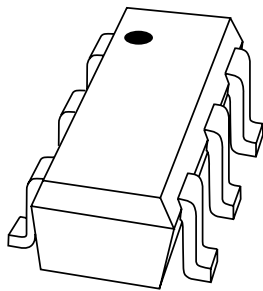


# DATA SHEET



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

Product specification  
Supersedes data of 1999 Apr 26

2001 Feb 16

# NPN/PNP resistor-equipped transistors

# PUMD12

### FEATURES

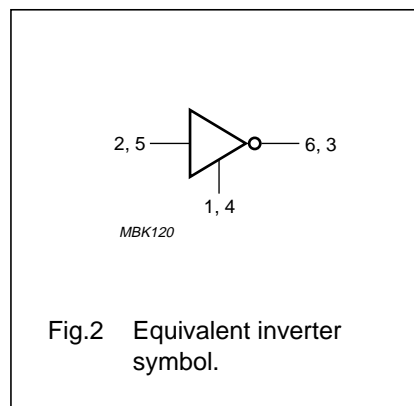
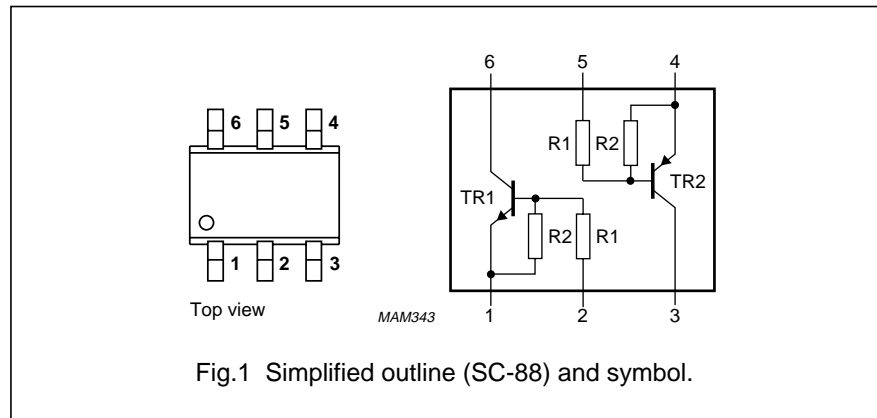
- Transistors with different polarity and built-in bias resistors
  - TR1 (NPN):  
R1 = R2 = 47 kΩ
  - TR2 (PNP):  
R1 = R2 = 47 kΩ
- No mutual interference between the transistors
- Simplification of circuit design
- Reduces number of components and board space.

### APPLICATIONS

- 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
PUMD12	Dt1

## NPN/PNP resistor-equipped transistors

## PUMD12

**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 positive negative		–	+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 transistors

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## 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.

