

# DATA SHEET

**PIMH9; PUMH9; PEMH9**  
NPN/NPN resistor-equipped  
transistors; R1 = 10 k $\Omega$ , R2 = 47 k $\Omega$

Product data sheet  
Supersedes data of 2003 Sep 15

2004 Apr 14

**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 <sub>CEO</sub>	collector-emitter voltage	–	50	V
I <sub>O</sub>	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 <sup>(1)</sup>	PUMB9	PUMD9

**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
PEMH9 PIMH9 PUMH9	<p>Top view <span style="float: right;">MHC049</span></p>	1	emitter TR1
		2	base TR1
		3	collector TR2
		4	emitter TR2
		5	base TR2
		6	collectorTR1

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## 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	
<b>Per transistor</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	–	10	V	
V <sub>i</sub>	input voltage		–	+40	V	
			–	–10	V	
I <sub>o</sub>	output current		–	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
		SOT457	note 1	–	300	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
		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.

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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
	SOT457	note 1	417	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
	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<sub>amb</sub> = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 50 V; I <sub>E</sub> = 0 A	–	–	100	nA
I <sub>CEO</sub>	collector-emitter cut-off current	V <sub>CE</sub> = 30 V; I <sub>B</sub> = 0 A	–	–	1	$\mu$ A
		V <sub>CE</sub> = 30 V; I <sub>B</sub> = 0 A; 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 A	–	–	150	$\mu$ A
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 5 mA	100	–	–	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 5 mA; I <sub>B</sub> = 0.25 mA	–	–	100	mV
V <sub>i(off)</sub>	input-off voltage	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 100 $\mu$ A	–	0.7	0.5	V
V <sub>i(on)</sub>	input-on voltage	V <sub>CE</sub> = 0.3 V; I <sub>C</sub> = 1 mA	1.4	0.8	–	V
R1	input resistor		7	10	13	k $\Omega$
$\frac{R2}{R1}$	resistor ratio		3.7	4.7	5.7	
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = 10 V; I <sub>E</sub> = i <sub>e</sub> = 0 A; f = 1 MHz	–	–	2.5	pF

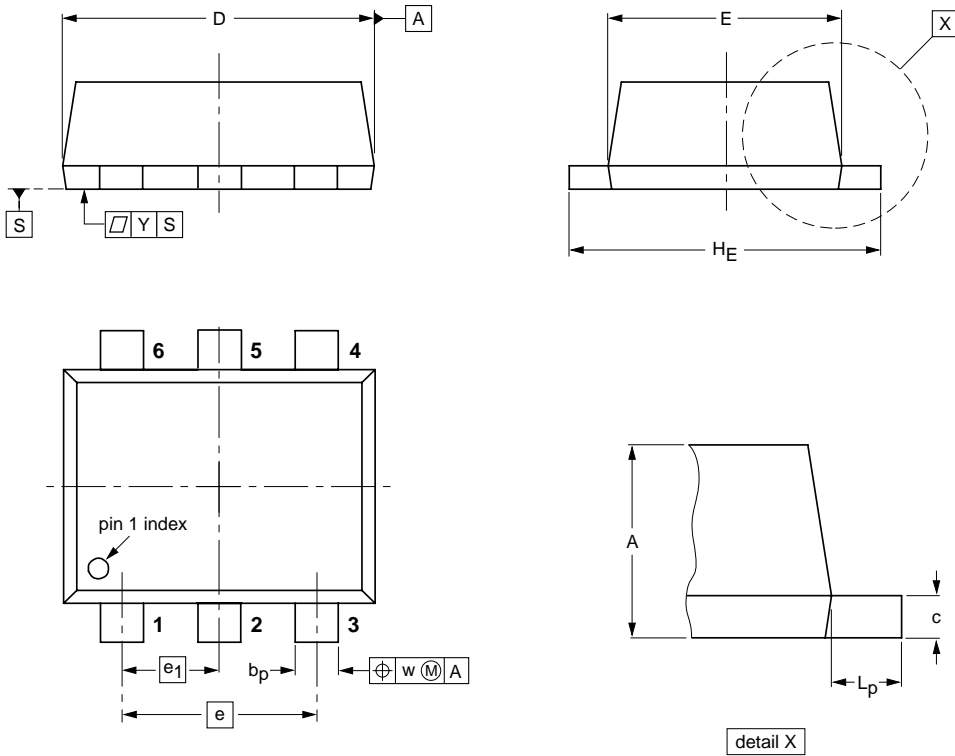
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PACKAGE OUTLINES

