

ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number:	PUMD13,135
Manufacturer:	Nexperia USA Inc.
Package:	6-TSSOP, SC-88, SOT-363
Availability:	Please confirm with sales

Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/pumd13-135.html>

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Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



PUMD13

50 V, 100 mA NPN/PNP resistor-equipped double transistor;
R1 = 4.7 kΩ, R2 = 47 kΩ

15 July 2026

Product data sheet

1. General description

NPN/PNP double Resistor-Equipped Transistor (RET) in a very small SOT363-3 (SC-88) Surface-Mounted Device (SMD) plastic package.

PNP/PNP complement: PUMB13

NPN/NPN complement: PUMH13

2. Features and benefits

- 100 mA output current capability
- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs

3. Applications

- Low current peripheral driver
- Control of IC inputs
- Replaces general-purpose transistors in digital applications

4. Quick reference data

Table 1. Quick reference data

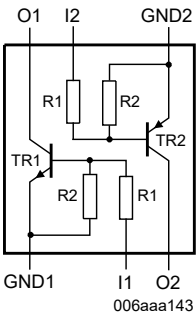
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor; for the PNP transistor (TR2) with negative polarity where applicable						
V _{CEO}	collector-emitter voltage	open base	-	-	50	V
I _O	output current		-	-	100	mA
R1	bias resistor 1 (input)	[1]	3.3	4.7	6.1	kΩ
R2/R1	bias resistor ratio	[1]	8	10	12	

[1] See section "Test information" for resistor calculation and test conditions.

50 V, 100 mA NPN/PNP resistor-equipped double transistor; R1 = 4.7 kΩ, R2 = 47 kΩ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	GND1	GND (emitter) TR1	 Transparent top view TSSOP6 (SOT363-3)	 006aaa143
2	I1	input (base) TR1		
3	O2	output (collector) TR2		
4	GND2	GND (emitter) TR2		
5	I2	input (base) TR2		
6	O1	output (collector) TR1		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PUMD13	TSSOP6	Plastic surface-mounted package; 6 leads	SOT363-3

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PUMD13	3%1

[1] % = placeholder for manufacturing site code

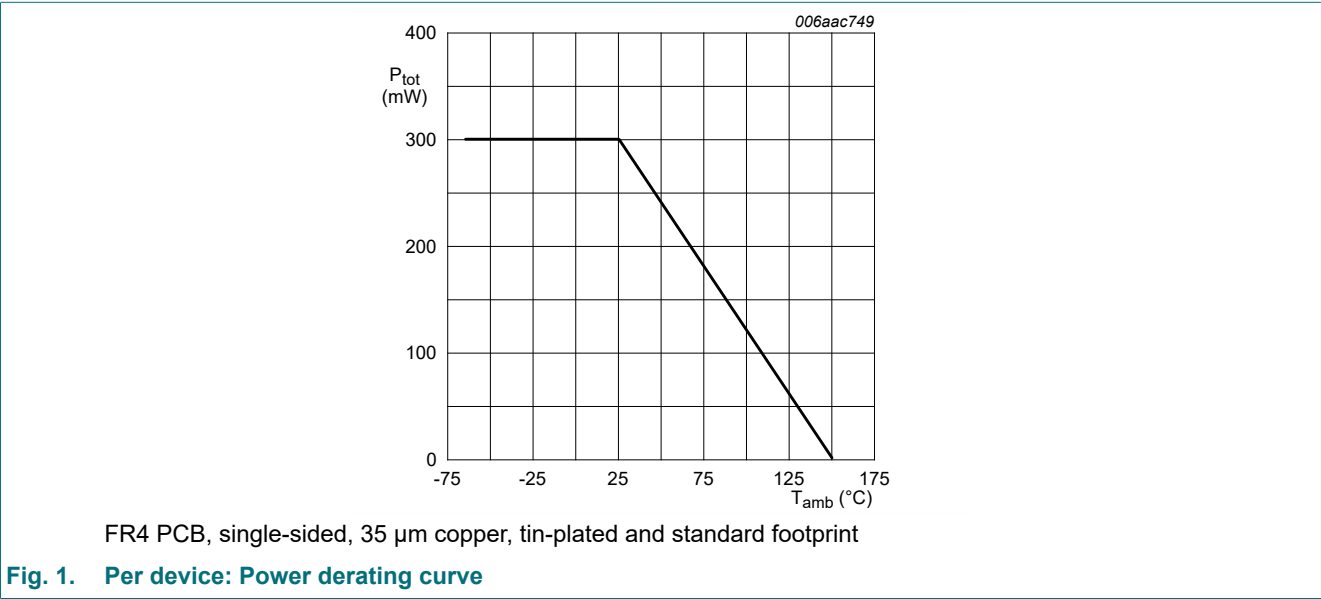
8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
Per transistor; for the PNP transistor (TR2) with negative polarity where applicable						
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		-	5	V
V _I	input voltage	positive (input voltage TR1)		-	30	V
		negative (input voltage TR1)		-	-5	V
		positive (input voltage TR2)		-	5	V
		negative (input voltage TR2)		-	-30	V
I _O	output current			-	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	200	mW
Per device						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	300	mW
T _j	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.