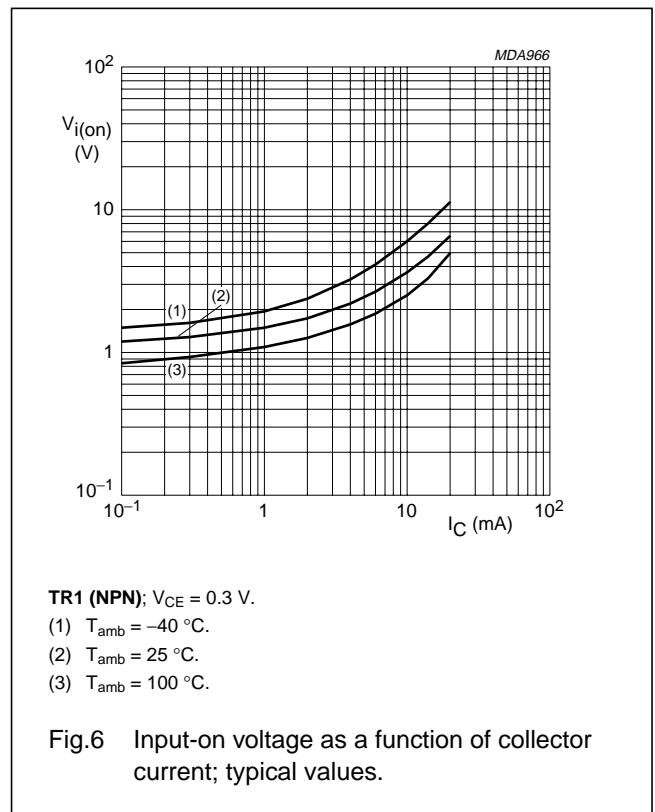
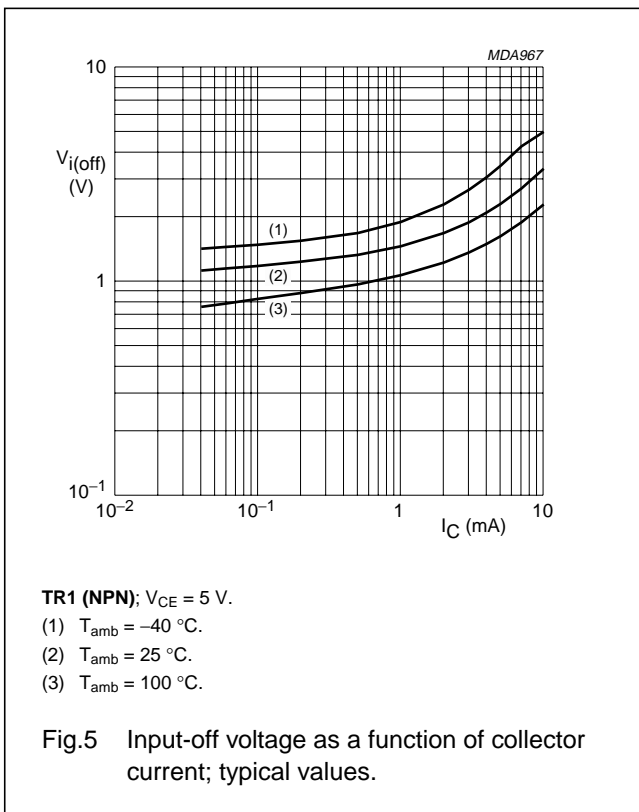
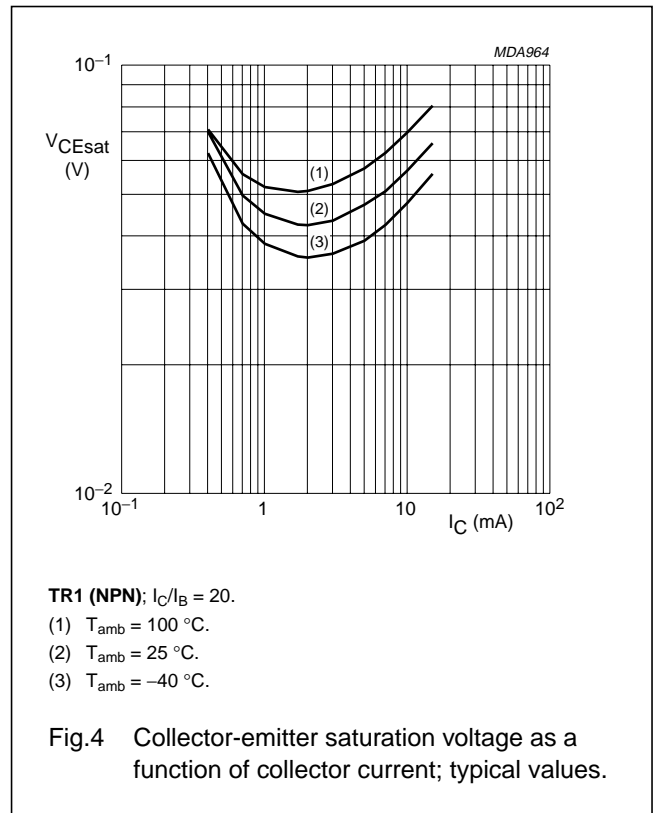
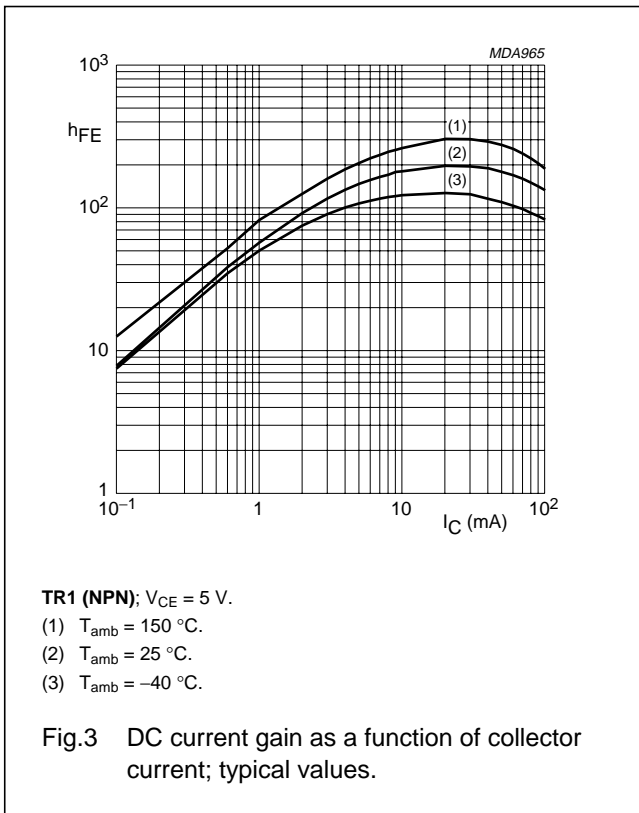
## CHARACTERISTICS

