) T_{amb} = –55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

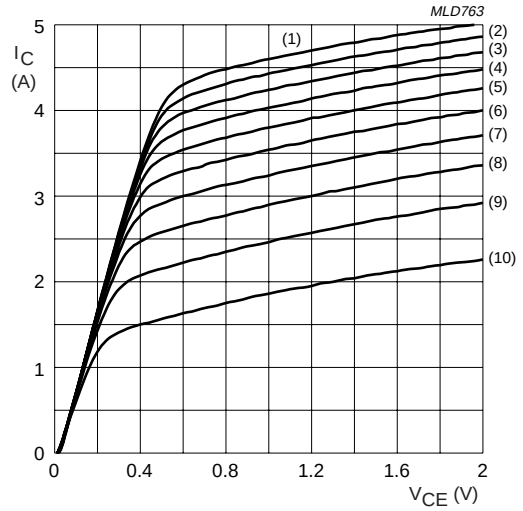
Fig.5 Base-emitter saturation voltage as a function of collector current; typical values.



T_{amb} = 25 °C.

(1) I_B = 3.96 nA.
(2) I_B = 3.63 nA.
(3) I_B = 3.30 nA.
(4) I_B = 2.97 nA.
(5) I_B = 2.64 nA.
(6) I_B = 2.31 nA.
(7) I_B = 1.98 nA.
(8) I_B = 1.65 nA.
(9) I_B = 1.32 nA.
(10) I_B = 0.99 nA.
(11) I_B = 0.66 nA.
(12) I_B = 0.33 nA.

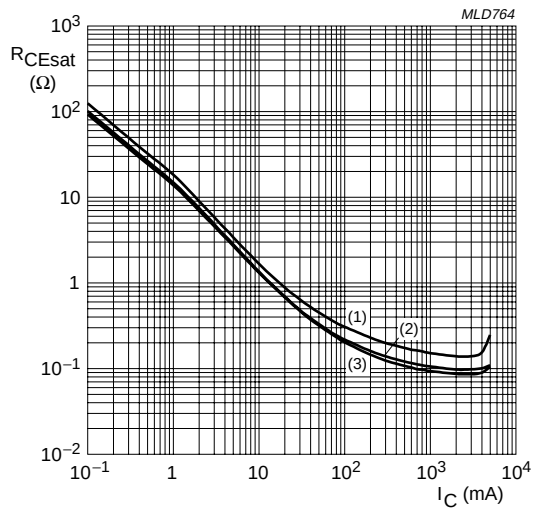
Fig.6 Collector current as a function of collector-emitter voltage; typical values.



T_{amb} = 25 °C.

(1) I_B = 150 mA.
(2) I_B = 135 mA.
(3) I_B = 120 mA.
(4) I_B = 105 mA.
(5) I_B = 90 mA.
(6) I_B = 75 mA.
(7) I_B = 60 mA.
(8) I_B = 45 mA.
(9) I_B = 30 mA.
(10) I_B = 15 mA.

Fig.7 Collector current as a function of collector-emitter voltage; typical values.



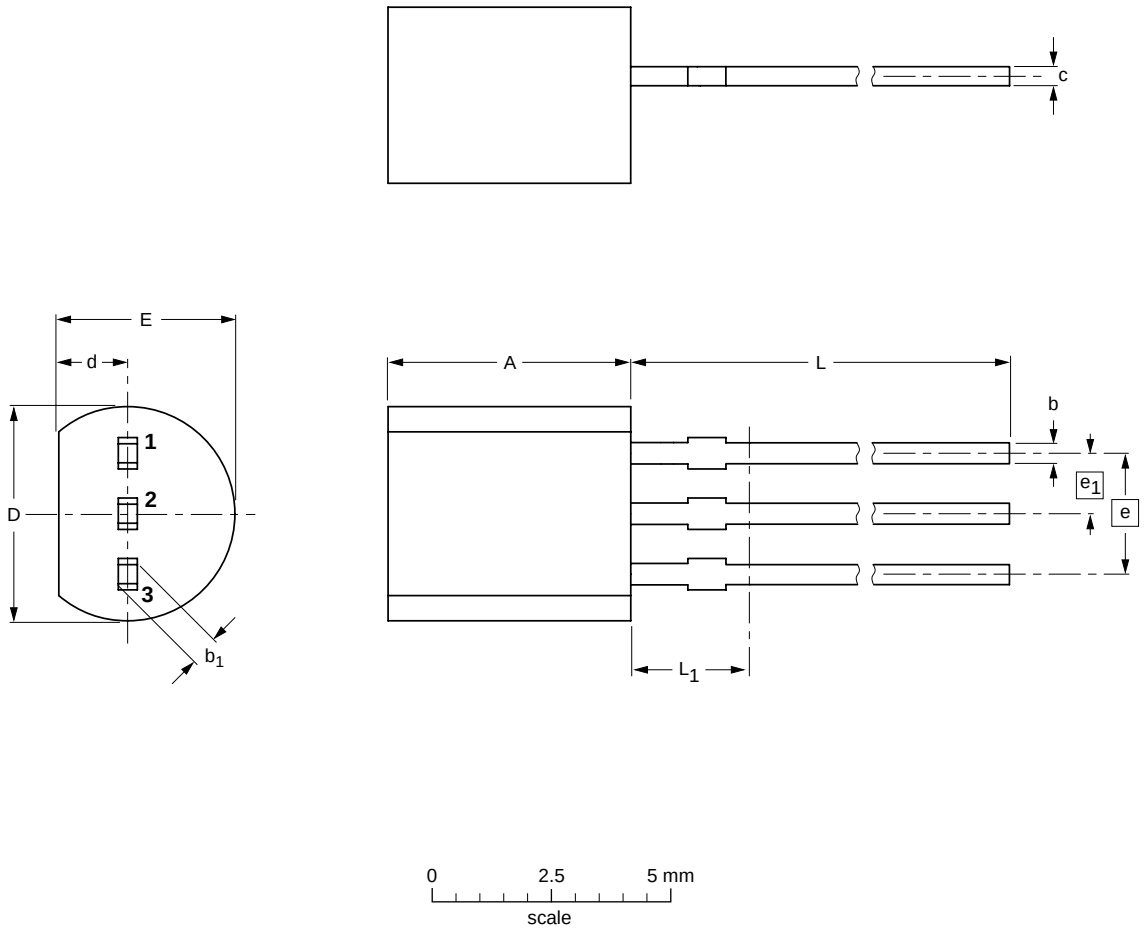
I_C/I_B = 20.

(1) T_{amb} = 150 °C. (2) T_{amb} = 25 °C. (3) T_{amb} = –55 °C.

Fig.8 Collector-emitter equivalent on-resistance as a function of collector current; typical values.

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)
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 VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT54		TO-92	SC-43			97-02-28

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