



PIMP32PAS-Q

50 V, 500 mA PNP/PNP Resistor-Equipped double Transistor;
R1 = 2.2 k Ω , R2 = 10 k Ω

1 September 2023

Product data sheet

1. General description

PNP/PNP Resistor-Equipped double Transistor (RET) in a medium power SOT1118D (DFN2020D-6) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks (SWF).

NPN/NPN complement: PIMN32PAS-Q

NPN/PNP complement: PIMC32PAS-Q

2. Features and benefits

- 500 mA output current capability
- Built-in resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Digital applications
- Cost-saving alternative to BC807 series in digital applications
- Control of IC inputs
- Switching loads

4. Quick reference data

Table 1. Quick reference data

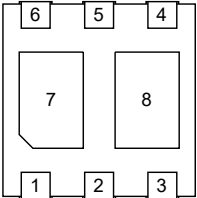
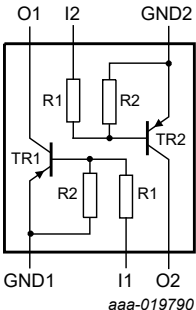
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
V _{CEO}	collector-emitter voltage	open base		-	-	-50	V
I _O	output current			-	-	-500	mA
R1	bias resistor 1 (input)	T _{amb} = 25 °C	[1]	1.54	2.2	2.86	k Ω
R2/R1	bias resistor ratio		[1]	4.1	4.55	5	

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

50 V, 500 mA PNP/PNP Resistor-Equipped double Transistor; R1 = 2.2 kΩ, R2 = 10 kΩ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	GND1	GND (emitter) TR1	 Transparent top view DFN2020D-6 (SOT1118D)	 aaa-019790
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		
7	O1	output (collector) TR1		
8	O2	output (collector) TR2		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PIMP32PAS-Q	DFN2020D-6	plastic, leadless thermally enhanced ultra thin and small outline package with side-wettable flanks (SWF); 6 terminals; 0.65 mm pitch; 2 mm x 2 mm x 0.65 mm body	SOT1118D

7. Marking

Table 4. Marking codes

Type number	Marking code
PIMP32PAS-Q	8H

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						
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			-12	5	V
I _O	output current			-	-500	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	360	mW
			[2]	-	550	mW
			[3]	-	510	mW
			[4]	-	730	mW
Per device						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	500	mW
			[2]	-	750	mW
			[3]	-	700	mW
			[4]	-	1	W
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, 35 μm copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided, 35μm copper, tin-plated; mounting pad for collector 1 cm².
- [3] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
- [4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated; mounting pad for collector 1 cm².

