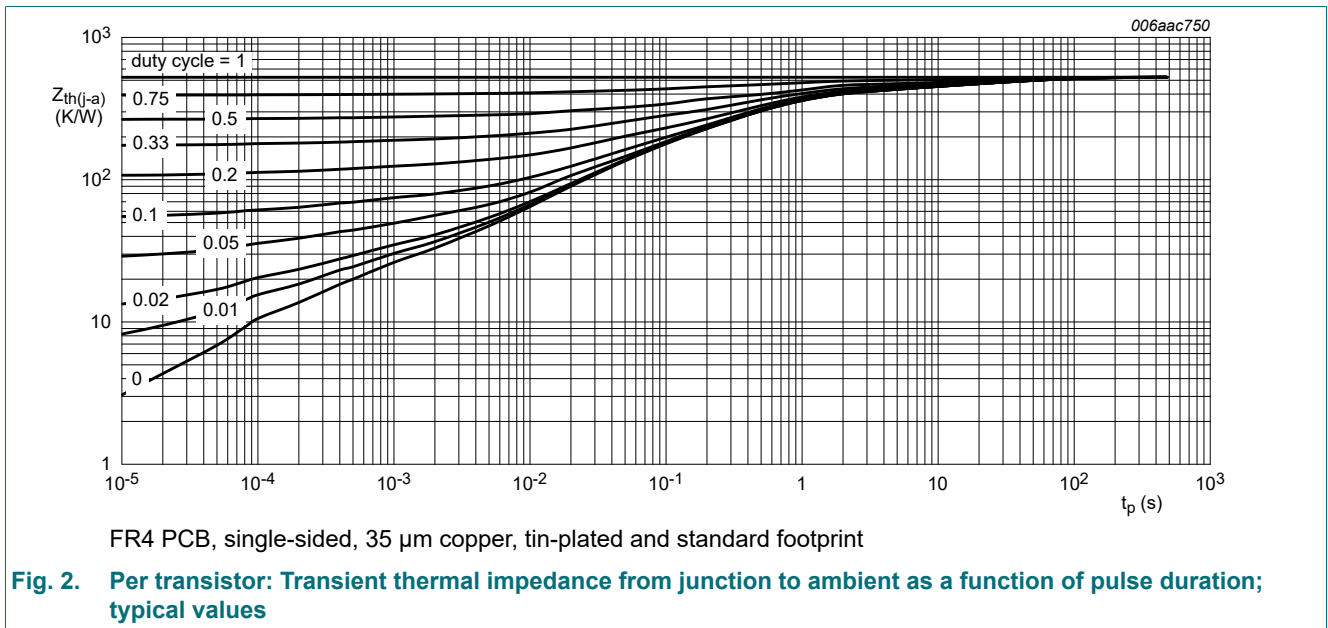


9. Thermal characteristics

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, 35 μm copper, tin-plated and standard footprint.



