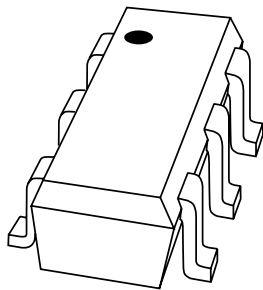# DATA SHEET

PBSS2515YPN

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

Product specification

Supersedes data of 2002 May 08

2005 Jan 11

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

PBSS2515YPN

FEATURES

- Low collector-emitter saturation voltage
- High current capability
- Replaces two SC-70 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
- Supply line switching circuits
- Battery driven equipment (mobile phones, video cameras and hand-held devices).

DESCRIPTION

NPN/PNP low V_{CEsat} transistor pair in a SC-88 plastic package.

MARKING

TYPE NUMBER	MARKING CODE
PBSS2515YPN	N8*

Note

1. * = -: made in Hong Kong
   * = t: made in Malaysia
   * = W: made in China.

ORDERING INFORMATION

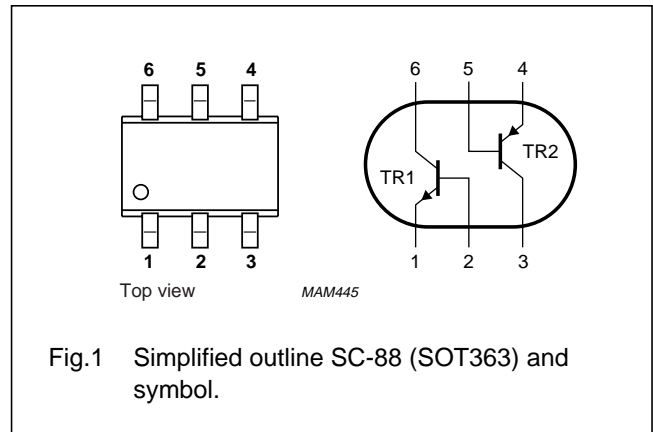| TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS2515YPN	SC-88	plastic surface mounted package; 6 leads	SOT363

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

Fig.1   Simplified outline SC-88 (SOT363) and symbol.

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

PBSS2515YPN

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	$T_{amb} \leq 25\ °C$	–	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
$R_{th(j-a)}$	thermal resistance from junction to ambient	note 1	416	K/W

