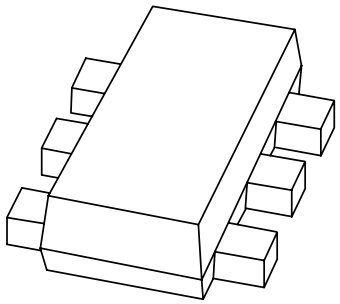
DATA SHEET



PBSS2515VPN

15 V low V_{CEsat} NPN/PNP transistor

Product specification
Supersedes data of 2001 Aug 31

2001 Nov 07

Philips
Semiconductors

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15 V low V_{CEsat} NPN/PNP transistor PBSS2515VPN

FEATURES

- 300 mW total power dissipation
- Very small 1.6 x 1.2 mm ultra thin package
- Excellent coplanarity due to straight leads
- Low collector-emitter saturation voltage
- High current capability
- Improved thermal behaviour due to flat lead
- Replaces two SC75/SC89 packaged low V_{CEsat} transistors on same PCB area
- Reduces required PCB area
- Reduced pick and place costs.

APPLICATION

- General purpose switching and muting
- Low frequency driver circuits
- LCD backlighting
- Audio frequency general purpose amplifier applications
- Battery driven equipment (mobile phones, video cameras and hand-held devices).

DESCRIPTION

NPN/PNP low V_{CEsat} transistor pair in a SOT666 plastic package.

MARKING

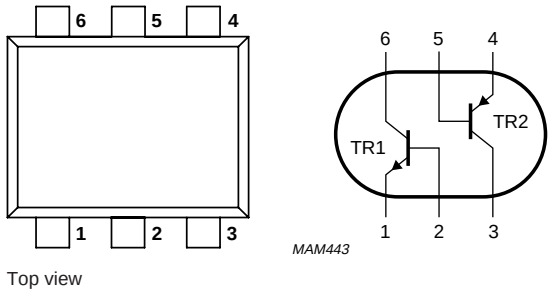
TYPE NUMBER	MARKING CODE
PBSS2515VPN	N8

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	15	V
I_{CM}	peak collector current	1	A
R_{CEsat}	equivalent on-resistance	<500	mΩ

PINNING

PIN	DESCRIPTION
1, 4	emitter TR1; TR2
2, 5	base TR1; TR2
6, 3	collector TR1; TR2



Top view

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
Per transistor; for the PNP transistor with negative polarity					
V_{CBO}	collector-base voltage	open emitter	–	15	V
V_{CEO}	collector-emitter voltage	open base	–	15	V
V_{EBO}	emitter-base voltage	open collector	–	6	V
I_C	collector current (DC)		–	500	mA
I_{CM}	peak collector current		–	1	A
I_{BM}	peak base current		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	200	mW
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		65	+150	°C
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	300	mW

Note

1. Transistor mounted on an FR4 printed-circuit board.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	notes 1 and 2	416	K/W

