**PEMB14; PUMB14** PNP/PNP resistor-equipped transistors; R1 = 47 kΩ, R2 = open

Rev. 02 — 31 August 2009

Product data sheet

## 1. Product profile

#### **1.1 General description**

PNP/PNP resistor-equipped transistors

Table 1	. Р	roduc	t over	view
i aloito i		. o a a o		

Type number	Package			NPN/NPN	
	NXP	JEITA	complement	complement	
PEMB14	SOT666	-	PEMD14	PEMH14	
PUMB14	SOT363	SC-88	PUMD14	PUMH14	

### 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	Тур	Max	Unit
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	-50	V
lo	output current (DC)		-	-	-100	mA
R1	bias resistor 1 (input)		33	47	61	kΩ



# PEMB14; PUMB14

*006aaa268* 

#### **PNP/PNP** resistor-equipped transistors; R1 = 47 k $\Omega$ , R2 = open

# 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				

# 3. Ordering information

Table 4.	Ordering	information
----------	----------	-------------

Type number	Package					
	Name	Description	Version			
PEMB14	-	plastic surface mounted package; 6 leads	SOT666			
PUMB14	SC-88	plastic surface mounted package; 6 leads	SOT363			

# 4. Marking

Table 5. Marking codes	
Type number	Marking code <sup>[1]</sup>
PEMB14	5A
PUMB14	T1*

[1] \* = -: made in Hong Kong

\* = p: made in Hong Kong

\* = t: made in Malaysia

\* = W: made in China

# PEMB14; PUMB14

#### **PNP/PNP** resistor-equipped transistors; $R1 = 47 \text{ k}\Omega$ , R2 = open

# 5. Limiting values

Symbol	Parameter	Conditions	Min	Мах	Unit
Per transis	stor				
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
lo	output current (DC)		-	-100	mA
I <sub>CM</sub>	peak collector current		-	-100	mA
P <sub>tot</sub>	total power dissipation	$T_{amb} \le 25 \ ^{\circ}C$			
	SOT363		<u>[1]</u> -	200	mW
	SOT666		<u>[1] [2]</u> _	200	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C
Tj	junction temperature		-	150	°C
T <sub>amb</sub>	ambient temperature		-65	+150	°C
Per device	)				
P <sub>tot</sub>	total power dissipation	$T_{amb} \le 25 \ ^{\circ}C$			
	SOT363		<u>[1]</u> _	300	mW
	SOT666		<u>[1] [2]</u> _	300	mW

[1] Device mounted on a 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	Тур	Мах	Unit
Per trans	istor					
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	$T_{amb} \le 25 \ ^{\circ}C$				
	SOT363		<u>[1]</u> -	-	625	K/W
	SOT666		<u>[1] [2]</u> _	-	625	K/W
Per devic	e					
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	$T_{amb} \le 25 \ ^{\circ}C$				
	SOT363		<u>[1]</u> -	-	416	K/W
	SOT666		<u>[1]</u> <u>[2]</u> _	-	416	K/W

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

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

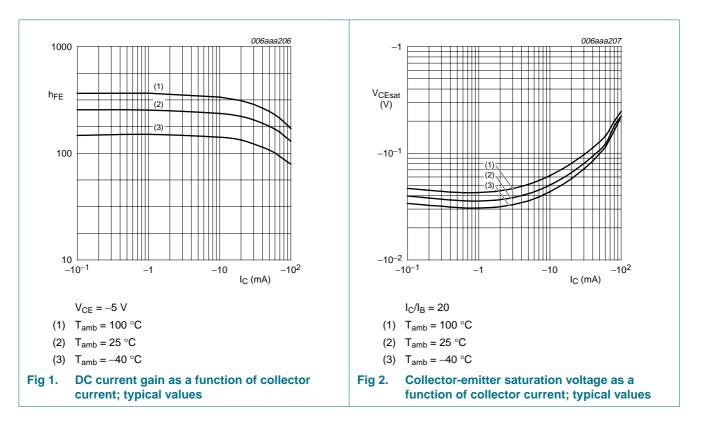
**PNP/PNP** resistor-equipped transistors; R1 = 47 kΩ, R2 = open