Note

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

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

PBSS2515YPN

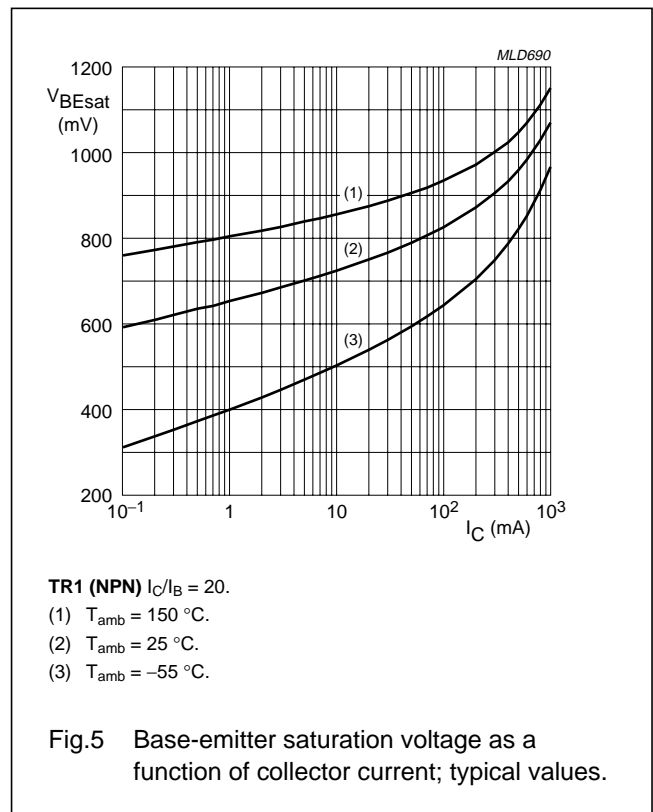