DATA SHEET

PIMH9; PUMH9; PEMH9
NPN/NPN resistor-equipped transistors; R1 = 10 kΩ, R2 = 47 kΩ

Product specification
Supersedes data of 2003 Sep 15

2004 Apr 14

Philips Semiconductors

PHILIPS

NPN/NPN resistor-equipped transistors; R1 = 10 kΩ, R2 = 47 kΩ

PIMH9; PUMH9; PEMH9

FEATURES

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

APPLICATIONS

- General purpose switching and amplification
- Inverter and interface circuits
- Circuit driver.

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	10	–	kΩ
R2	bias resistor	47	–	kΩ

DESCRIPTION

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

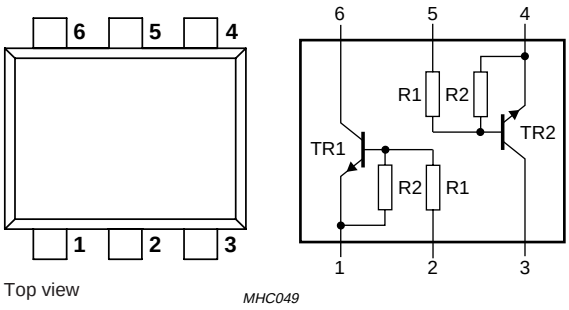
PRODUCT OVERVIEW

TYPE NUMBER	PACKAGE		MARKING CODE	PNP/PNP COMPLEMENT	NPN/PNP COMPLEMENT
	PHILIPS	EIAJ			
PEMH9	SOT666	–	H9	PEMB9	PEMD9
PIMH9	SOT457	SC-74	H9	–	–
PUMH9	SOT363	SC-88	H*9[1]	PUMB9	PUMD9

Note

1. * = 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
PEMH9 PIMH9 PUMH9	 Top view MHC049	1 2 3 4 5 6	emitter TR1 base TR1 collector TR2 emitter TR2 base TR2 collectorTR1

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PEMH9	–	plastic surface mounted package; 6 leads	SOT666
PIMH9	–	plastic surface mounted package; 6 leads	SOT457
PUMH9	–	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				
	positive		–	+40	V
	negative		–	–10	V
I_O	output current		–	100	mA
I_{CM}	peak collector current		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C			
	SOT363	note 1	–	200	mW
	SOT457	note 1	–	300	mW
	SOT666	notes 1 and 2	–	200	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C			
	SOT363	note 1	–	300	mW
	SOT457	note 1	–	600	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.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
Per transistor				
$R_{th(j-a)}$	thermal resistance from junction to ambient	$T_{amb} \leq 25$ °C		
	SOT363	note 1	625	K/W
	SOT457	note 1	417	K/W
	SOT666	notes 1 and 2	625	K/W
Per device				
$R_{th(j-a)}$	thermal resistance from junction to ambient	$T_{amb} \leq 25$ °C		
	SOT363	note 1	416	K/W
	SOT457	note 1	208	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.