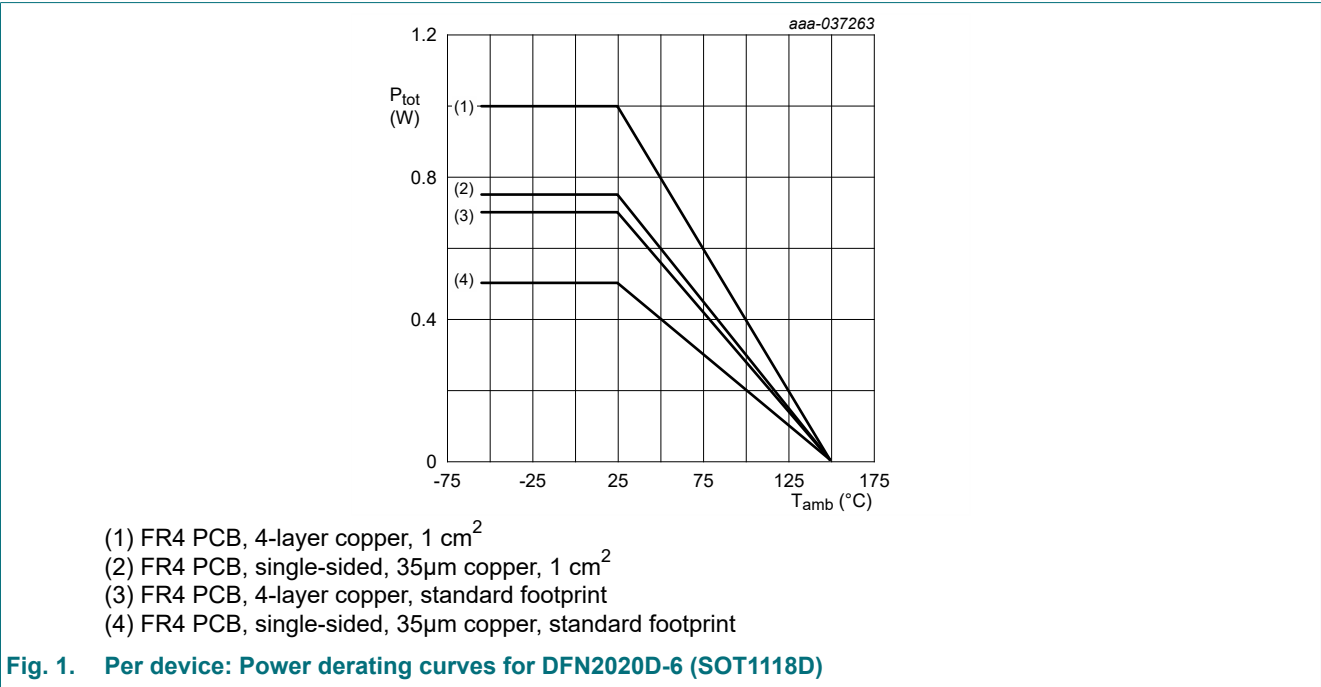


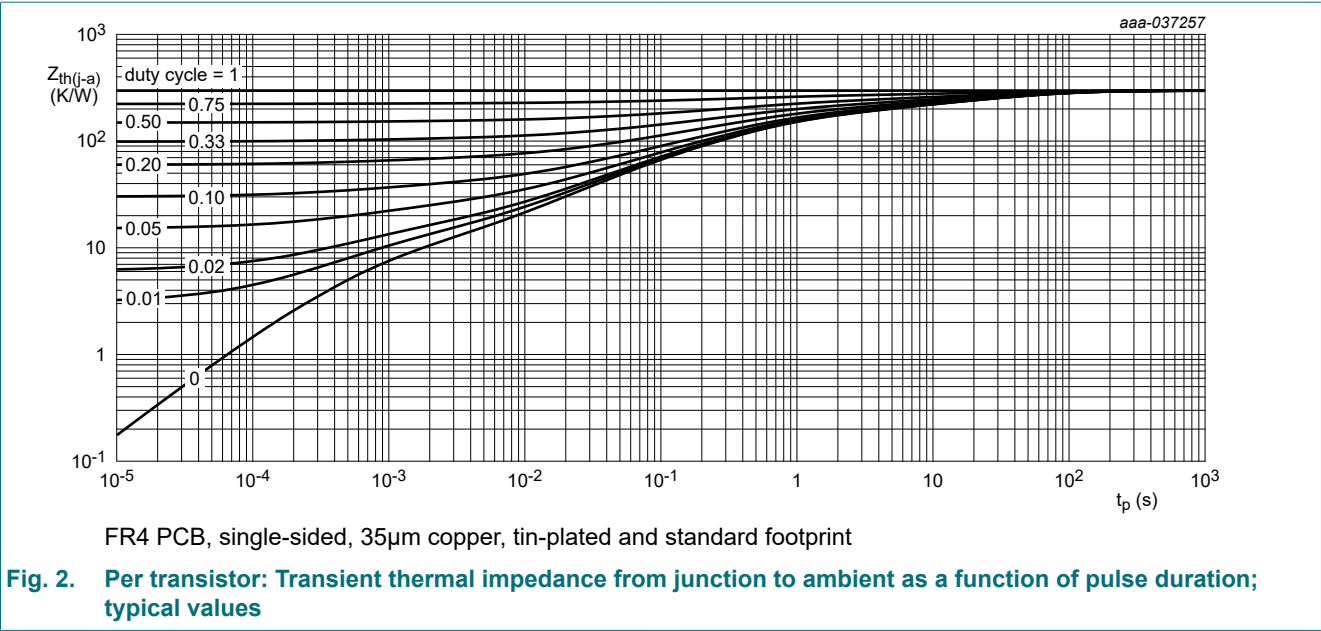
Fig. 1. Per device: Power derating curves for DFN2020D-6 (SOT1118D)

