



THE DATASHEET OF PEMD17



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Kind regards,

Team Nexperia

PEMD17; PUMD17

NPN/PNP resistor-equipped transistors;
R1 = 47 k Ω , R2 = 22 k Ω

Rev. 03 — 24 January 2005

Product data sheet

1. Product profile

1.1 General description

NPN/PNP resistor-equipped transistors.

Table 1: Product overview

Type number	Package		PNP/PNP complement	NPN/PNP complement
	Philips	JEITA		
PEMD17	SOT666	-	PEMB17	PEMH17
PUMD17	SOT363	SC-88	PUMB17	PUMH17

1.2 Features

- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place cost

1.3 Applications

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

1.4 Quick reference data

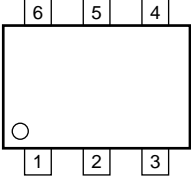
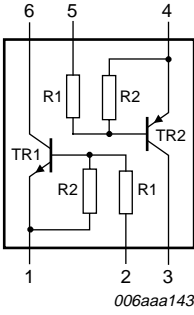
Table 2: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	50	V
I _O	output current (DC)		-	-	100	mA
R1	bias resistor 1 (input)		33	47	61	k Ω
R2/R1	bias resistor ratio		0.37	0.47	0.57	

PHILIPS

2. Pinning information

Table 3: Pinning

Pin	Description	Simplified outline	Symbol
1	GND (emitter) TR1	 001aab555	 006aaa143
2	input (base) TR1		
3	output (collector) TR2		
4	GND (emitter) TR2		
5	input (base) TR2		
6	output (collector) TR1		

3. Ordering information

Table 4: Ordering information

Type number	Package		Version
	Name	Description	
PEMD17	-	plastic surface mounted package; 6 leads	SOT666
PUMD17	SC-88	plastic surface mounted package; 6 leads	SOT363

4. Marking

Table 5: Marking codes

Type number	Marking code ^[1]
PEMD17	5N
PUMD17	D9*

- [1] * = -: made in Hong Kong
 * = p: made in Hong Kong
 * = t: made in Malaysia
 * = W: made in China

5. Limiting values

Table 6: 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		-	+40	V	
	negative		-	-10	V	
V _I	input voltage TR2					
	positive		-	+10	V	
	negative		-	-40	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		[1]	-	200	mW
	SOT666		[1] [2]	-	200	mW
T _{stg}	storage temperature		-65	+150	°C	
T _j	junction temperature		-	150	°C	
T _{amb}	ambient temperature		-65	+150	°C	
Per device						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C				
	SOT363		[1]	-	300	mW
	SOT666		[1] [2]	-	300	mW

[1] Device mounted on a FR4 printed-circuit board, single-sided copper, standard footprint.

[2] Reflow soldering is the only recommended soldering method.

6. Thermal characteristics

Table 7: Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
$R_{th(j-a)}$	thermal resistance from junction to ambient	$T_{amb} \leq 25\text{ °C}$				
	SOT363		[1]	-	-	625 K/W
	SOT666		[1] [2]	-	-	625 K/W
Per device						
$R_{th(j-a)}$	thermal resistance from junction to ambient	$T_{amb} \leq 25\text{ °C}$				
	SOT363		[1]	-	-	416 K/W
	SOT666		[1] [2]	-	-	416 K/W

[1] Device mounted on a FR4 printed-circuit board, single-sided copper, standard footprint.

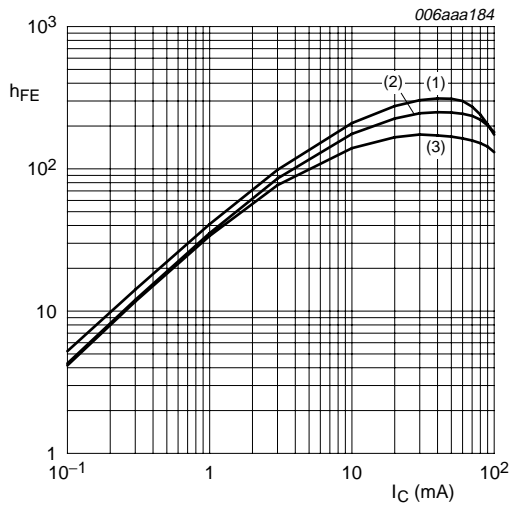
[2] Reflow soldering is the only recommended soldering method.