10. Characteristics

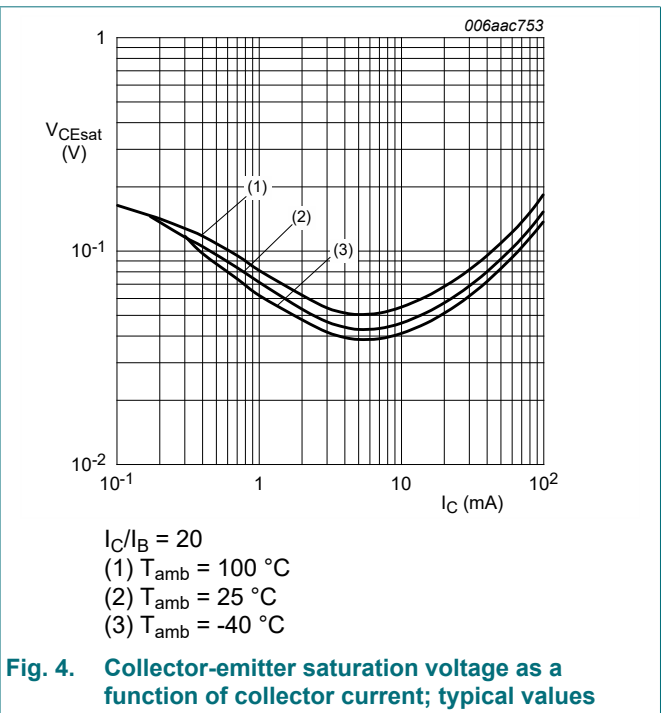
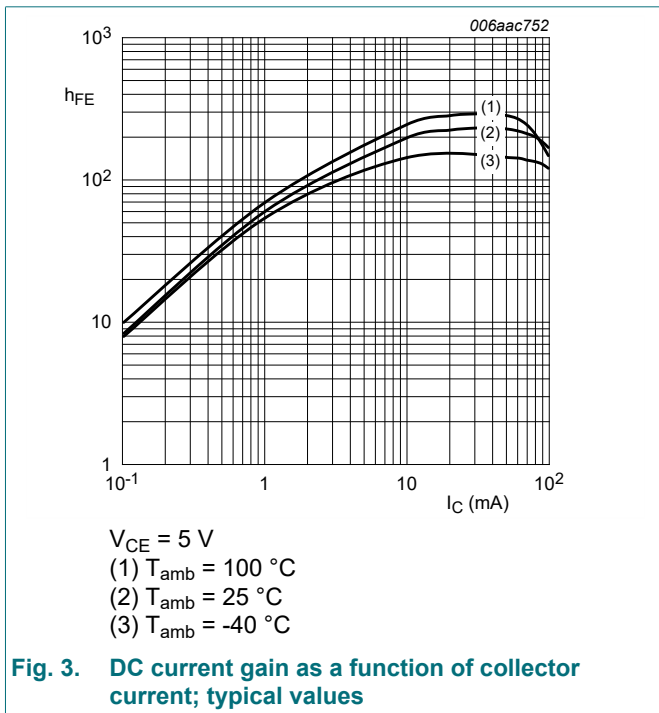
Table 7. Characteristics

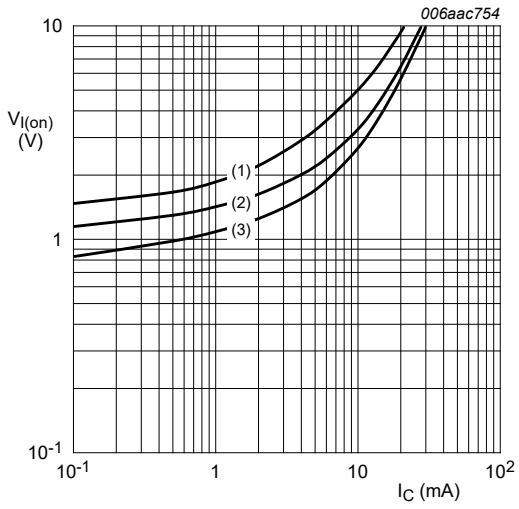
$T_{amb} = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100\text{ }\mu\text{A}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ °C}$	50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 2\text{ mA}$; $I_B = 0\text{ A}$; $T_{amb} = 25\text{ °C}$	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
		$V_{CE} = 30\text{ V}$; $I_B = 0\text{ A}$; $T_j = 150\text{ °C}$	-	-	5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}$; $I_C = 0\text{ A}$	-	-	90	μA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}$; $I_C = 5\text{ mA}$	80	-	-	
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	$V_{CE} = 5\text{ V}$; $I_C = 100\text{ }\mu\text{A}$	-	1.2	0.8	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = 0.3\text{ V}$; $I_C = 2\text{ mA}$	3	1.6	-	V
R1	bias resistor 1 (input)		[1]	47	61	kΩ
R2/R1	bias resistor ratio		[1]	1	1.2	
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

[1] See "Section 11: Test information" for resistor calculation and test conditions.

