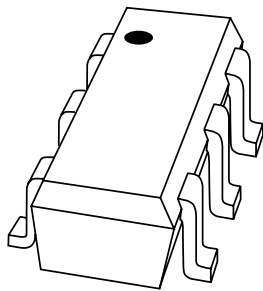


# DATA SHEET



## **PUMD12** NPN/PNP resistor-equipped transistor

Product specification

1999 Apr 26

# NPN/PNP resistor-equipped transistor

# PUMD12

### FEATURES

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

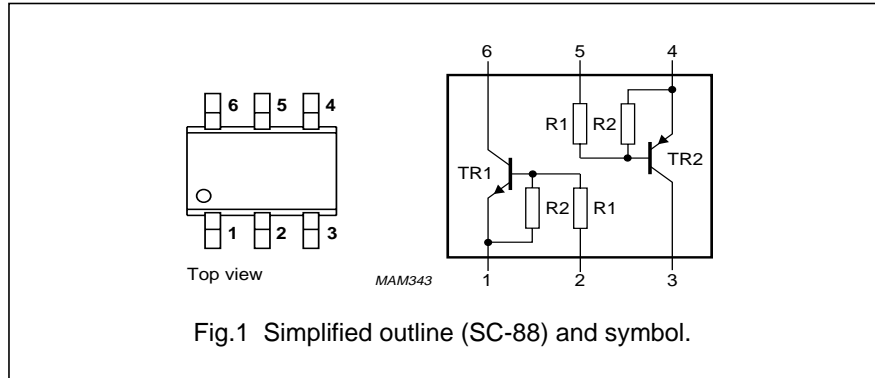


Fig.1 Simplified outline (SC-88) and symbol.

### APPLICATIONS

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

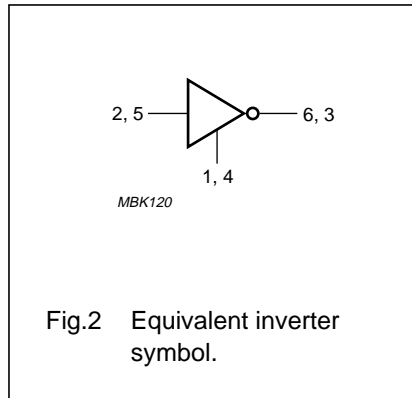


Fig.2 Equivalent inverter symbol.

### DESCRIPTION

NPN/PNP resistor-equipped transistors in an SC-88 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
PUMD12	Dt1

### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

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		–	+40	V
			–	–10	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	–	200	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	–	300	mW

