

DATA SHEET

PEMD12; PUMD12
NPN/PNP resistor-equipped
transistors; R1 = 47 k Ω , R2 = 47 k Ω

Product specification
Supersedes data of 2001 Nov 7

2003 Oct 08

NPN/PNP resistor-equipped transistors; R1 = 47 k Ω , R2 = 47 k Ω

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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 driver
- Replacement of general purpose transistors in digital applications
- Control of IC inputs.

QUICK REFERENCE DATA

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

DESCRIPTION

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

PRODUCT OVERVIEW

TYPE NUMBER	PACKAGE		MARKING CODE	PNP/PNP COMPLEMENT	NPN/PNP COMPLEMENT
	PHILIPS	EIAJ			
PEMD12	SOT666		D2	PEMB2	PEMH2
PUMD12	SOT363	SC-88	D*1 ⁽¹⁾	PUMB2	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
PEMD12 PUMD12	<p>Top view</p> <p>MAM468</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
PEMD12	–	plastic surface mounted package; 6 leads	SOT666
PUMD12	–	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; for the PNP transistor with negative polarity					
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 TR1 positive negative		–	+40	V
			–	–10	V
V_i	input voltage TR2 positive negative		–	+10	V
			–	–40	V
I_O	output current (DC)		–	100	mA
I_{CM}	peak collector current		–	100	mA
P_{tot}	total power dissipation SOT363 SOT666	$T_{amb} \leq 25 \text{ }^\circ\text{C}$ note 1	–	200	mW
		notes 1 and 2	–	200	mW
T_{stg}	storage temperature		–65	+150	$^\circ\text{C}$
T_j	junction temperature		–	150	$^\circ\text{C}$
T_{amb}	operating ambient temperature		–65	+150	$^\circ\text{C}$
Per device					
P_{tot}	total power dissipation SOT363 SOT666	$T_{amb} \leq 25 \text{ }^\circ\text{C}$ note 1	–	300	mW
		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
Per transistor				
$R_{th\ j-a}$	thermal resistance from junction to ambient	$T_{amb} \leq 25 \text{ }^\circ\text{C}$		
	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	$T_{amb} \leq 25 \text{ }^\circ\text{C}$		
	SOT363	note 1	416	K/W
	SOT666	notes 1 and 2	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

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor; for the PNP transistor with negative polarity						
I_{CBO}	collector-base cut-off current	$V_{CB} = 50 \text{ V}$; $I_E = 0$	–	–	100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$; $I_B = 0$	–	–	1	μA
		$V_{CE} = 30 \text{ V}$; $I_B = 0$; $T_j = 150 \text{ }^\circ\text{C}$	–	–	50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5 \text{ V}$; $I_C = 0$	–	–	90	μA
h_{FE}	DC current gain	$V_{CE} = 5 \text{ V}$; $I_C = 5 \text{ mA}$	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 (NPN)		–	–	2.5	pF
	TR2 (PNP)		–	–	3	pF

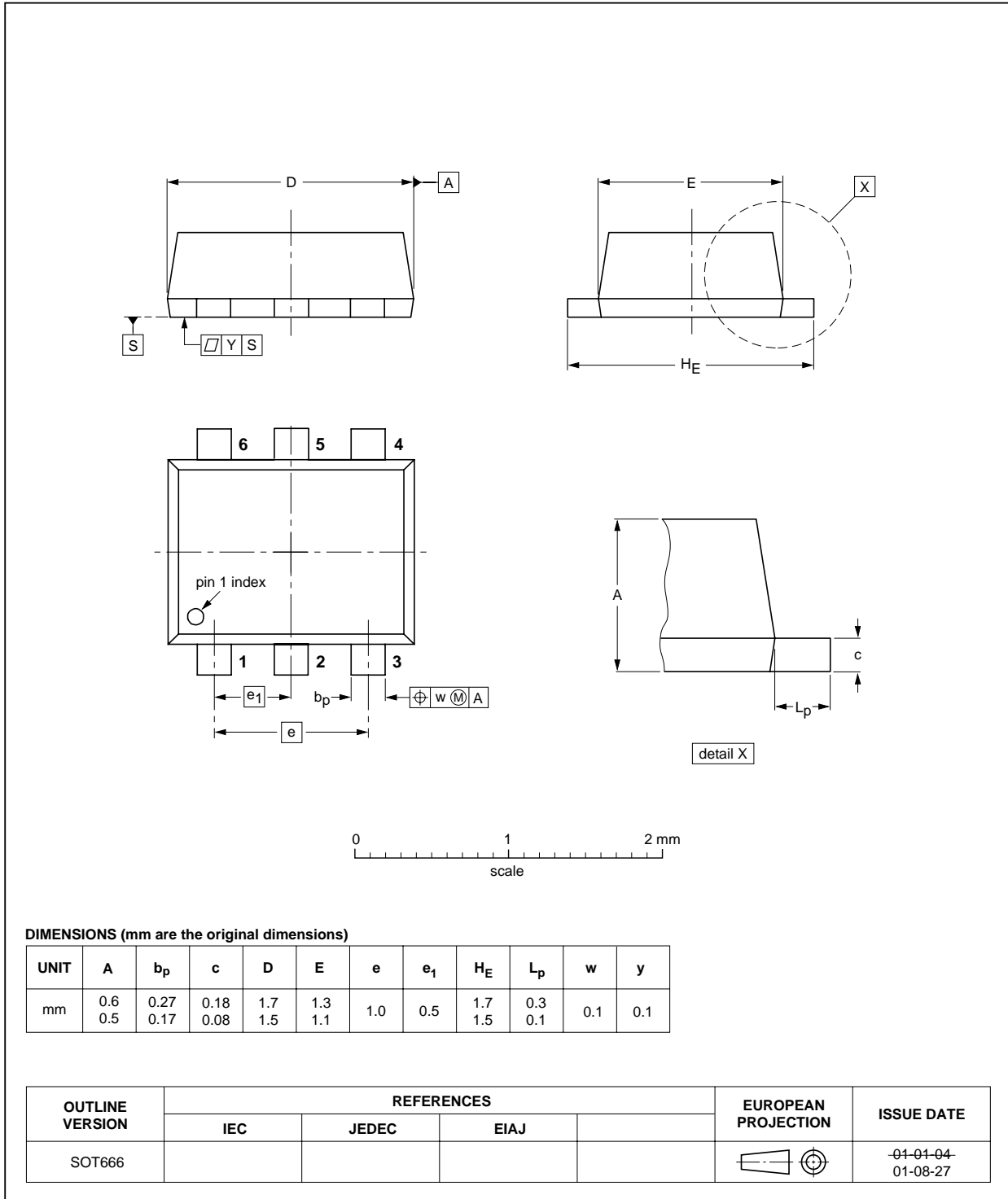
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PACKAGE OUTLINES

