



NHUMH10/13/9 series

80 V, 100 mA NPN/NPN resistor-equipped double transistors

Rev. 2 — 12 August 2026

Product data sheet

1. General description

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

Table 1. Product overview

Type number	R1	R2	Package		PNP/PNP complement:	NPN/PNP complement:
	k Ω	k Ω	Nexperia	JEITA		
NHUMH10	2.2	47	SOT363	SC-88	NHUMB10	NHUMD10
NHUMH13	4.7	47			NHUMB13	NHUMD13
NHUMH9	10	47			NHUMB9	NHUMD9

2. Features and benefits

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

3. Applications

- Digital applications
- Cost saving alternative for BC846 series in digital applications
- Controlling IC inputs
- Switching loads

4. Quick reference data

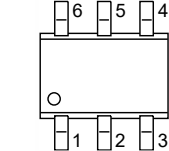
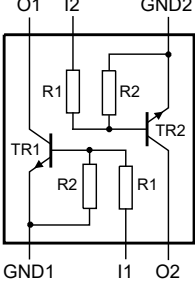
Table 2. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V_{CEO}	collector-emitter voltage	open base	-	-	80	V
I_O	output current		-	-	100	mA

5. Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	GND1	GND (emitter) TR1	 TSSOP6 (SOT363)	 aaa-019894
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 4. Ordering information

Type number	Package		
	Name	Description	Version
NHUMH10	TSSOP6	plastic surface-mounted package; 6 leads	SOT363
NHUMH13			
NHUMH9			

7. Marking

Table 5. Marking

Type number	Marking code [1]
NHUMH10	6H%
NHUMH13	6K%
NHUMH9	6G%

[1] % = placeholder for manufacturing site code

8. Limiting values

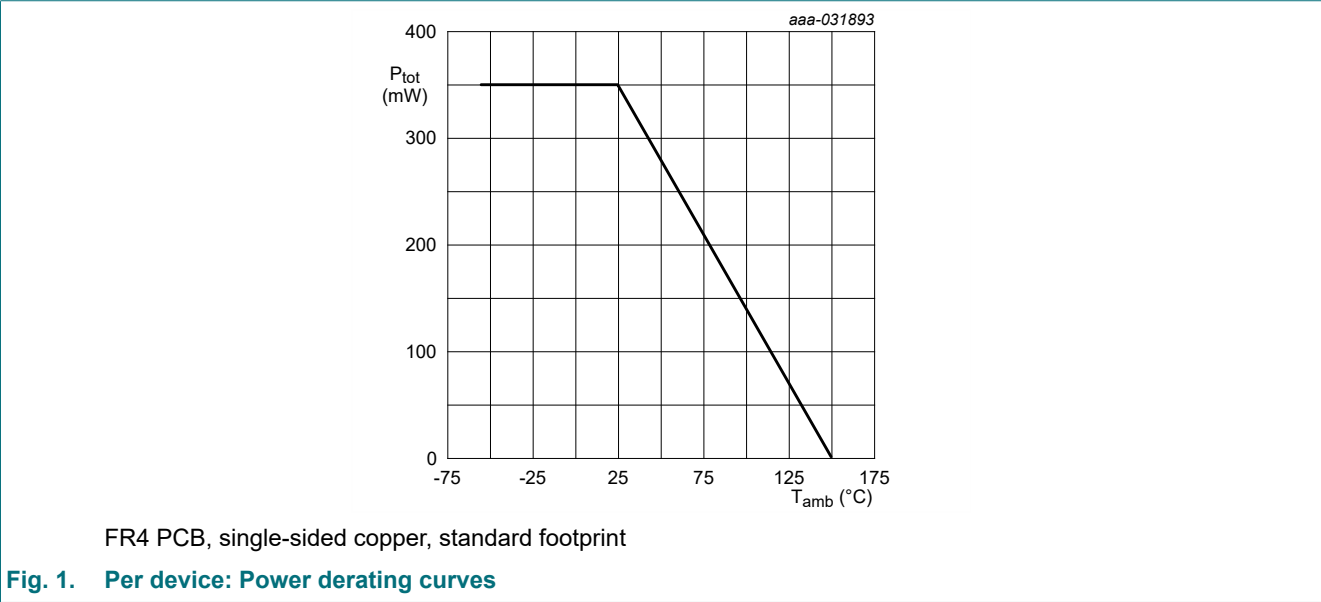
Table 6. Limiting values

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

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

Symbol	Parameter	Conditions	Min	Max	Unit
Per transistor					
V_{CBO}	collector-base voltage	open emitter	-	80	V
V_{CEO}	collector-emitter voltage	open base	-	80	V
V_{EBO}	emitter-base voltage	open collector	-	7	V
V_I	input voltage				
	NHUMH10		-7	+20	V
	NHUMH13		-7	+30	V
	NHUMH9		-7	+40	V
I_O	output current		-	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$ [1]	-	235	mW
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$ [1]	-	350	mW
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-55	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.



