

# DATA SHEET

**PEMD4; PUMD4**  
NPN/PNP resistor-equipped  
transistors; R1 = 10 k $\Omega$ , R2 = open

Product specification  
Supersedes data of 2002 Jan 14

2003 Oct 10

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

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V <sub>CEO</sub>	collector-emitter voltage	–	50	V
I <sub>O</sub>	output current (DC)	–	100	mA
TR1	NPN	–	–	–
TR2	PNP	–	–	–
R1	bias resistor	10	–	kΩ
R2	open	–	–	–

**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			
PEMD4	SOT666		23	PEMB4	PEMH4
PUMD4	SOT363	SC-88	D*4	PUMB4	PUMH4

**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
PEMD4 PUMD4	<p>Top view</p> <p>MDB814</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
PEMD4	–	plastic surface mounted package; 6 leads	SOT666
PUMD4	–	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
<b>Per transistor; for the PNP transistor with negative polarity</b>					
V <sub>CBO</sub>	collector-base voltage	open emitter	–	50	V
V <sub>CEO</sub>	collector-emitter voltage	open base	–	50	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	5	V
I <sub>O</sub>	output current (DC)		–	100	mA
I <sub>CM</sub>	peak collector current		–	100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C			
	SOT363	note 1	–	200	mW
	SOT666	notes 1 and 2	–	200	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C
<b>Per device</b>					
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C			
	SOT363	note 1	–	300	mW
	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
<b>Per transistor</b>				
R <sub>th j-a</sub>	thermal resistance from junction to ambient	T <sub>amb</sub> ≤ 25 °C		
	SOT363	note 1	625	K/W
	SOT666	notes 1 and 2	625	K/W
<b>Per device</b>				
R <sub>th j-a</sub>	thermal resistance from junction to ambient	T <sub>amb</sub> ≤ 25 °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<sub>amb</sub> = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Per transistor; for the PNP transistor with negative polarity</b>						
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 50 V; I <sub>E</sub> = 0	–	–	100	nA
I <sub>CEO</sub>	collector-emitter cut-off current	V <sub>CE</sub> = 30 V; I <sub>B</sub> = 0	–	–	1	$\mu$ A
		V <sub>CE</sub> = 30 V; I <sub>B</sub> = 0; T <sub>j</sub> = 150 °C	–	–	50	$\mu$ A
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0	–	–	100	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 1 mA	200	–	–	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 10 mA; I <sub>B</sub> = 0.5 mA	–	–	150	mV
R1	input resistor		7	10	13	k $\Omega$
C <sub>c</sub>	collector capacitance	I <sub>E</sub> = i <sub>e</sub> = 0; V <sub>CB</sub> = 10 V; f = 1 MHz				
	TR1 (NPN)		–	–	2.5	pF
	TR2 (PNP)		–	–	3	pF

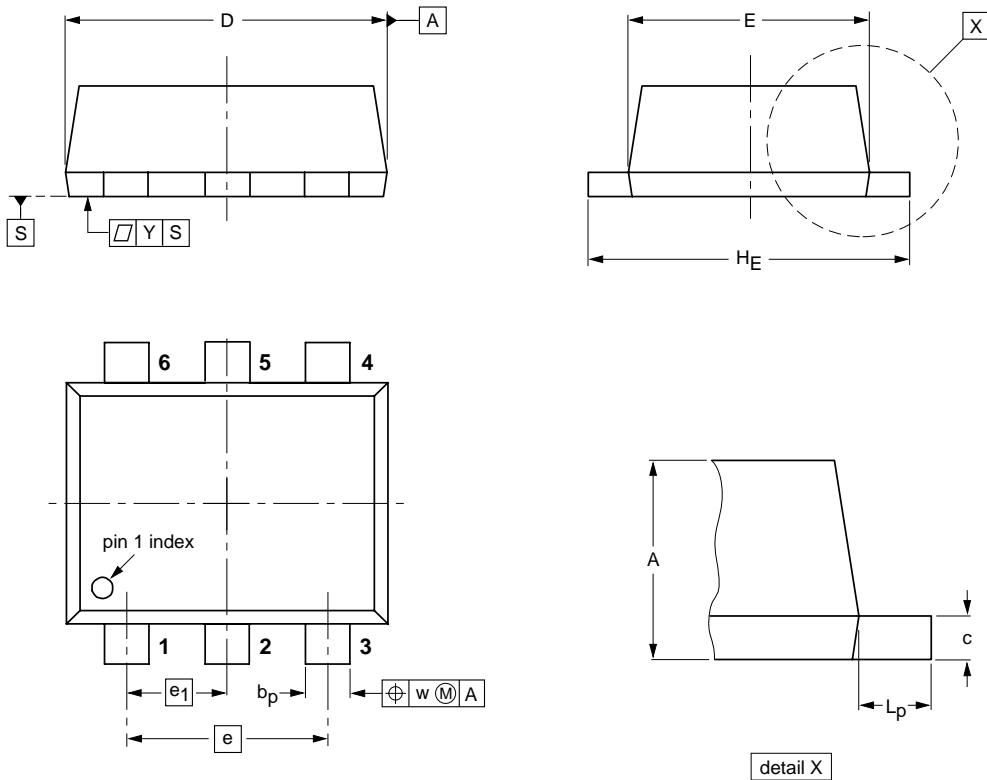
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PEMD4; PUMD4