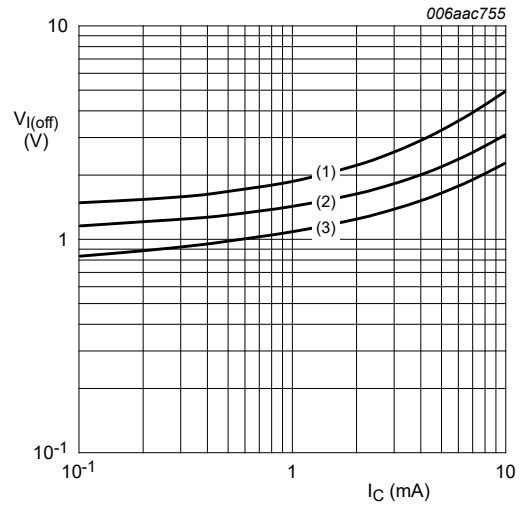
[2] Characteristics of built-in transistor





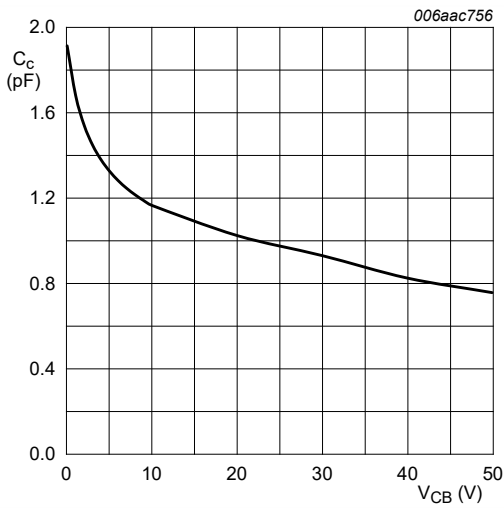
$V_{CE} = 0.3\text{ V}$
 (1) $T_{amb} = -40\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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



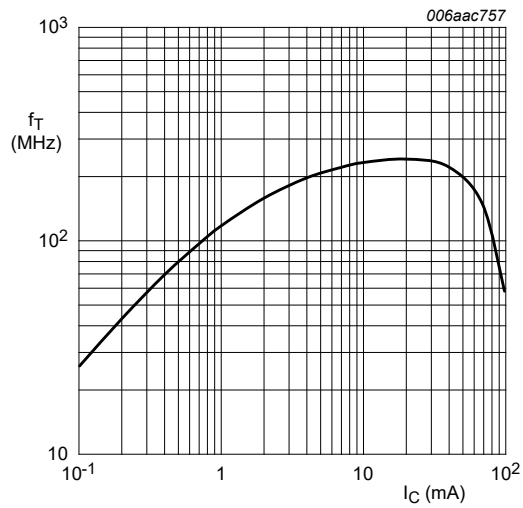
$V_{CE} = 5\text{ V}$
 (1) $T_{amb} = -40\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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



$f = 1\text{ MHz}$
 $T_{amb} = 25\text{ °C}$

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



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

Fig. 8. Transition frequency as a function of collector current; typical values of built-in transistor

11. Test information

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.

Resistor calculation

- Calculation of bias resistor 1 (R1)

$$R1 = \frac{V(I12) - V(I11)}{I12 - I11}$$

- Calculation of bias resistor ratio (R2/R1)