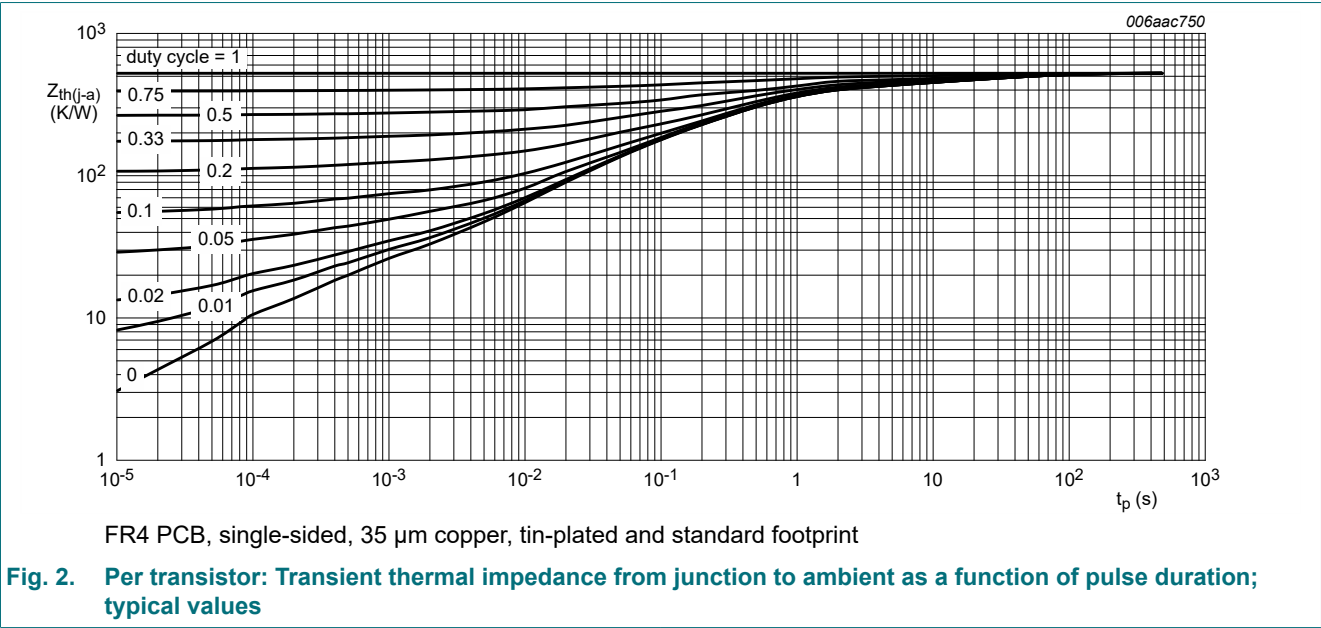


9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	417	K/W

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



10. Characteristics

Table 7. Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor; for the PNP transistor (TR2) with negative polarity where applicable							
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100\text{ }\mu\text{A}$; $I_E = 0\text{ A}$		50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 2\text{ mA}$; $I_B = 0\text{ A}$		50	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = 50\text{ V}$; $I_E = 0\text{ A}$		-	-	100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30\text{ V}$; $I_B = 0\text{ A}$		-	-	1	μA
		$V_{CE} = 30\text{ V}$; $I_B = 0\text{ A}$; $T_J = 150\text{ }^{\circ}\text{C}$		-	-	5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}$; $I_C = 0\text{ A}$		-	-	170	μA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}$; $I_C = 10\text{ mA}$		100	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 5\text{ mA}$; $I_B = 0.25\text{ mA}$		-	-	100	mV
$V_{I(off)}$	off-state input voltage	$V_{CE} = 5\text{ V}$; $I_C = 100\text{ }\mu\text{A}$		-	0.6	0.5	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = 0.3\text{ V}$; $I_C = 5\text{ mA}$		1.3	0.9	-	V
