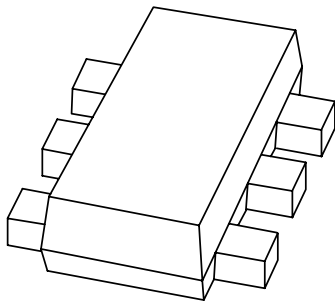


DATA SHEET



PBSS2515VPN

15 V low $V_{CE(sat)}$ NPN/PNP
transistor

Product data sheet
Supersedes data of 2001 Nov 07

2005 Jan 11

15 V low $V_{CE(sat)}$ NPN/PNP transistor**PBSS2515VPN****FEATURES**

- 300 mW total power dissipation
- Very small 1.6×1.2 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 $V_{CE(sat)}$ 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 $V_{CE(sat)}$ 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
$R_{CE(sat)}$	equivalent on-resistance	<500	m Ω

PINNING

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

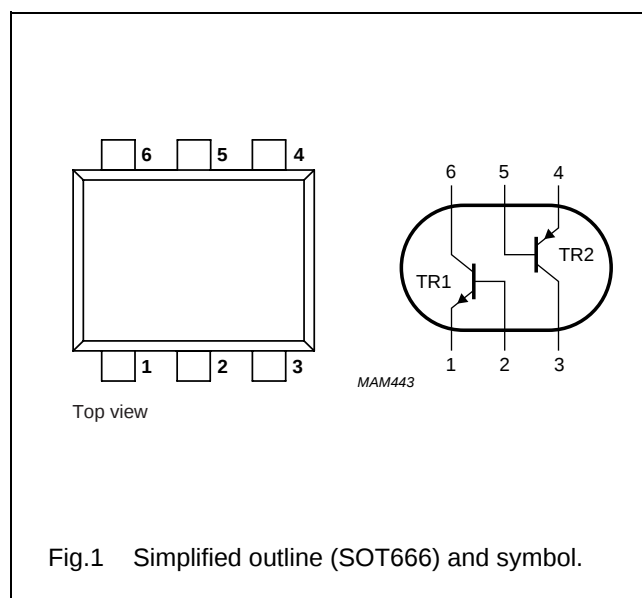


Fig.1 Simplified outline (SOT666) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS2515VPN	—	plastic surface mounted package; 6 leads	SOT666

15 V low $V_{CE(sat)}$ NPN/PNP transistor

PBSS2515VPN

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	$T_{amb} \leq 25\text{ °C}$; 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	$T_{amb} \leq 25\text{ °C}$; note 1	–	300	mW

Note

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	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.

15 V low $V_{CE(sat)}$ NPN/PNP transistor

PBSS2515VPN

CHARACTERISTICS

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

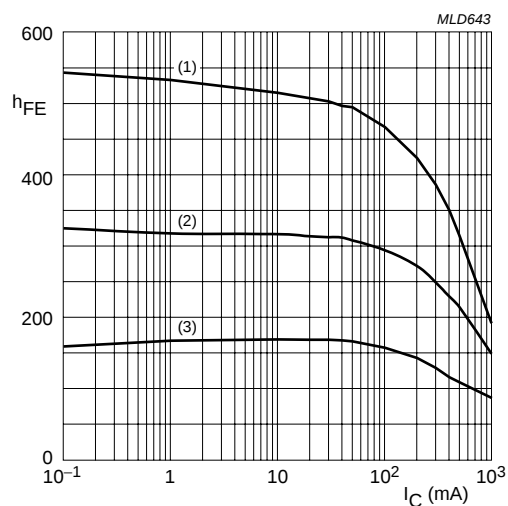
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor; for the PNP transistor with negative polarity						
I_{CBO}	collector-base cut-off current	$V_{CB} = 15\text{ V}; I_E = 0\text{ A}$	–	–	100	nA
		$V_{CB} = 15\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$	–	–	50	μA
I_{EBO}	emitter-base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

