PEMB18; PUMB18

PNP/PNP resistor-equipped transistors; R1 = 4.7 kΩ, R2 = 10 kΩ

Rev. 03 — 8 July 2005

Product data sheet

1. Product profile

1.1 General description

PNP/PNP resistor-equipped transistors.

Table 1: Product overview

Type number	Package		NPN/PNP complement	NPN/NPN complement
	Philips	JEITA		
PEMB18	SOT666	-	PEMD18	PEMH18
PUMB18	SOT363	SC-88	PUMD18	PUMH18

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)		3.3	4.7	6.1	kΩ
R2/R1	bias resistor ratio		1.7	2.1	2.6	

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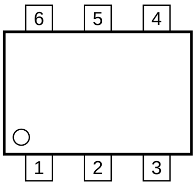
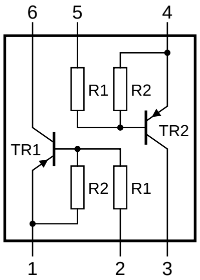
2. Pinning information

Table 3: Pinning

Pin	Description	Simplified outline	Symbol
1	GND (emitter) TR1	 001aab555	 006aaa212
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		
	Name	Description	Version
PEMB18	-	plastic surface mounted package; 6 leads	SOT666
PUMB18	SC-88	plastic surface mounted package; 6 leads	SOT363

4. Marking

Table 5: Marking codes

Type number	Marking code [1]
PEMB18	6A
PUMB18	B8*

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

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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					
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	-	–7	V
V_I	input voltage				
	positive		-	+7	V
	negative		-	–20	V
I_O	output current (DC)		-	–100	mA
I_{CM}	peak collector current		-	–100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °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	$T_{amb} \leq 25$ °C			
	SOT363	[1]	-	300	mW
	SOT666	[1] [2]	-	300	mW

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and 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	$T_{amb} \leq 25$ °C				
	SOT363	[1]	-	-	625	K/W
	SOT666	[1] [2]	-	-	625	K/W
Per device						
$R_{th(j-a)}$	thermal resistance from junction to ambient	$T_{amb} \leq 25$ °C				
	SOT363	[1]	-	-	416	K/W
	SOT666	[1] [2]	-	-	416	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

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

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7. Characteristics

Table 8: Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
I_{CBO}	collector-base cut-off current	V_{CB} = –50 V; I_E = 0 A	-	-	–100	nA
I_{CEO}	collector-emitter cut-off current	V_{CE} = –30 V; I_B = 0 A	-	-	–1	µA
		V_{CE} = –30 V; I_B = 0 A; T_j = 150 °C	-	-	–50	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = –5 V; I_C = 0 A	-	-	–600	µA
h_{FE}	DC current gain	V_{CE} = –5 V; I_C = –10 mA	50	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = –10 mA; I_B = –0.5 mA	-	-	–150	mV
$V_{I(off)}$	off-state input voltage	V_{CE} = –5 V; I_C = –100 µA	-	–0.9	–0.3	V
$V_{I(on)}$	on-state input voltage	V_{CE} = –0.3 V; I_C = –20 mA	–2.5	–1.5	-	V
R1	bias resistor 1 (input)		3.3	4.7	6.1	kΩ
R2/R1	bias resistor ratio		1.7	2.1	2.6	
C_c	collector capacitance	V_{CB} = –10 V; I_E = i_e = 0 A; f = 1 MHz	-	-	3	pF

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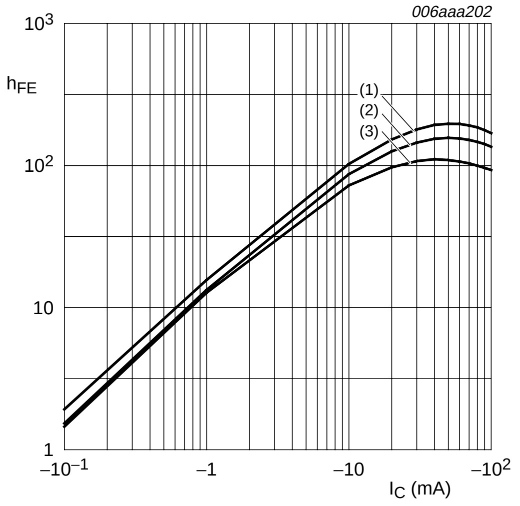


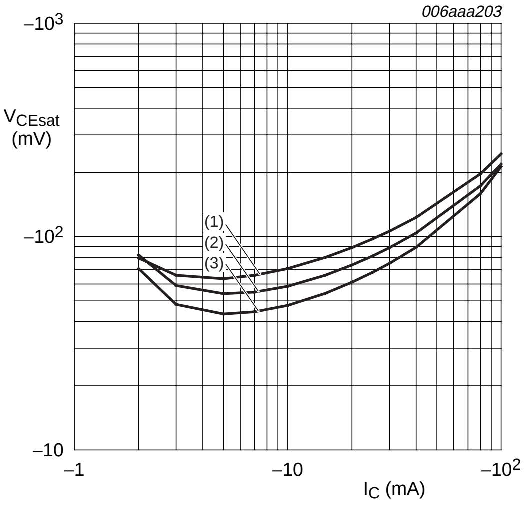
$V_{CE} = -5$ V

(1) $T_{amb} = 100$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = -40$ °C