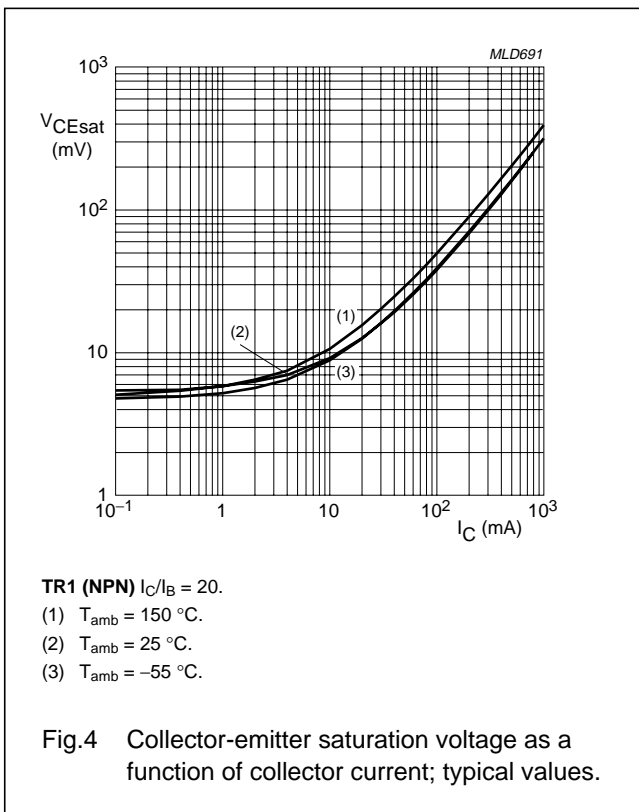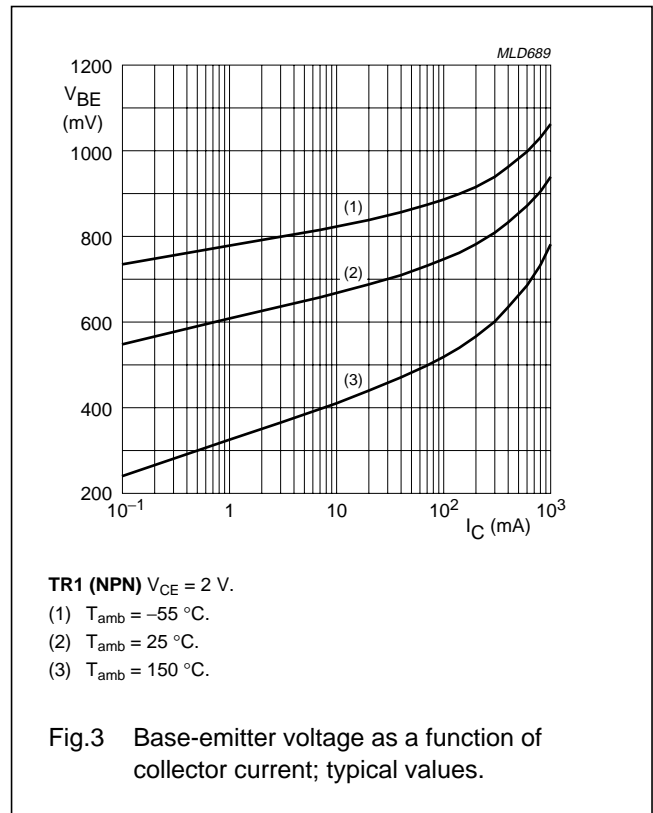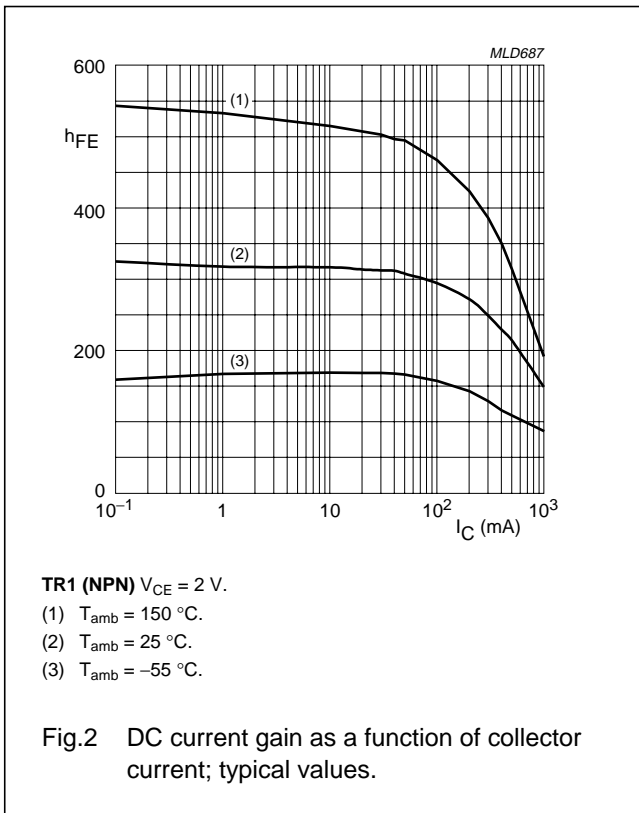### CHARACTERISTICS

