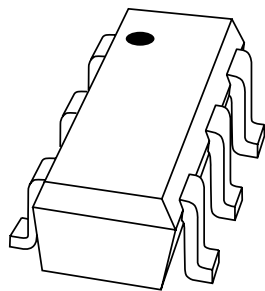


# DATA SHEET



## **PUMD13** NPN/PNP resistor-equipped transistors

Product specification

2001 Feb 27

# NPN/PNP resistor-equipped transistors

# PUMD13

### FEATURES

- Transistors with different polarity and built-in bias resistors R1 and R2 (4.7 and 47 kΩ respectively)
- No mutual interference between the transistors
- Simplification of circuit design
- Reduced number of components and board space.

### APPLICATION

- Especially suitable for space reduction in interface and driver circuits
- Inverter circuit configurations without use of external resistors.

### DESCRIPTION

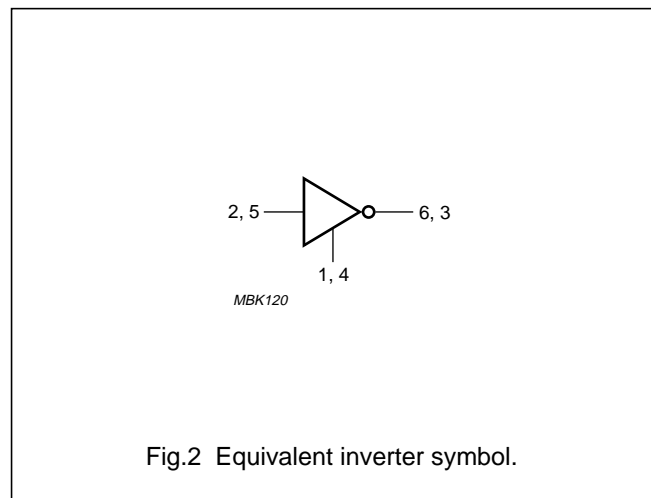
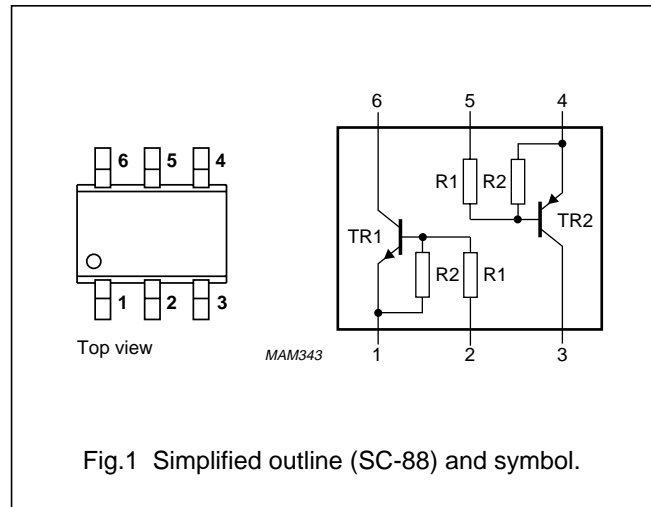
NPN/PNP resistor-equipped transistors in an SC-88 (SOT363) plastic package.

### PINNING

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

### MARKING

TYPE NUMBER	MARKING CODE
PUMD13	3t1



## NPN/PNP resistor-equipped transistors

## PUMD13

**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Per transistor for the PNP transistor with negative polarity</b>					
V <sub>CBO</sub>	collector-base voltage	open emitter	–	50	V
V <sub>CEO</sub>	collector-emitter voltage	open base	–	50	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	10	V
V <sub>I</sub>	input voltage TR1				
	positive		–	+30	V
	negative		–	–5	V
	input voltage TR2				
	positive		–	+5	V
	negative		–	–30	V
I <sub>o</sub>	output current (DC)		–	100	mA
I <sub>CM</sub>	peak collector current		–	100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	–	300	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C
<b>Per device</b>					
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	–	200	mW

**Note**

1. Refer to SC88 standard mounting conditions.

## NPN/PNP resistor-equipped transistors

## PUMD13

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	from junction to ambient	in free air; note 1	416	K/W

## Note

- See standard mounting conditions SC88.

