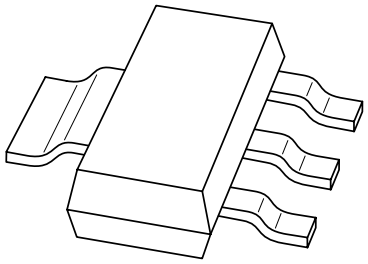
DATA SHEET



PBSS4540Z

40 V low V_{CEsat} NPN transistor

Product data sheet
Supersedes data of 2001 Jul 24

2001 Nov 14

40 V low V_{CEsat} NPN transistor PBSS4540Z

FEATURES

- Low collector-emitter saturation voltage
- High current capabilities
- Improved device reliability due to reduced heat generation.

APPLICATIONS

- Supply line switching circuits
- Battery management applications
- DC/DC converter applications
- Strobe flash units
- Heavy duty battery powered equipment (motor and lamp drivers)
- MOSFET driver applications.

DESCRIPTION

NPN low V_{CEsat} transistor in a SOT223 plastic package.
PNP complement: PBSS5540Z.

MARKING

TYPE NUMBER	MARKING CODE
PBSS4540Z	PB4540

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX	UNIT
V_{CEO}	emitter-collector voltage	40	V
I_C	collector current (DC)	5	A
I_{CM}	peak collector current	10	A
R_{CEsat}	equivalent on-resistance	<71	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter
4	collector

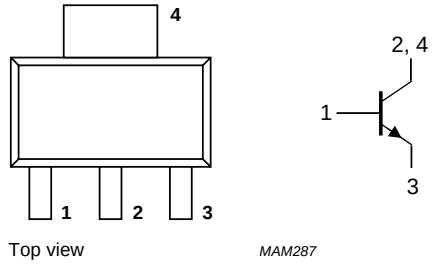


Fig.1 Simplified outline (SOT223) and symbol.

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	–	6	V
I_C	collector current (DC)		–	5	A
I_{CM}	peak collector current		–	10	A
I_{BM}	peak base current		–	2	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; notes 1 and 3	–	1.35	W
		$T_{amb} \leq 25$ °C; notes 2 and 3	–	2	W
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, mounting pad for collector 1 cm^2.
2. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 6 cm^2.
3. For other mounting conditions, see *"Thermal considerations for SOT223 in the General Part of associated Handbook"*.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	92	K/W
		note 2	62.5	K/W

Notes

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm^2.
2. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 6 cm^2.

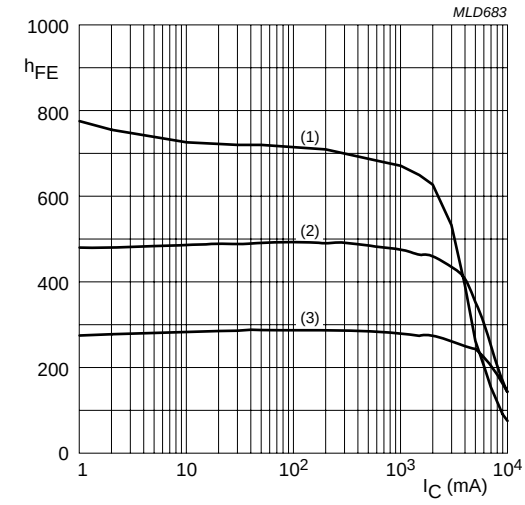
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	V_{CB} = 30 V; I_E = 0	–	–	100	nA
		V_{CB} = 30 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	300	500	–	
		V_{CE} = 2 V; I_C = 1 A; note 1	300	500	–	
		V_{CE} = 2 V; I_C = 2 A; note 1	250	450	–	
		V_{CE} = 2 V; I_C = 5 A; note 1	100	300	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 500 mA; I_B = 5 mA	–	50	90	mV
		I_C = 1 A; I_B = 10 mA	–	75	120	mV
		I_C = 2 A; I_B = 200 mA	–	90	150	mV
		I_C = 5 A; I_B = 500 mA	–	210	355	mV
R_{CEsat}	equivalent on-resistance	I_C = 5 A; I_B = 500 mA; note 1	–	42	71	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = 5 A; I_B = 500 mA	–	1.1	1.3	V
V_{BEon}	base-emitter turn-on voltage	V_{CE} = 2 V; I_C =2 A	–	0.8	1.1	V
f_T	transition frequency	I_C = 100 mA; V_{CE} = 10 V; f = 100 MHz	70	130	–	MHz
C_c	collector capacitance	V_{CB} = 10 V; I_E = I_e = 0; f = 1 MHz	–	60	75	pF