$$\frac{R2}{R1} = \frac{V(I14) - V(I13)}{R1 \cdot (I14 - I13)} - 1$$

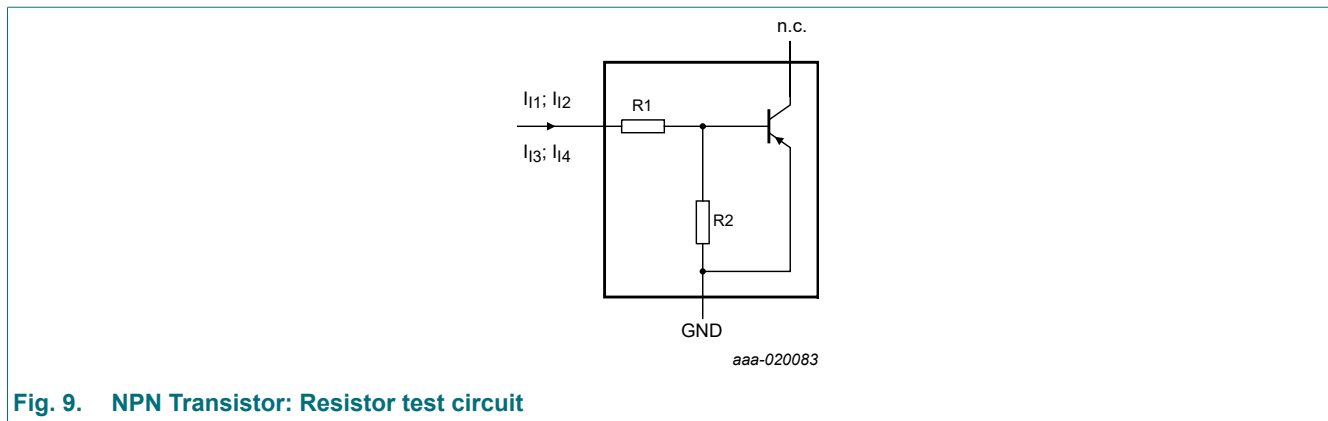


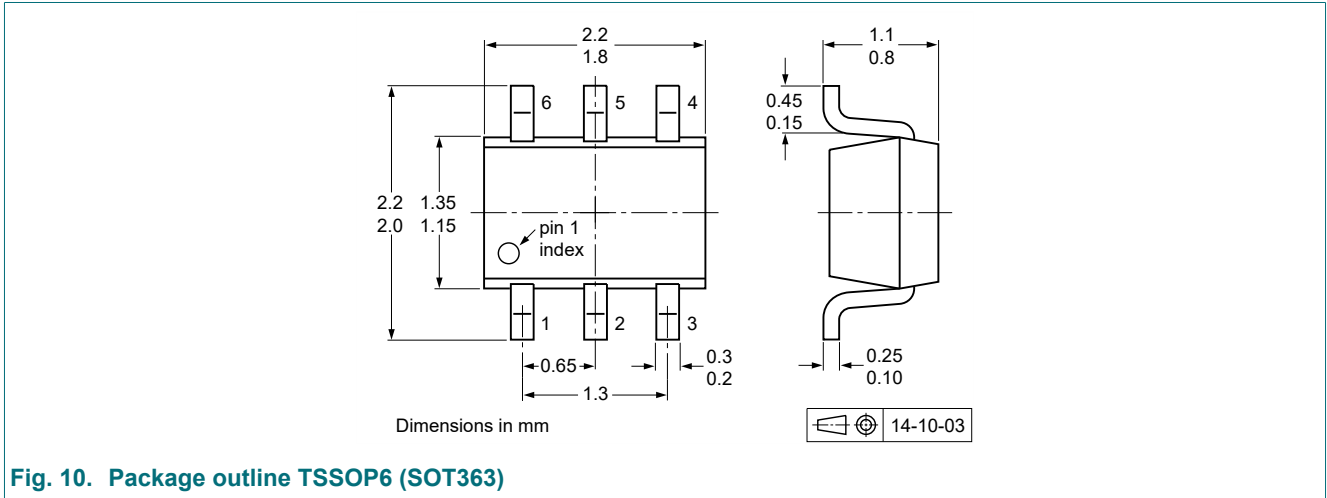
Fig. 9. NPN Transistor: Resistor test circuit

Resistor test conditions

Table 8. Resistor test conditions

Type number	Test conditions			
	I ₁₁	I ₁₂	I ₁₃	I ₁₄
PUMH2-Q	-55 μA	-105 μA	55 μA	105 μA