7. Characteristics

Table 8: Characteristics

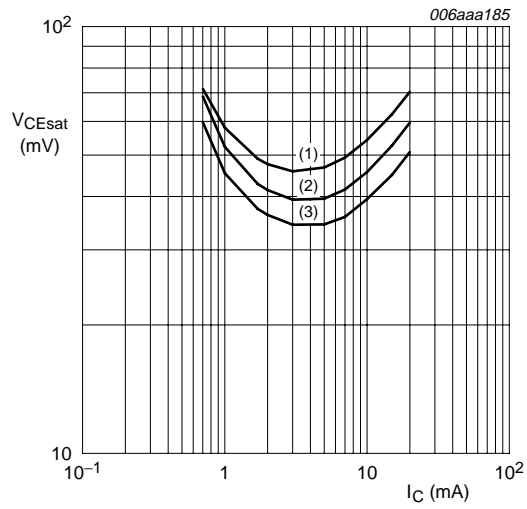
$T_{amb} = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
Per transistor; for the PNP transistor with negative polarity							
I_{CBO}	collector-base cut-off current	$V_{CB} = 50\text{ V}; I_E = 0\text{ A}$	-	-	100	nA	
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30\text{ V}; I_B = 0\text{ A}$	-	-	1	μA	
		$V_{CE} = 30\text{ V}; I_B = 0\text{ A}; T_j = 150\text{ °C}$	-	-	50	μA	
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	110	μA	
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 5\text{ mA}$	60	-	-		
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	-	-	150	mV	
$V_{I(off)}$	off-state input voltage	$V_{CE} = 5\text{ V}; I_C = 100\text{ }\mu\text{A}$	-	1.7	1.2	V	
$V_{I(on)}$	on-state input voltage	$V_{CE} = 0.3\text{ V}; I_C = 2\text{ mA}$	4	2.7	-	V	
R1	bias resistor 1 (input)		33	47	61	kΩ	
R2/R1	bias resistor ratio		0.37	0.47	0.57		
C_c	collector capacitance	$V_{CB} = -10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$					
			TR1 (NPN)	-	-	2.5	pF
			TR2 (PNP)	-	-	3	pF



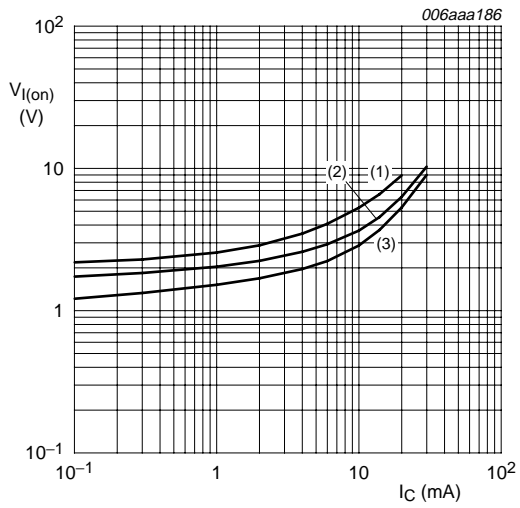
$V_{CE} = 5 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -40 \text{ }^\circ\text{C}$

Fig 1. TR1 (NPN): DC current gain as a function of collector current; typical values



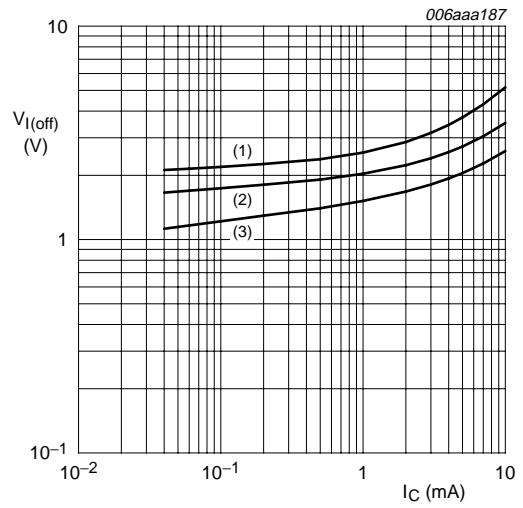
$I_C/I_B = 20$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -40 \text{ }^\circ\text{C}$

Fig 2. TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values



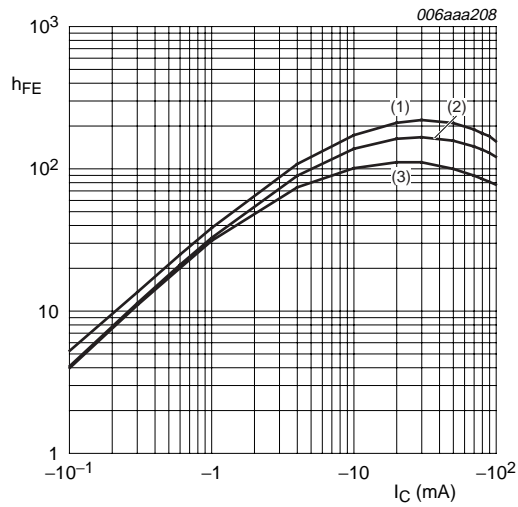
$V_{CE} = 0.3 \text{ V}$
 (1) $T_{amb} = -40 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 100 \text{ }^\circ\text{C}$

