

# DATA SHEET

**PEMB13; PUMB13**  
PNP/PNP resistor-equipped  
transistors;  $R1 = 4.7 \text{ k}\Omega$ ,  $R2 = 47 \text{ k}\Omega$

Product specification  
Supersedes data of 2003 Dec 11

2004 Apr 15

**PNP/PNP resistor-equipped transistors;**  
**R1 = 4.7 kΩ, R2 = 47 kΩ**

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**FEATURES**

- Built-in bias resistors
- Simplified circuit design
- Reduction of component count
- Reduced pick and place costs.

**APPLICATIONS**

- Low current peripheral drivers
- Replacement of general purpose transistors in digital applications
- Control of IC inputs.

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V <sub>CEO</sub>	collector-emitter voltage	–	–50	V
I <sub>O</sub>	output current (DC)	–	–100	mA
TR1	PNP	–	–	–
TR2	PNP	–	–	–
R1	bias resistor	4.7	–	kΩ
R2	bias resistor	47	–	kΩ

**DESCRIPTION**

PNP/PNP resistor-equipped transistors (see “Simplified outline, symbol and pinning” for package details).

**PRODUCT OVERVIEW**

TYPE NUMBER	PACKAGE		MARKING CODE	NPN/PNP COMPLEMENT	NPN/PNP COMPLEMENT
	PHILIPS	EIAJ			
PEMB13	SOT666	–	45	PEMD13	PEMH13
PUMB13	SOT363	SC-88	B*5	PUMD13	PUMH13

**Note**

- \* = p: Made in Hong Kong.  
 \* = t: Made in Malaysia.  
 \* = W: Made in China.

**SIMPLIFIED OUTLINE, SYMBOL AND PINNING**

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PEMB13 PUMB13	<p>Top view <span style="margin-left: 100px;">MAM477</span></p>	1	emitter TR1
		2	base TR1
		3	collector TR2
		4	emitter TR2
		5	base TR2
		6	collector TR1

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#### ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PEMB13	–	plastic surface mounted package; 6 leads	SOT666
PUMB13	–	plastic surface mounted package; 6 leads	SOT363

#### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Per transistor</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		–	+5	V
			–	–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	–	200	mW
	SOT363	notes 1 and 2	–	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			
		note 1	–	300	mW
	SOT363	notes 1 and 2	–	300	mW
	SOT666		–	300	mW

#### Notes

1. Device mounted on an FR4 printed-circuit board, single-sided copper, standard footprint.
2. Reflow soldering is the only recommended soldering method.

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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
<b>Per transistor</b>				
R <sub>th j-a</sub>	thermal resistance from junction to ambient	T <sub>amb</sub> ≤ 25 °C		
	SOT363	note 1	625	K/W
	SOT666	notes 1 and 2	625	K/W
<b>Per device</b>				
R <sub>th j-a</sub>	thermal resistance from junction to ambient	T <sub>amb</sub> ≤ 25 °C		
	SOT363	note 1	416	K/W
	SOT666	note 1	416	K/W

## Notes

1. Device mounted on an FR4 printed-circuit board, single-sided copper, standard footprint.
2. Reflow soldering is the only recommended soldering method.

## CHARACTERISTICS

T<sub>amb</sub> = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = -50 V; I <sub>E</sub> = 0	-	-	-100	nA
I <sub>CEO</sub>	collector-emitter cut-off current	V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0	-	-	-1	$\mu$ A
		V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0; T <sub>j</sub> = 150 °C	-	-	-50	$\mu$ A
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = -5 V; I <sub>C</sub> = 0	-	-	-170	$\mu$ A
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -10 mA	100	-	-	
V <sub>CEsat</sub>	saturation voltage	I <sub>C</sub> = -5 mA; I <sub>B</sub> = -0.25 mA	-	-	-100	mV
V <sub>i(off)</sub>	input-off voltage	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -100 $\mu$ A	-	-0.6	-0.5	V
V <sub>i(on)</sub>	input-on voltage	V <sub>CE</sub> = -0.3 V; I <sub>C</sub> = -5 mA	-1.3	-0.9	-	V
R1	input resistor		3.3	4.7	6.1	k $\Omega$
$\frac{R2}{R1}$	resistor ratio		8	10	12	
C <sub>c</sub>	collector capacitance	I <sub>E</sub> = i <sub>e</sub> = 0; V <sub>CB</sub> = -10 V; f = 1 MHz	-	-	3	pF

