PNP/PNP resistor-equipped transistors;

R1 = 22 kΩ, R2 = 22 kΩ

Rev. 3 — 28 November 2011

Product data sheet

1. Product profile

1.1 General description

PNP/PNP double Resistor-Equipped Transistors (RET) in Surface-Mounted Device (SMD) plastic packages.

Table 1.	Product	overview

Type number					Package
	NXP	JEITA	complement	complement	configuration
PEMB1	SOT666	-	PEMD2	PEMH1	ultra small and flat lead
PUMB1	SOT363	SC-88	PUMD2	PUMH1	very small

1.2 Features and benefits

- 100 mA output current capability
- Built-in bias resistors
- Simplifies circuit design
- 1.3 Applications
 - Low current peripheral driver
 - Control of IC inputs
 - Replaces general-purpose transistors in digital applications

1.4 Quick reference data

Table 2.	Quick reference data					
Symbol	Parameter Conditions Min Typ Max Unit					Unit
Per trans	istor					
V _{CEO}	collector-emitter voltage	open base	-	-	-50	V
I _O	output current		-	-	-100	mA
R1	bias resistor 1 (input)		15.4	22	28.6	kΩ
R2/R1	bias resistor ratio		0.8	1	1.2	



- Reduces component count
- Reduces pick and place costs
- AEC-Q101 qualified

1

| | 2 3 006aaa212

PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω

2. Pinning information

Table 3.	Pinning		
Pin	Description	Simplified outline	Graphic 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	
PEMB1	-	plastic surface-mounted package; 6 leads	SOT666	
PUMB1	SC-88	plastic surface-mounted package; 6 leads	SOT363	

4. Marking

Table 5. Marking codes	
Type number	Marking code ^[1]
PEMB1	Z4
PUMB1	B*3

[1] * = placeholder for manufacturing site code

PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω

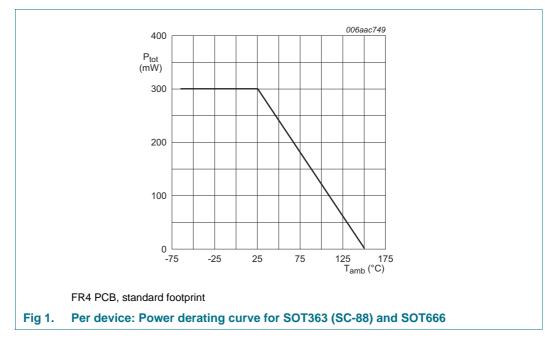
5. Limiting values

Symbol	Parameter	Conditions	Min	Max	Unit
Per transis	stor				
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
VI	input voltage				
	positive		-	+10	V
	negative		-	-40	V
lo	output current		-	-100	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms	-	-100	mA
P _{tot}	total power dissipation	$T_{amb} \le 25 \ ^{\circ}C$			
	PEMB1 (SOT666)		<u>[1][2]</u> _	200	mW
	PUMB1 (SOT363)		<u>[1]</u> -	200	mW
Per device)				
P _{tot}	total power dissipation	$T_{amb} \leq 25 \ ^{\circ}C$			
	PEMB1 (SOT666)		<u>[1][2]</u> _	300	mW
	PUMB1 (SOT363)		<u>[1]</u> -	300	mW
Tj	junction temperature		-	150	°C
T _{amb}	ambient temperature		-65	+150	°C
T _{stg}	storage temperature		-65	+150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

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

PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω



6. Thermal characteristics

Table 7.	Thermal characteristics					
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Per trans	istor					
R _{th(j-a)}	thermal resistance from junction to ambient	in free air				
	PEMB1 (SOT666)		<u>[1][2]</u> _	-	625	K/W
	PUMB1 (SOT363)		<u>[1]</u> _	-	625	K/W
Per devic	e					
R _{th(j-a)}	thermal resistance from junction to ambient	in free air				
	PEMB1 (SOT666)		<u>[1][2]</u> _	-	417	K/W
	PUMB1 (SOT363)		<u>[1]</u> -	-	417	K/W