$T_{amb} = 25\ °C$ 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	$V_{CB} = 15\ V$; $I_E = 0\ A$	–	–	100	nA
		$V_{CB} = 15\ V$; $I_E = 0\ A$; $T_j = 150\ °C$	–	–	50	µA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\ V$; $I_C = 0\ A$	–	–	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_{BEon}	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	$V_{CB} = 10\ V$; $I_E = I_e = 0\ A$; $f = 1\ MHz$	–	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	$V_{CB} = -10\ V$; $I_E = I_e = 0\ A$; $f = 1\ MHz$	–	–	10	pF

Note

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

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

PBSS2515YPN

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.

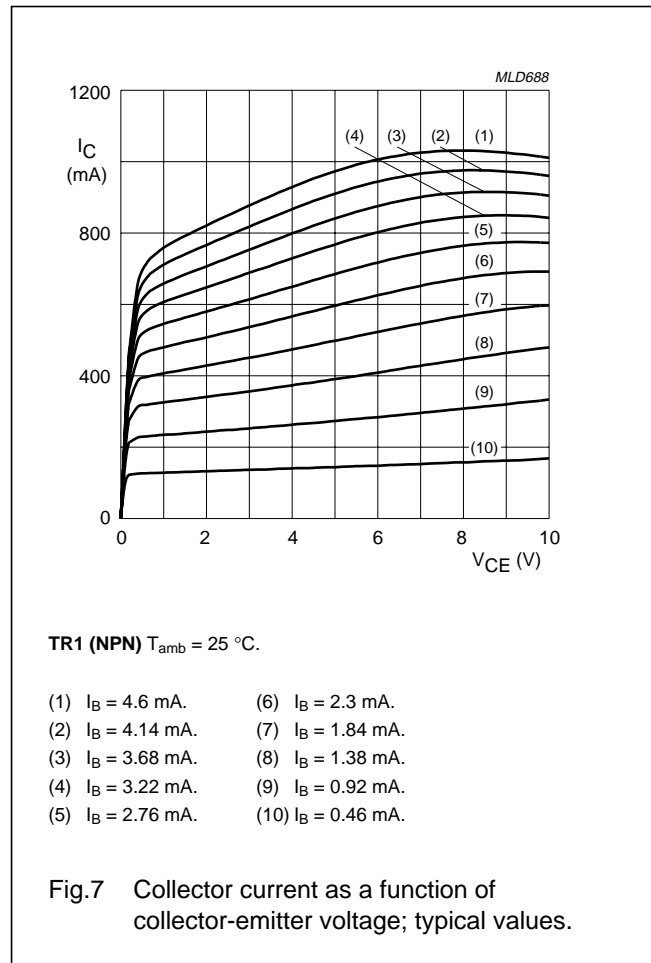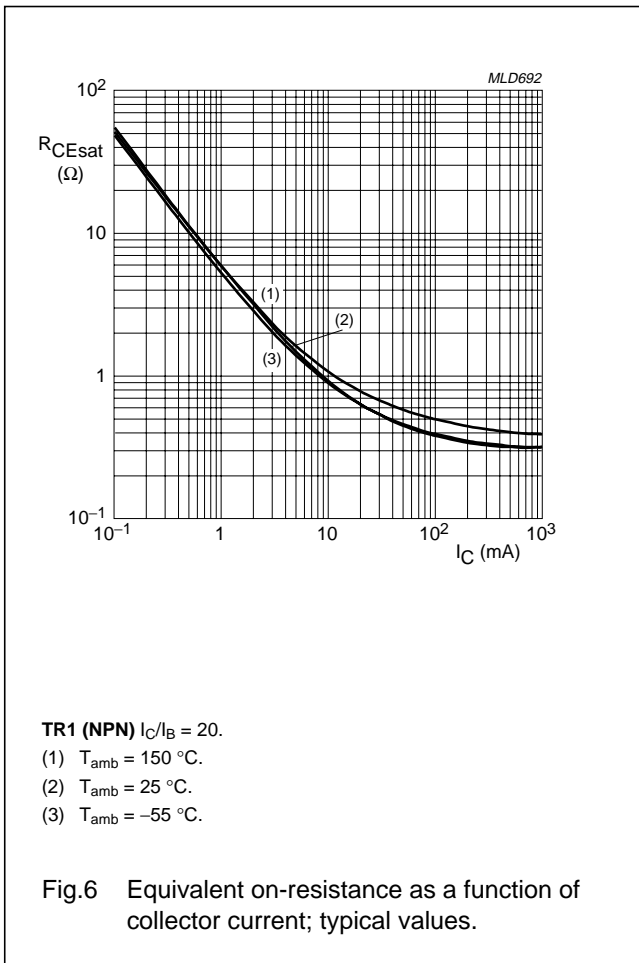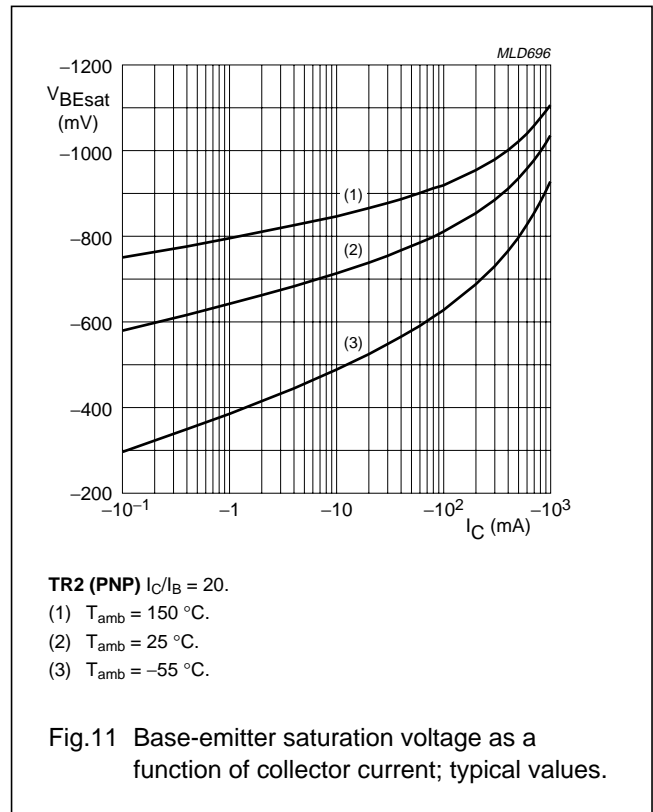Fig.5   Base-emitter saturation voltage as a
function of collector current; typical values.
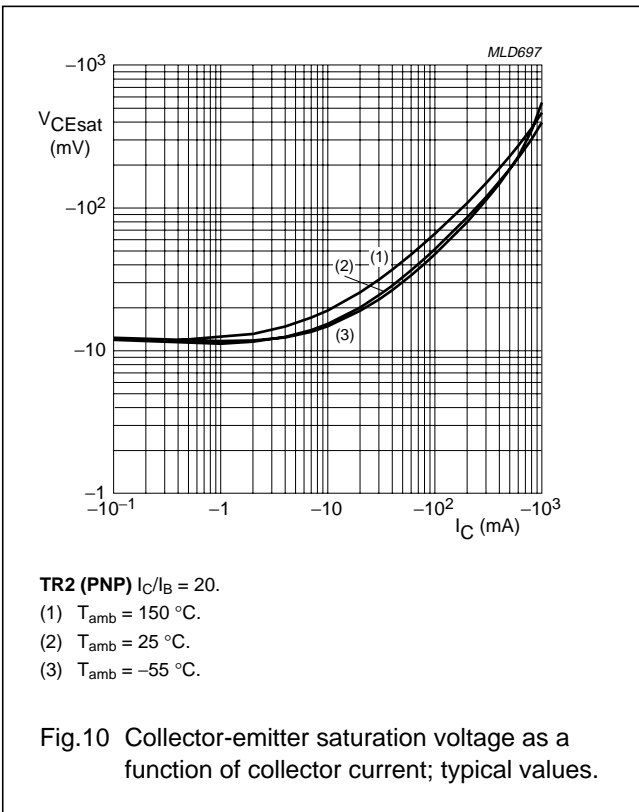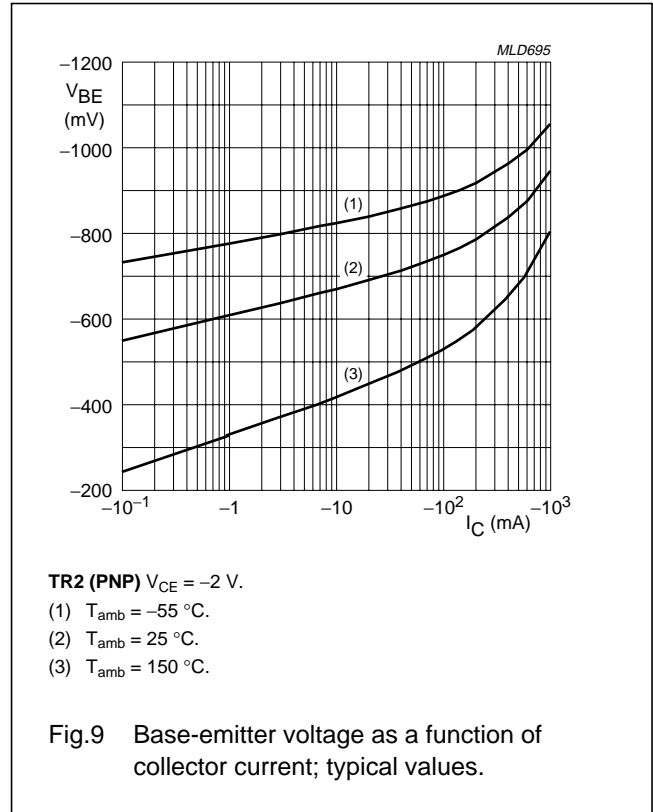
15 V low $V_{CE(sat)}$ NPN/PNP transistor