R1	bias resistor 1 (input)		[1]	3.3	4.7	6.1	k Ω
R2/R1	bias resistor ratio		[1]	8	10	12	
TR1 (NPN)							
C_c	collector capacitance	$V_{CB} = 10\text{ V}$; $I_E = 0\text{ A}$; $i_e = 0\text{ A}$; $f = 1\text{ MHz}$		-	-	2.5	pF
f_T	transition frequency	$V_{CE} = 5\text{ V}$; $I_C = 10\text{ mA}$; $f = 100\text{ MHz}$	[2]	-	230	-	MHz
TR2 (PNP)							
C_c	collector capacitance	$V_{CB} = -10\text{ V}$; $I_E = 0\text{ A}$; $i_e = 0\text{ A}$; $f = 1\text{ MHz}$		-	-	3	pF
f_T	transition frequency	$V_{CE} = -5\text{ V}$; $I_C = -10\text{ mA}$; $f = 100\text{ MHz}$	[2]	-	180	-	MHz

[1] See section "Test information" for resistor calculation and test conditions.

[2] Characteristics of built-in transistor

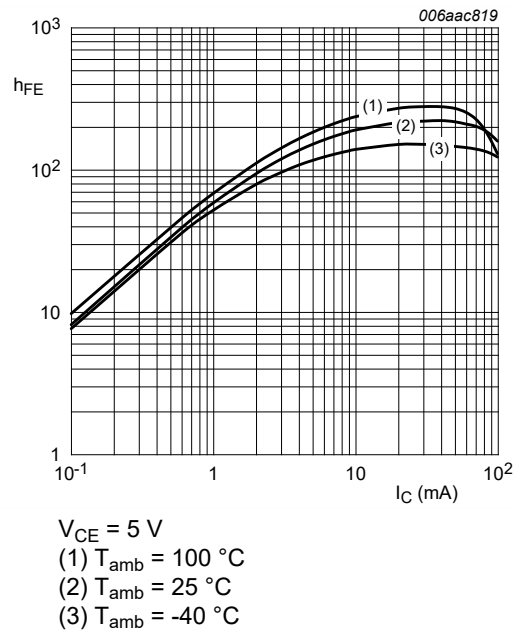


Fig. 3. TR1 (NPN): DC current gain as a function of collector current; typical values

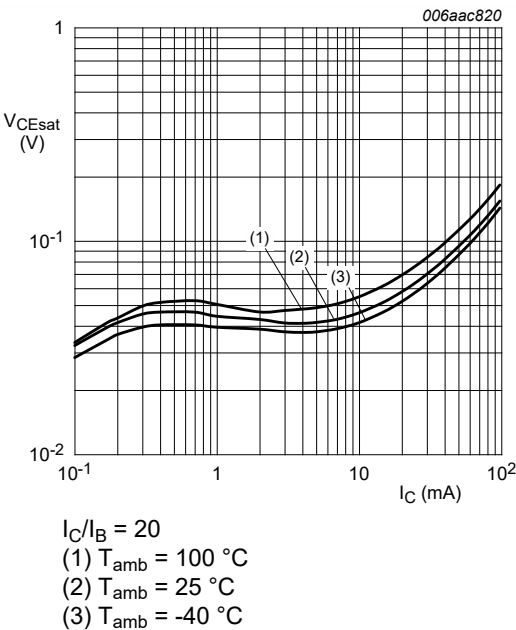


Fig. 4. TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values

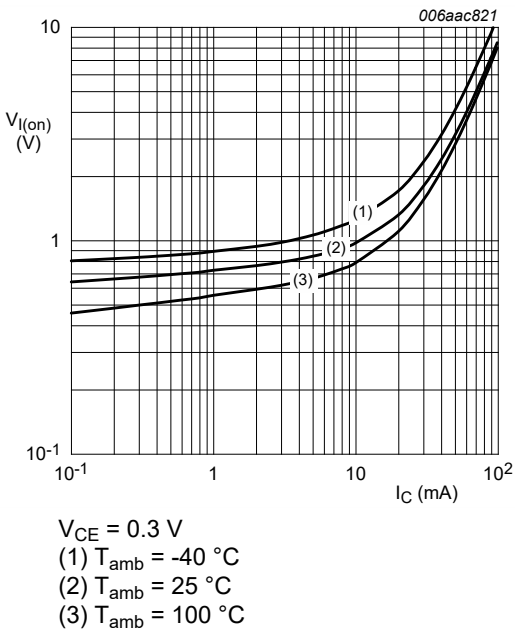


Fig. 5. TR1 (NPN): On-state input voltage as a function of collector current; typical values