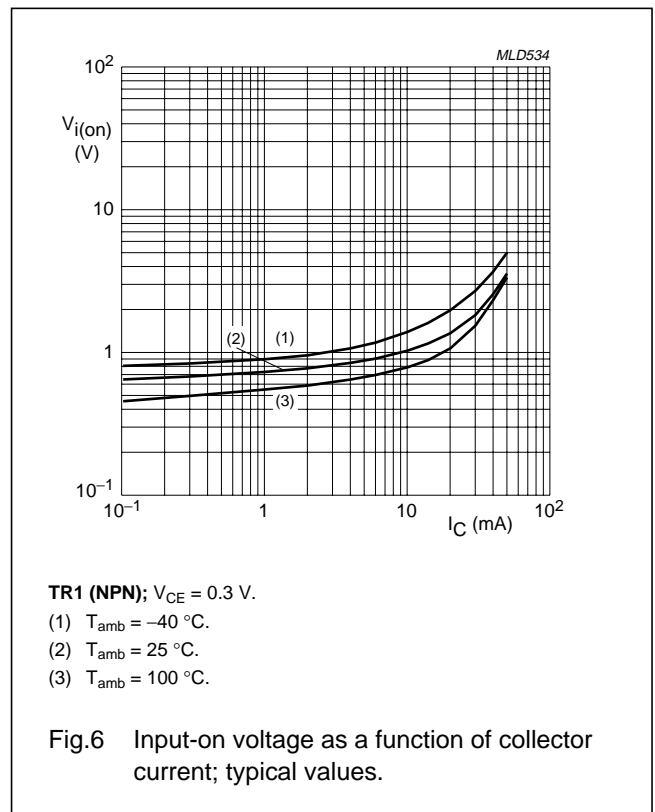
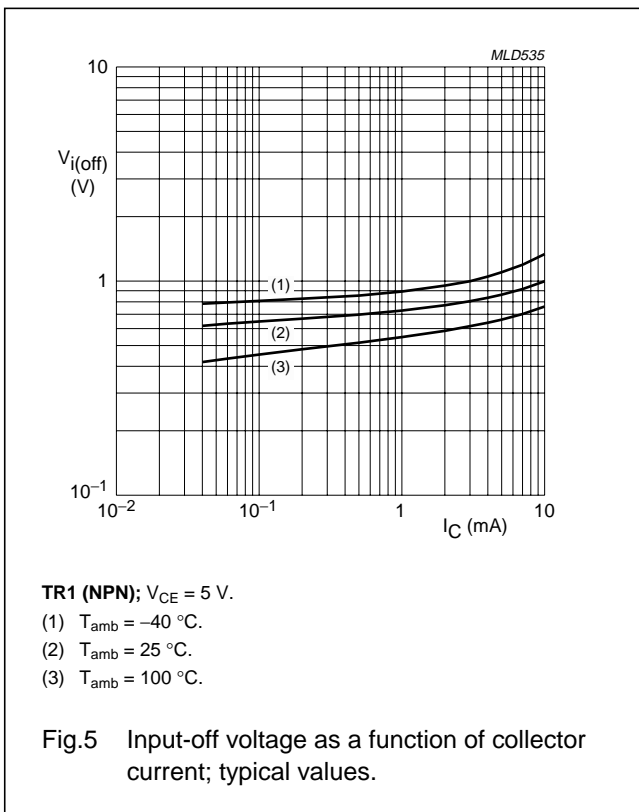
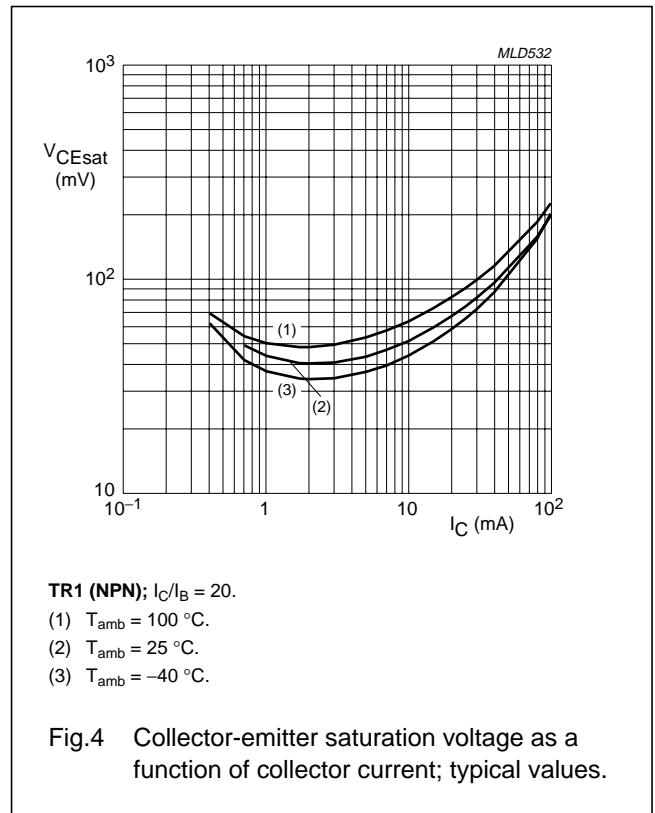
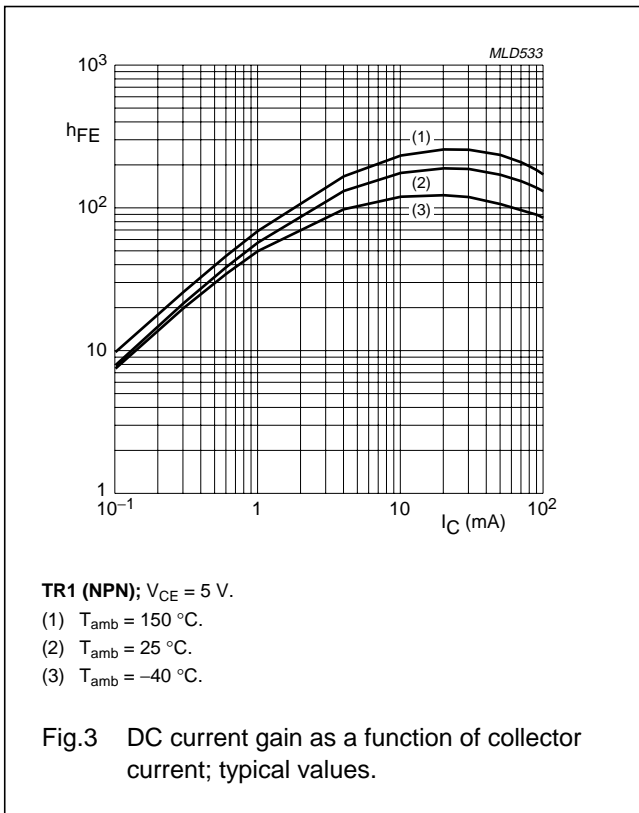
## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Per transistor for the PNP transistor with negative polarity</b>						
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 50\text{ V}; I_E = 0$	–	–	100	nA
$I_{CEO}$	collector-emitter cut-off current	$V_{CE} = 30\text{ V}; I_B = 0$	–	–	1	$\mu\text{A}$
		$V_{CE} = 30\text{ V}; I_B = 0; T_j = 150\text{ °C}$	–	–	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	–	–	170	$\mu\text{A}$
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}$	100	–	–	
$V_{CEsat}$	saturation voltage	$I_C = 5\text{ mA}; I_B = 0.25\text{ mA}$	–	–	100	mV
$V_{i(off)}$	input off voltage	$V_{CE} = 5\text{ V}; I_C = 100\text{ }\mu\text{A}$	–	0.6	0.5	V
$V_{i(on)}$	input on voltage	$V_{CE} = 0.3\text{ V}; I_C = 5\text{ mA}$	1.3	0.9	–	V
$R_1$	input resistor		3.3	4.7	6.1	k $\Omega$
$\frac{R_2}{R_1}$	resistor ratio		8	10	12	
$C_c$	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V};$ $f = 1\text{ MHz}$	–	–	2.5	pF
	TR1 (NPN)				3	pF
	TR2 (PNP)					