Notes

1. Transistor mounted on an FR4 printed-circuit board.
2. The only recommended soldering method is reflow soldering.

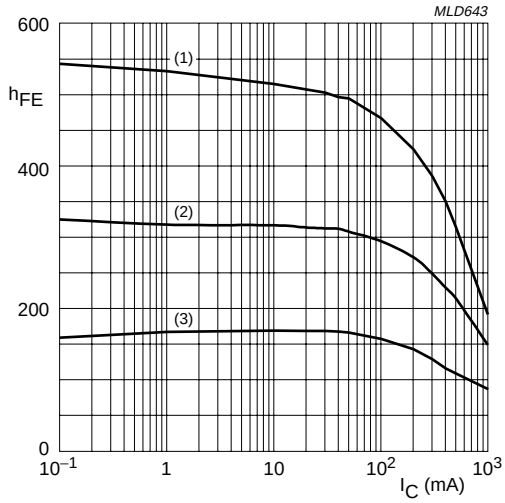
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor; for the PNP transistor with negative polarity						
I_{CBO}	collector-base cut-off current	V_{CB} = 15 V; I_E = 0	–	–	100	nA
		V_{CB} = 15 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 = 10 mA	200	–	–	
		V_{CE} = 2 V; I_C = 100 mA; note 1	150	–	–	
		V_{CE} = 2 V; I_C = 500 mA; note 1	90	–	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 10 mA; I_B = 0.5 mA	–	–	25	mV
		I_C = 200 mA; I_B = 10 mA	–	–	150	mV
		I_C = 500 mA; I_B = 50 mA; note 1	–	–	250	mV
R_{CEsat}	equivalent on-resistance	I_C = 500 mA; I_B = 50 mA; note 1	–	300	<500	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = 500 mA; I_B = 50 mA; note 1	–	–	1.1	V
V_{BE}	base-emitter turn-on voltage	V_{CE} = 2 V; I_C = 100 mA; note 1	–	–	0.9	V
NPN transistor						
f_T	transition frequency	I_C = 100 mA; V_{CE} = 5 V; f = 100 MHz	250	420	–	MHz
C_c	collector capacitance	V_{CB} = 10 V; I_E = I_e = 0; f = 1MHz	–	4.4	6	pF
PNP transistor						
f_T	transition frequency	I_C = –100 mA; V_{CE} = –5 V; f = 100 MHz	100	280	–	MHz
C_c	collector capacitance	V_{CB} = –10 V; I_E = I_e = 0; f = 1MHz	–	–	10	pF

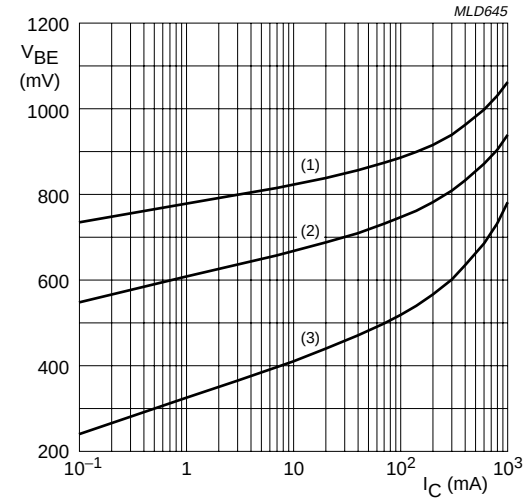
Note

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



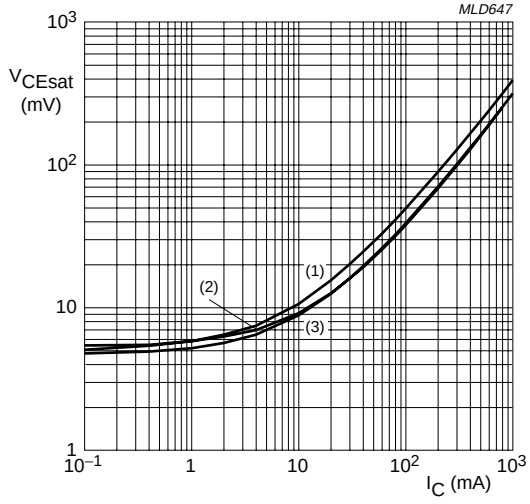
TR1 (NPN) V_{CE} = 2 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

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



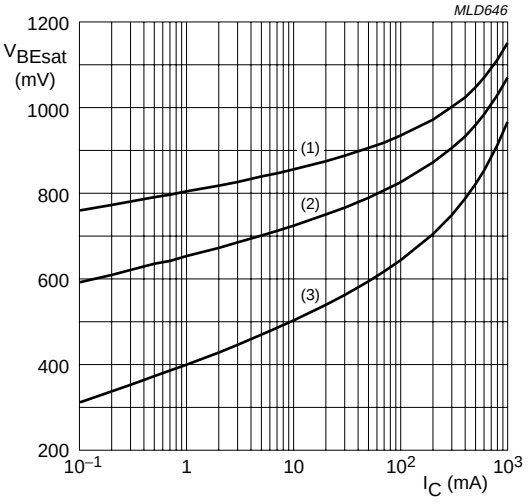
TR1 (NPN) V_{CE} = 2 V.
(1) T_{amb} = –55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



