

# DATA SHEET

**PEMB2; PUMB2**  
PNP/PNP resistor-equipped  
transistors; R1 = 47 k $\Omega$ , R2 = 47 k $\Omega$

Product data sheet  
Supersedes data of 2001 Sep 14

2003 Oct 15

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

**PEMB2; PUMB2**

**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	47	–	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			
PEMB2	SOT666	–	B2	PEMD12	PEMH2
PUMB2	SOT363	SC-88	B*2 <sup>(1)</sup>	PUMD12	PUMH2

**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
PEMB2 PUMB2	<p>Top view <span style="float: right;">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
PEMB2	–	plastic surface mounted package; 6 leads	SOT666
PUMB2	–	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	–	–5	V
V <sub>I</sub>	input voltage		–	+10	V
			–	–40	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			
	SOT363	note 1	–	200	mW
	SOT666	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			
	SOT363	note 1	–	300	mW
	SOT666	notes 1 and 2	–	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	μA
		V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0; T <sub>j</sub> = 150 °C	-	-	-50	μA
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = -5 V; I <sub>C</sub> = 0	-	-	-90	μA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -5 mA	80	-	-	
V <sub>CEsat</sub>	saturation voltage	I <sub>C</sub> = -10 mA; I <sub>B</sub> = -0.5 mA	-	-	-150	mV
V <sub>i(off)</sub>	input-off voltage	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -100 μA	-	-1.2	-0.8	V
V <sub>i(on)</sub>	input-on voltage	V <sub>CE</sub> = -0.3 V; I <sub>C</sub> = -2 mA	-3	-1.6	-	V
R1	input resistor		33	47	61	k $\Omega$
$\frac{R2}{R1}$	resistor ratio		0.8	1	1.2	
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

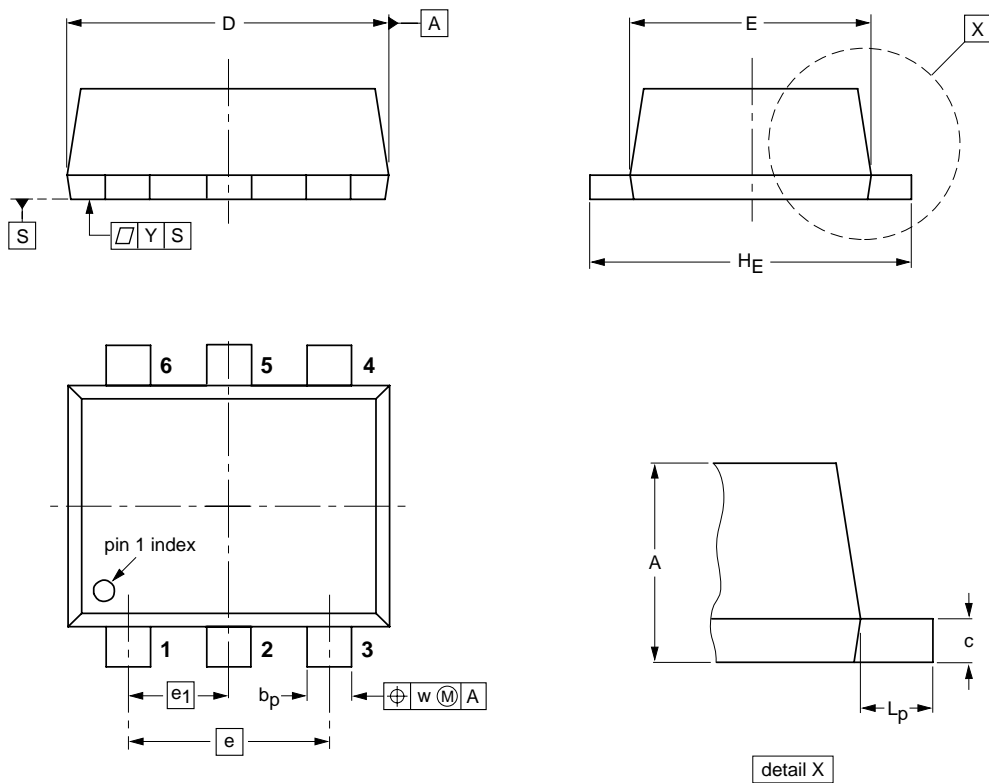
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PACKAGE OUTLINES

