

DATA SHEET

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

Product data sheet
Supersedes data of 2003 Dec 11

2004 Apr 15



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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.

DESCRIPTION

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

QUICK REFERENCE DATA

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V _{CEO}	collector-emitter voltage	–	–50	V
I _O	output current (DC)	–	–100	mA
TR1	PNP	–	–	–
TR2	PNP	–	–	–
R1	bias resistor	4.7	–	kΩ
R2	bias resistor	47	–	kΩ

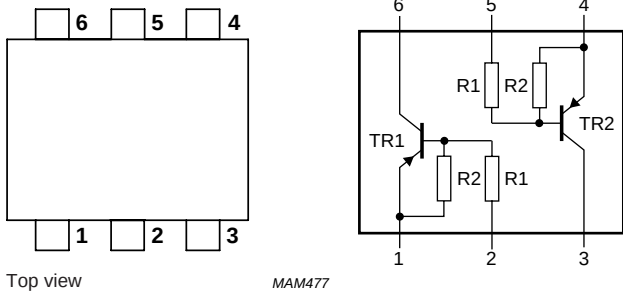
PRODUCT OVERVIEW

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

1. * = 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	 Top view MAM477	1 2 3 4 5 6	emitter TR1 base TR1 collector TR2 emitter TR2 base TR2 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
Per transistor					
V _{CBO}	collector-base voltage	open emitter	–	–50	V
V _{CEO}	collector-emitter voltage	open base	–	–50	V
V _{EBO}	emitter-base voltage	open collector	–	–10	V
V _I	input voltage				
	positive		–	+5	V
	negative		–	–30	V
I _O	output current (DC)		–	–100	mA
I _{CM}	peak collector current		–	–100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C			
	SOT363	note 1	–	200	mW
	SOT666	notes 1 and 2	–	200	mW
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	150	°C
T _{amb}	operating ambient temperature		–65	+150	°C
Per device					
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C			
	SOT363	note 1	–	300	mW
	SOT666	notes 1 and 2	–	300	mW

Notes

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

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THERMAL CHARACTERISTICS

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

Notes

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

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CBO}	collector-base cut-off current	V _{CB} = -50 V; I _E = 0	–	–	-100	nA
I _{CEO}	collector-emitter cut-off current	V _{CE} = -30 V; I _B = 0	–	–	-1	μA
		V _{CE} = -30 V; I _B = 0; T _j = 150 °C	–	–	-50	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 V; I _C = 0	–	–	-170	μA
h _{FE}	DC current gain	V _{CE} = -5 V; I _C = -10 mA	100	–	–	
V _{CEsat}	saturation voltage	I _C = -5 mA; I _B = -0.25 mA	–	–	-100	mV
V _{i(off)}	input-off voltage	V _{CE} = -5 V; I _C = -100 μA	–	-0.6	-0.5	V
V _{i(on)}	input-on voltage	V _{CE} = -0.3 V; I _C = -5 mA	-1.3	-0.9	–	V
R1	input resistor		3.3	4.7	6.1	k Ω
$\frac{R2}{R1}$	resistor ratio		8	10	12	
C _c	collector capacitance	I _E = I _e = 0; V _{CB} = -10 V; f = 1 MHz	–	–	3	pF

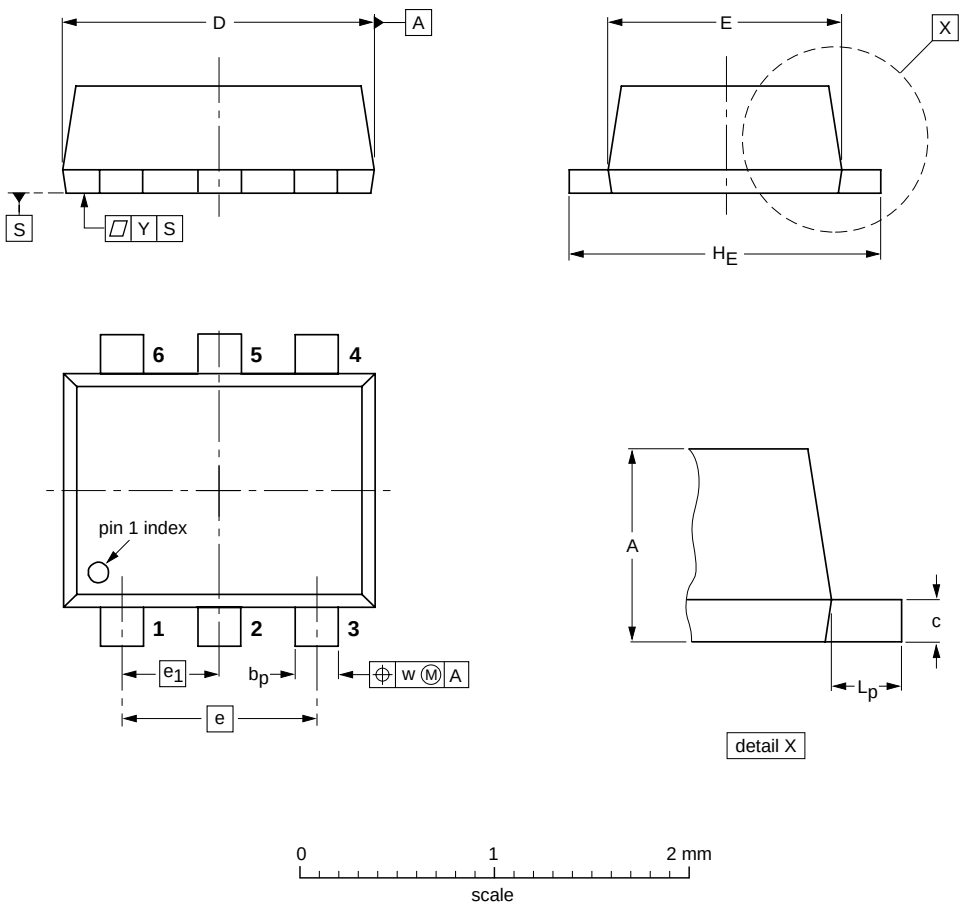
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PACKAGE OUTLINES