### Note

1. Refer to SC-88 standard mounting conditions.

## NPN/PNP resistor-equipped transistor

## PUMD12

## THERMAL CHARACTERISTICS

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

## Note

1. Refer to SC-88 standard mounting conditions.

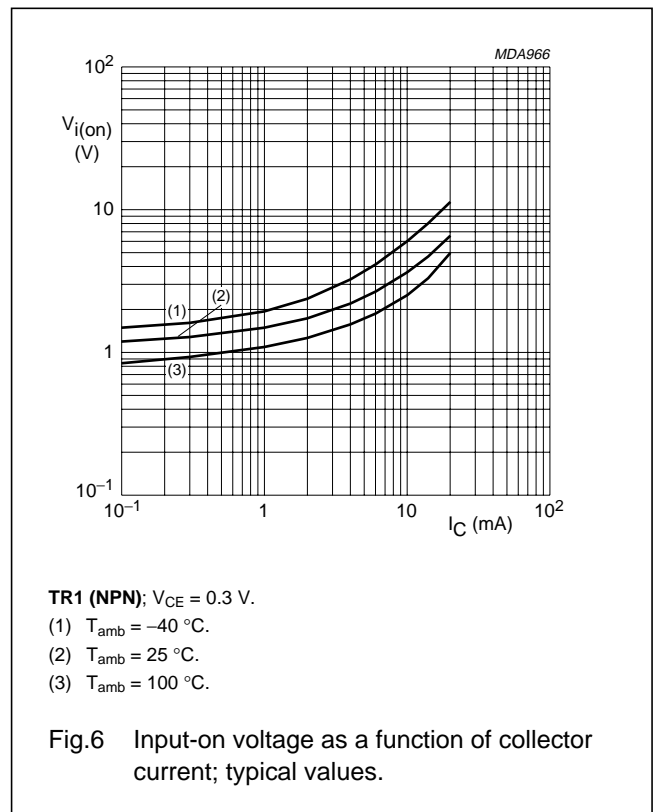
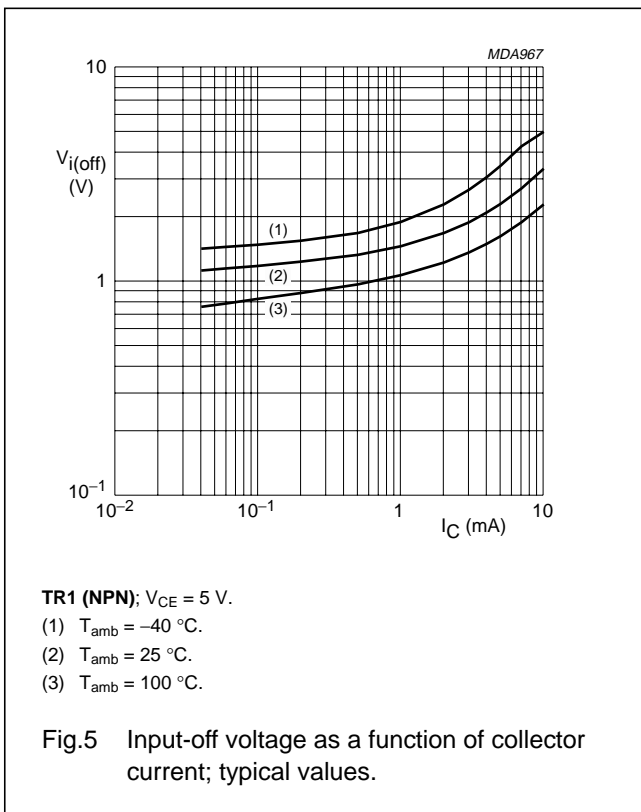
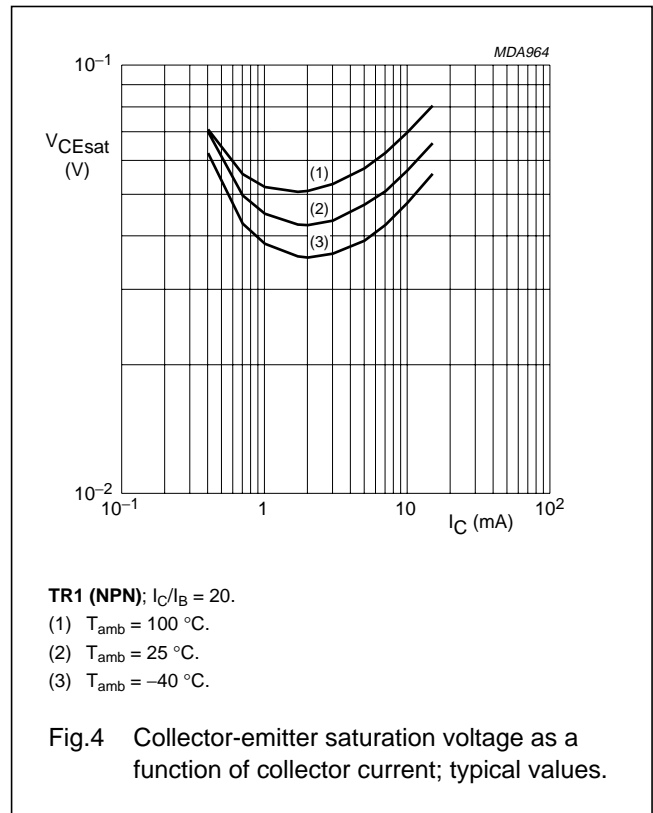
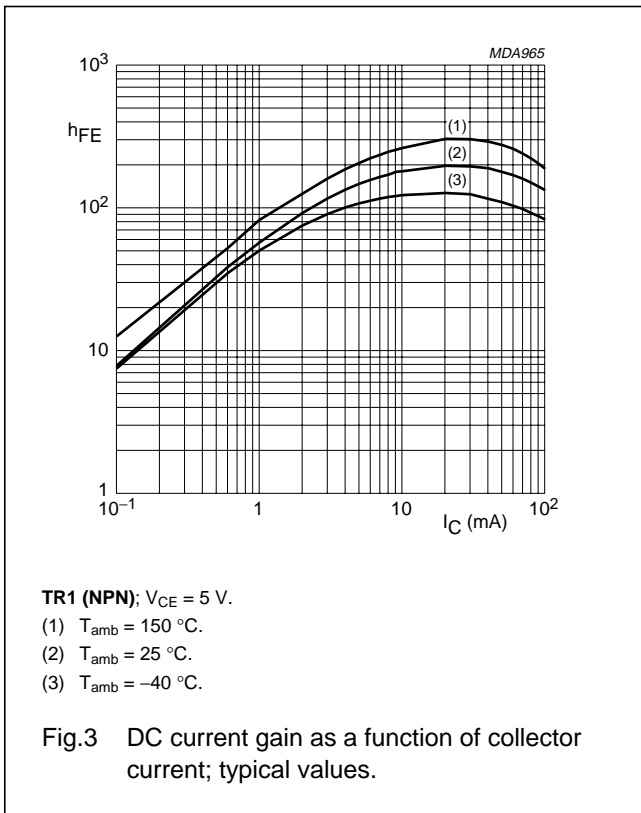
## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Per transistor; for the PNP transistor with negative polarity</b>						
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 50\text{ V}$	–	–	100	nA
$I_{CEO}$	collector cut-off current	$I_B = 0; V_{CE} = 30\text{ V}$	–	–	1	$\mu\text{A}$
		$I_B = 0; V_{CE} = 30\text{ V}; T_j = 150\text{ °C}$	–	–	50	$\mu\text{A}$
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	–	90	$\mu\text{A}$
$h_{FE}$	DC current gain	$I_C = 5\text{ mA}; V_{CE} = 5\text{ V}$	80	–	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	–	150	mV
$V_{i(off)}$	input-off voltage	$I_C = 100\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$	–	1.2	0.8	V
$V_{i(on)}$	input-on voltage	$I_C = 2\text{ mA}; V_{CE} = 0.3\text{ V}$	3	1.6	–	V
R1	input resistor		33	47	61	$\text{k}\Omega$
$\frac{R2}{R1}$	resistor ratio		0.8	1	1.2	
$C_c$	collector capacitance	$I_E = I_E = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$				
	TR1		–	–	2.5	pF
	TR2		–	–	3	pF