# 7. Characteristics

#### Table 8. Characteristics

T<sub>amb</sub> = 25 °C unless otherwise specified

Symbol	Daramatar	Conditions	Min	<b>T</b> um	Max	l lmit
Symbol	Parameter	Conditions	WIIN	Тур	Max	Unit
Per transis	stor					
I <sub>CBO</sub>	collector-base cut-off current	$V_{CB} = -50 \text{ V}; I_E = 0 \text{ A}$	-	-	-100	nA
I <sub>CEO</sub>	collector-emitter	$V_{CE} = -30 \text{ V}; \text{ I}_{B} = 0 \text{ A}$	-	-	-1	μA
	cut-off current	$V_{CE} = -30 \text{ V}; I_B = 0 \text{ A};$ $T_j = 150 \text{ °C}$	-	-	-50	μA
I <sub>EBO</sub>	emitter-base cut-off current	$V_{EB} = -5 \text{ V}; \text{ I}_{C} = 0 \text{ A}$	-	-	-100	nA
h <sub>FE</sub>	DC current gain	$V_{CE} = -5 \text{ V}; I_C = -1 \text{ mA}$	100	-	-	
V <sub>CEsat</sub>	collector-emitter saturation voltage	$I_{C}$ = -10 mA; $I_{B}$ = -0.5 mA	-	-	-150	mV
R1	bias resistor 1 (input)		33	47	61	kΩ
C <sub>c</sub>	collector capacitance	$V_{CB} = -10 \text{ V}; \text{ I}_{E} = \text{i}_{e} = 0 \text{ A};$ f = 1 MHz	-	-	2.5	pF