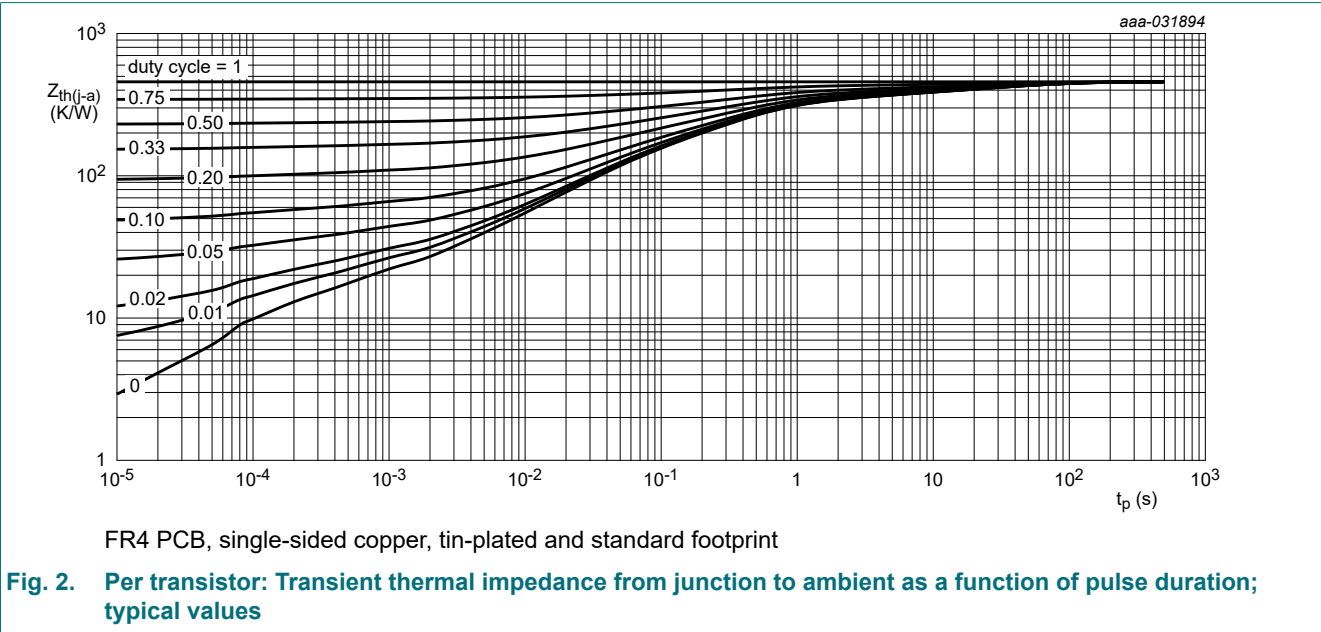
9. Thermal characteristics

Table 7. Thermal characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	532	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	150	K/W
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	358	K/W

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



10. Characteristics

Table 8. Characteristics
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V _{(BR)CBO}	collector-base breakdown voltage	I _C = 100 μA; I _E = 0 A	80	-	-	V
V _{(BR)CEO}	collector-emitter breakdown voltage	I _C = 2 mA; I _B = 0 A	80	-	-	V
I _{CBO}	collector-base cut-off current	V _{CB} = 80 V; I _E = 0 A	-	-	100	nA
I _{CEO}	collector-emitter cut-off current	V _{CE} = 60 V; I _B = 0 A	-	-	100	nA
		V _{CE} = 60 V; I _B = 0 A; T _J = 150 °C	-	-	5	μA
I _{EBO}	emitter-base cut-off current					
	NHUMH10	V _{EB} = 7 V; I _C = 0 A	-	-	270	μA
	NHUMH13		-	-	260	μA
	NHUMH9		-	-	230	μA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C =10 mA	100	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = 10 mA; I _B = 0.5 mA	-	-	100	mV
V _{I(off)}	off-state input voltage					
	NHUMH10	V _{CE} = 5 V ; I _C = 100 μA	-	595	500	mV
	NHUMH13		-	625	500	mV
	NHUMH9		-	690	500	mV
V _{I(on)}	on-state input voltage					
	NHUMH10	V _{CE} = 0.3 V ; I _C = 10 mA	1.2	0.81	-	V
	NHUMH13		1.4	0.95	-	V
	NHUMH9		1.6	1.22	-	V
R1	bias resistor 1 (input)					
	NHUMH10	[1]	1.54	2.2	2.86	kΩ
	NHUMH13		3.3	4.7	6.1	kΩ
	NHUMH9		7	10	13	kΩ
R2/R1	bias resistor ratio					
	NHUMH10	[1]	17	21	26	
	NHUMH13		8	10	12	
	NHUMH9		3.7	4.7	5.7	
f _T	transition frequency	V _{CE} = 5 V; I _C = 10 mA; f = 100 MHz	[2]	170	-	MHz
C _c	collector capacitance	V _{CB} = 10 V; I _E = i _e = 0 A; f = 1 MHz	-	-	2.5	pF

[1] See section "Test information" for resistor calculation and test conditions
[2] Characteristics of built-in transistor