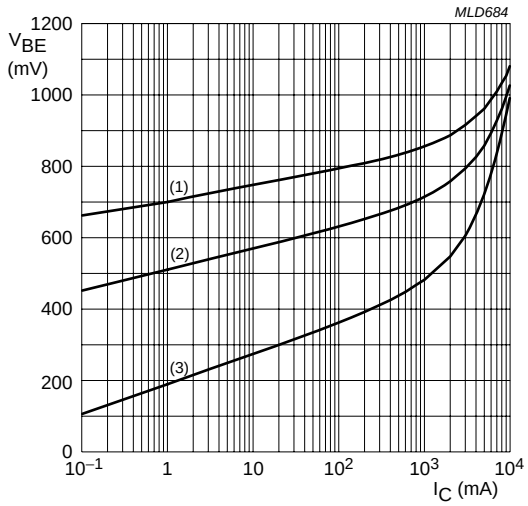
Note

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



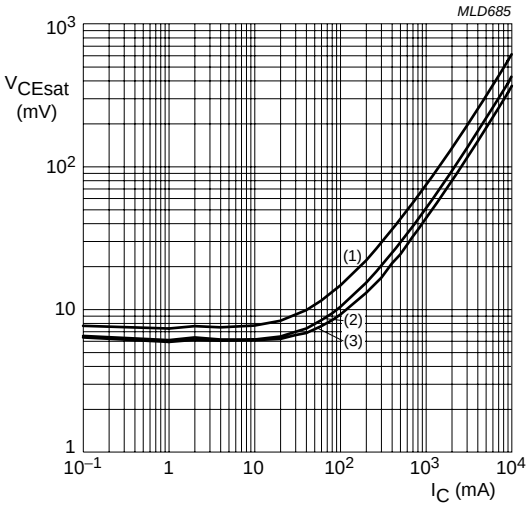
V_{CE} = 2 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



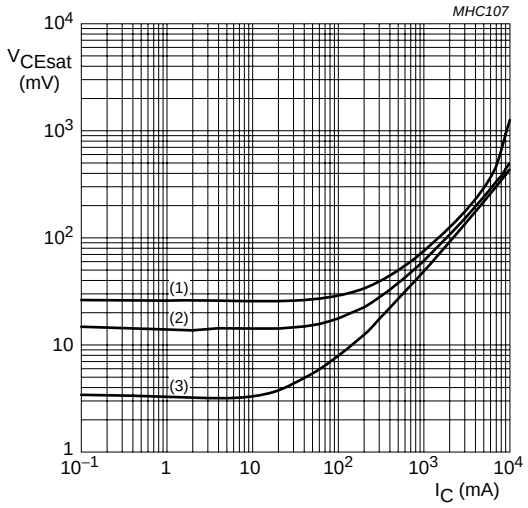
V_{CE} = 2 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



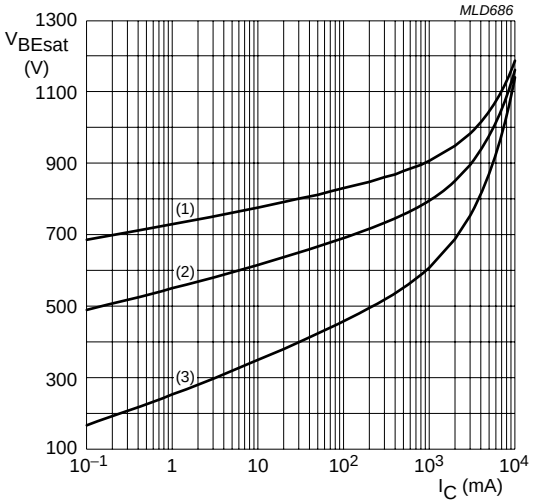
I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



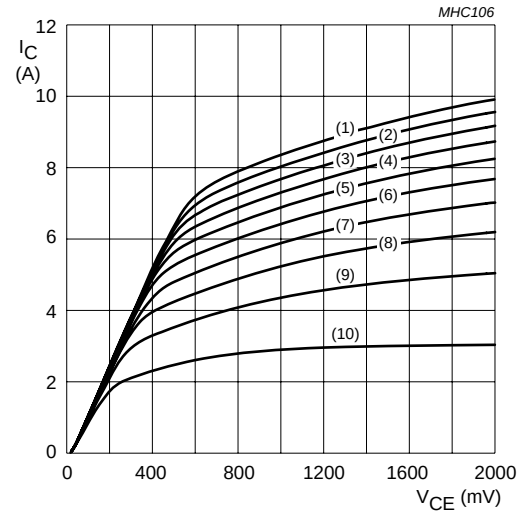
T_{amb} = 25 °C.
(1) I_C/I_B = 100.
(2) I_C/I_B = 50.
(3) I_C/I_B = 10.