PBSS2515YPN

MLD692

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.

MLD688

TR1 (NPN) $T_{amb} = 25$ °C.

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

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

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

PBSS2515YPN

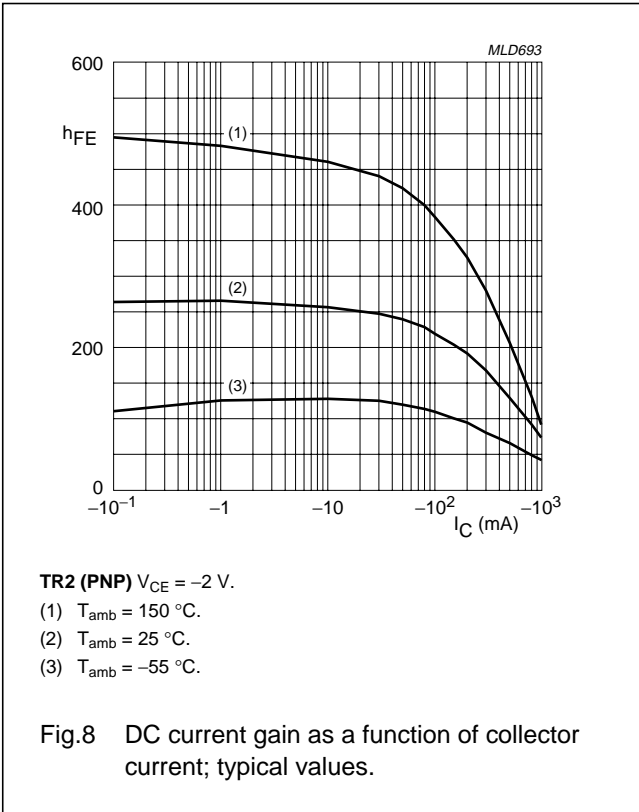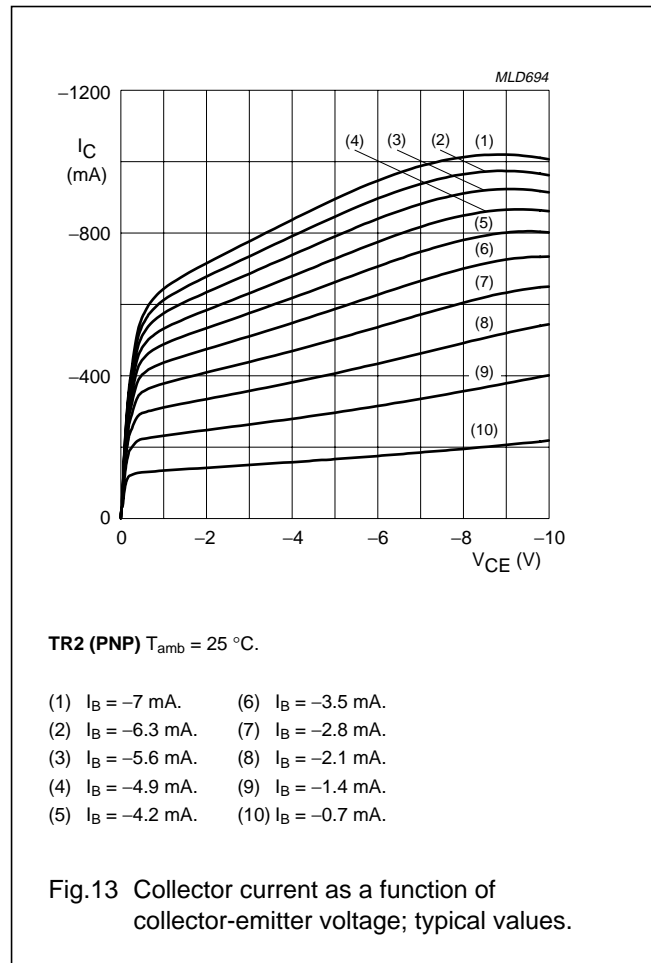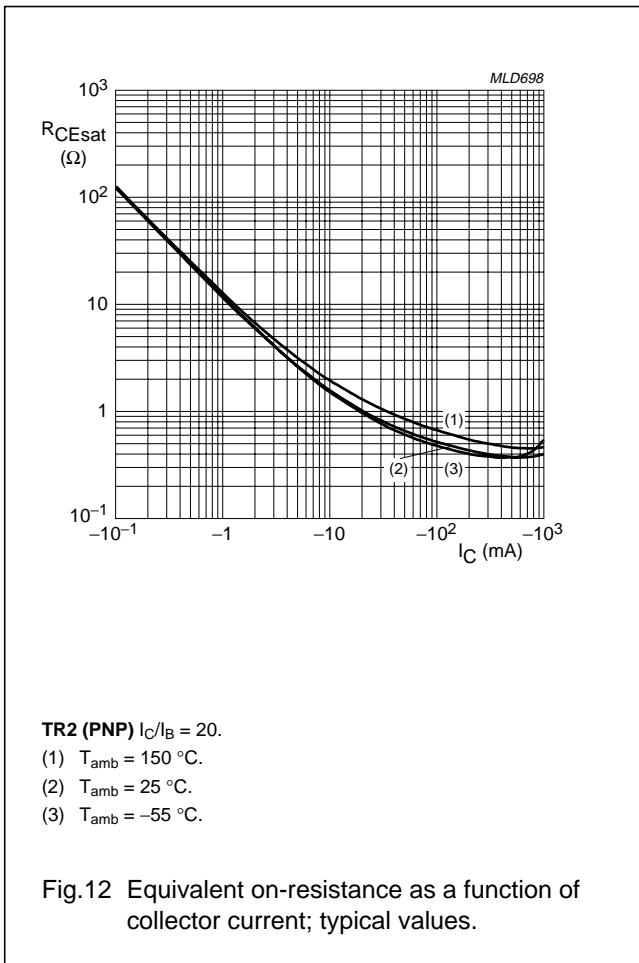**TR2 (PNP)** V_{CE} = −2 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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

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

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

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

PBSS2515YPN

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads   **SOT363**

DIMENSIONS (mm are the original dimensions)

UNIT	A	A₁ max	bp	c	D	E	e	e₁	H_E	Lp	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT363			SC-88			97-02-28 04-11-08

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

PBSS2515YPN

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS[1]	PRODUCT STATUS[2][3]	DEFINITION
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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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Printed in The Netherlands   R75/03/pp11   Date of release: 2005 Jan 11   Document order number: 9397 750 14428

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