

DATA SHEET

PEMH2; PUMH2
NPN/NPN resistor-equipped
transistors; $R1 = 47 \text{ k}\Omega$, $R2 = 47 \text{ k}\Omega$

Product specification
Supersedes data of 2003 Oct 02

2004 Apr 14

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R1 = 47 kΩ, R2 = 47 kΩ

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FEATURES

- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces 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	NPN	–	–	–
R1	bias resistor	47	–	kΩ
R2	bias resistor	47	–	kΩ

DESCRIPTION

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

PRODUCT OVERVIEW

TYPE NUMBER	PACKAGE		MARKING CODE	NPN/PNP COMPLEMENT	PNP/PNP COMPLEMENT
	PHILIPS	EIAJ			
PEMH2	SOT666	–	Z2	PEMD12	PEMB2
PUMH2	SOT363	SC-88	2*H ⁽¹⁾	PUMD12	PUMB2

Note

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

SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PEMH2 PUMH2	<p>Top view MHC049</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
PEMH2	–	plastic surface mounted package; 6 leads	SOT666
PUMH2	–	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		–	+40	V
			–	–10	V
I_O	output current (DC)		–	100	mA
I_{CM}	peak collector current		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$			
		SOT363	note 1	–	200
	SOT666	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	$T_{amb} \leq 25 \text{ }^\circ\text{C}$			
		SOT363	note 1	–	300
	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
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						
I_{CBO}	collector-base cut-off current	$V_{CB} = 50 \text{ V}$; $I_E = 0 \text{ A}$	–	–	100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$; $I_B = 0 \text{ A}$	–	–	1	μA
		$V_{CE} = 30 \text{ V}$; $I_B = 0 \text{ A}$; $T_j = 150 \text{ }^\circ\text{C}$	–	–	50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5 \text{ V}$; $I_C = 0 \text{ A}$	–	–	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	$V_{CE} = 5 \text{ V}$; $I_C = 100 \mu\text{A}$	–	1.2	0.8	V
$V_{i(on)}$	input on voltage	$V_{CE} = 0.3 \text{ V}$; $I_C = 2 \text{ mA}$	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	$V_{CB} = 10 \text{ V}$; $I_E = i_e = 0 \text{ A}$; $f = 1 \text{ MHz}$	–	–	2.5	pF

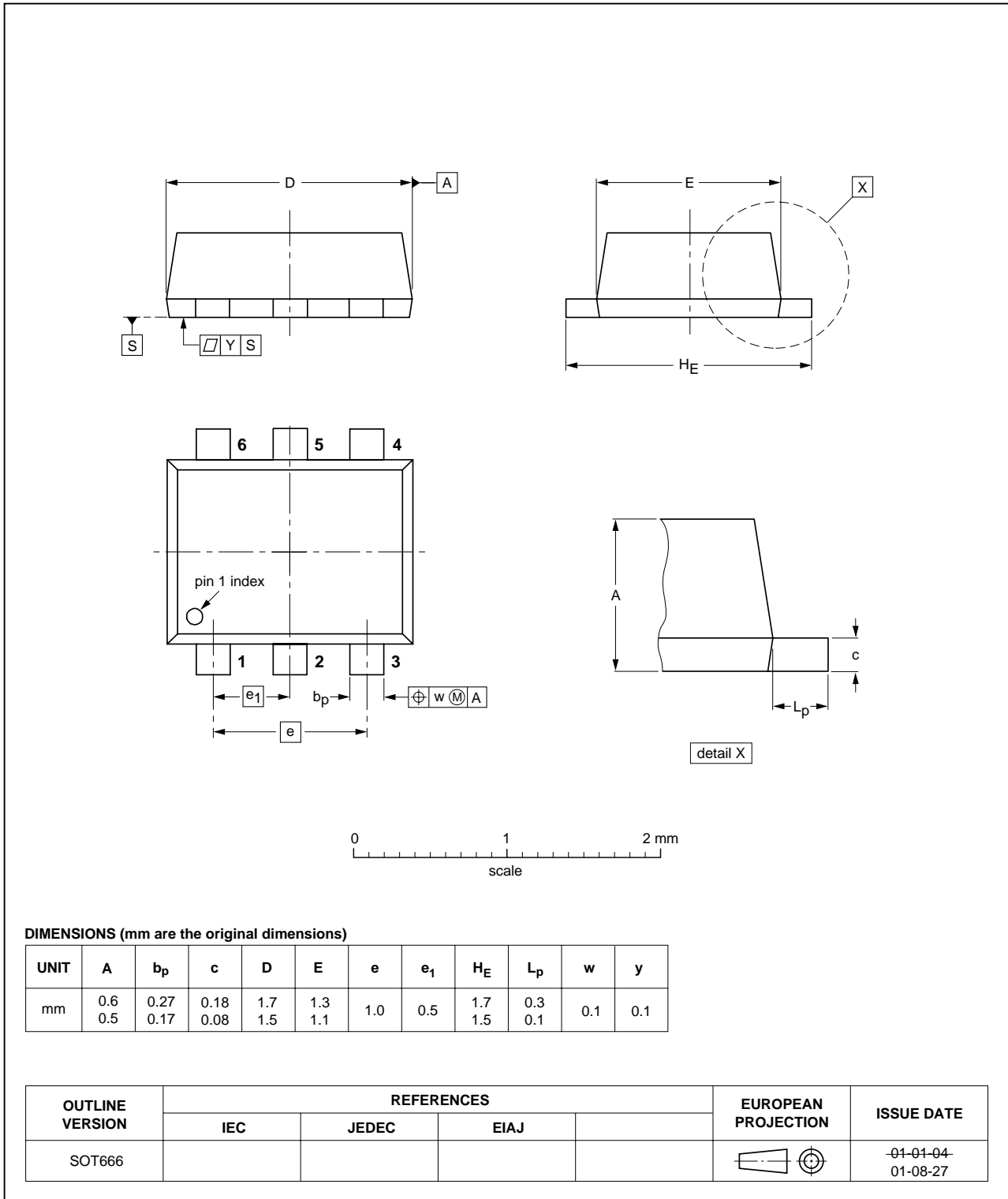
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PACKAGE OUTLINES