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

15 V low $V_{CE(sat)}$ NPN/PNP transistor

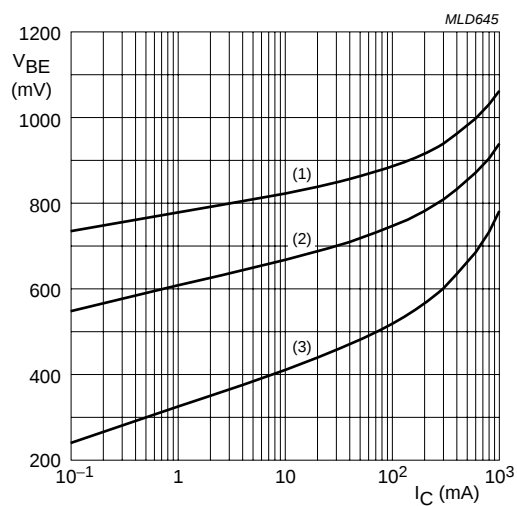
PBSS2515VPN



TR1 (NPN) $V_{CE} = 2$ V.

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

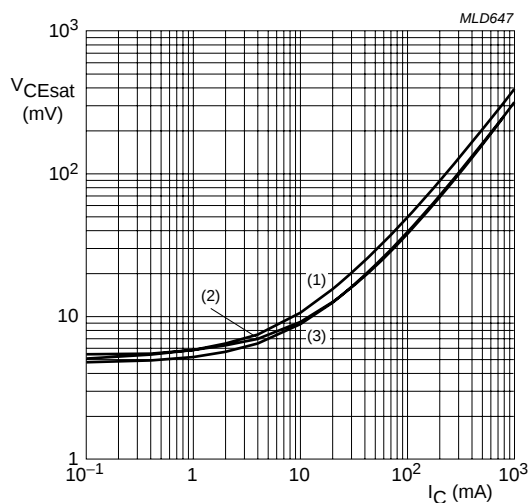
Fig.2 DC current gain as a function of collector current; typical values.



TR1 (NPN) $V_{CE} = 2$ V.

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

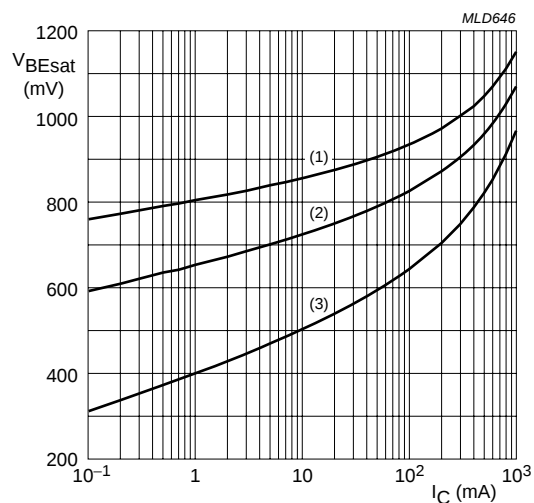
Fig.3 Base-emitter voltage as a function of collector current; typical values.



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.



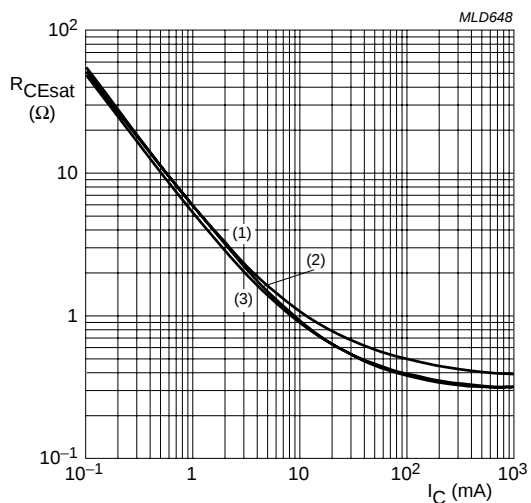
TR1 (NPN) $I_C/I_B = 20$.

- (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.