Plastic surface mounted package; 6 leads

SOT666

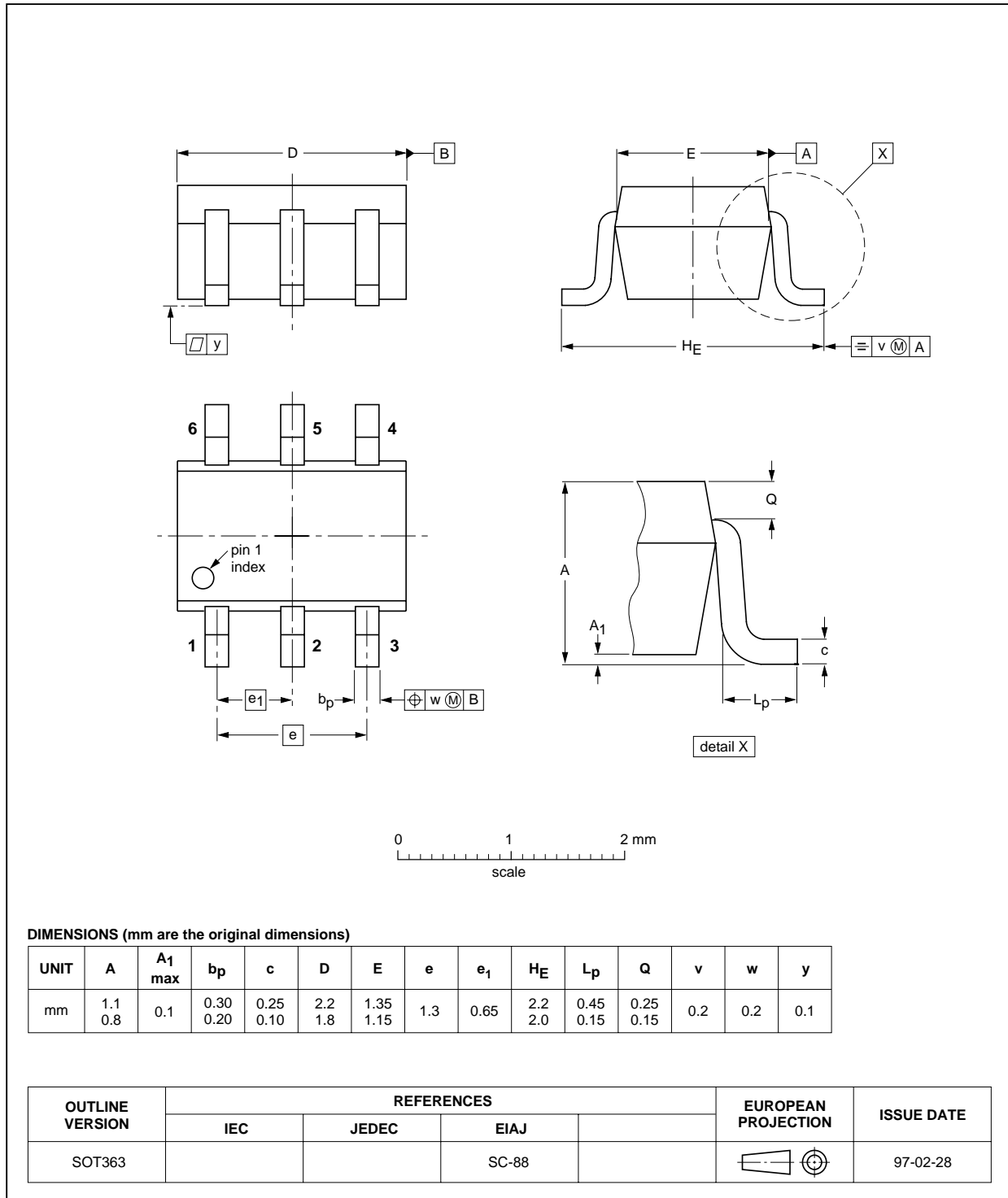


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DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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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