Plastic surface mounted package; 6 leads

SOT666

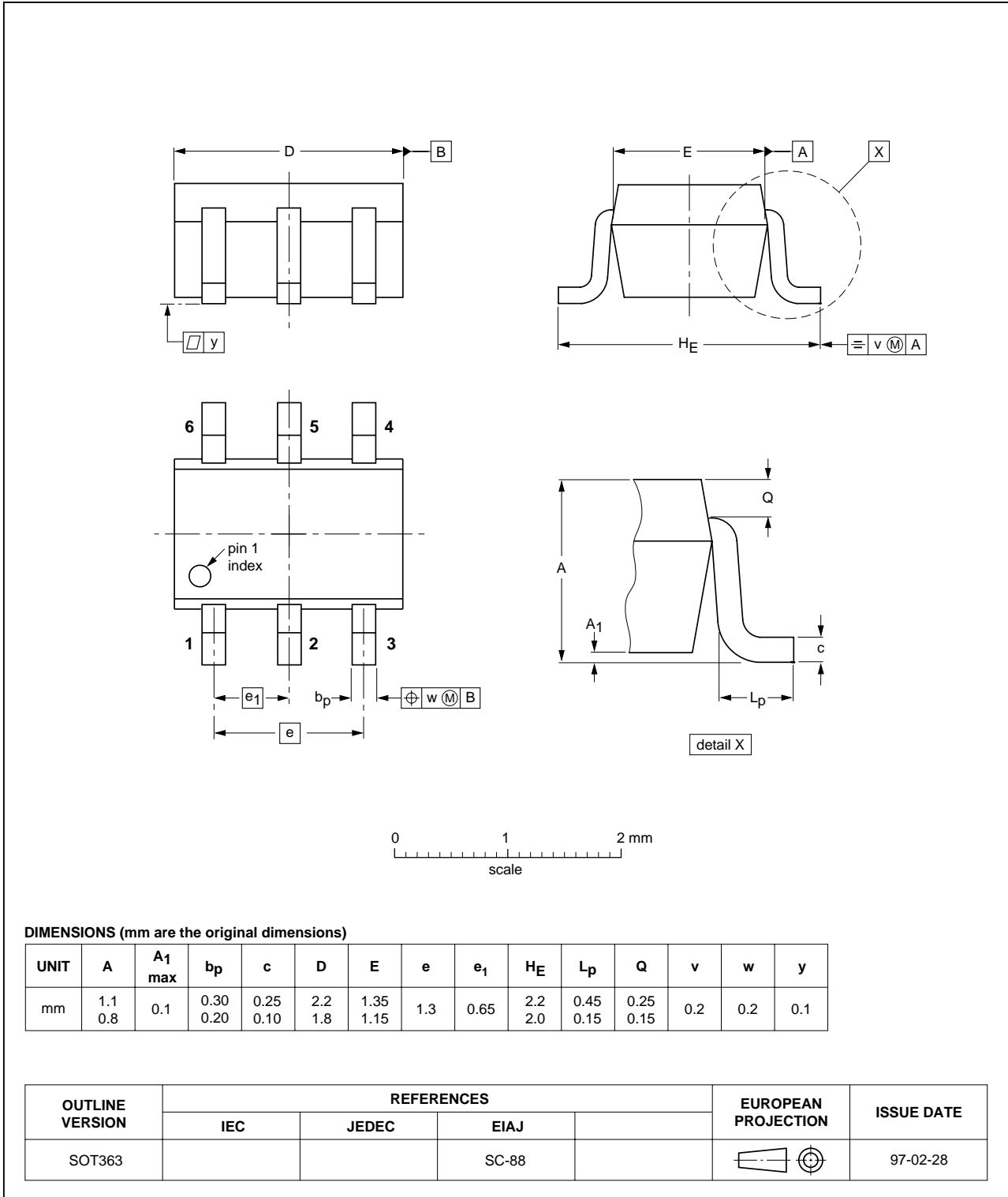


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DATA SHEET STATUS

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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