Fig 3. TR1 (NPN): On-state input voltage as a function of collector current; typical values



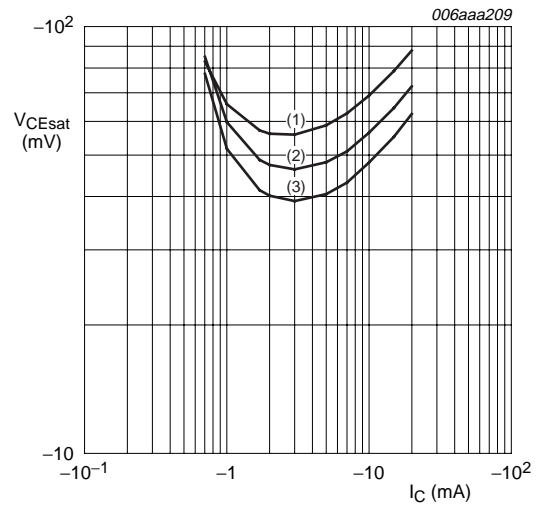
$V_{CE} = 5 \text{ V}$
 (1) $T_{amb} = -40 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 100 \text{ }^\circ\text{C}$

Fig 4. TR1 (NPN): Off-state input voltage as a function of collector current; typical values



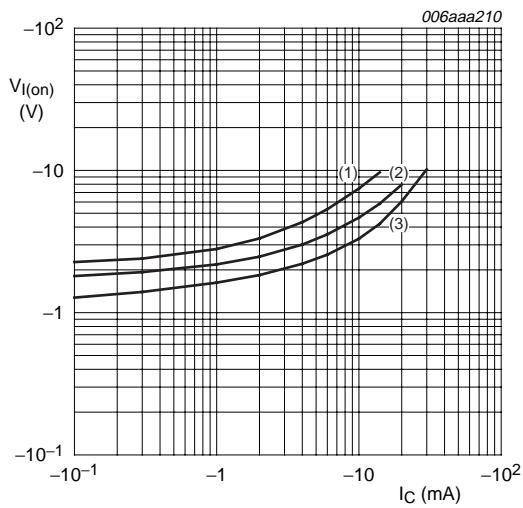
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -40 \text{ }^\circ\text{C}$

Fig 5. TR2 (PNP): DC current gain as a function of collector current; typical values



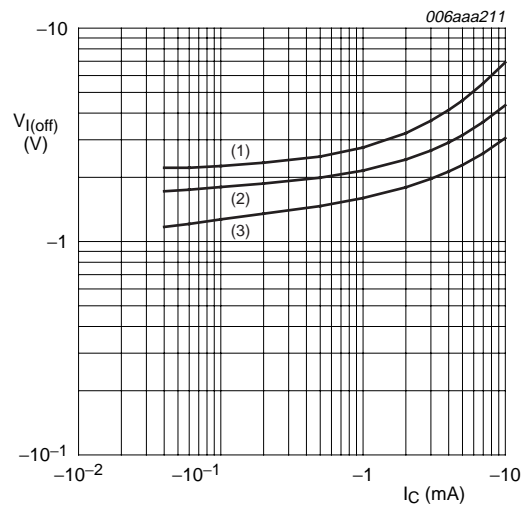
$I_C/I_B = 20$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -40 \text{ }^\circ\text{C}$

Fig 6. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values



$V_{CE} = -0.3 \text{ V}$
 (1) $T_{amb} = -40 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 100 \text{ }^\circ\text{C}$

Fig 7. TR2 (PNP): On-state input voltage as a function of collector current; typical values



$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = -40 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 100 \text{ }^\circ\text{C}$

Fig 8. TR2 (PNP): Off-state input voltage as a function of collector current; typical values

