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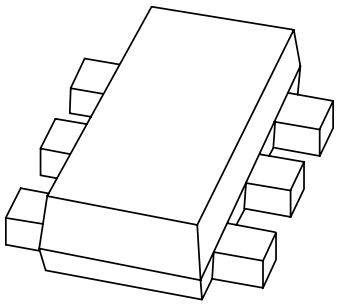
Team Nexperia

DATA SHEET



PBSS4240V

40 V low V_{CEsat} NPN transistor

Product data sheet

2003 Jan 30

NXP founded by Philips

40 V low V_{CEsat} NPN transistor PBSS4240V

FEATURES

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High collector current gain (h_{FE}) at high I_C
- High efficiency leading to reduced heat generation
- Reduced printed-circuit board area requirements.

APPLICATIONS

- Power management:
  - DC-DC converter
  - Supply line switching
  - Battery charger
  - LCD back lighting.
- Peripheral driver:
  - Driver in low supply voltage applications (e.g. lamps and LEDs)
  - Inductive load drivers (e.g. relay, buzzers and motors).

DESCRIPTION

NPN transistor providing low V_{CEsat} and high current capability in a SOT666 plastic package.
PNP complement: PBSS5240V.

MARKING

TYPE NUMBER	MARKING CODE
PBSS4240V	42

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	40	V
I_C	collector current (DC)	2	A
I_{CRP}	peak collector current	2	A
R_{CEsat}	equivalent on-resistance	<190	mΩ

PINNING

PIN	DESCRIPTION
1	collector
2	collector
3	base
4	emitter
5	collector
6	collector

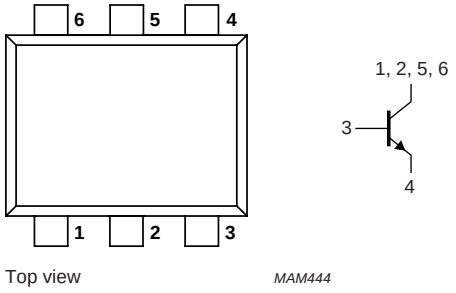


Fig.1 Simplified outline (SOT666) and symbol.

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)	note 1	–	2	A
I_{CRP}	repetitive peak collector current	note 2	–	2	A
I_{CM}	peak collector current		–	3	A
I_B	base current (DC)		–	300	mA
I_{BM}	peak base current		–	1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 3	–	300	mW
		$T_{amb} \leq 25$ °C; note 4	–	500	mW
		$T_{amb} \leq 25$ °C; note 1	–	900	mW
		$T_{amb} \leq 25$ °C; notes 2 and 3	–	1.2	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 ceramic circuit board, Al_2O_3, standard footprint.
2. Operated under pulsed conditions: duty cycle $\delta \leq 20\%$, pulse width $t_p \leq 30$ ms.
3. Device mounted on a printed-circuit board, single-sided copper, tinplated, standard footprint.
4. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm^2.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	410	K/W
		note 2	215	K/W
		note 3	140	K/W
		notes 1 and 4	110	K/W

Notes

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, standard footprint.
2. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm^2.
3. Device mounted on a ceramic circuit board, Al_2O_3, standard footprint.
4. Operated under pulsed conditions: duty cycle $\delta \leq 20\%$, pulse width $t_p \leq 30$ ms.

Soldering

The only recommended soldering method is reflow soldering.

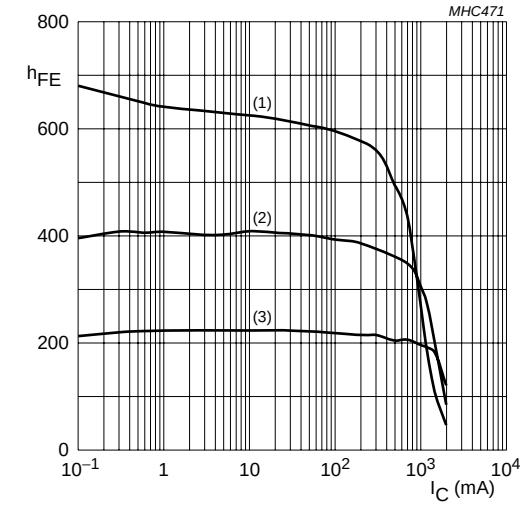
CHARACTERISTICS

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_E = 0	–	–	100	nA
		V_{CB} = 40 V; I_E = 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_{CE} = 5 V; I_C = 2 A; note 1	75	–	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 100 mA; I_B = 1 mA	–	50	75	mV
		I_C = 500 mA; I_B = 50 mA	–	70	100	mV
		I_C = 1 A; I_B = 100 mA; note 1	–	150	190	mV
		I_C = 2 A; I_B = 200 mA; note 1	–	300	400	mV
R_{CEsat}	equivalent on-resistance	I_C = 1 A; I_B = 100 mA; note 1	–	150	<190	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