$T_{amb} = 25\text{ °C}$  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	k $\Omega$
$\frac{R2}{R1}$	resistor ratio		0.8	1	1.2	
$C_c$	collector capacitance	$I_E = I_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	–	2.5	pF
	TR1					
	TR2					

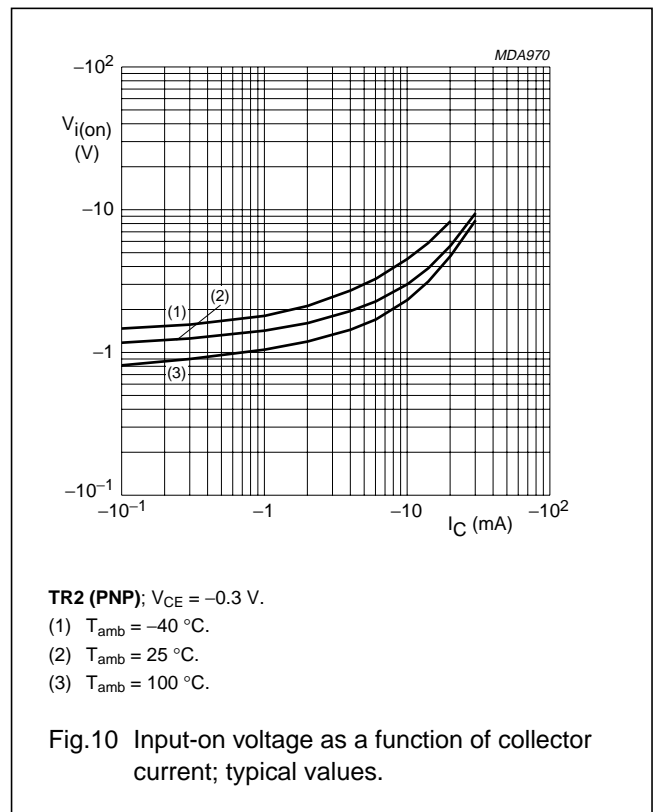
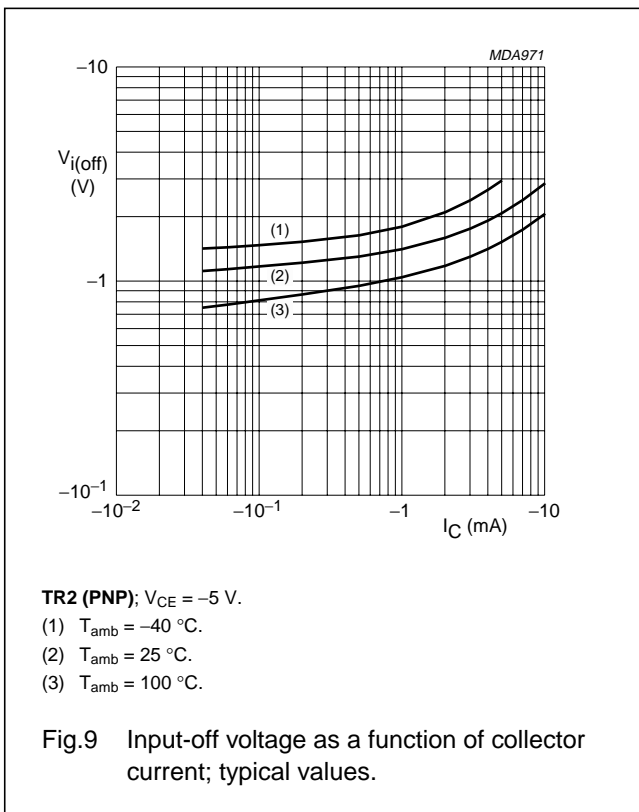
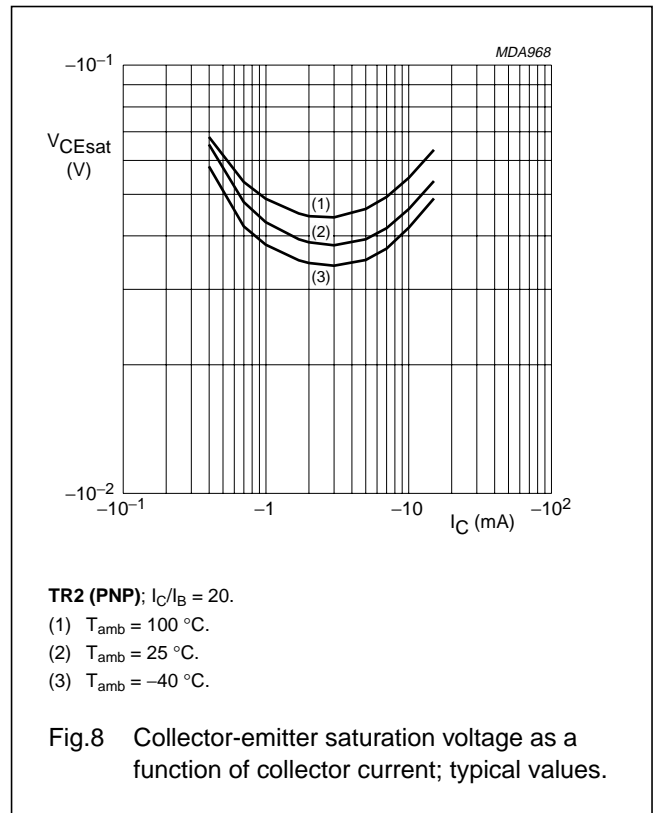
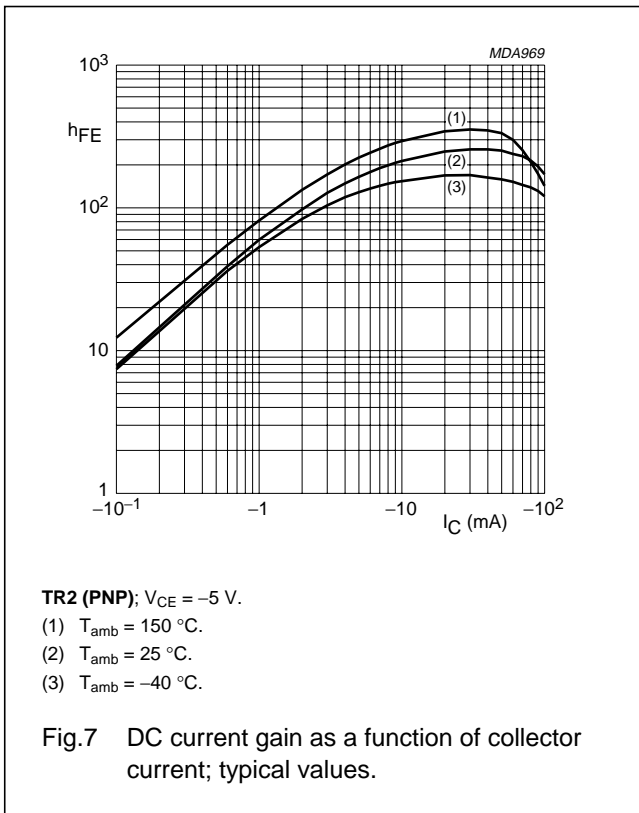
NPN/PNP resistor-equipped transistors