Plastic surface mounted package; 6 leads

SOT666



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	w	y
mm	0.6 0.5	0.27 0.17	0.18 0.08	1.7 1.5	1.3 1.1	1.0	0.5	1.7 1.5	0.3 0.1	0.1	0.1

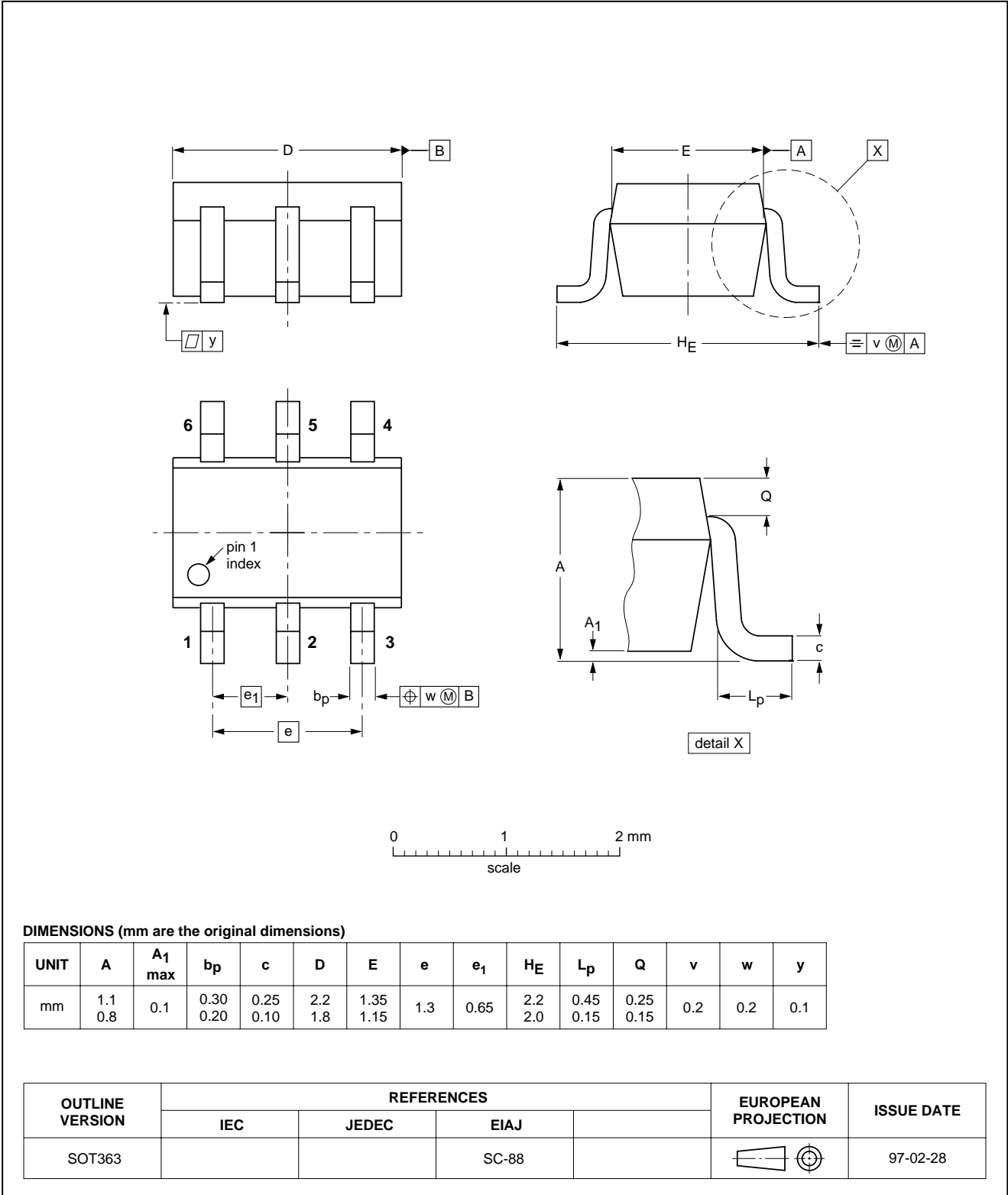
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT666						01-01-04 01-08-27

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## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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# ***NXP Semiconductors***

## **Customer notification**

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## **Contact information**

For additional information please visit: **<http://www.nxp.com>**

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Printed in The Netherlands

R75/02/pp8

Date of release: 2003 Oct 15

Document order number: 9397 750 11791