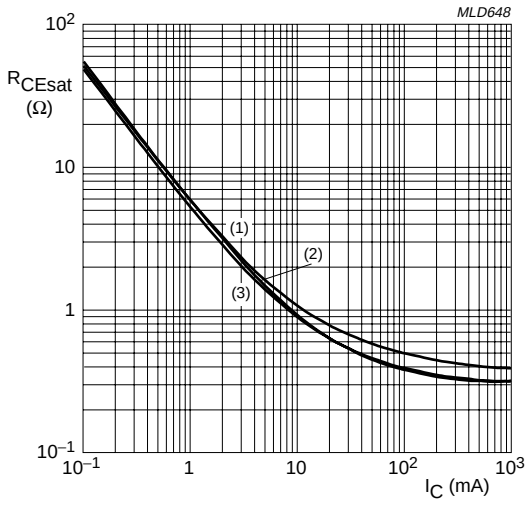
TR1 (NPN) I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

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



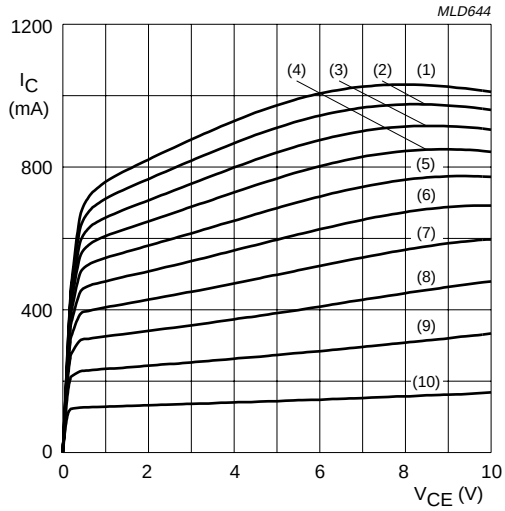
TR1 (NPN) I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

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



TR1 (NPN) I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

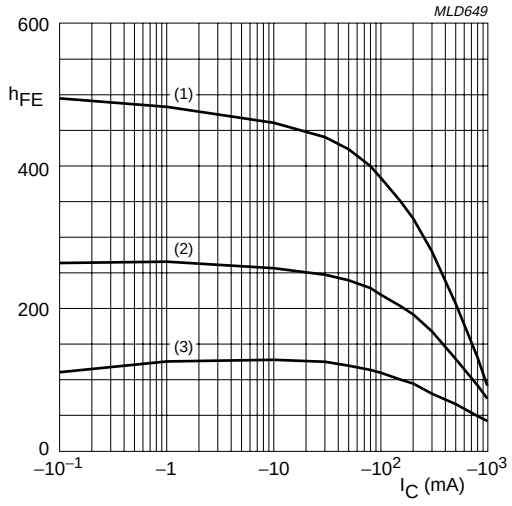
Fig.6 Equivalent on-resistance as a function of collector current; typical values.



TR1 (NPN) T_{amb} = 25 °C.

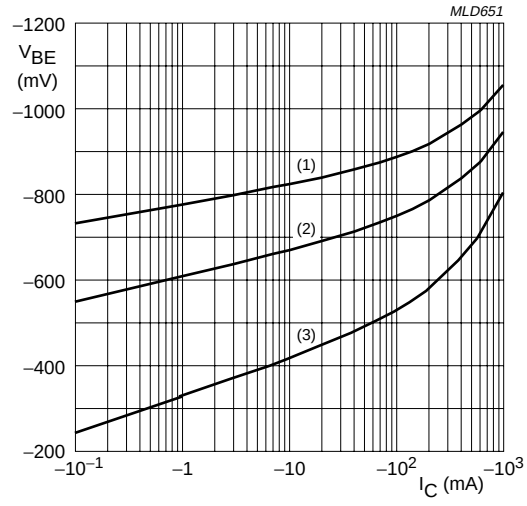
(1) I_B = 4.6 mA.
(2) I_B = 4.14 mA.
(3) I_B = 3.68 mA.
(4) I_B = 3.22 mA.
(5) I_B = 2.76 mA.
(6) I_B = 2.3 mA.
(7) I_B = 1.84 mA.
(8) I_B = 1.38 mA.
(9) I_B = 0.92 mA.
(10) I_B = 0.46 mA.