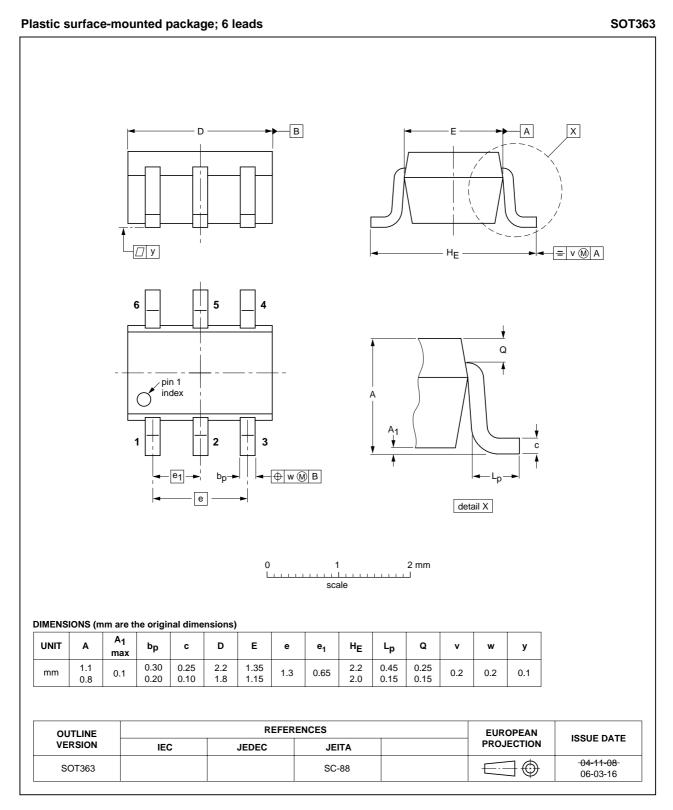


#### **NXP Semiconductors**

PEMB14; PUMB14

PNP/PNP resistor-equipped transistors; R1 = 47 k $\Omega$ , R2 = open

## 8. Package outline



#### Fig 3. Package outline SOT363 (SC-88)

# PEMB14; PUMB14

**PNP/PNP** resistor-equipped transistors; R1 = 47 k $\Omega$ , R2 = open

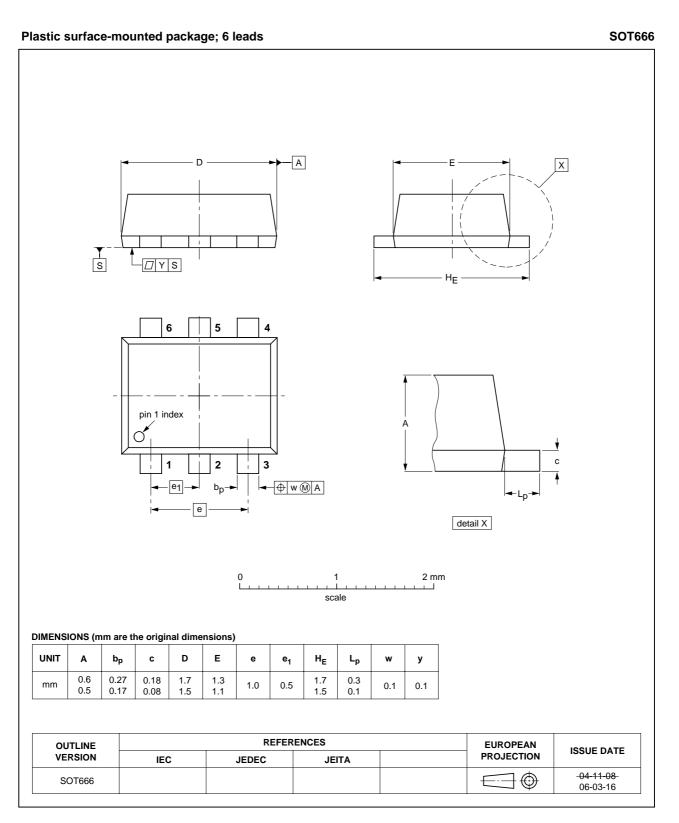


Fig 4. Package outline SOT666

PEMB14\_PUMB14\_2
Product data sheet

**PNP/PNP** resistor-equipped transistors; R1 = 47 k $\Omega$ , R2 = open

# 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 q	uantity	
			3000	4000	10000
PEMB14	SOT666	4 mm pitch, 8 mm tape and reel;	-	-115	-
PUMB14	SOT363	4 mm pitch, 8 mm tape and reel; T1	<sup>[2]</sup> -115	-	-135
PUMB14	SOT363	4 mm pitch, 8 mm tape and reel; T2	<u>3</u> -125	-	-165

[1] For further information and the availability of packing methods, see Section 12.

[2] T1: normal taping

[3] T2: reverse taping

PNP/PNP resistor-equipped transistors; R1 = 47 kΩ, R2 = open

# **10. Revision history**

Table 10. Revision histo	ory					
Document ID	Release date	Data sheet status	Change notice	Supersedes		
PEMB14_PUMB14_2	20090831	Product data sheet	-	PEMB14_PUMB14_1		
Modifications:	<ul> <li>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.</li> </ul>					
	<ul> <li>Figure 3 "Package outline SOT363 (SC-88)": updated</li> </ul>					
<ul> <li>Figure 4 "Package outline SOT666": updated</li> </ul>						
PEMB14_PUMB14_1	20050217	Product data sheet	-	-		

# **11. Legal information**

#### 11.1 Data sheet status

Document status[1][2]	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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

[2] The term 'short data sheet' is explained in section "Definitions".

[3] 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.

#### 11.2 Definitions

**Draft** — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

#### 11.3 Disclaimers

**General** — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

**Right to make changes** — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <a href="http://www.nxp.com/profile/terms">http://www.nxp.com/profile/terms</a>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

**No offer to sell or license** — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

**Export control** — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

**Quick reference data** — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

#### 11.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

# **12. Contact information**

For more information, please visit: http://www.nxp.com

For sales office addresses, please send an email to: salesaddresses@nxp.com

#### **NXP Semiconductors**

# PEMB14; PUMB14

PNP/PNP resistor-equipped transistors; R1 = 47 kΩ, R2 = open

### 13. Contents

1	Product profile 1
1.1	General description
1.2	Features 1
1.3	Applications 1
1.4	Quick reference data 1
2	Pinning information 2
3	Ordering information 2
4	Marking
5	Limiting values 3
6	Thermal characteristics 3
7	Characteristics 4
8	Package outline 5
9	Packing information7
10	Revision history 8
11	Legal information 9
11.1	Data sheet status 9
11.2	Definitions
11.3	Disclaimers
11.4	Trademarks
12	Contact information
13	Contents

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

© NXP B.V. 2009.

All rights reserved.

For more information, please visit: http://www.nxp.com For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 31 August 2009 Document identifier: PEMB14\_PUMB14\_2