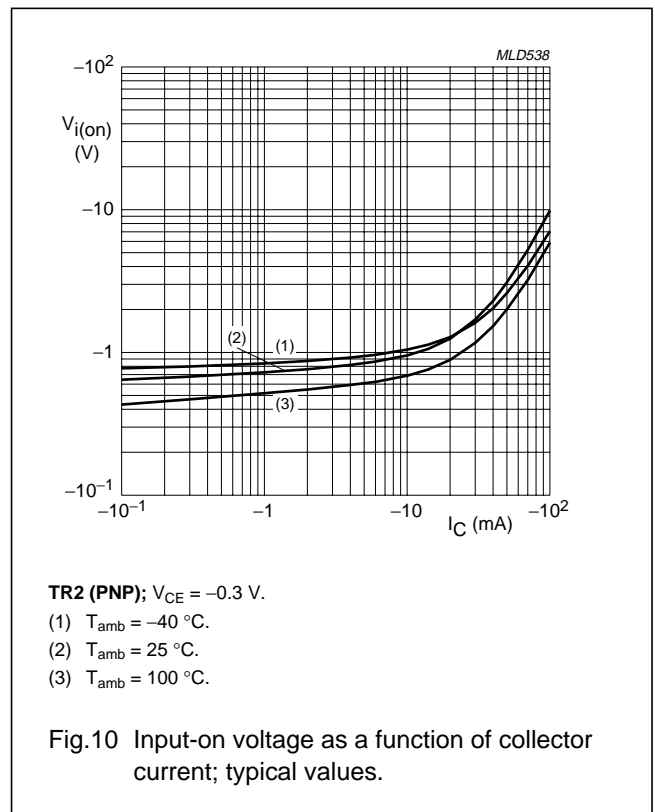
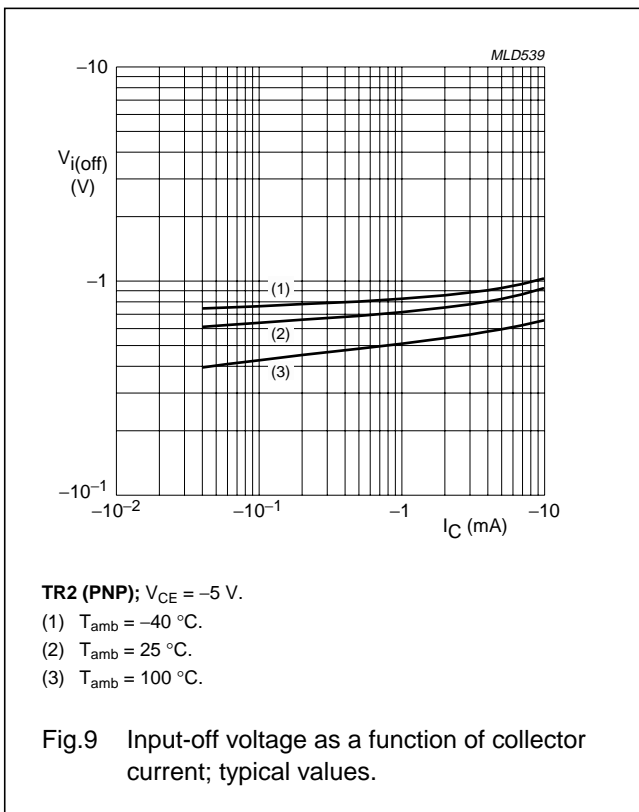