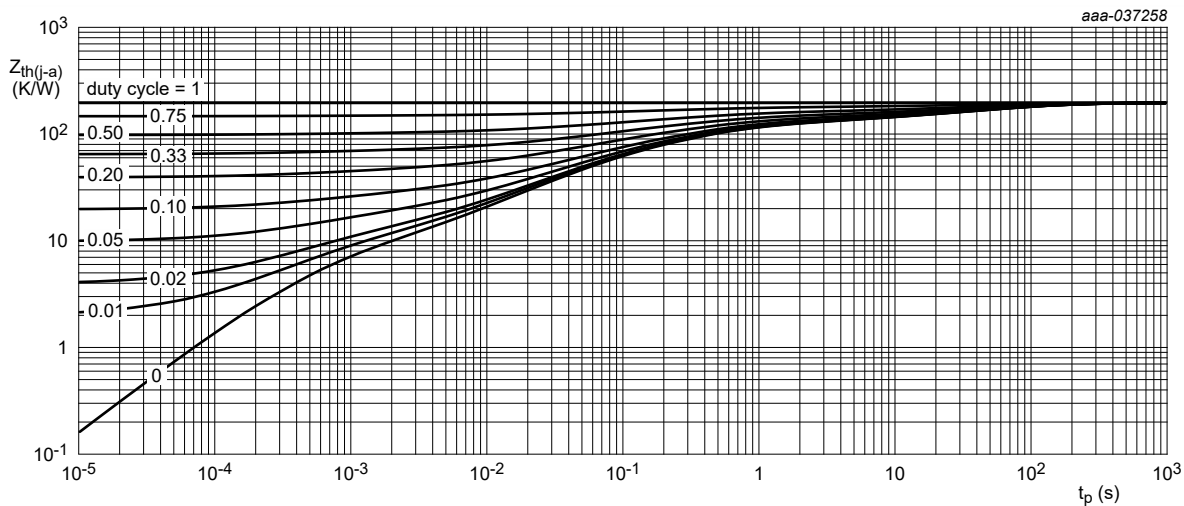
9. Thermal characteristics

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]	-	-	348	K/W
			[2]	-	-	228	K/W
			[3]	-	-	246	K/W
			[4]	-	-	172	K/W
Per device							
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	250	K/W
			[2]	-	-	167	K/W
			[3]	-	-	179	K/W
			[4]	-	-	125	K/W

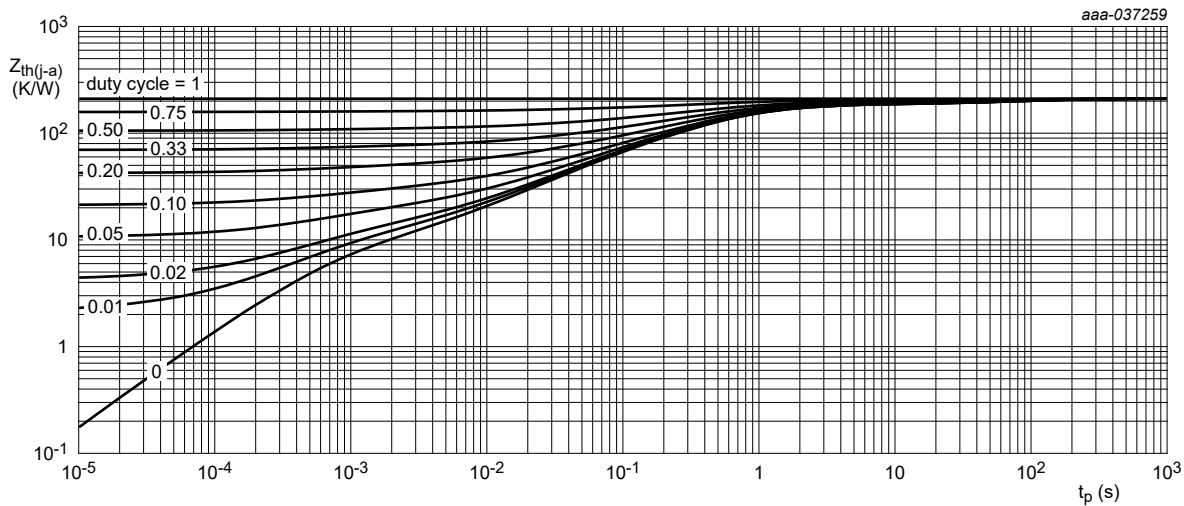
- [1] Device mounted on an FR4 PCB, single-sided, 35 μm copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided, 35μm copper, tin-plated; mounting pad for collector 1 cm².
- [3] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
- [4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated; mounting pad for collector 1 cm².