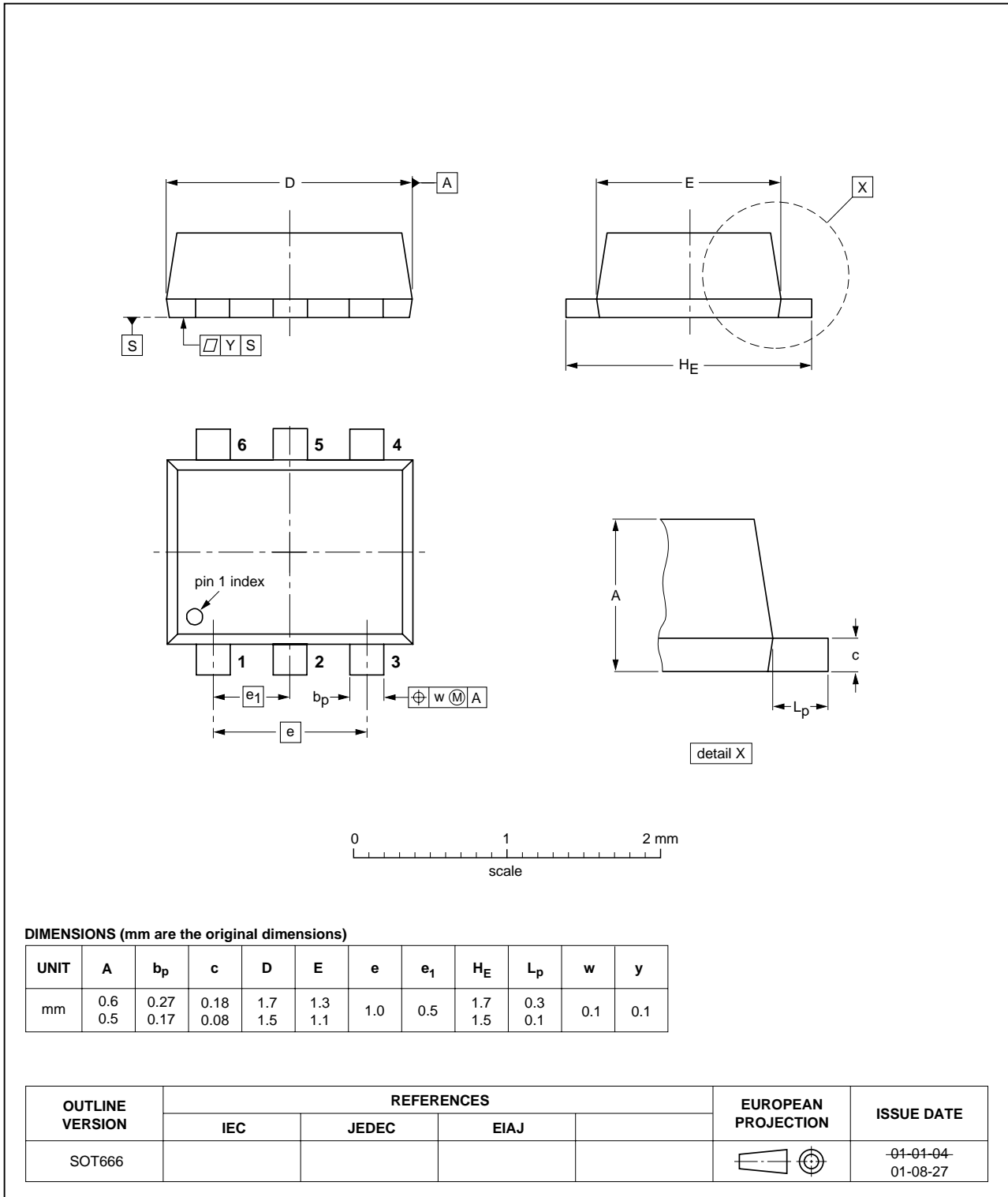
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PACKAGE OUTLINES