PACKAGE OUTLINES

Plastic surface mounted package; 6 leads

SOT666



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

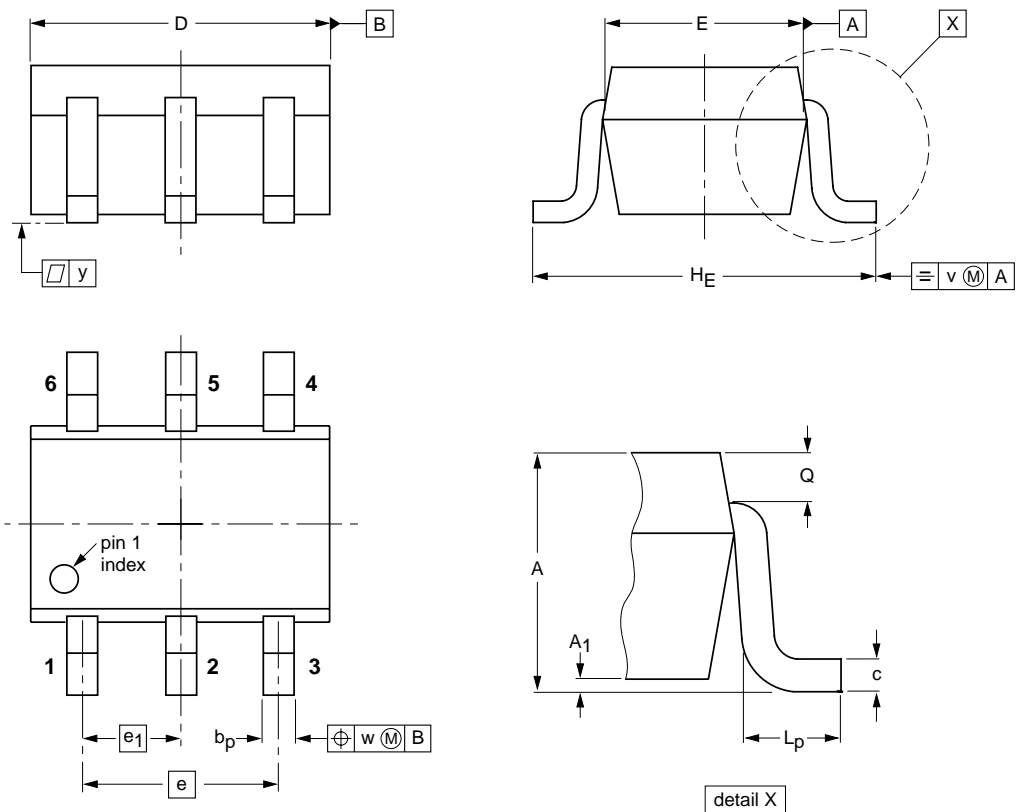
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT666					01-01-04 01-08-27

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DIMENSIONS (mm are the original dimensions)

UNIT	A	A1 max	bp	c	D	E	e	e1	HE	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	EIAJ			
SOT363			SC-88			97-02-28

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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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