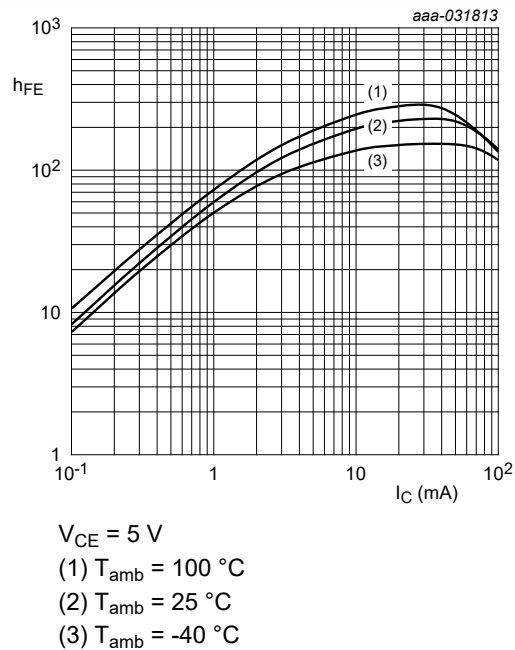


Fig. 3. NHUMH10: DC current gain as a function of collector current; typical values

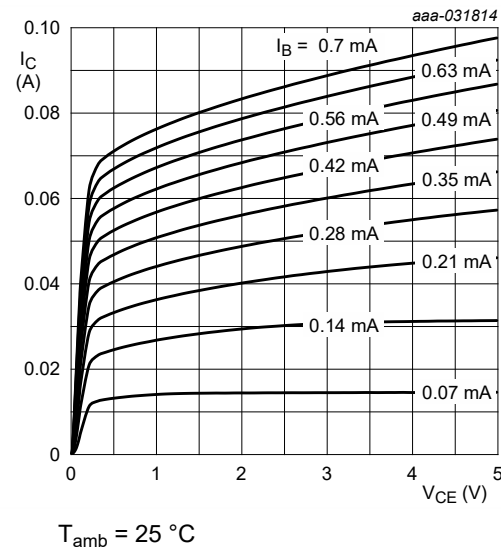


Fig. 4. NHUMH10: Collector current as a function of collector-emitter voltage; typical values

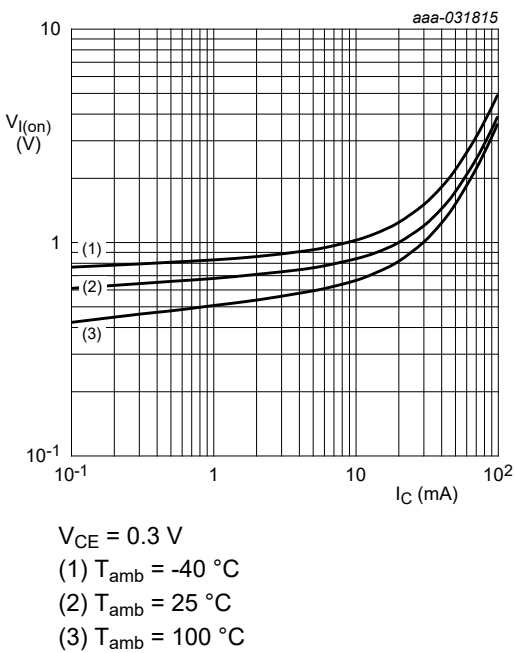


Fig. 5. NHUMH10: On-state input voltage as a function of collector current; typical values

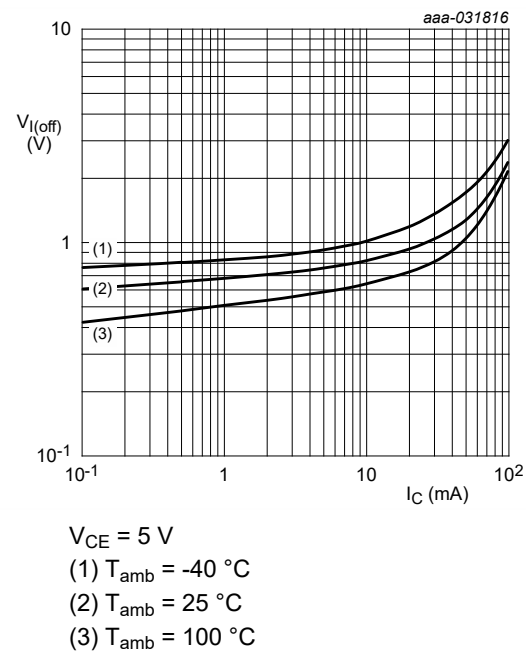


Fig. 6. NHUMH10: Off-state input voltage as a function of collector current; typical values

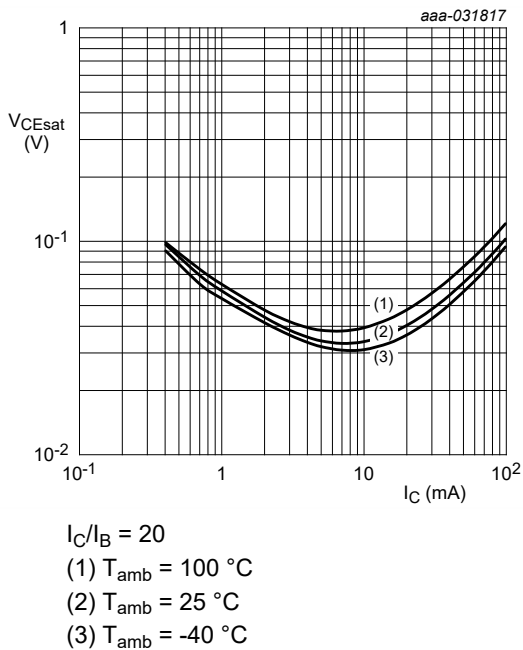


Fig. 7. NHUMH10: Collector-emitter saturation voltage as a function of collector current; typical values