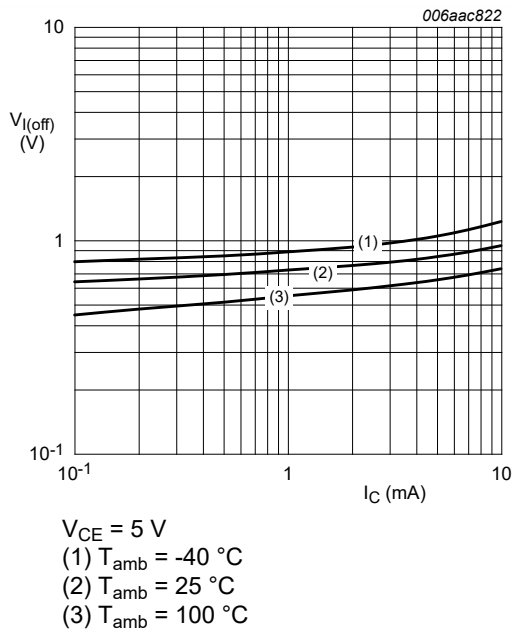


Fig. 6. TR1 (NPN): Off-state input voltage as a function of collector current; typical values

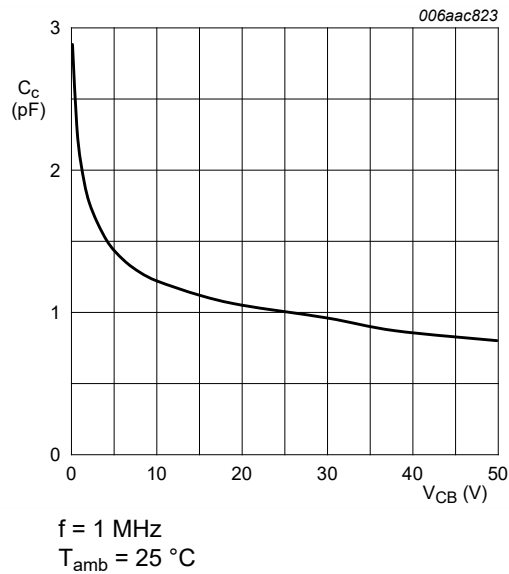


Fig. 7. TR1 (NPN): Collector capacitance as a function of collector-base voltage; typical values

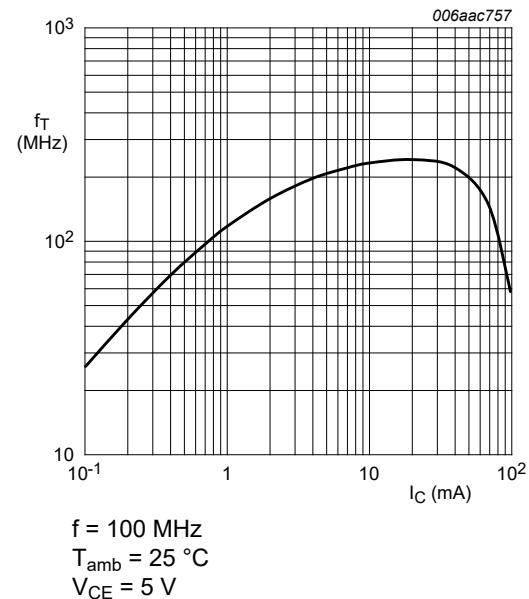


Fig. 8. TR1 (NPN): Transition frequency as a function of collector current; typical values of built-in transistor