8. Package outline

Plastic surface mounted package; 6 leads

SOT363

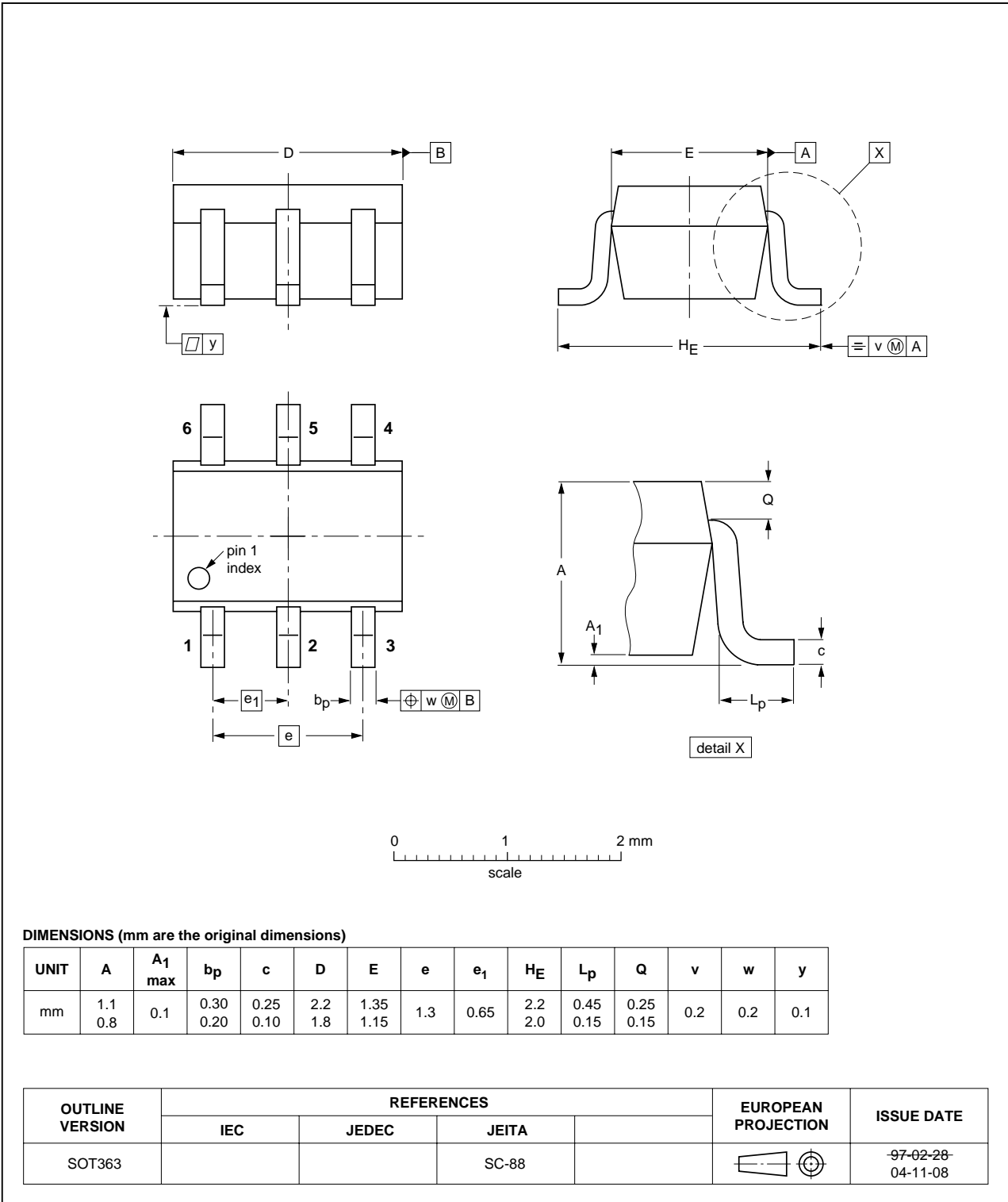


Fig 9. Package outline SOT363 (SC-88)