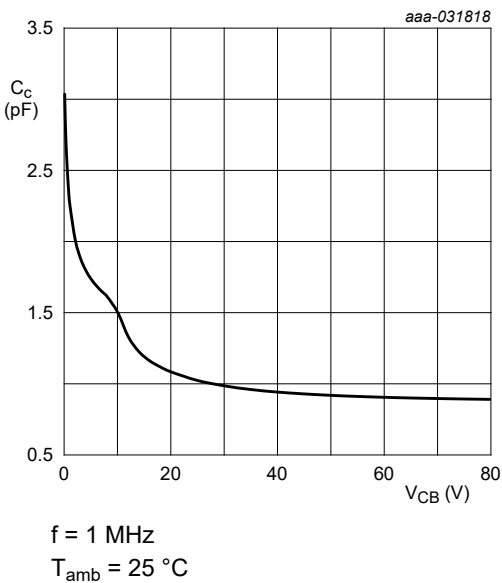


Fig. 8. NHUMH10: Collector capacitance as a function of collector-base voltage; typical values

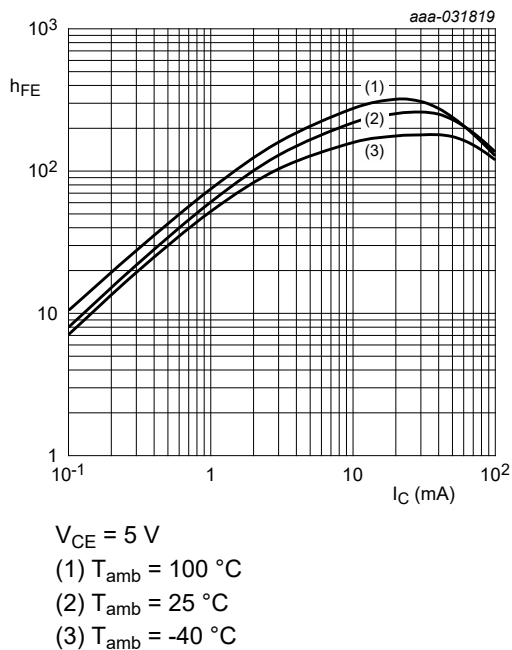


Fig. 9. NHUMH13: DC current gain as a function of collector current; typical values

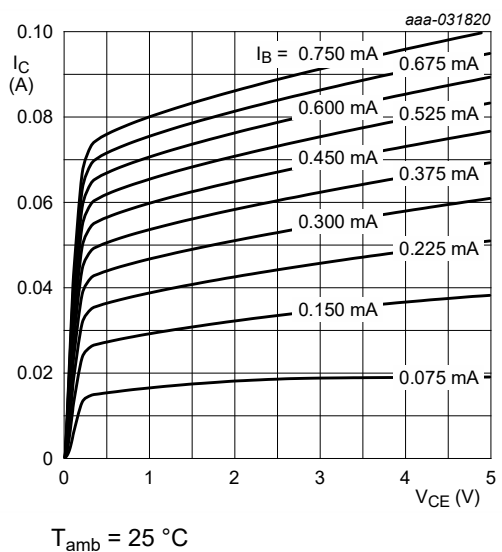


Fig. 10. NHUMH13: Collector current as a function of collector-emitter voltage; typical values

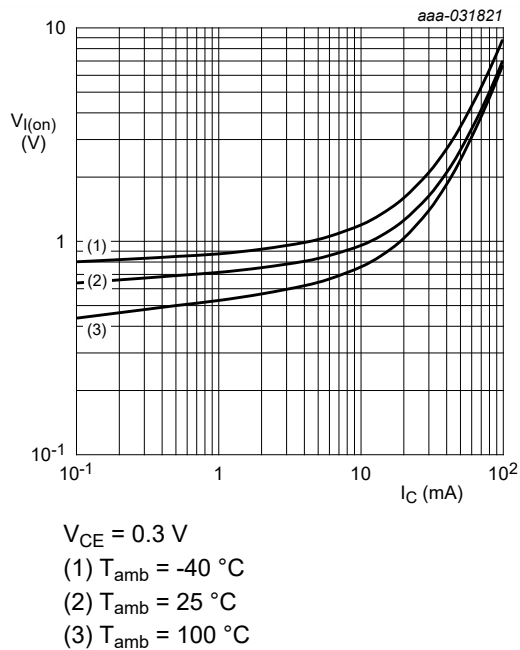


Fig. 11. NHUMH13: On-state input voltage as a function of collector current; typical values

