Chipsmall

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In data sheets and application notes which still contain NXP or Philips Semiconductors references, use the references to Nexperia, as shown below.

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If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via **salesaddresses@nexperia.com**). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

PEMD19; PUMD19

NPN/PNP resistor-equipped transistors; R1 = 22 kΩ, R2 = open

Rev. 01 — 17 February 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/NPN complement
	Philips	**JEITA**		
PEMD19	SOT666	-	PEMB19	PEMH19
PUMD19	SOT363	SC-88	PUMB19	PUMH19

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
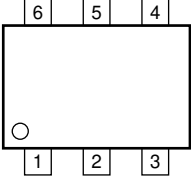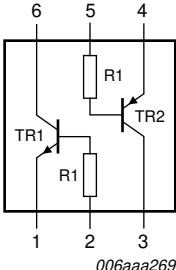
1.4 Quick reference data

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)		15.4	22	28.6	kΩ

PHILIPS

2. Pinning information

Table 3: **Pinning**

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

001aab555

006aaa269

3. Ordering information

Table 4: **Ordering information**

Type number	Package			Version
	Name	Description		
PEMD19	-	plastic surface mounted package; 6 leads		SOT666
PUMD19	SC-88	plastic surface mounted package; 6 leads		SOT363

4. Marking

Table 5: **Marking codes**

Type number	Marking code [1]
PEMD19	6E
PUMD19	T4*

[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		-	5	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, 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

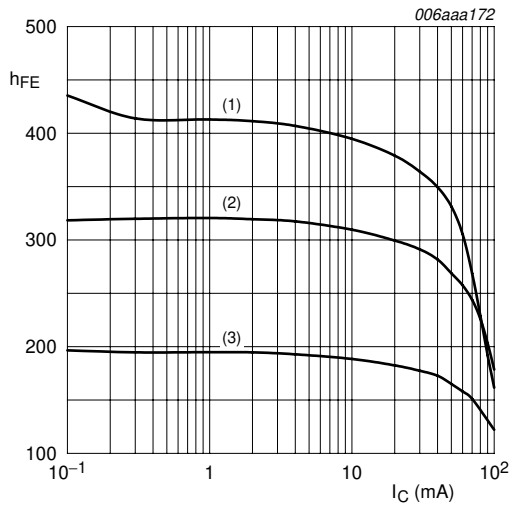[1]   Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint.

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

7. Characteristics

Table 8: **Characteristics**

T$_{amb}$ = 25 °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 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	-	-	100	nA
h$_{FE}$	DC current gain	V$_{CE}$ = 5 V; I$_C$ = 1 mA	100	-	-	
V$_{CEsat}$	collector-emitter saturation voltage	I$_C$ = 10 mA; I$_B$ = 0.5 mA	-	-	150	mV
R1	bias resistor 1 (input)		15.4	22	28.6	kΩ
C$_c$	collector capacitance	V$_{CB}$ = −10 V; I$_E$ = i$_e$ = 0 A; f = 1 MHz				
	TR1 (NPN)		-	-	2.5	pF
	TR2 (PNP)		-	-	3	pF

V_{CE} = 5 V
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −40 °C

Fig 1.   TR1 (NPN): DC current gain as a function of collector current; typical values
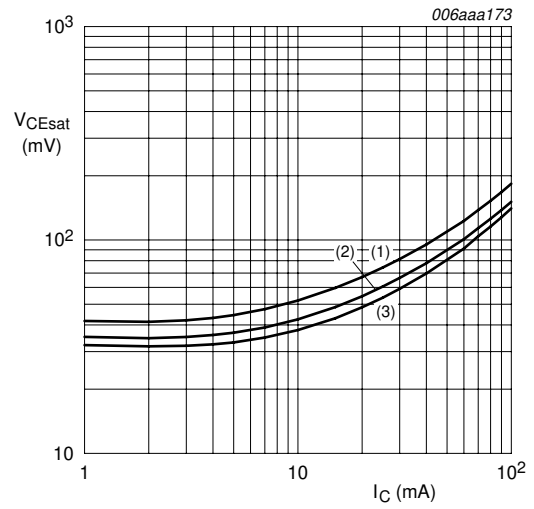
I_C/I_B = 20
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −40 °C

Fig 2.   TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values
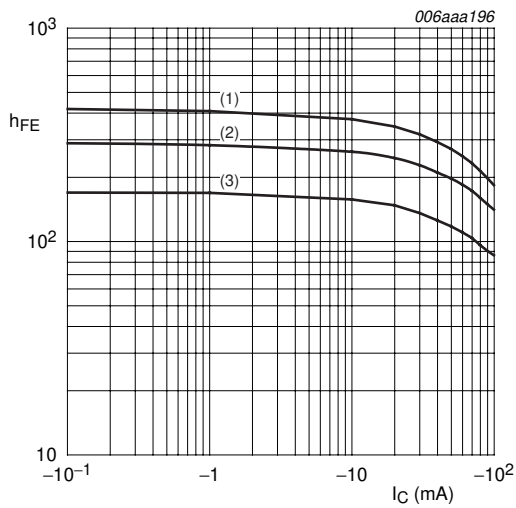
V_{CE} = −5 V
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −40 °C