12. Package outline



13. Soldering

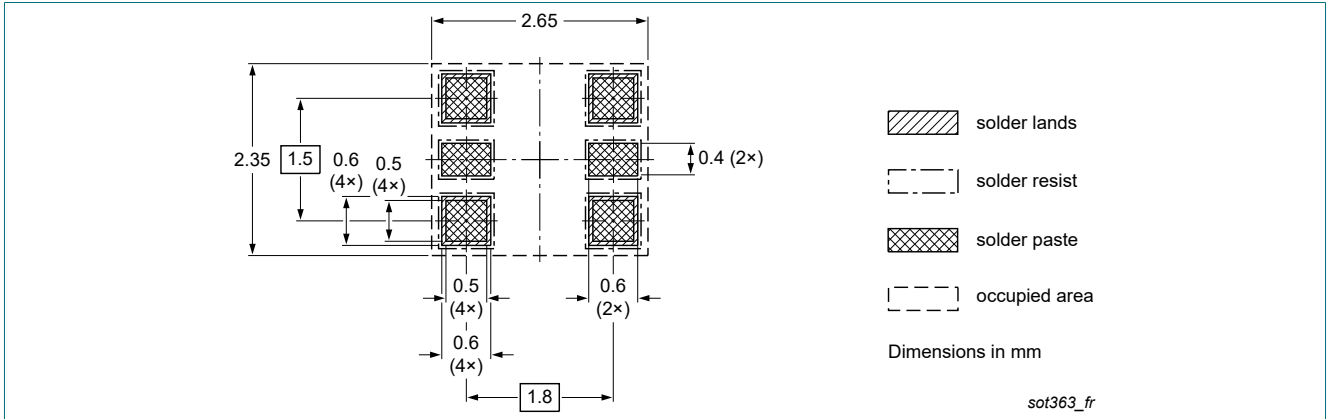


Fig. 11. Reflow soldering footprint for TSSOP6 (SOT363)

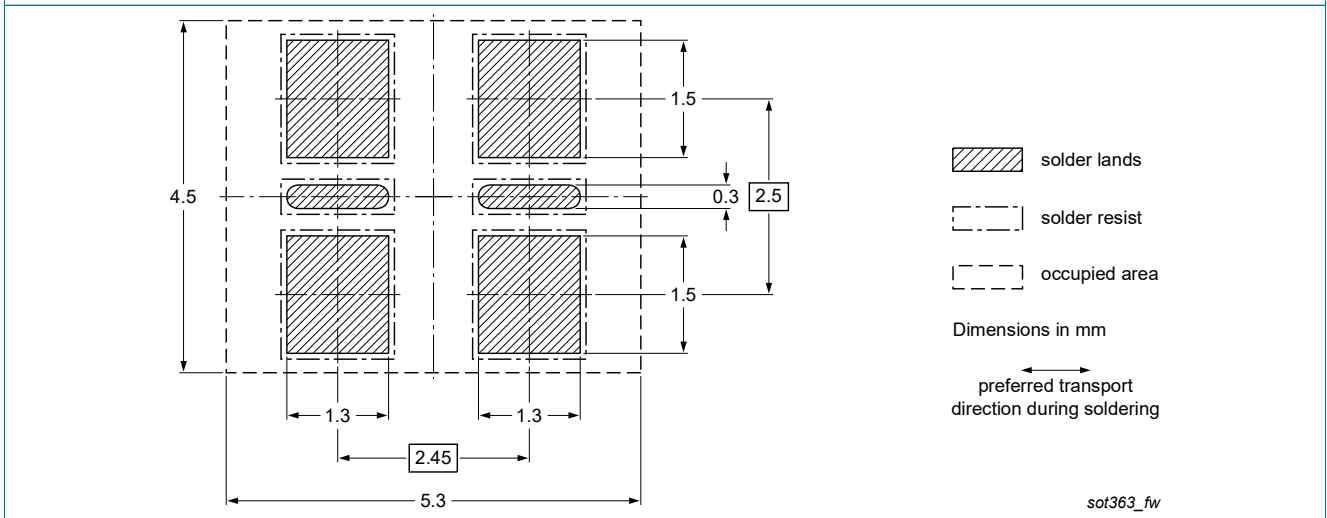


Fig. 12. Wave soldering footprint for TSSOP6 (SOT363)

50 V, 100 mA NPN/NPN resistor-equipped double transistor; R1 = 47 k Ω , R2 = 47 k Ω

14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PUMH2-Q v.1	20211008	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".
- [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 <https://www.nexperia.com>.

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