Plastic surface mounted package; 6 leads

SOT666

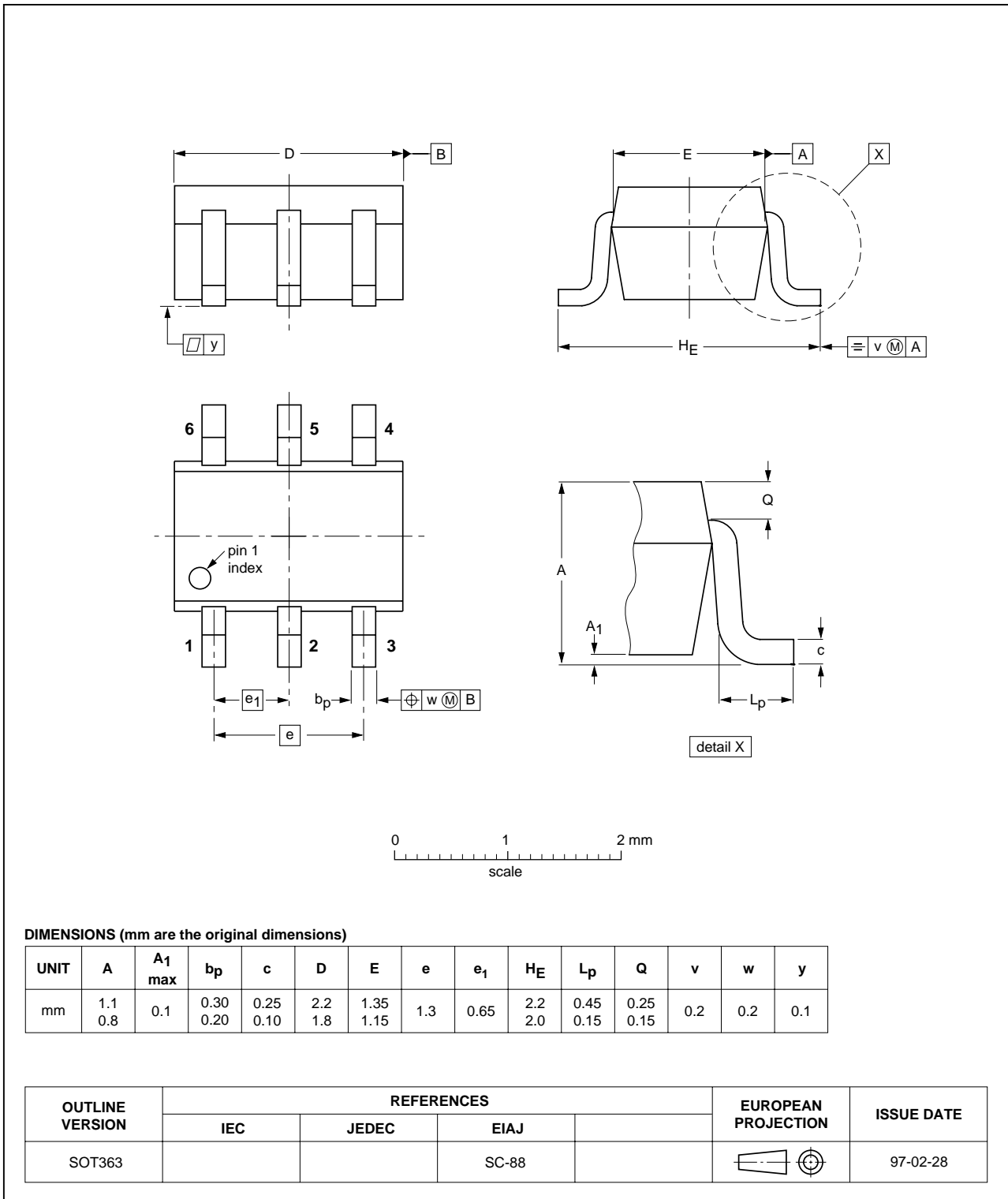


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LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
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## **Contact information**

For additional information please visit <http://www.semiconductors.philips.com>. Fax: +31 40 27 24825

For sales offices addresses send e-mail to: [sales.addresses@www.semiconductors.philips.com](mailto:sales.addresses@www.semiconductors.philips.com).

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