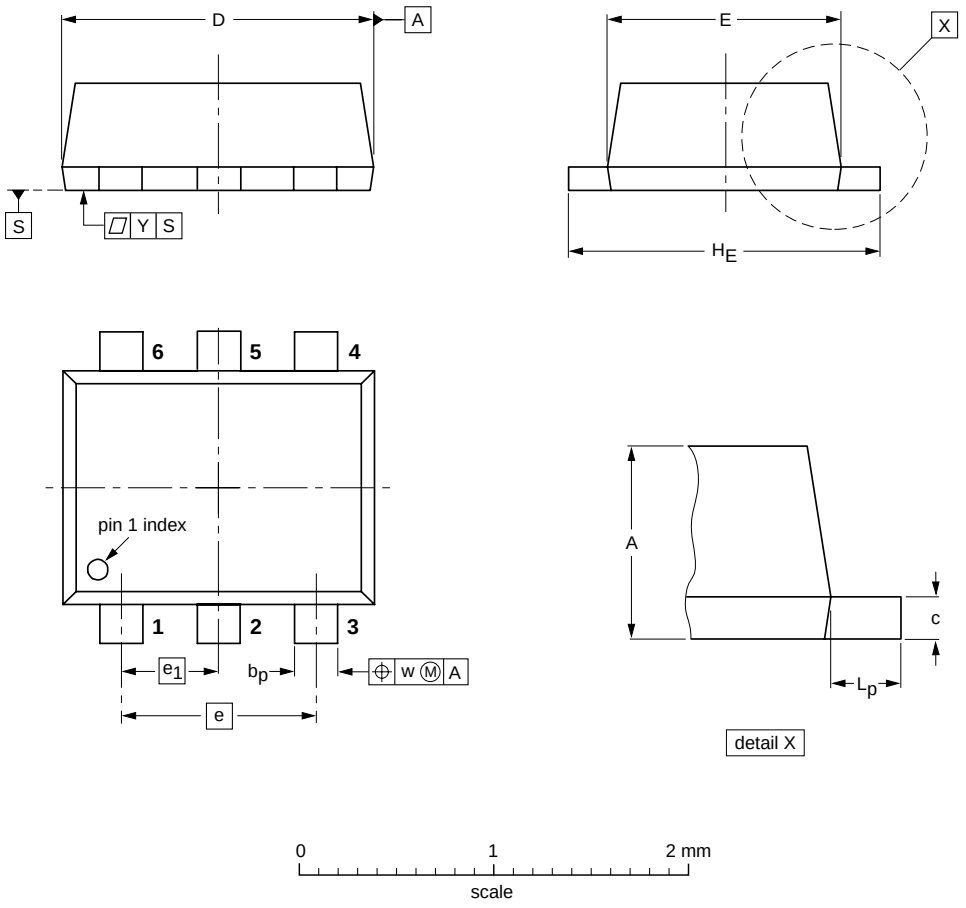
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
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	–	–	150	µA
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 5 mA	100	–	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 5 mA; I_B = 0.25 mA	–	–	100	mV
$V_{i(off)}$	input-off voltage	V_{CE} = 5 V; I_C = 100 µA	–	0.7	0.5	V
$V_{i(on)}$	input-on voltage	V_{CE} = 0.3 V; I_C = 1 mA	1.4	0.8	–	V
R1	input resistor		7	10	13	kΩ
$\frac{R2}{R1}$	resistor ratio		3.7	4.7	5.7	
C_c	collector capacitance	V_{CB} = 10 V; $I_E = i_e$ = 0 A; f = 1 MHz	–	–	2.5	pF