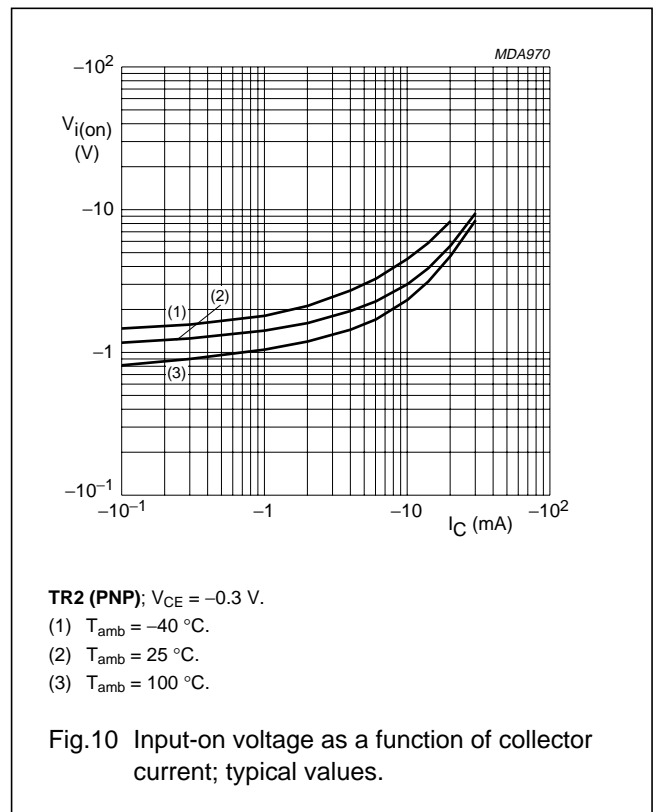
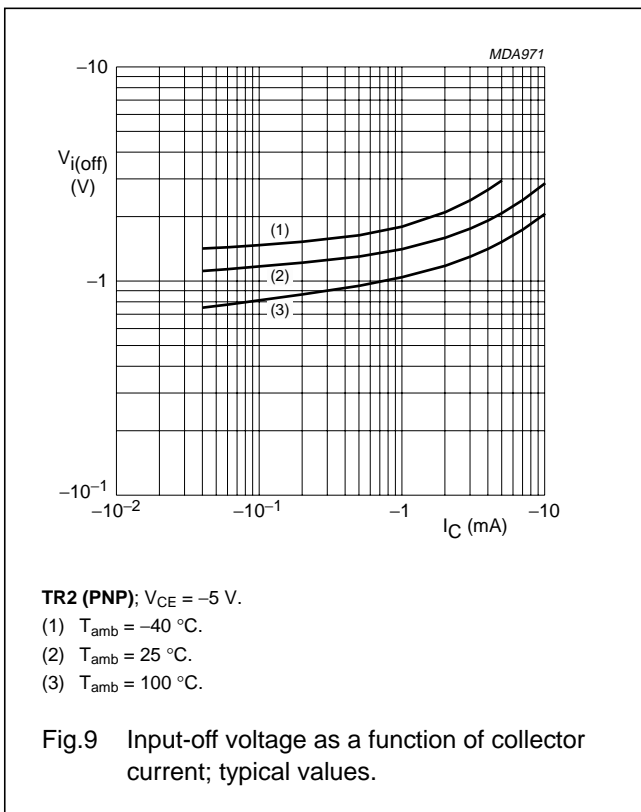
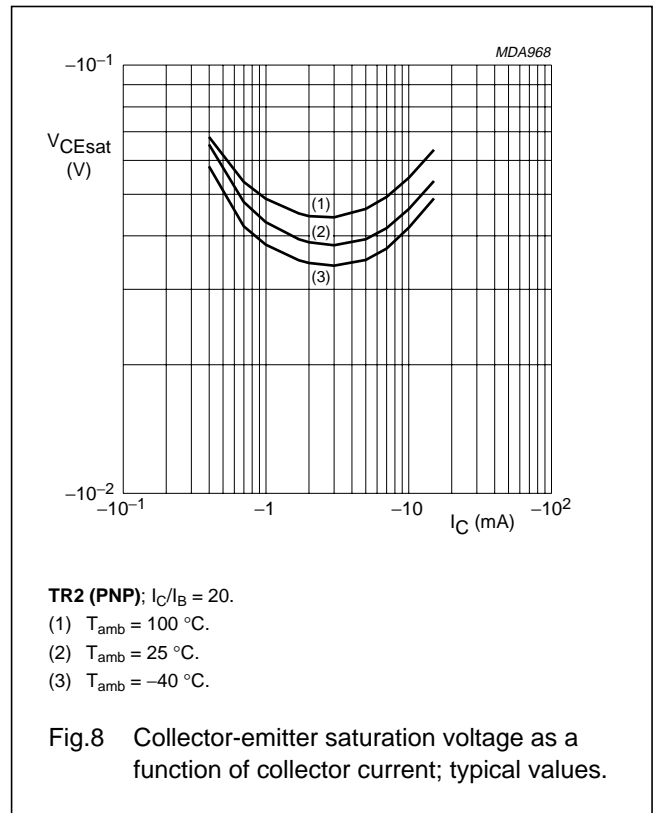
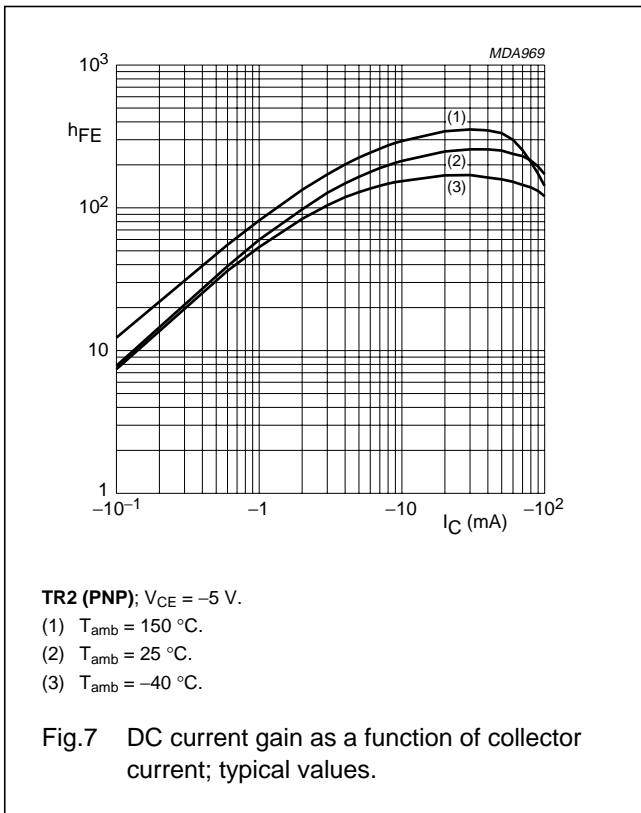
NPN/PNP resistor-equipped transistor