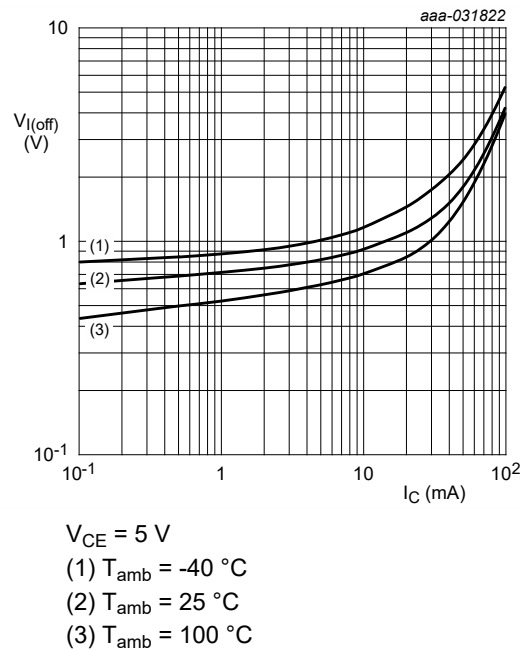


Fig. 12. NHUMH13: Off-state input voltage as a function of collector current; typical values

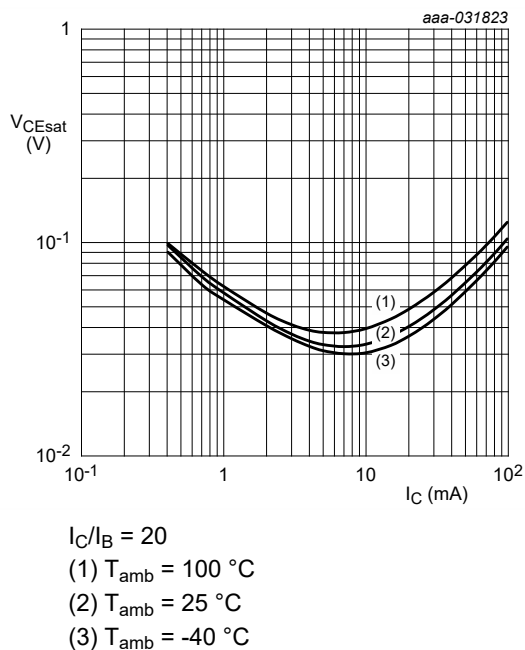


Fig. 13. NHUMH13: Collector-emitter saturation voltage as a function of collector current; typical values

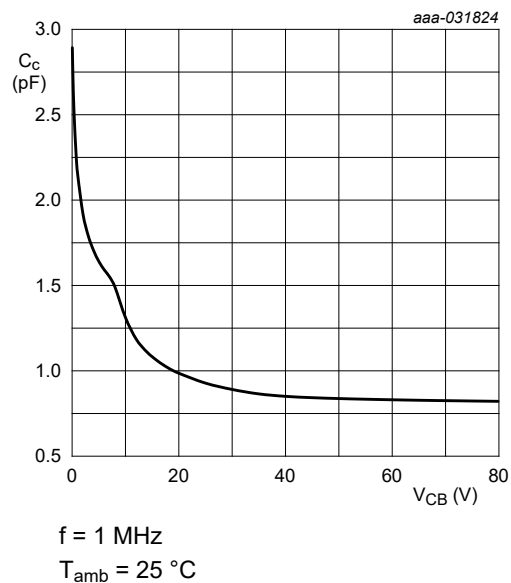


Fig. 14. NHUMH13: Collector capacitance as a function of collector-base voltage; typical values

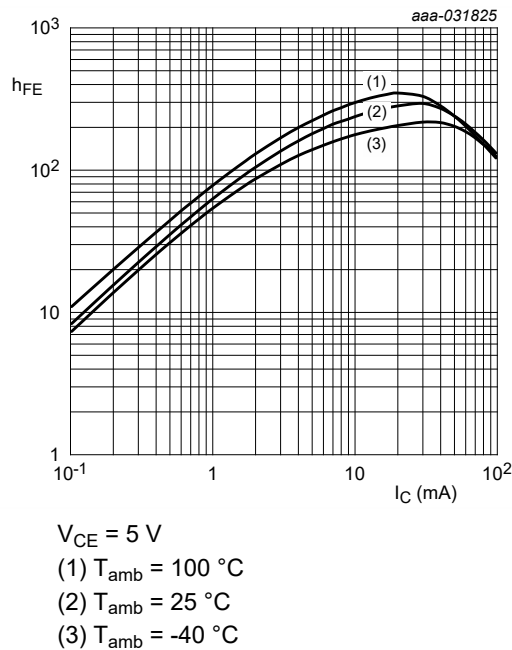


Fig. 15. NHUMH9: DC current gain as a function of collector current; typical values

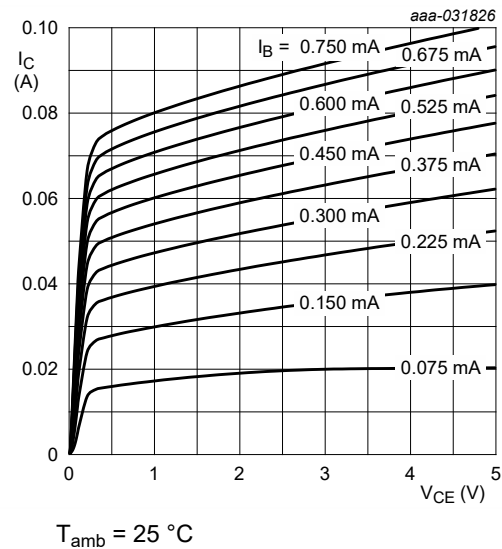


Fig. 16. NHUMH9: Collector current as a function of collector-emitter voltage; typical values