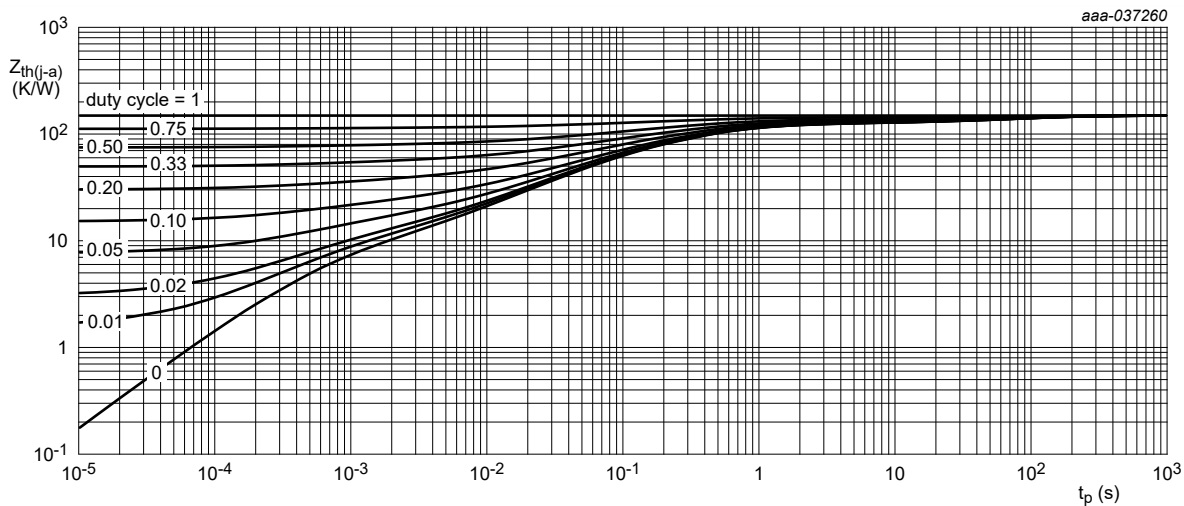
FR4 PCB, single-sided, 35µm copper, tin-plated, mounting pad for collector 1 cm².

Fig. 3. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, tin-plated and standard footprint.

Fig. 4. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, tin-plated, mounting pad for collector 1 cm².

Fig. 5. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100\ \mu\text{A}$; $I_E = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10\ \text{mA}$; $I_B = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-50	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = -50\ \text{V}$; $I_E = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	-	-100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = -50\ \text{V}$; $I_B = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	-	-0.5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\ \text{V}$; $I_C = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	-	-0.65	mA
h_{FE}	DC current gain	$V_{CE} = -5\ \text{V}$; $I_C = -50\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		70	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -50\ \text{mA}$; $I_B = -2.5\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	-	-100	mV
$V_{I(off)}$	off-state input voltage	$V_{CE} = -5\ \text{V}$; $I_C = -100\ \mu\text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-0.4	-0.65	-1	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = -0.3\ \text{V}$; $I_C = -20\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-0.5	-0.95	-1.4	V
R1	bias resistor 1 (input)	$T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	1.54	2.2	2.86	kΩ
R2/R1	bias resistor ratio		[1]	4.1	4.55	5	
C_c	collector capacitance	$V_{CB} = -10\ \text{V}$; $I_E = 0\ \text{A}$; $i_e = 0\ \text{A}$; $f = 1\ \text{MHz}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	7	-	pF
f_T	transition frequency	$V_{CE} = -5\ \text{V}$; $I_C = -50\ \text{mA}$; $f = 100\ \text{MHz}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[2]	-	150	-	MHz

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

[2] Characteristics of built-in transistor.