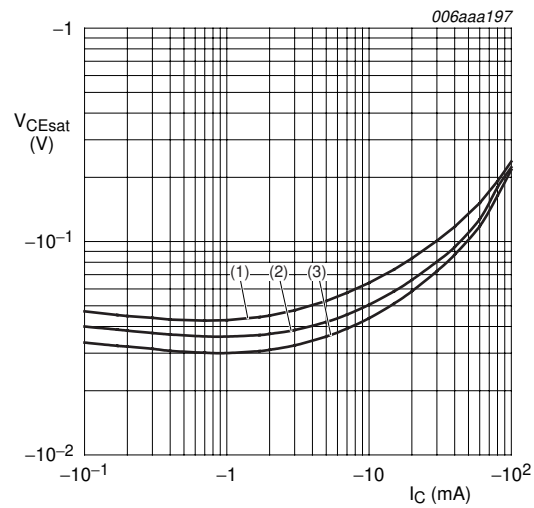**Fig 3.   TR2 (PNP): DC current gain as a function of collector current; typical values**

I_C/I_B = 20
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −40 °C

Fig 4.   TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values

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Product data sheet

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8. Package outline

Plastic surface mounted package; 6 leads

SOT363

DIMENSIONS (mm are the original dimensions)

UNIT	A	A₁ max	bp	c	D	E	e	e₁	H_E	Lp	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			~~97-02-28~~ 04-11-08
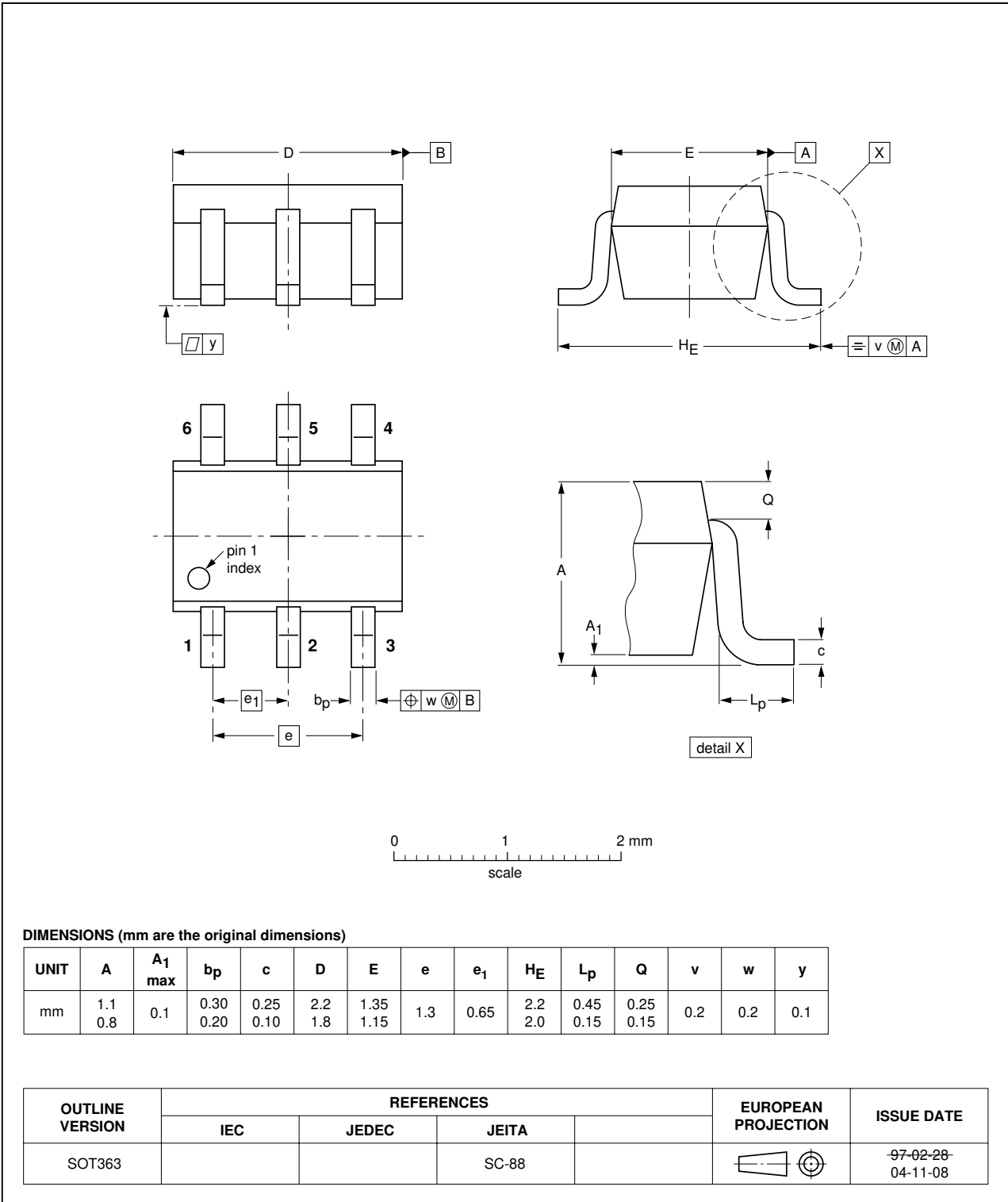
Fig 5. Package outline SOT363 (SC-88)