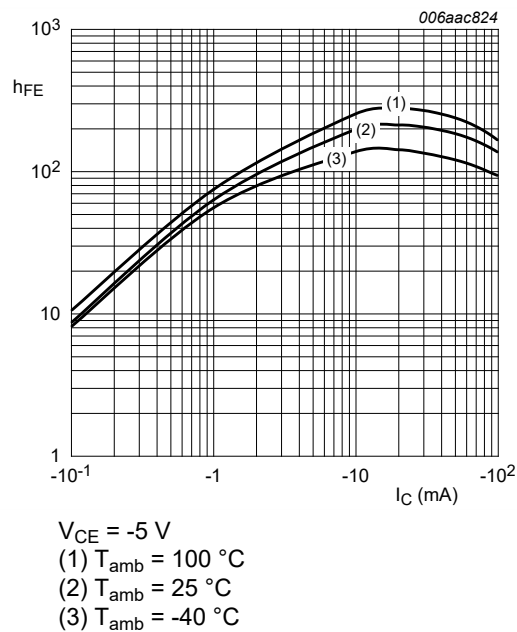


Fig. 9. TR2 (PNP): DC current gain as a function of collector current; typical values

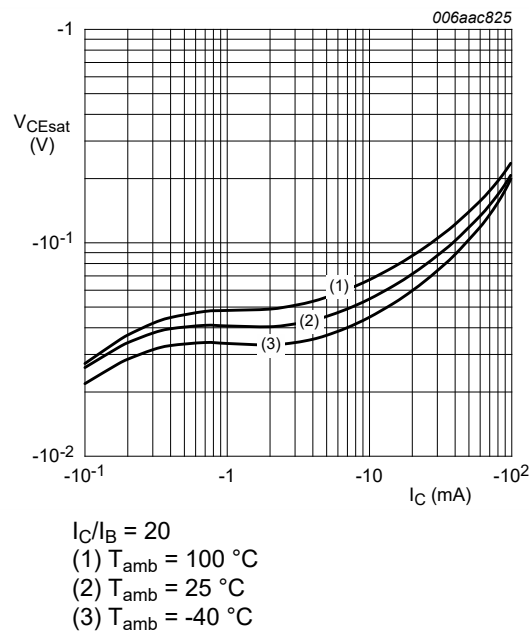


Fig. 10. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values

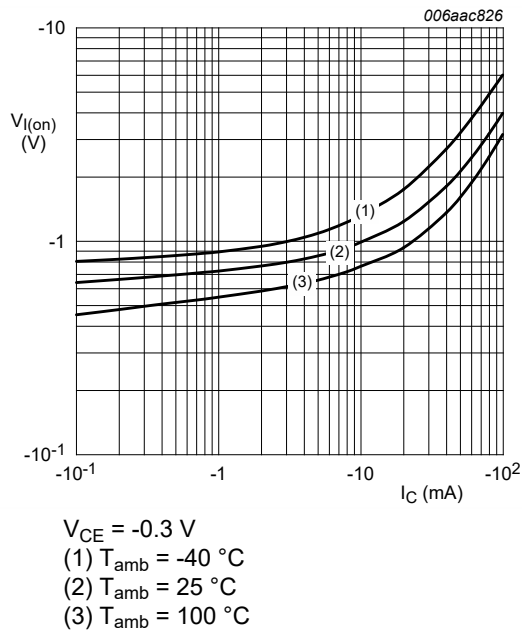


Fig. 11. TR2 (PNP): On-state input voltage as a function of collector current; typical values

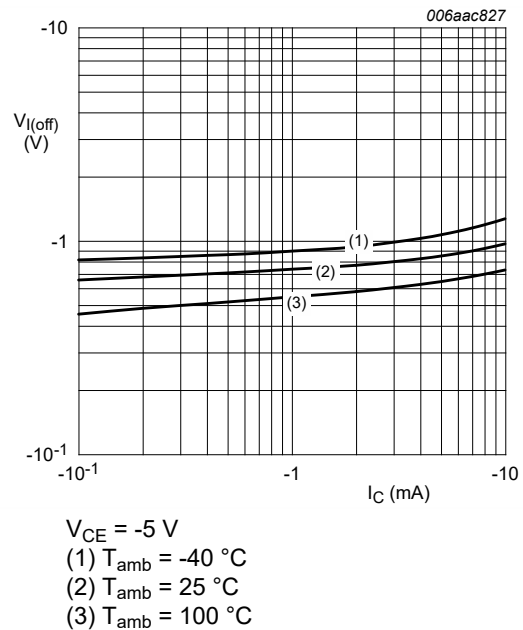


Fig. 12. TR2 (PNP): Off-state input voltage as a function of collector current; typical values