Plastic surface-mounted package; 6 leads

SOT666



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	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

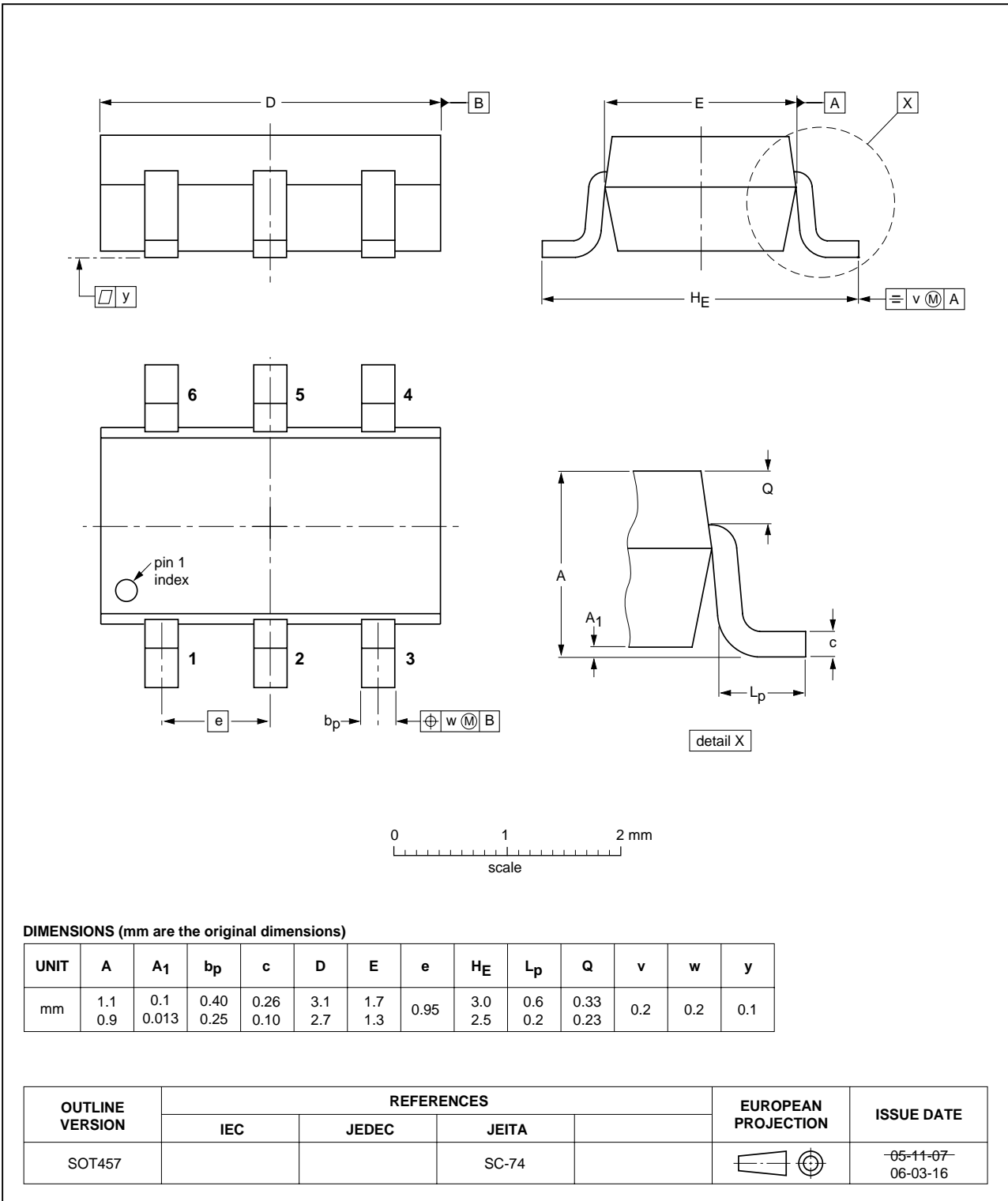
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT666					04-11-08 06-03-16

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Plastic surface-mounted package (TSOP6); 6 leads