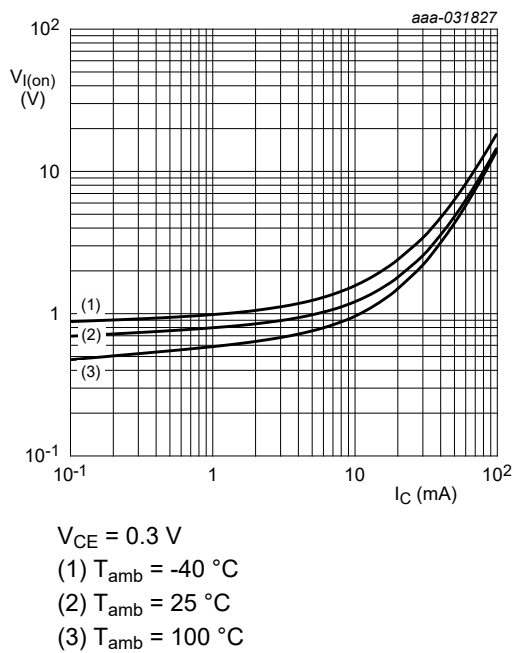


Fig. 17. NHUMH9: On-state input voltage as a function of collector current; typical values

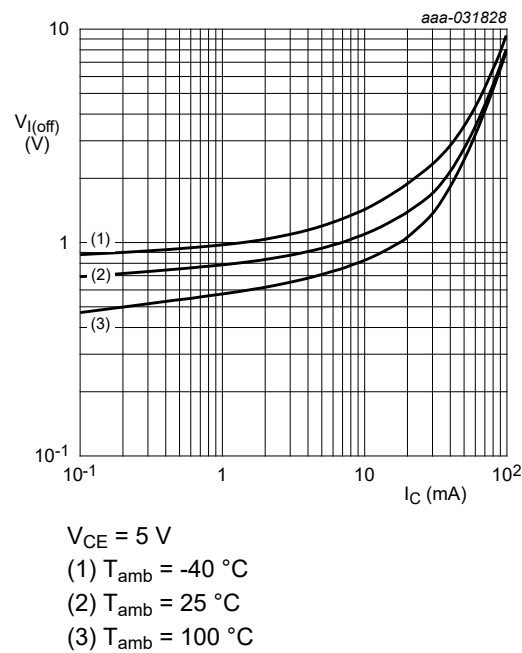


Fig. 18. NHUMH9: Off-state input voltage as a function of collector current; typical values

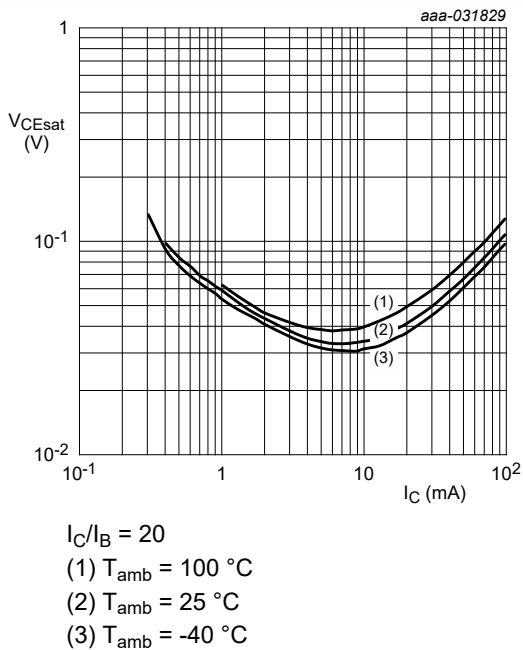


Fig. 19. NHUMH9: Collector-emitter saturation voltage as a function of collector current; typical values

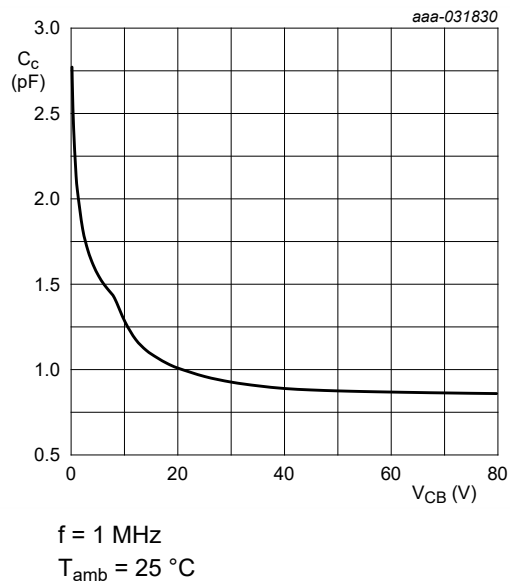
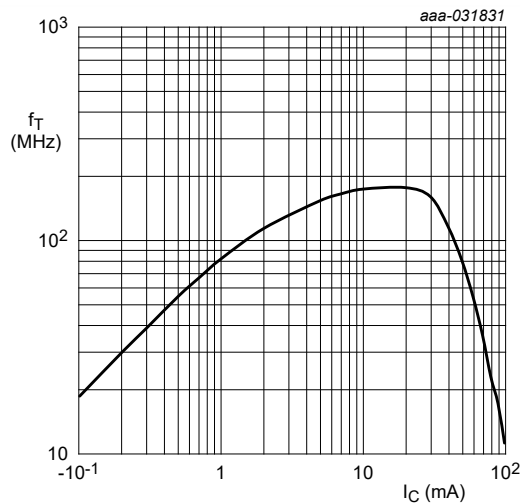