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



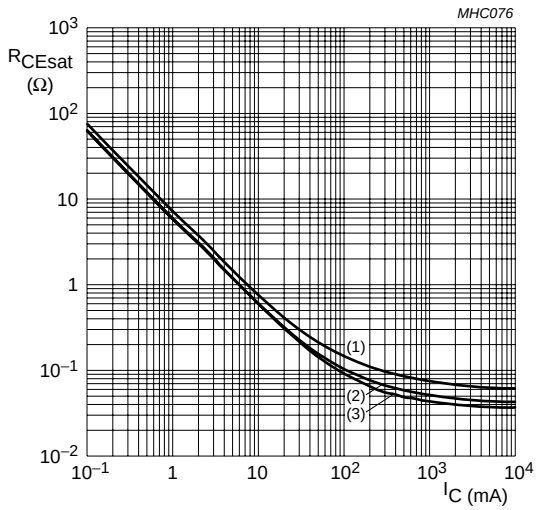
I_C/I_B = 20.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



(1) I_B = 70 mA.
(2) I_B = 63 mA.
(3) I_B = 56 mA.
(4) I_B = 49 mA.
(5) I_B = 42 mA.
(6) I_B = 35 mA.
(7) I_B = 28 mA.
(8) I_B = 21 mA.
(9) I_B = 14 mA.
(10) I_B = 7 mA.

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

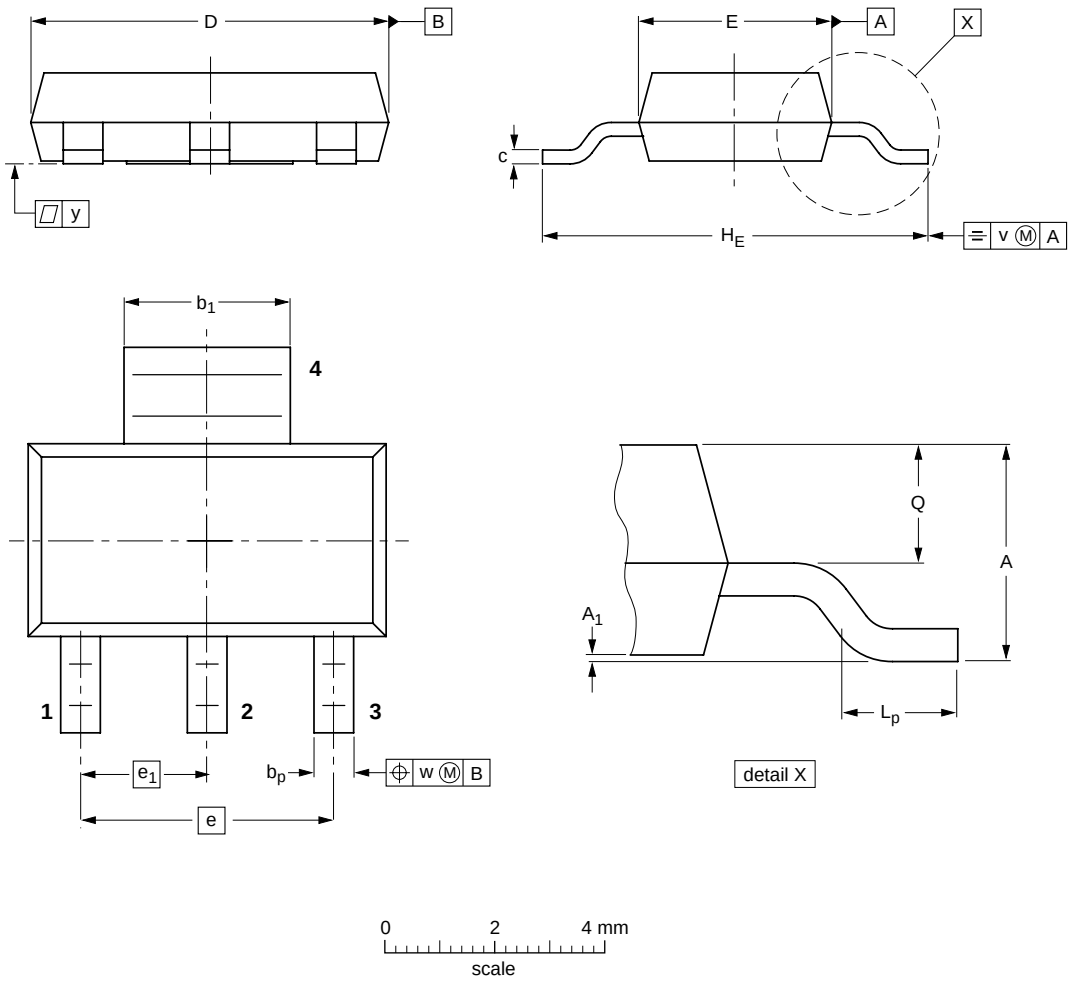


I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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

PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads **SOT223**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	b_1	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT223			SC-73			~~97-02-28~~ 99-09-13

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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