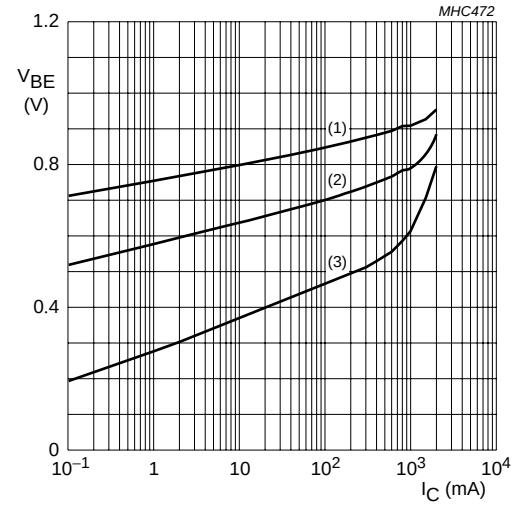
Note

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



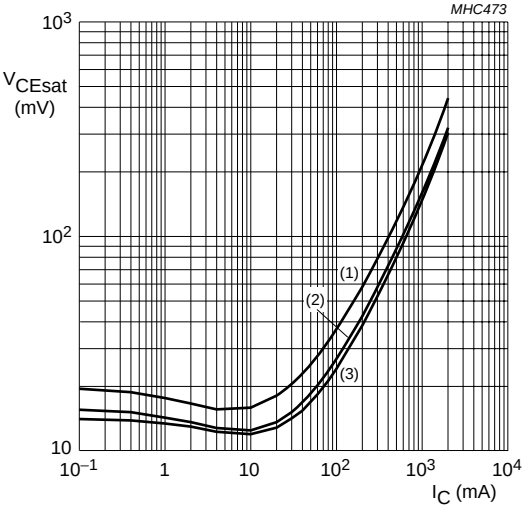
V_{CE} = 5 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



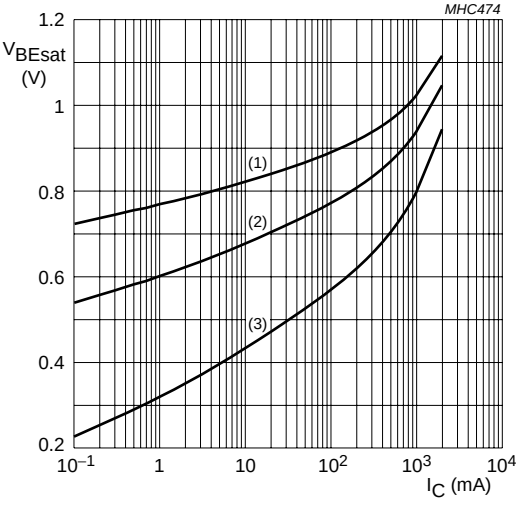
V_{CE} = 5 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



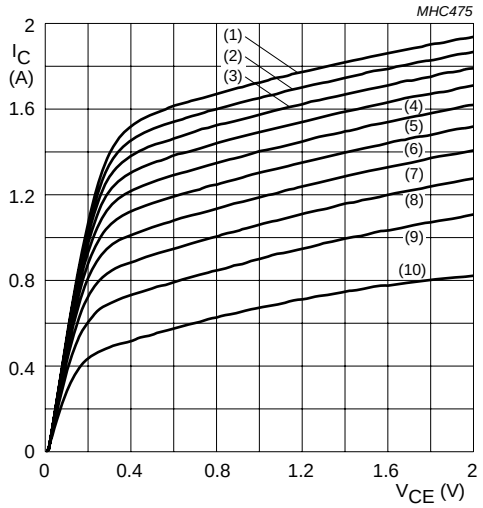
I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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.