PUMD12



NPN/PNP resistor-equipped transistor

PUMD12



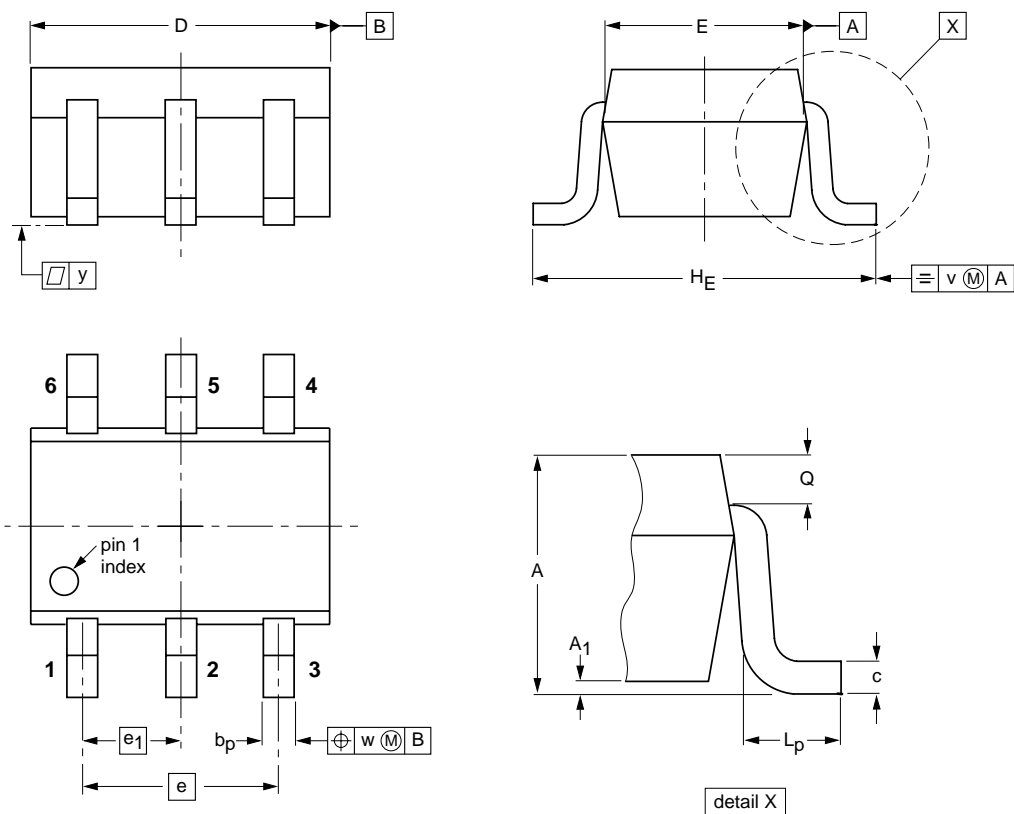
NPN/PNP resistor-equipped transistor

PUMD12

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT363



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	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	EIAJ			
SOT363			SC-88			97-02-28

## NPN/PNP resistor-equipped transistor

PUMD12

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Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). 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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