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



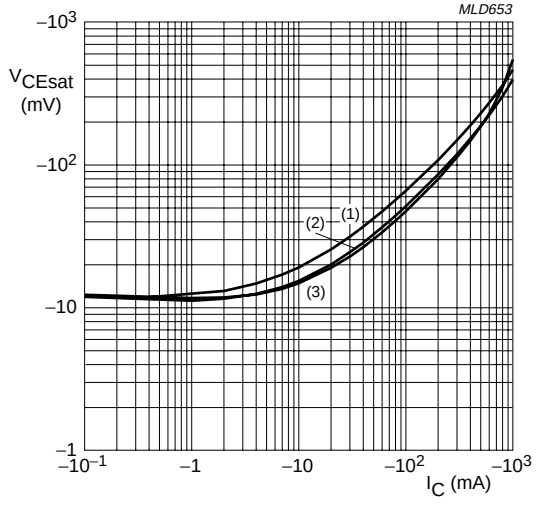
TR2 (PNP) V_{CE} = −2 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.8 DC current gain as a function of collector current; typical values.



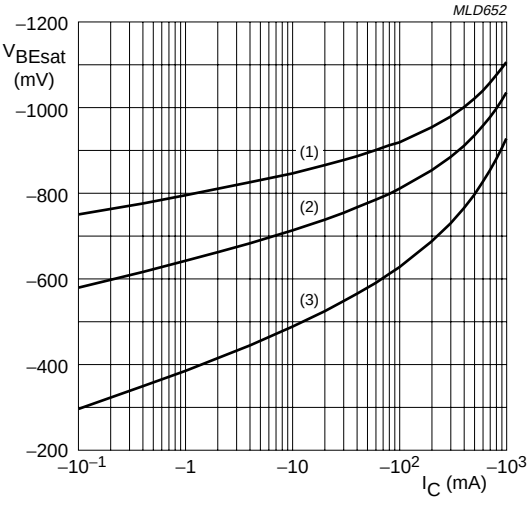
TR2 (PNP) V_{CE} = −2 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

Fig.9 Base-emitter voltage as a function of collector current; typical values.



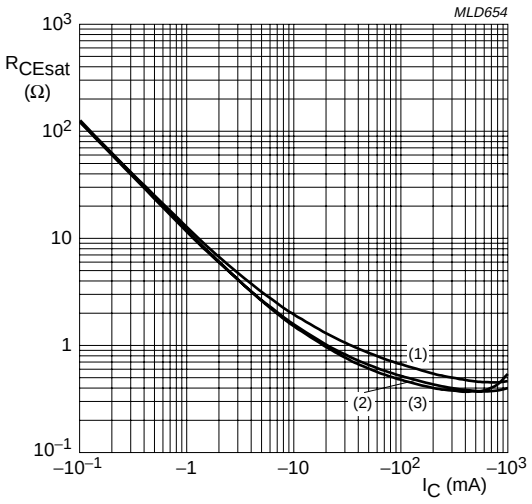
TR2 (PNP) I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.10 Collector-emitter saturation voltage as a function of collector current; typical values.



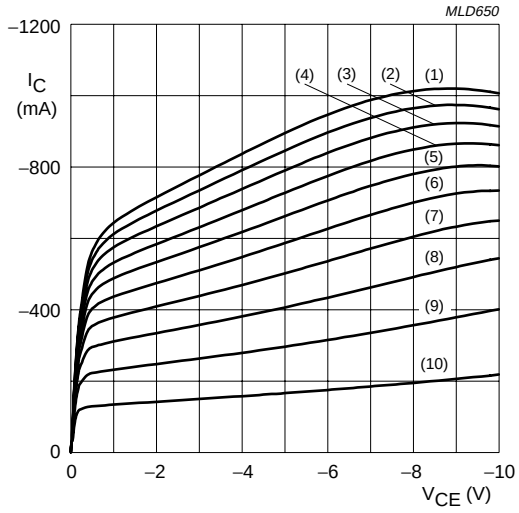
TR2 (PNP) I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.11 Base-emitter saturation voltage as a function of collector current; typical values.