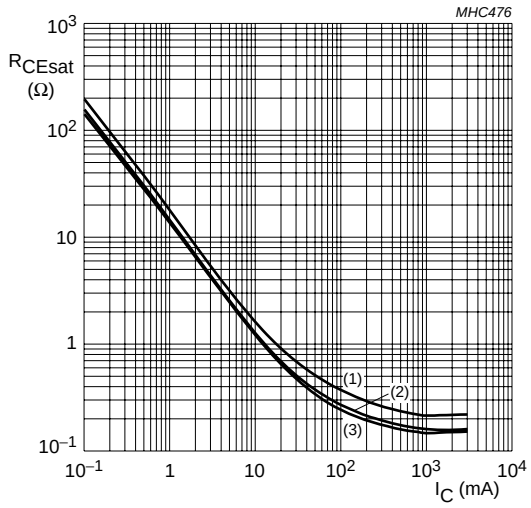
Fig.5 Base-emitter saturation voltage as a function of collector current; typical values.



T_{amb} = 25 °C.

(1) I_B = 3 mA.
(2) I_B = 2.7 mA.
(3) I_B = 2.4 mA.
(4) I_B = 2.1 mA.
(5) I_B = 1.8 mA.
(6) I_B = 1.5 mA.
(7) I_B = 1.2 mA.
(8) I_B = 0.9 mA.
(9) I_B = 0.6 mA.
(10) I_B = 0.3 mA.

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



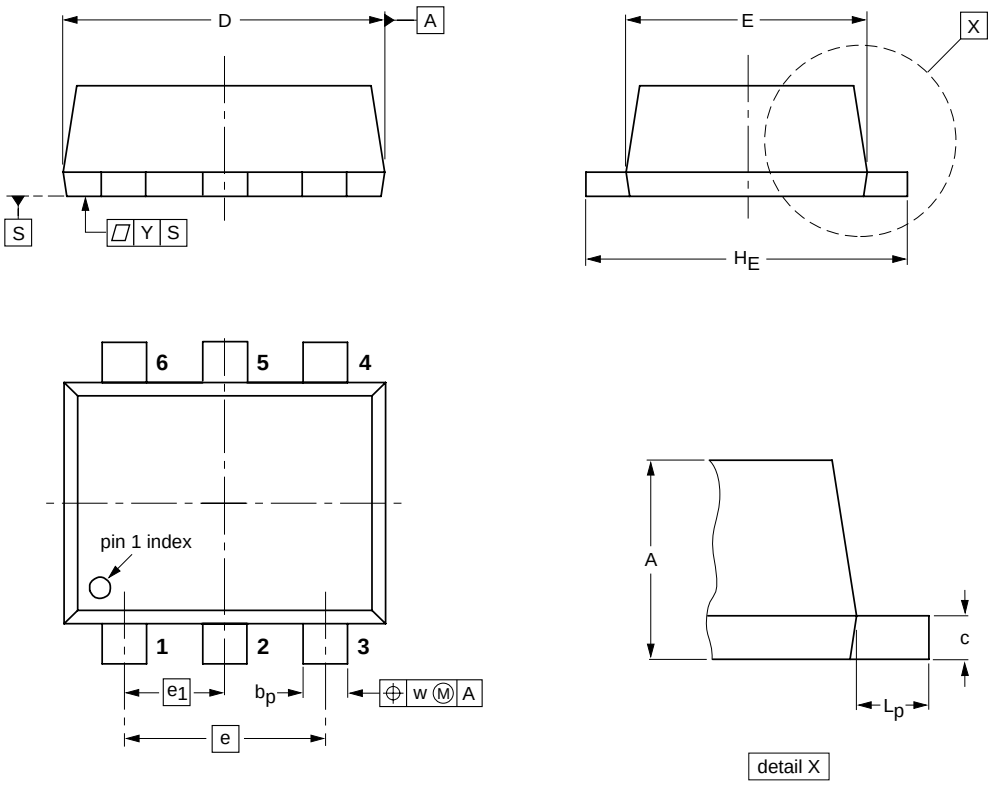
I_C/I_B = 20.

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

Fig.7 Collector-emitter equivalent on-resistance as a function of collector current; typical values.

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads **SOT666**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b_p	c	D	E	e	e_1	H_E	L_p	w	y
mm	0.6 0.5	0.27 0.17	0.18 0.08	1.7 1.5	1.3 1.1	1.0	0.5	1.7 1.5	0.3 0.1	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT666						~~01-01-04~~ 01-08-27

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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NXP Semiconductors

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