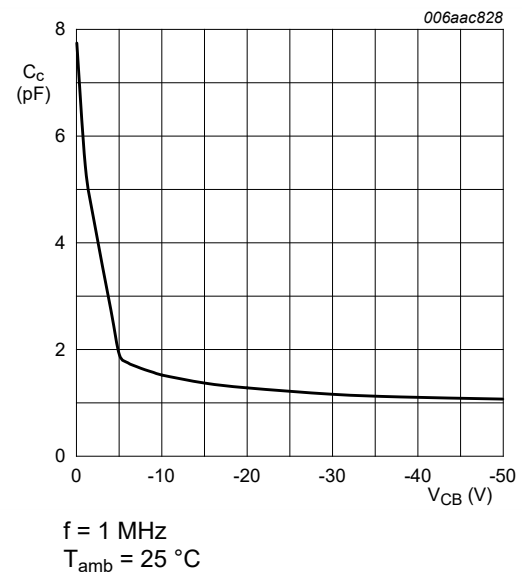


Fig. 13. TR2 (PNP): Collector capacitance as a function of collector-base voltage; typical values

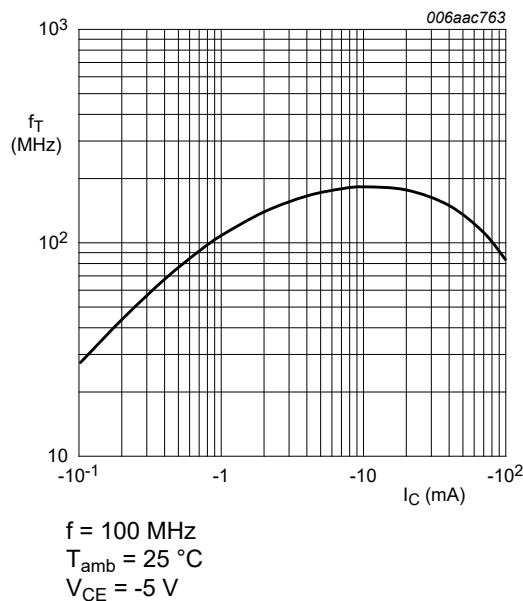


Fig. 14. TR2 (PNP): Transition frequency as a function of collector current; typical values of built-in transistor

11. Test information

Resistor calculation

- Calculation of bias resistor 1 (R1)

$$R_1 = \frac{V(I_2) - V(I_1)}{I_2 - I_1}$$

- Calculation of bias resistor ratio (R2/R1)