Fig. 20. NHUMH9: Collector capacitance as a function of collector-base voltage; typical values



$f = 100\text{ MHz}$
 $V_{CE} = 5\text{ V}$
 $T_{amb} = 25\text{ }^{\circ}\text{C}$

Fig. 21. 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)
$$\frac{R_2}{R_1} = \frac{V(I_4) - V(I_3)}{R_1 \cdot (I_4 - I_3)} - 1$$

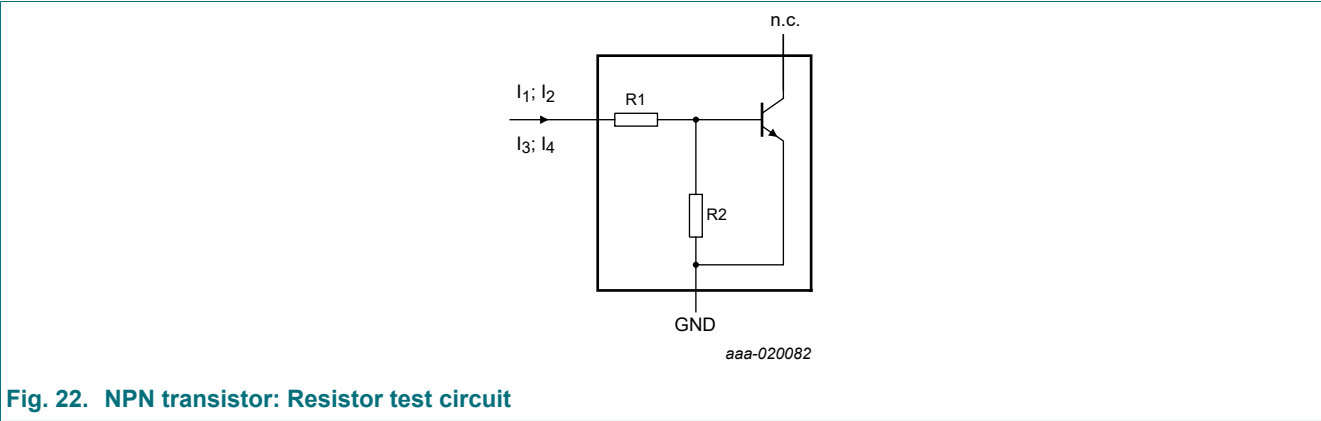


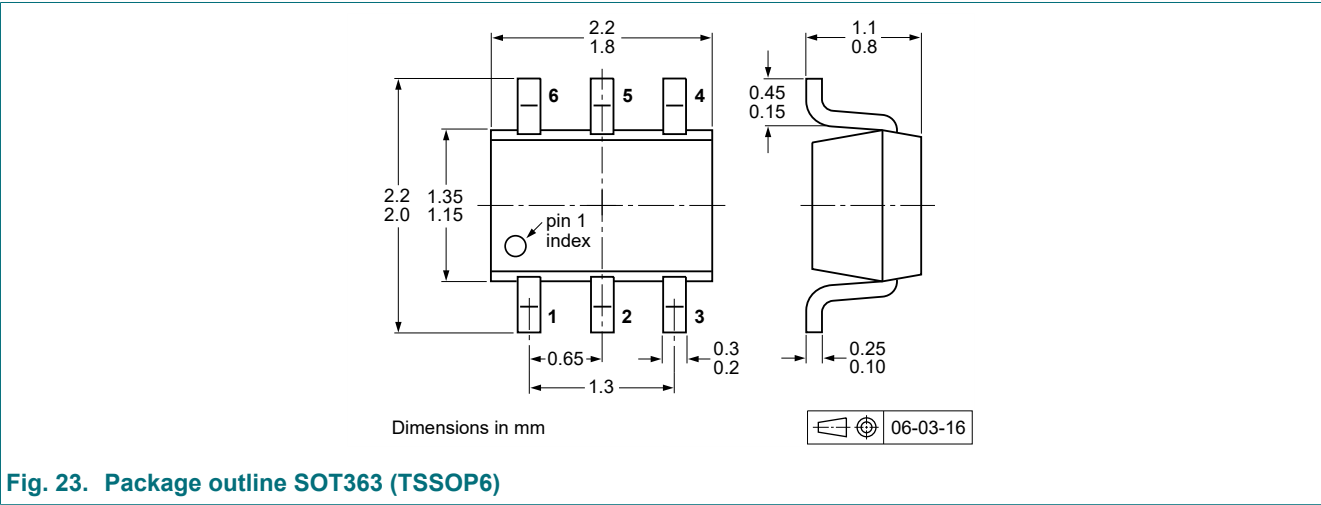
Fig. 22. NPN transistor: Resistor test circuit