TR2 (PNP) I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.12 Equivalent on-resistance as a function of collector current; typical values.



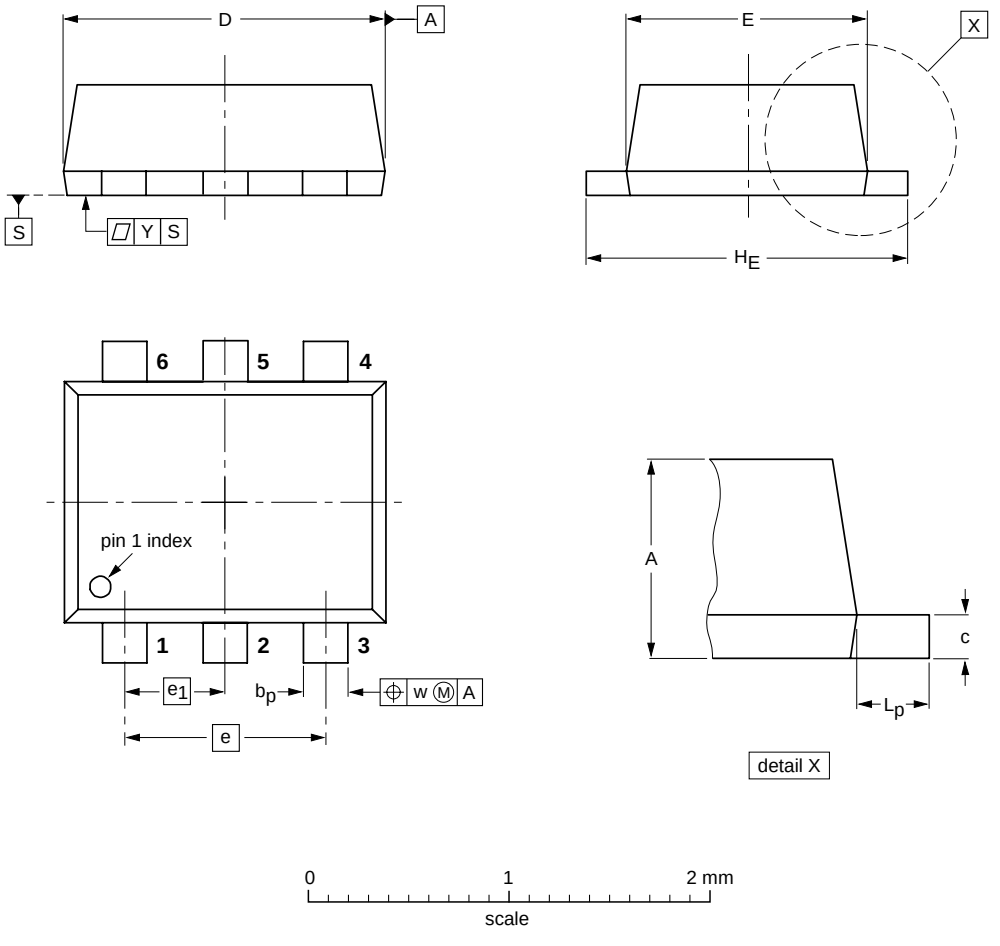
TR2 (PNP) T_{amb} = 25 °C.

(1) I_B = −7 mA.
(2) I_B = −6.3 mA.
(3) I_B = −5.6 mA.
(4) I_B = −4.9 mA.
(5) I_B = −4.2 mA.
(6) I_B = −3.5 mA.
(7) I_B = −2.8 mA.
(8) I_B = −2.1 mA.
(9) I_B = −1.4 mA.
(10) I_B = −0.7 mA.

Fig.13 Collector current as a function of collector-emitter voltage; 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

DATA SHEET STATUS[1]	PRODUCT STATUS[2]	DEFINITIONS
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