SOT457

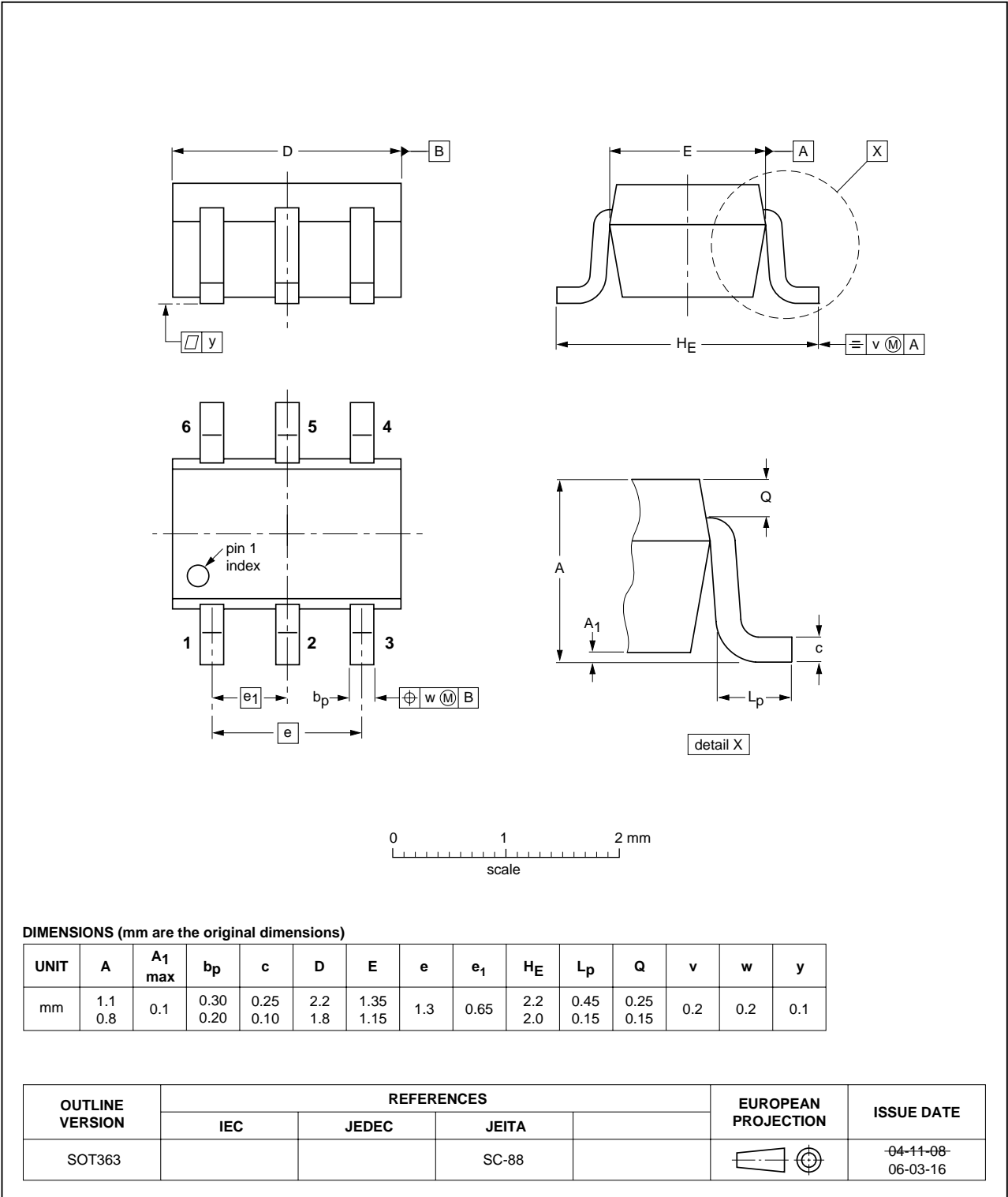


NPN/NPN resistor-equipped transistors;  
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Plastic surface-mounted package; 6 leads

SOT363



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## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

## Notes

1. Please consult the most recently issued document before initiating or completing a design.
2. The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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# ***NXP Semiconductors***

## **Customer notification**

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

## **Contact information**

For additional information please visit: <http://www.nxp.com>

For sales offices addresses send e-mail to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

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