Resistor test conditions

Table 9. Resistor test conditions

Type number	R1 (kΩ)	R2 (kΩ)	Test conditions			
			I ₁	I ₂	I ₃	I ₄
Per transistor						
NHUMH10	2.2	47	1.6 mA	2.4 mA	-55 μA	-105 μA
NHUMH13	4.7	47	1.2 mA	1.8 mA	-55 μA	-105 μA
NHUMH9	10	47	0.8 mA	1.1 mA	-55 μA	-105 μA

12. Package outline



13. Soldering

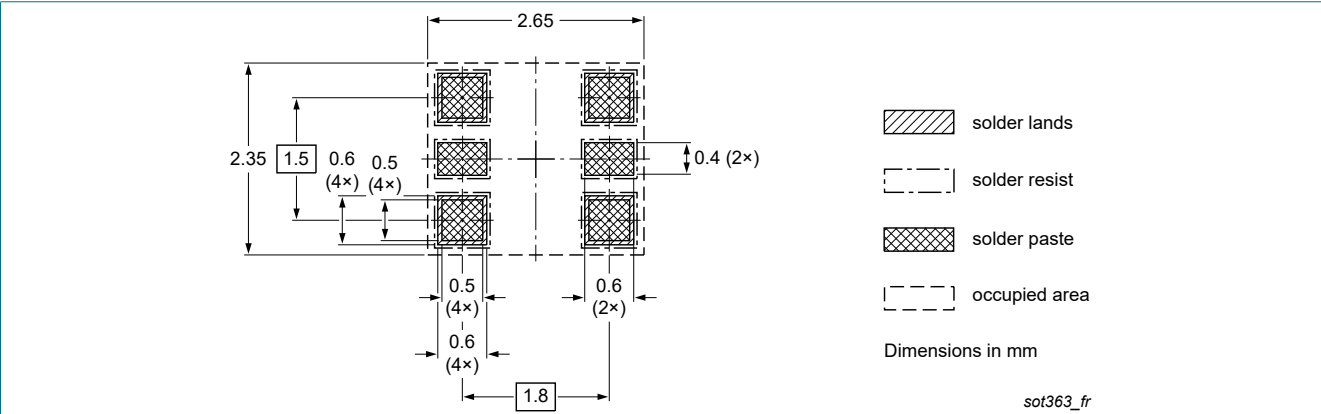


Fig. 24. Reflow soldering footprint for SOT363 (TSSOP6)

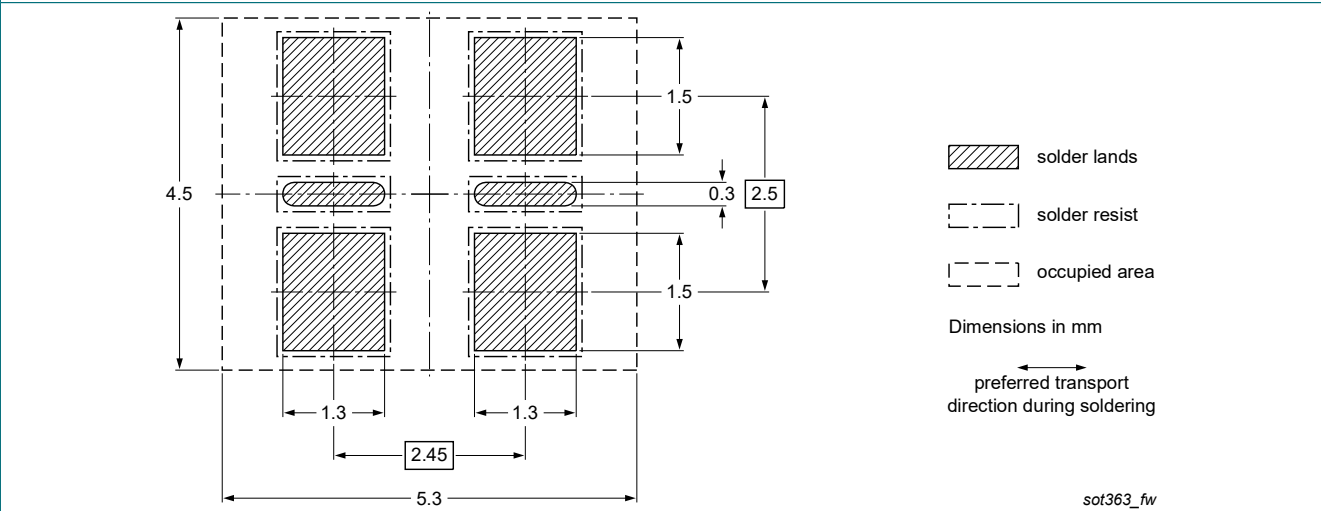


Fig. 25. Wave soldering footprint for SOT363 (TSSOP6)

14. Revision history

Table 10. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
NHUMH10_13_9_SER v.2	20260812	Product data sheet	-	NHUMH10_13_9_SER v.1
Modifications:	Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
NHUMH10_13_9_SER v.1	20200724	Product data sheet	-	-

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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