PUMD12



NPN/PNP resistor-equipped transistors

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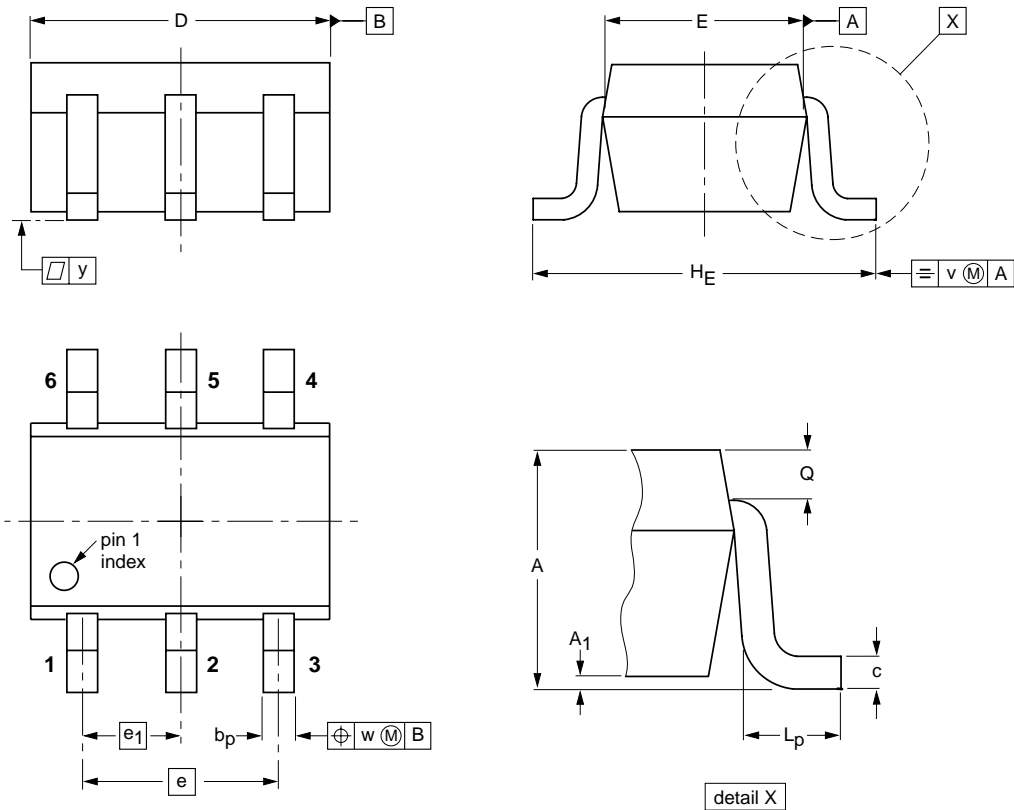
NPN/PNP resistor-equipped transistors

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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 transistors

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## 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.

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NPN/PNP resistor-equipped transistors

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**NOTES**

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**NOTES**

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**NOTES**

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