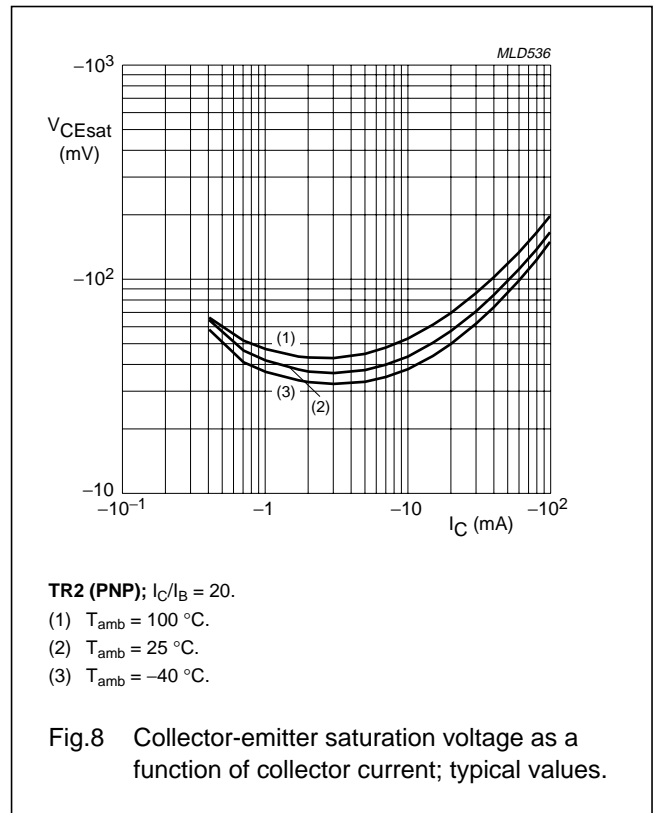
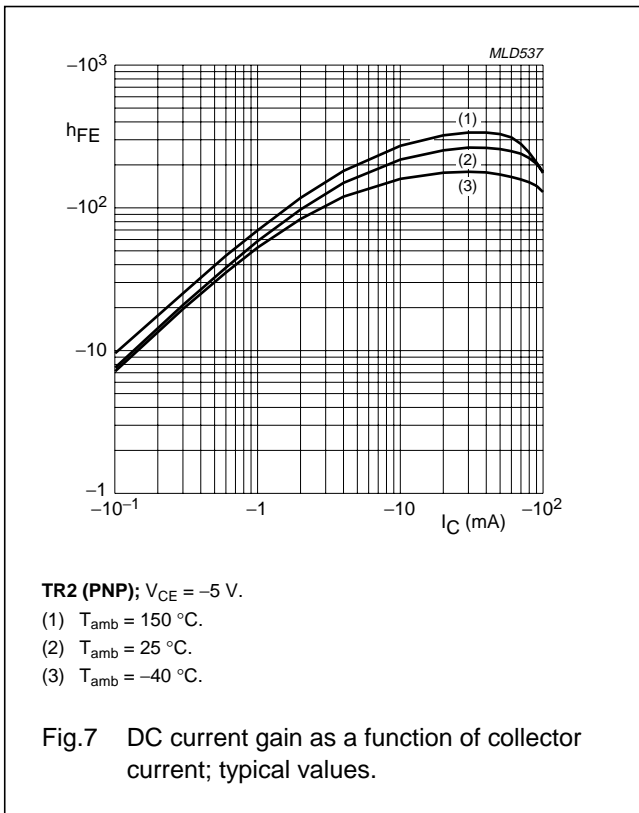
NPN/PNP resistor-equipped transistors