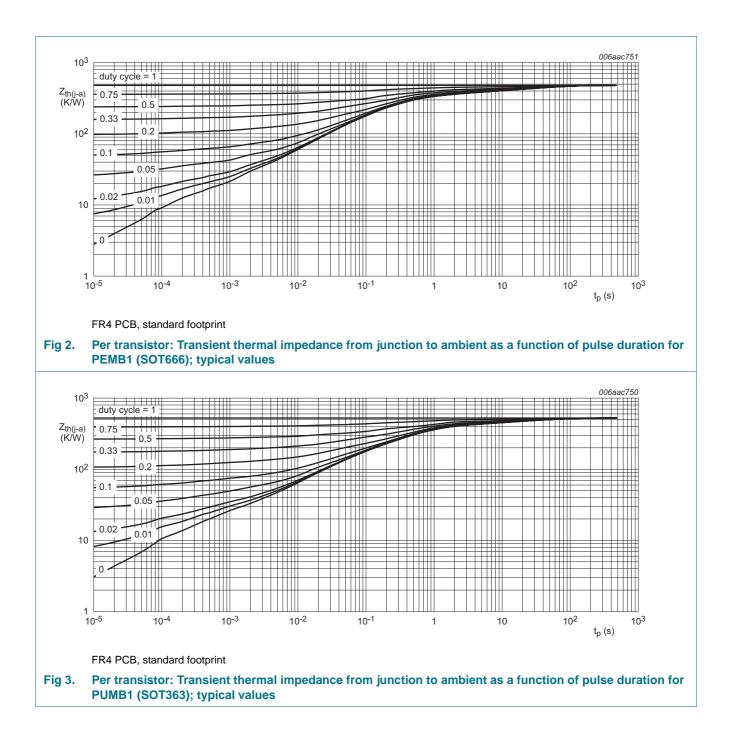
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

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

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PEMB1; PUMB1

PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω



PNP/PNP resistor-equipped transistors; R1 = 22 k, R2 = 22 k

7. Characteristics

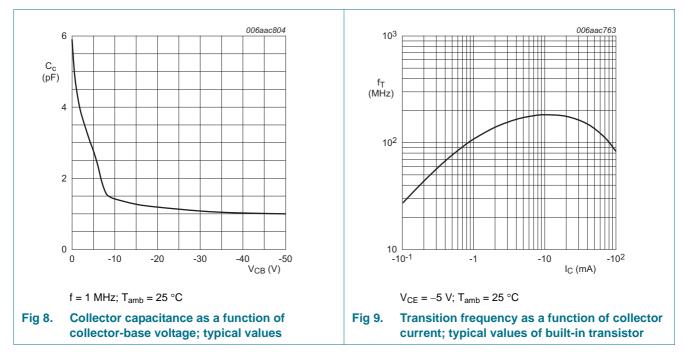
Table 8. T _{amb} = 25	Characteristics	ecified.				
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Per trans	istor					
I _{CBO}	collector-base cut-off current	$V_{CB} = 50 \text{ V}; $	-	-	100	nA
I _{CEO}	collector-emitter cut-	$\text{oVM}_{\text{CE}} = 30 \text{ V}; _{\text{B}} = 0 \text{ A}$	-	-	100	nA
	current	$V_{CE} = 30 \text{ V}; _{B} = 0 \text{ A};$ T _j = 150 G	-	-	5	PA
I _{EBO}	emitter-base cut-off current	$V_{EB} = 5 V; I_C = 0 A$	-	-	180	PA
h _{FE}	DC current gain	$V_{E} = 5 \text{ V}; \text{ I}_{C} = 5 \text{ mA}$	60	-	-	
V _{CEsat}	collector-emitter saturation voltage	$I_{C} = 10 \text{ mA}; I_{B} = 0.5 \text{ mA}$	-	-	150	mV
V _{I(off)}	off-state input voltage	e _{CE} V= 5V; I _C = 100 PA	-	1.1	0.8	V
V _{I(on)}	on-state input voltage	$c_{\rm E}V = 0.3 \text{ V}; _{\rm C} = 5 \text{ mA}$	2.5	1.7	-	V
R1	bias resistor 1 (input)		15.4	22	28	.6 : k
R2/R1	bias resistor ratio		0.8	1	1.2	
C _c	collector capacitance	$ _{C} \underbrace{V}_{C} = 10 \ V; \ I_{E} = i_{e} = 0 \ A; \\ f = 1 \ MHz $	-	-	3	рF
f _T	transition frequency	$c \not\!$	-	180	-	MHz

[1] Characteristics bufuilt-in transistor

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PEMB1; PUMB1

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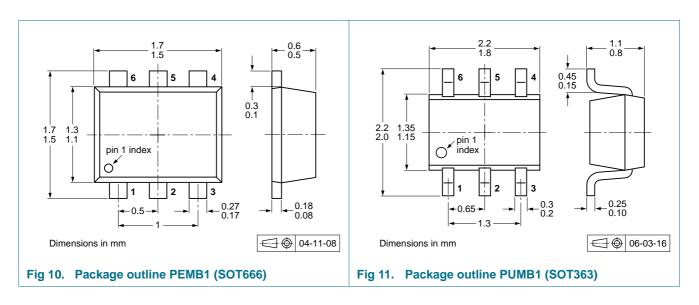