15 V low $V_{CE(sat)}$ NPN/PNP transistor

PBSS2515VPN



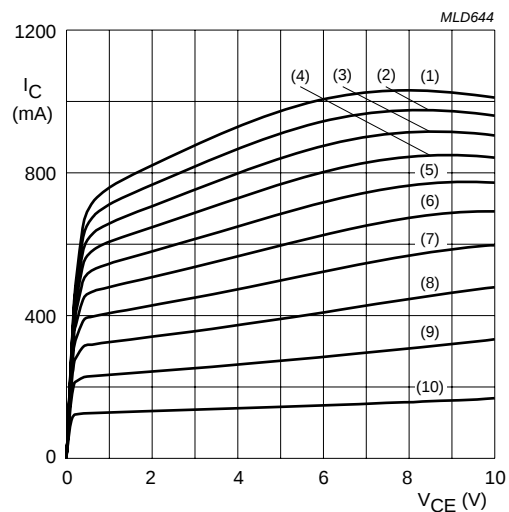
TR1 (NPN) $I_C/I_B = 20$.

(1) $T_{amb} = 150\text{ °C}$.

(2) $T_{amb} = 25\text{ °C}$.

(3) $T_{amb} = -55\text{ °C}$.

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



TR1 (NPN) $T_{amb} = 25\text{ °C}$.

(1) $I_B = 4.6\text{ mA}$.

(2) $I_B = 4.14\text{ mA}$.

(3) $I_B = 3.68\text{ mA}$.

(4) $I_B = 3.22\text{ mA}$.

(5) $I_B = 2.76\text{ mA}$.

(6) $I_B = 2.3\text{ mA}$.

(7) $I_B = 1.84\text{ mA}$.

(8) $I_B = 1.38\text{ mA}$.

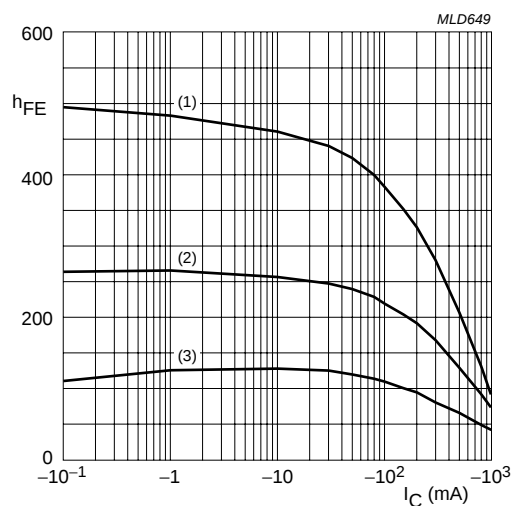
(9) $I_B = 0.92\text{ mA}$.

(10) $I_B = 0.46\text{ mA}$.

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

15 V low $V_{CE(sat)}$ NPN/PNP transistor

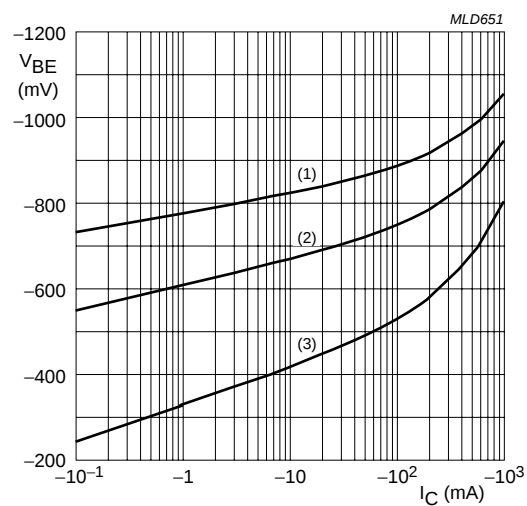
PBSS2515VPN



TR2 (PNP) $V_{CE} = -2$ V.

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

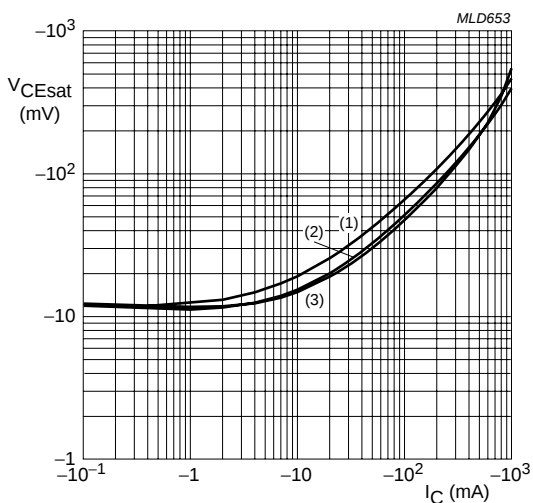
Fig.8 DC current gain as a function of collector current; typical values.