Plastic surface mounted package; 6 leads

SOT666

pin 1 index

detail X

0   1   2 mm

scale

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						~~01-08-27~~ 04-11-08
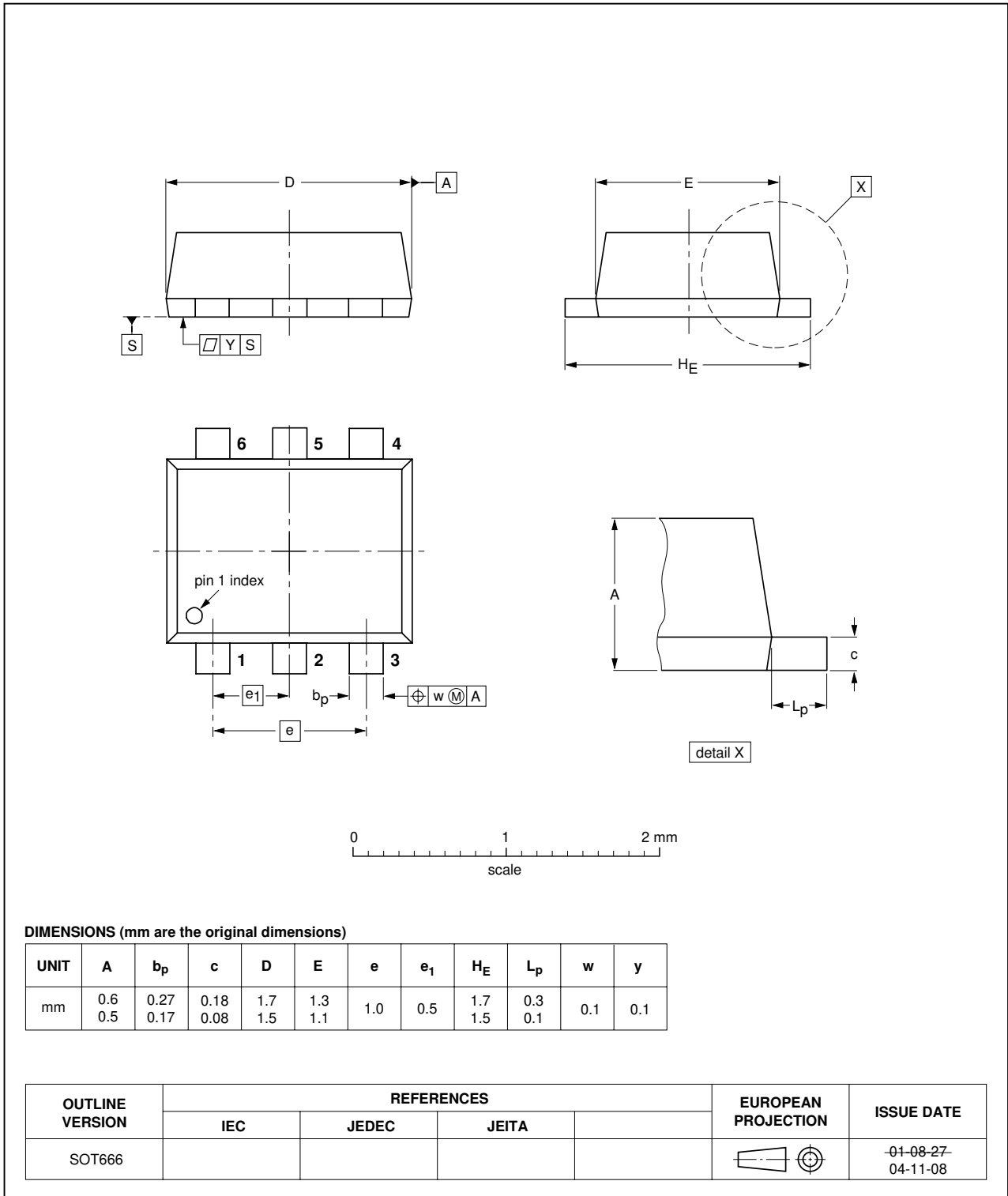
Fig 6.   Package outline SOT666

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
PEMD19	SOT666	4 mm pitch, 8 mm tape and reel	-	-115	-
PUMD19	SOT363	4 mm pitch, 8 mm tape and reel; T1 [2]	-115	-	-135
PUMD19	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

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Product data sheet   **Rev. 01 — 17 February 2005**   **8 of 11**

10. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PEMD19_PUMD19_1	20050217	Product data sheet	-	9397 750 14408	-

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.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1]   Please consult the most recently issued data sheet before initiating or completing a design.

[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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15. Contents

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