8. Test information

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101* - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

9. Package outline



PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω

10. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[1]

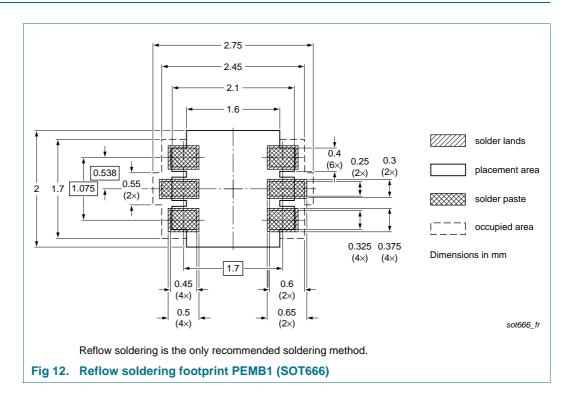
71 0		Description		Packing quantity			
number				3000	4000	8000	10000
PEMB1	SOT666	2 mm pitch, 8 mm tape and reel		-	-	-315	-
	4 mm pitch, 8 mm tape and reel		-	-115	-	-	
PUMB1	SOT363	4 mm pitch, 8 mm tape and reel; T1	[2]	-115	-	-	-135
		4 mm pitch, 8 mm tape and reel; T2	[3]	-125	-	-	-165

[1] For further information and the availability of packing methods, see Section 14.

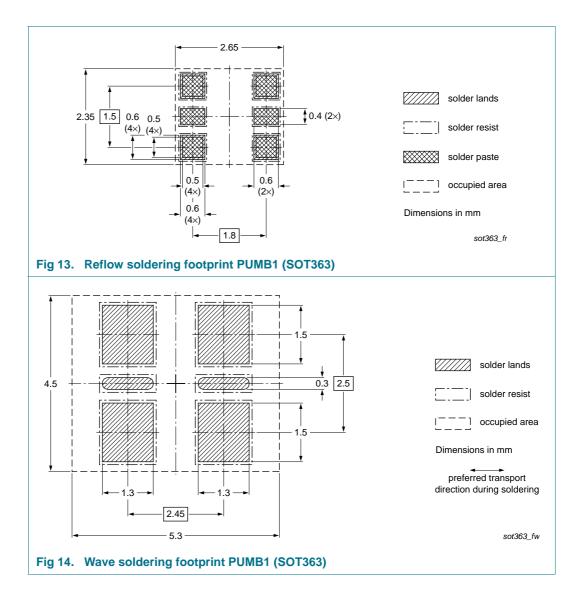
[2] T1: normal taping

[3] T2: reverse taping

11. Soldering



PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω



PEMB1_PUMB1 Product data sheet

PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω

12. Revision history

Table 10. Revision his	story						
Document ID	Release date	Data sheet status	Change notice	Supersedes			
PEMB1_PUMB1 v.3	20111128	Product data sheet	-	PEMB1_PUMB1 v.2			
Modifications:		of this document has been i of NXP Semiconductors.	redesigned to comply w	ith the new identity			
	 Legal texts I 	have been adapted to the n	ew company name whe	ere appropriate.			
	 Section 1 "F 	 Section 1 "Product profile": updated 					
 <u>Section 4 "Marking</u>": updated <u>Figure 1</u> to <u>9</u>: added 							
	 <u>Section 5 "Limiting values"</u>: updated 						
	 <u>Section 6 "Thermal characteristics"</u>: updated 						
	 <u>Table 8 "Characteristics</u>": V_{i(on)} redefined to V_{I(on)} on-state input voltage, V_{i(off)} redefined to V_{I(off)} off-state input voltage, I_{CEO} updated, f_T added 						
	<u>Section 8 "Test information"</u> : added						
	 Section 9 "Package outline": superseded by minimized package outline drawings 						
	Section 10 "	Packing information": adde	d				
	<u>Section 11 "Soldering"</u> : added						
	Section 13 "	Legal information": updated	I				
PEMB1_PUMB1 v.2	20031015	Product data sheet	-	PEMB1 v.1			
PEMB1 v.1	20010913	Product specification	-	-			

PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω

13. Legal information

13.1 Data sheet status

Document status[1][2]	Product status ^[3]	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.

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PNP/PNP resistor-equipped transistors; $R1 = 22 k\Omega$, $R2 = 22 k\Omega$

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PEMB1; PUMB1

PNP/PNP resistor-equipped transistors; R1 = 22 k Ω , R2 = 22 k Ω

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