TR2 (PNP) $V_{CE} = -2$ V.

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

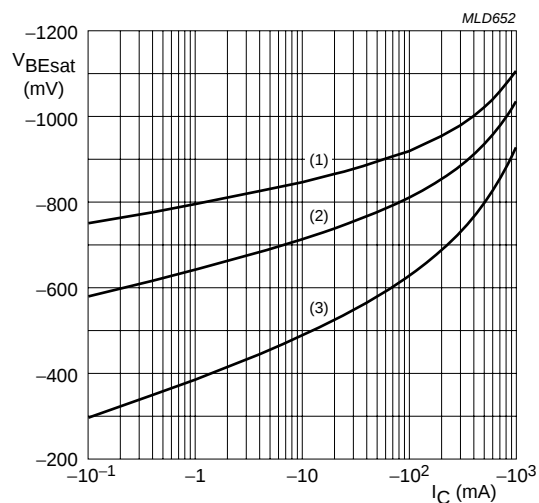
Fig.9 Base-emitter voltage as a function of collector current; typical values.



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.



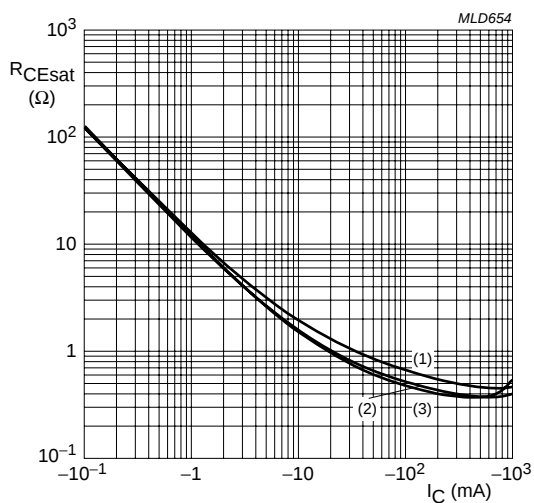
TR2 (PNP) $I_C/I_B = 20$.

- (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.

15 V low $V_{CE(sat)}$ NPN/PNP transistor

PBSS2515VPN



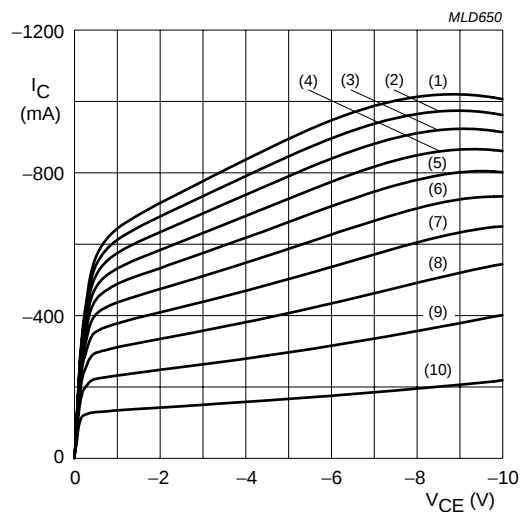
TR2 (PNP) $I_C/I_B = 20$.

(1) $T_{amb} = 150\text{ °C}$.

(2) $T_{amb} = 25\text{ °C}$.

(3) $T_{amb} = -55\text{ °C}$.

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



TR2 (PNP) $T_{amb} = 25\text{ °C}$.

(1) $I_B = -7\text{ mA}$.

(6) $I_B = -3.5\text{ mA}$.

(2) $I_B = -6.3\text{ mA}$.

(7) $I_B = -2.8\text{ mA}$.

(3) $I_B = -5.6\text{ mA}$.

(8) $I_B = -2.1\text{ mA}$.

(4) $I_B = -4.9\text{ mA}$.

(9) $I_B = -1.4\text{ mA}$.

(5) $I_B = -4.2\text{ mA}$.

(10) $I_B = -0.7\text{ mA}$.