PUMD13



NPN/PNP resistor-equipped transistors

PUMD13



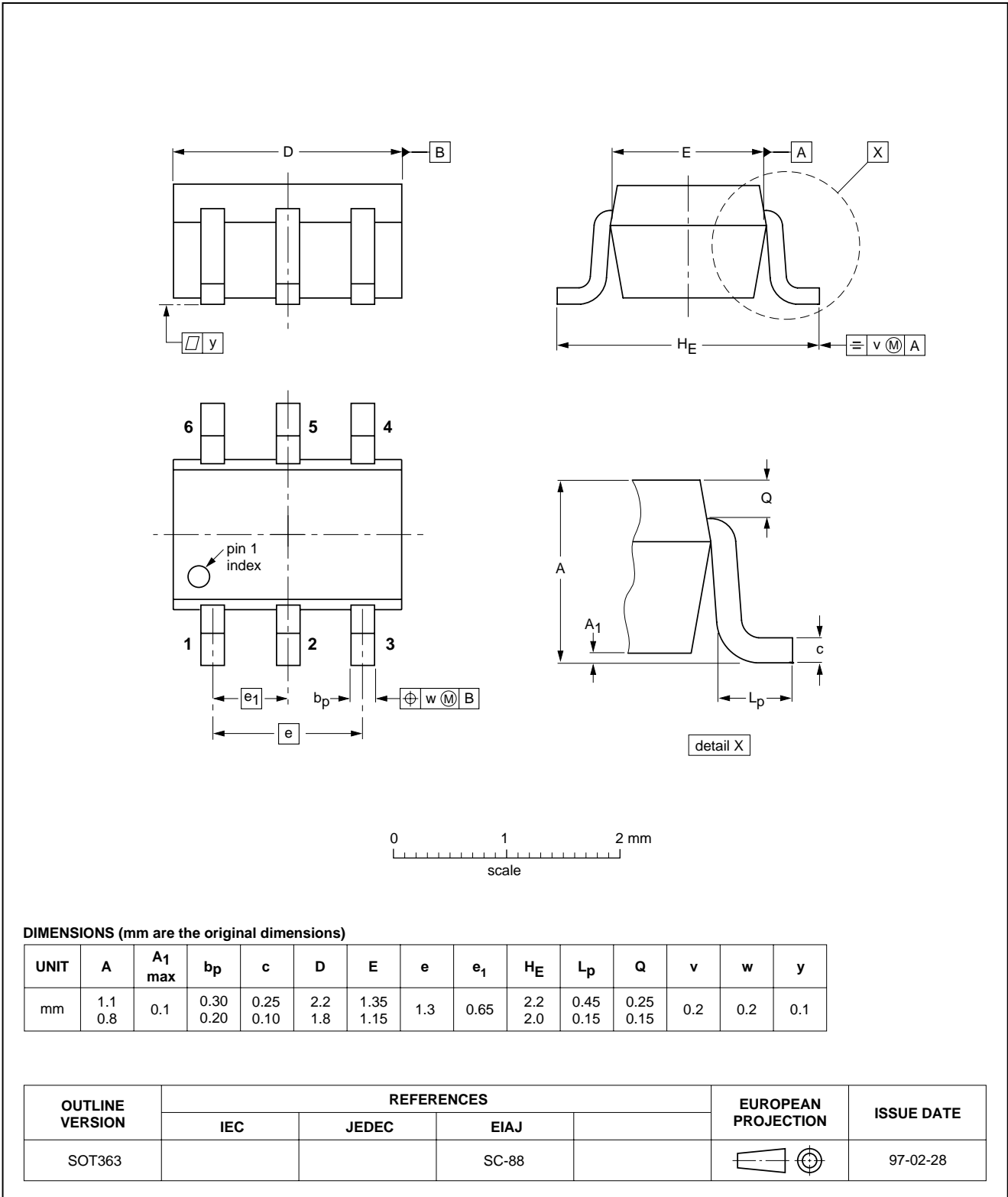
NPN/PNP resistor-equipped transistors

PUMD13

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT363



## NPN/PNP resistor-equipped transistors

## PUMD13

## DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS <sup>(1)</sup>
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

**Note**

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**NPN/PNP resistor-equipped transistors**

**PUMD13**

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**NOTES**

NPN/PNP resistor-equipped transistors

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**NOTES**

NPN/PNP resistor-equipped transistors

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**NOTES**

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