$$\frac{R2}{R1} = \frac{V(I_4) - V(I_3)}{R1 \cdot (I_4 - I_3)} - 1$$

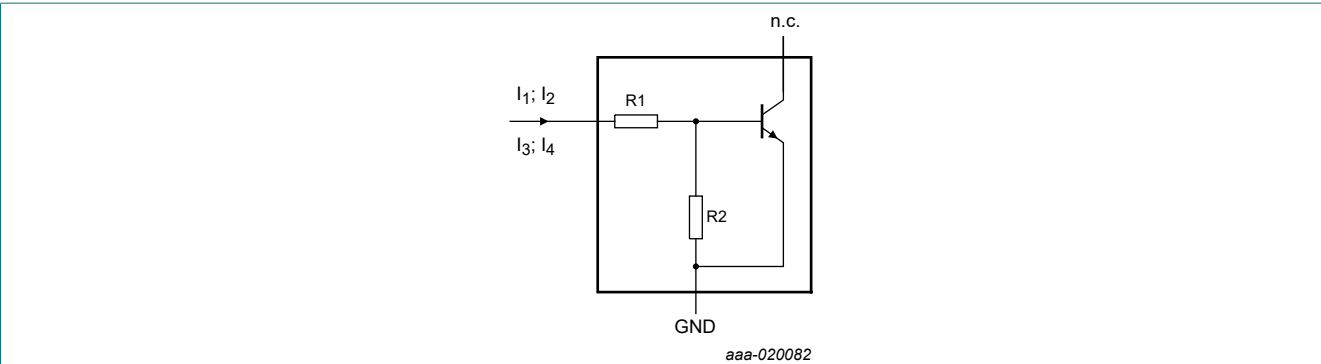


Fig. 15. NPN transistor: Resistor test circuit

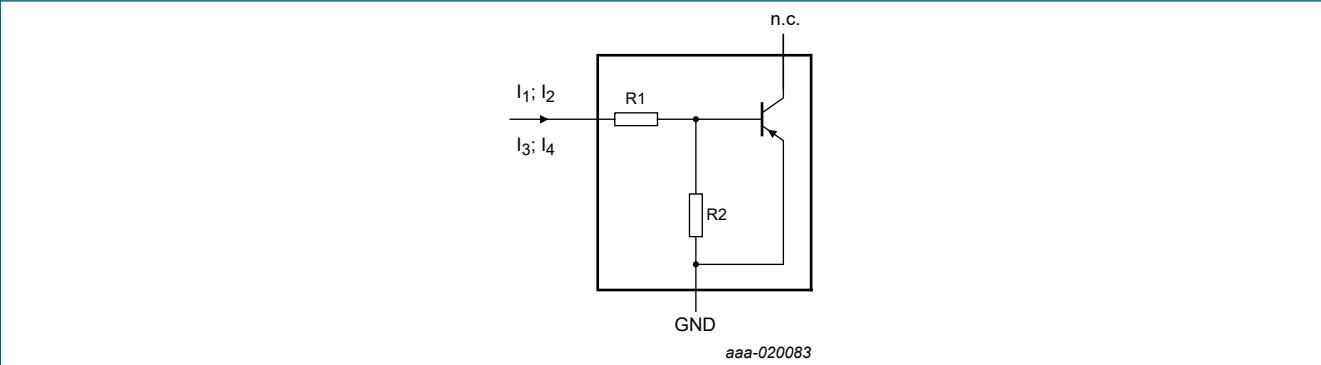


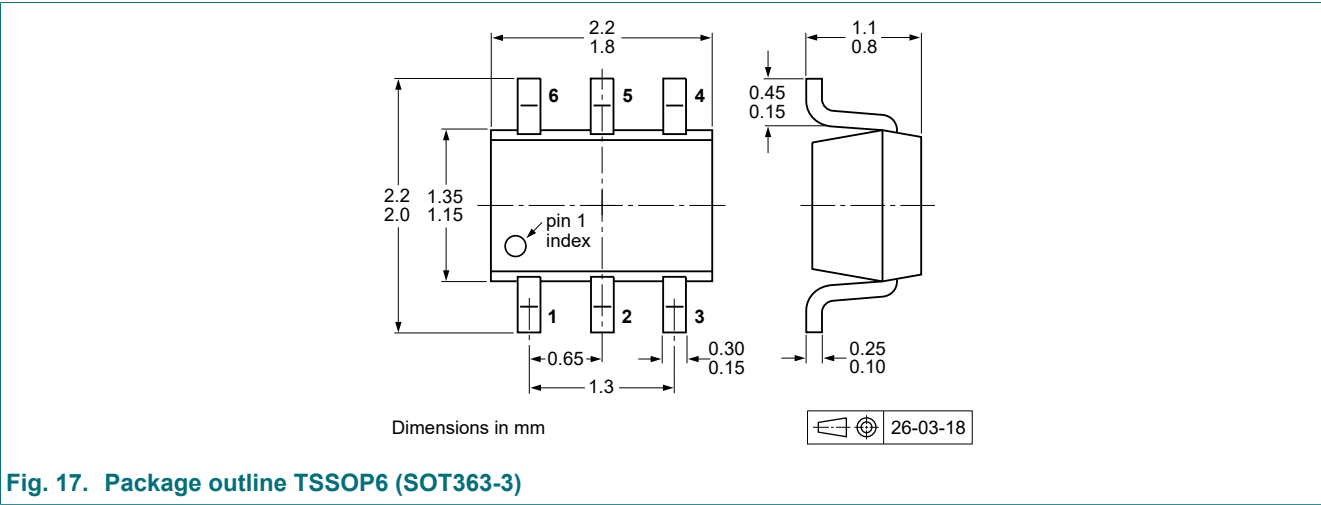
Fig. 16. PNP transistor: Resistor test circuit