Plastic surface-mounted package; 6 leads

SOT666



DIMENSIONS (mm are the original dimensions)

UNIT	A	b _p	c	D	E	e	e ₁	H _E	L _p	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

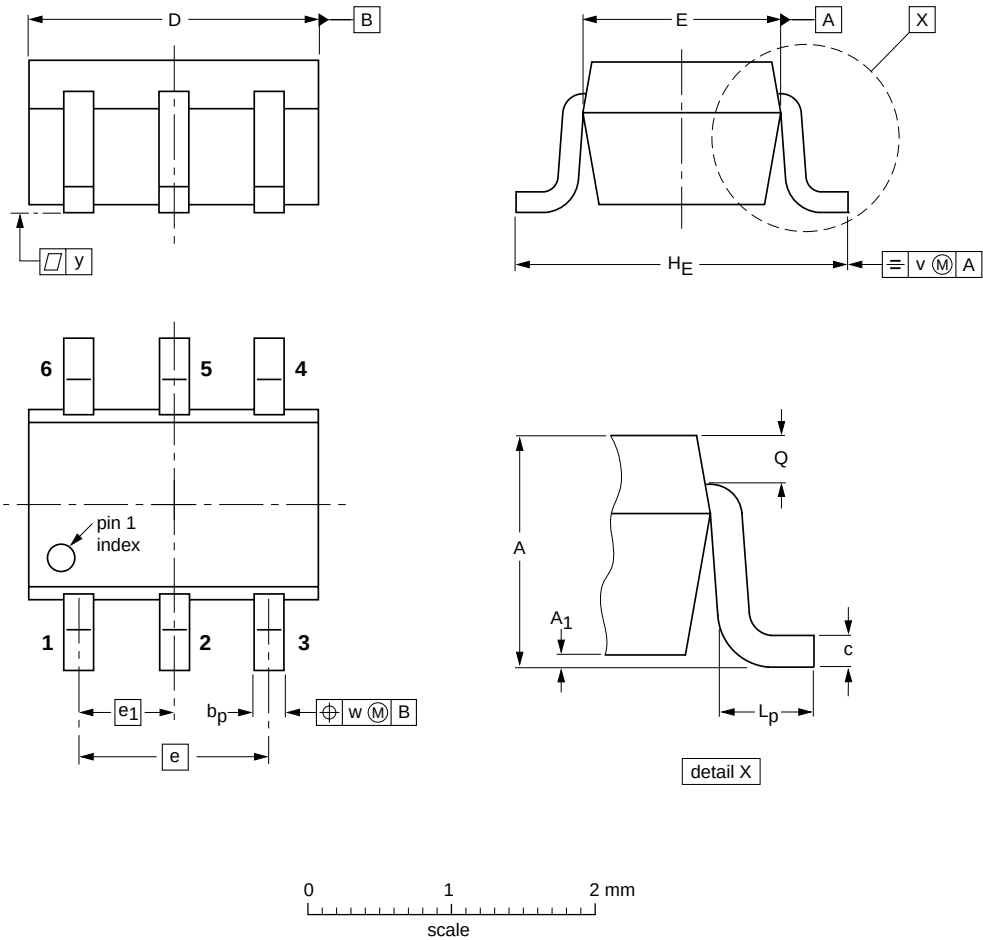
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT666						04-11-08 06-03-16

PNP/PNP resistor-equipped transistors;
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SOT363



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	c	D	E	e	e ₁	H _E	L _p	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	JEITA			
SOT363			SC-88			04-11-08 06-03-16

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DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	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.

Notes

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NXP Semiconductors

Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

Contact information

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Printed in The Netherlands

R75/03/pp8

Date of release: 2004 Apr 15

Document order number: 9397 750 13102

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