Plastic surface mounted package; 6 leads

SOT666

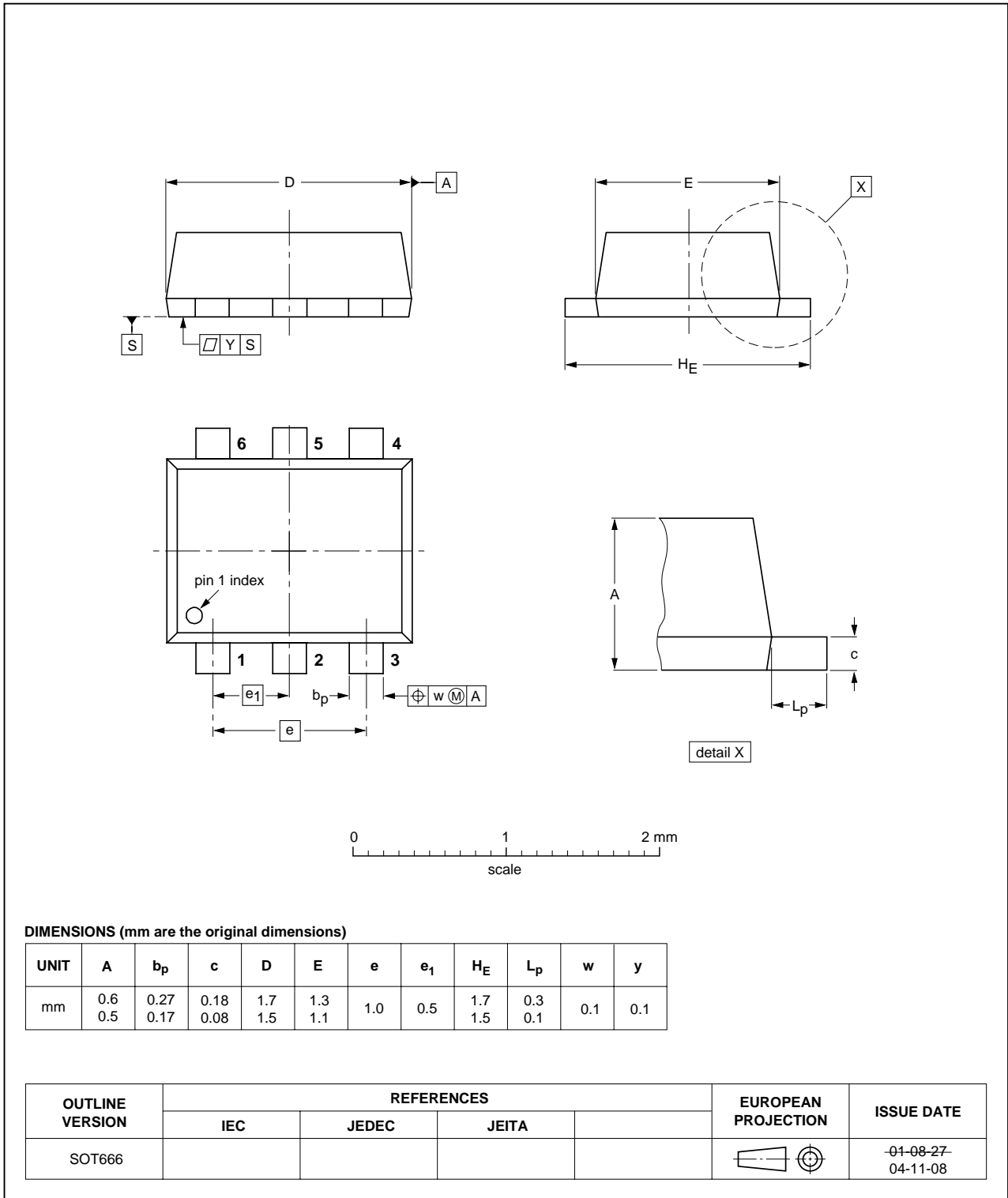


Fig 10. Package outline SOT666

9. Packing information

Table 9: Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code. [\[1\]](#)

Type number	Package	Description	Packing quantity		
			3000	4000	10000
PEMD17	SOT666	4 mm pitch, 8 mm tape and reel	-	-115	-
PUMD17	SOT363	4 mm pitch, 8 mm tape and reel; T1 [2]	-115	-	-135
PUMD17	SOT363	4 mm pitch, 8 mm tape and reel; T2 [3]	-125	-	-165

[1] For further information and the availability of packing methods, see [Section 14](#).

[2] T1: normal taping

[3] T2: reverse taping

10. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PEMD17_PUMD17_3	20050124	Product data sheet	-	9397 750 14367	PUMD17_2
Modifications:					
<ul style="list-style-type: none"> • This data sheet is an enhancement of data sheet PUMD17_2. • The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors. • Type PEMD17 added • Table 8 Characteristics: $V_{i(on)}$ input-on voltage and $V_{i(off)}$ input-off voltage renamed to $V_{I(on)}$ on-state input voltage and $V_{I(off)}$ off-state input voltage • Figure 1, 2, 3, 4, 5, 6, 7 and 8 electrical graphs for TR1 (NPN) and TR2 (PNP) added • Table 9 Packing information added 					
PUMD17_2	20040422	Product specification	-	9397 750 13099	PUMD17_1
PUMD17_1	20031016	Product specification	-	9397 750 11866	-

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Level	Data sheet status ^[1]	Product status ^[2] ^[3]	Definition
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