Resistor test conditions

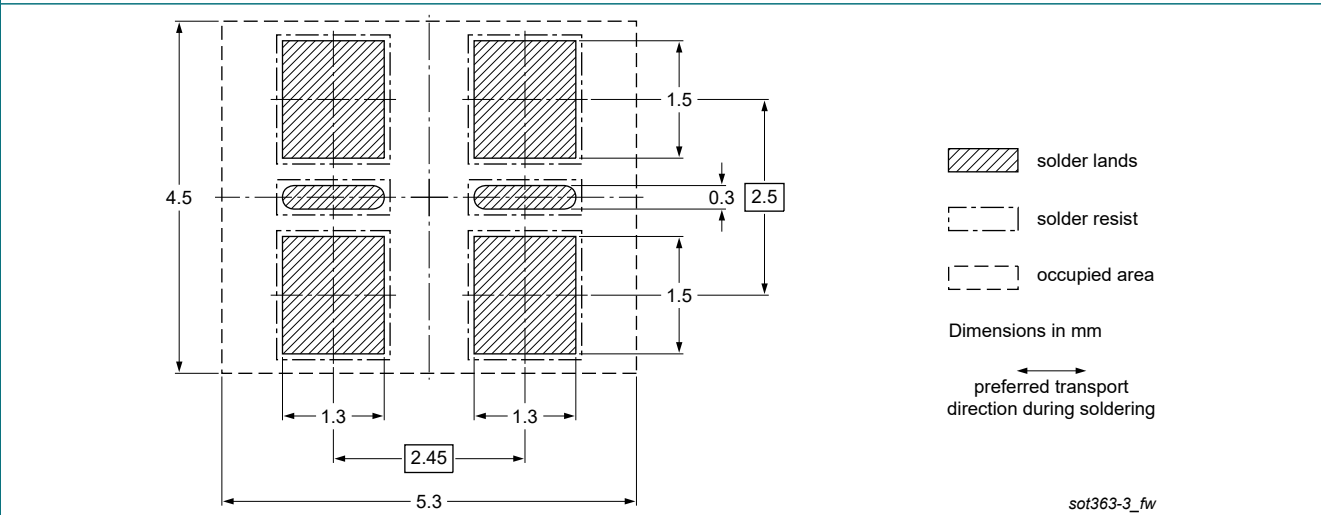
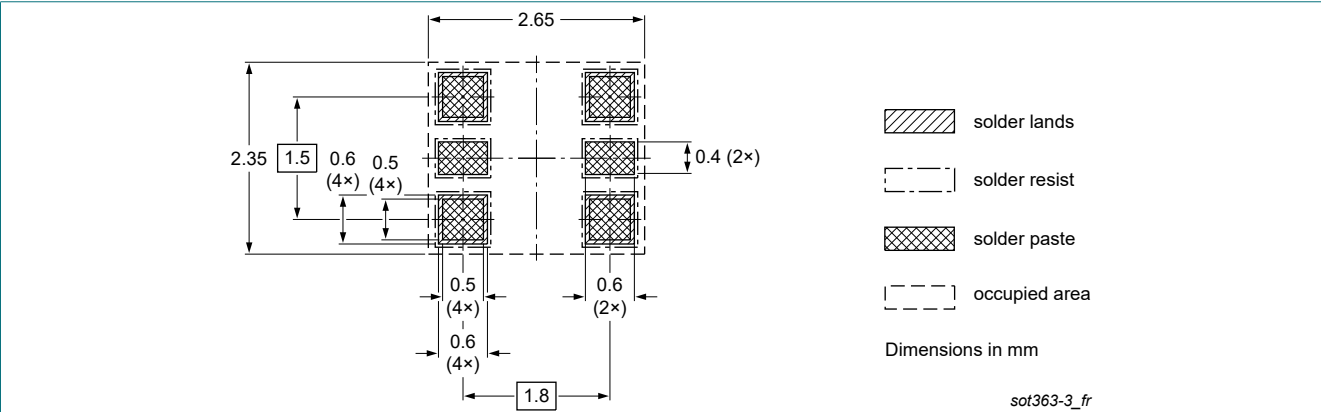
Table 8. Resistor test conditions

PUMD13	R1 (kΩ)	R2 (kΩ)	Test conditions			
			I ₁	I ₂	I ₃	I ₄
TR1 (NPN)	4.7	47	90 μA	140 μA	-55 μA	-105 μA
TR2 (PNP)	4.7	47	-90 μA	-140 μA	55 μA	105 μA

12. Package outline



13. Soldering



14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PUMD13 v.6	20260715	Product data sheet	-	PUMD13 v.5
Modifications:	• Package changed from SOT363 to SOT363-3			
PUMD13 v.5	20221001	Product data sheet	-	PEMD13_PUMD13 v.4
PEMD13_PUMD13 v.4	20111207	Product data sheet	-	PEMD13_PUMD13 v.3
PEMD13_PUMD13 v.3	20031008	Product data sheet	-	PEMD13 v.2
PEMD13 v.2	20010911	Preliminary specification	-	PUMD13 v.1
PUMD13 v.1	20010227	Product specification	-	-

15. Legal information

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".
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