PACKAGE OUTLINES

Plastic surface mounted package; 6 leads **SOT666**

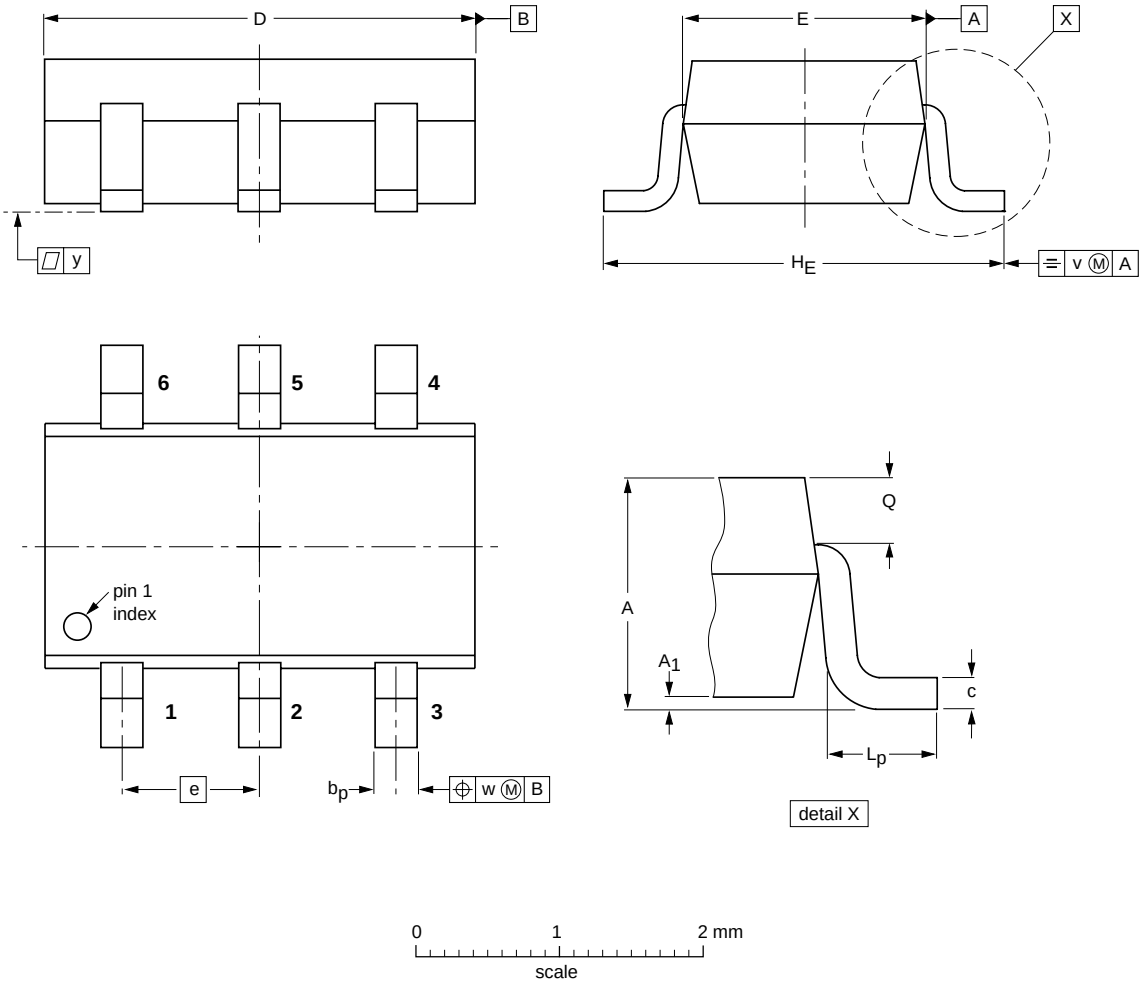


DIMENSIONS (mm are the original dimensions)

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

Plastic surface mounted package; 6 leads **SOT457**

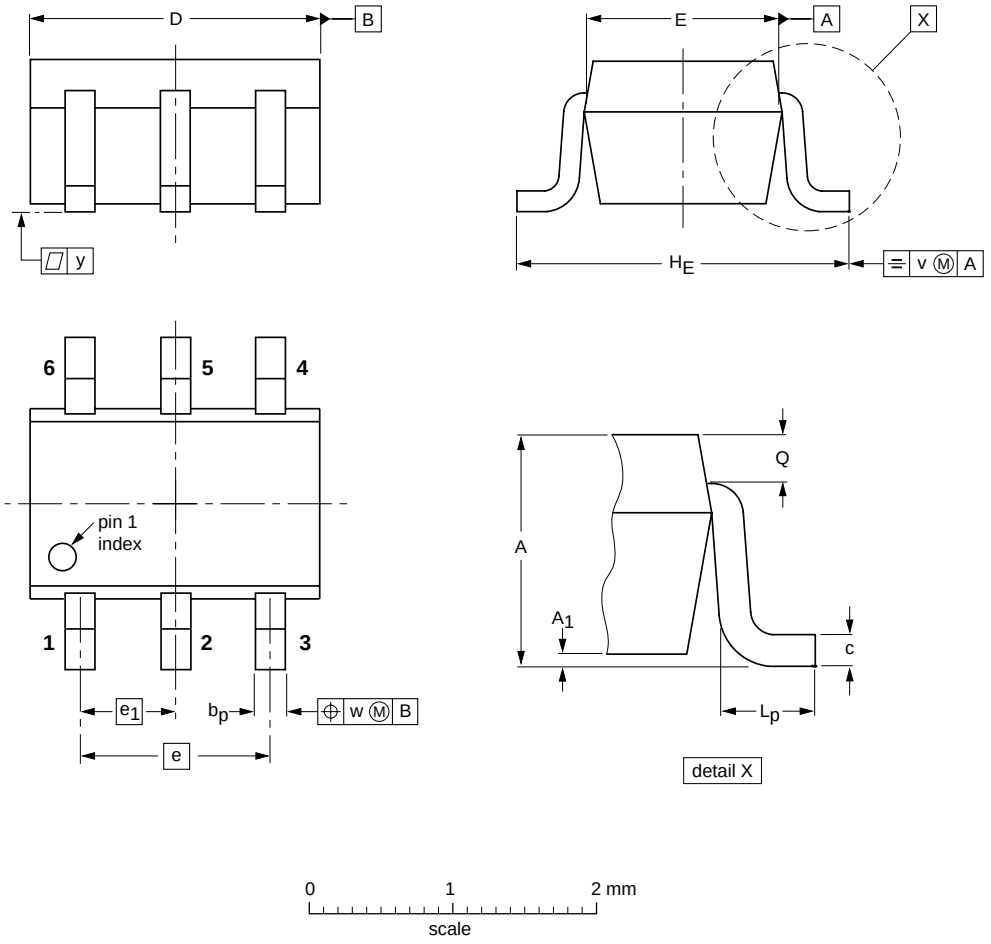


DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	c	D	E	e	H_E	L_p	Q	v	w	y
mm	1.1 0.9	0.1 0.013	0.40 0.25	0.26 0.10	3.1 2.7	1.7 1.3	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT457			SC-74			~~97-02-28~~ 01-05-04

Plastic surface mounted package; 6 leads **SOT363**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	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

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).

Notes

1. Please consult the most recently issued data sheet before initiating or completing a design.
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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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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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Contact information

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.

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