Fig 1. DC current gain as a function of collector current; typical values



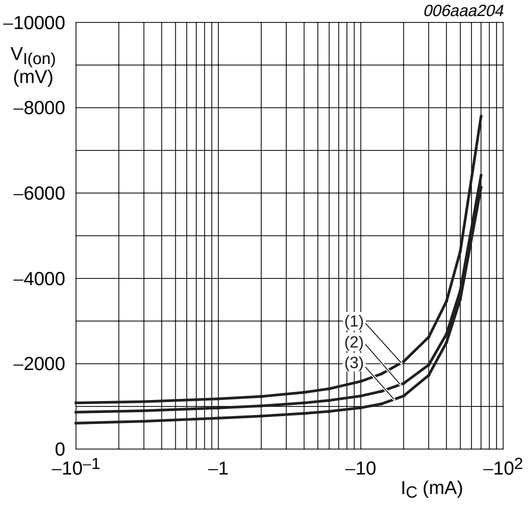
$I_C/I_B = 20$

(1) $T_{amb} = 100$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = -40$ °C

Fig 2. Collector-emitter saturation voltage as a function of collector current; typical values



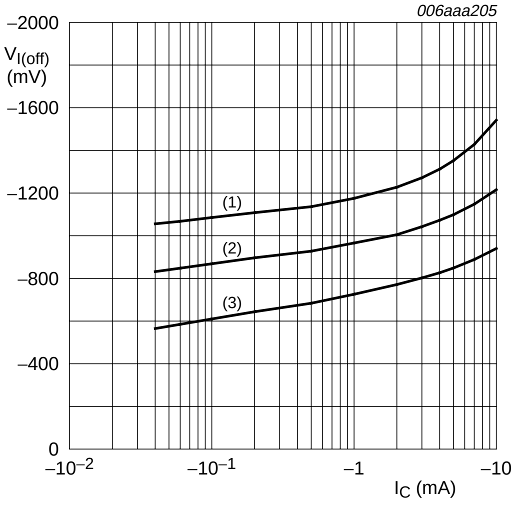
$V_{CE} = -0.3$ V

(1) $T_{amb} = -40$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 100$ °C

Fig 3. On-state input voltage as a function of collector current; typical values



$V_{CE} = -5$ V

(1) $T_{amb} = -40$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 100$ °C

Fig 4. Off-state input voltage as a function of collector current; typical values

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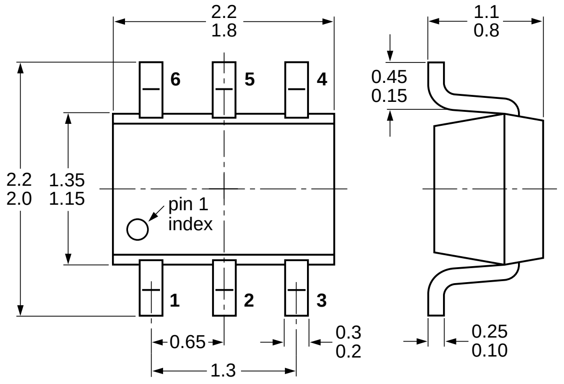
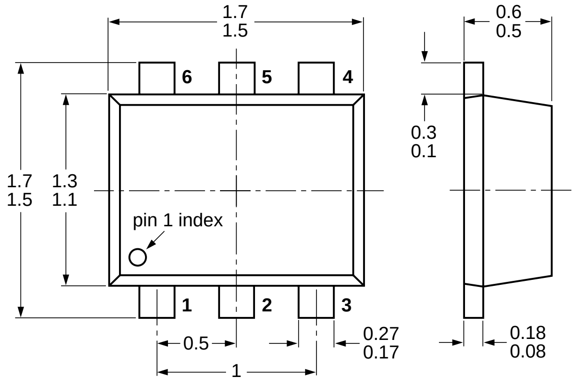
8. Package outline



Dimensions in mm

04-11-08

Fig 5. Package outline SOT363 (SC-88)



Dimensions in mm

04-11-08

Fig 6. 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**
PEMB18	SOT666	4 mm pitch, 8 mm tape and reel	-	-115	-
PUMB18	SOT363	4 mm pitch, 8 mm tape and reel; T1 [2]	-115	-	-135
PUMB18	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 15.

[2] T1: normal taping

[3] T2: reverse taping

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10. Revision history

Table 10: Revision history

Document ID	**Release date**	**Data sheet status**	**Change notice**	**Doc. number**	**Supersedes**
PEMB18_PUMB18_3	20050708	Product data sheet	-	-	PEMB18_PUMB18_2
Modifications:	• Table 6 "Limiting values": V_{EBO} emitter-base voltage typing error adjusted • Section 14 "Trademarks": added				
PEMB18_PUMB18_2	20050202	Product data sheet	-	9397 750 14371	PUMB18_1
PUMB18_1	20031003	Product specification	-	9397 750 11821	-

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11. 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.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

12. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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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16. Contents

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