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

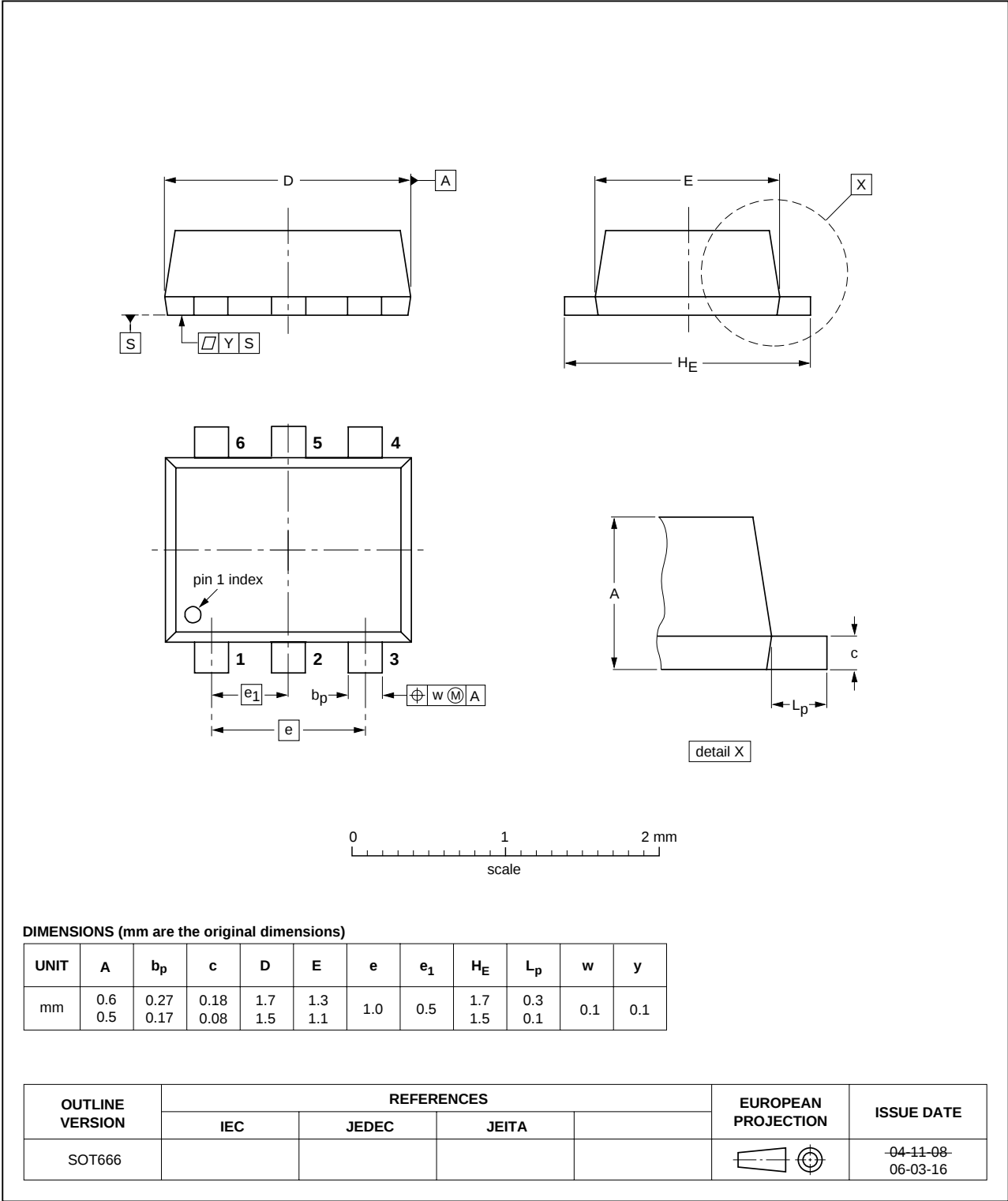
15 V low $V_{CE(sat)}$ NPN/PNP transistor

PBSS2515VPN

PACKAGE OUTLINE

Plastic surface-mounted package; 6 leads

SOT666



15 V low $V_{CE(sat)}$ NPN/PNP transistor

PBSS2515VPN

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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