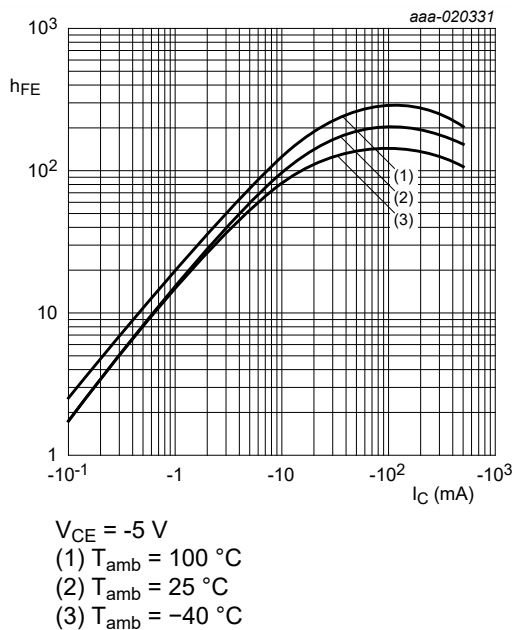


Fig. 6. DC current gain as a function of collector current; typical values

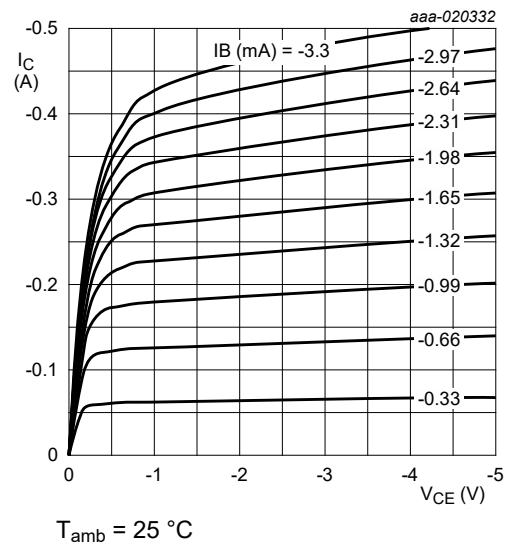


Fig. 7. Collector current as a function of collector-emitter voltage; typical values

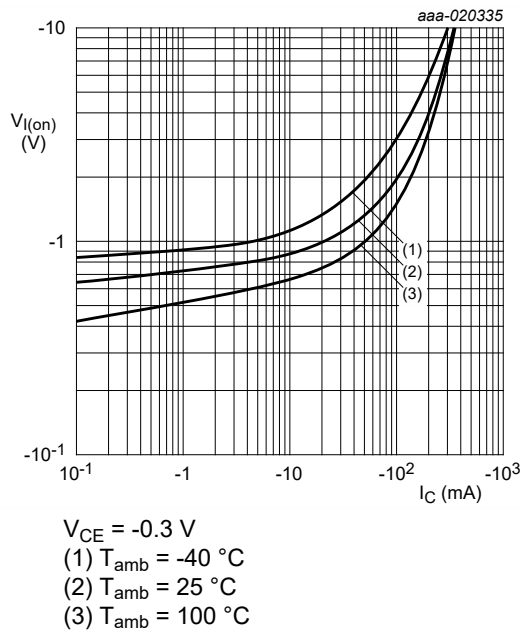


Fig. 8. On-state input voltage as a function of collector current; typical values

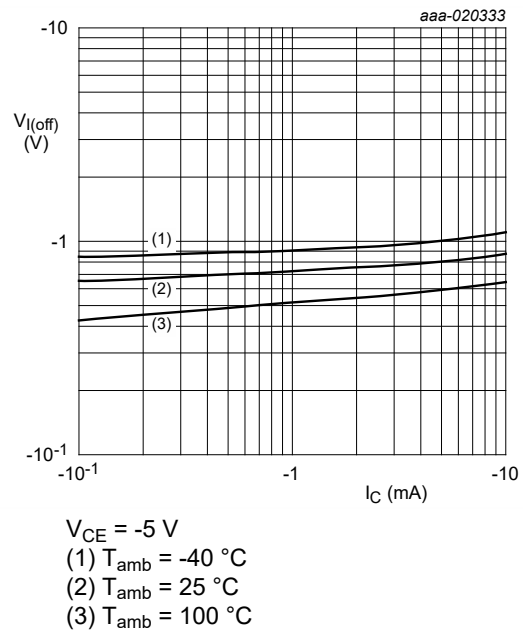


Fig. 9. Off-state input voltage as a function of collector current; typical values

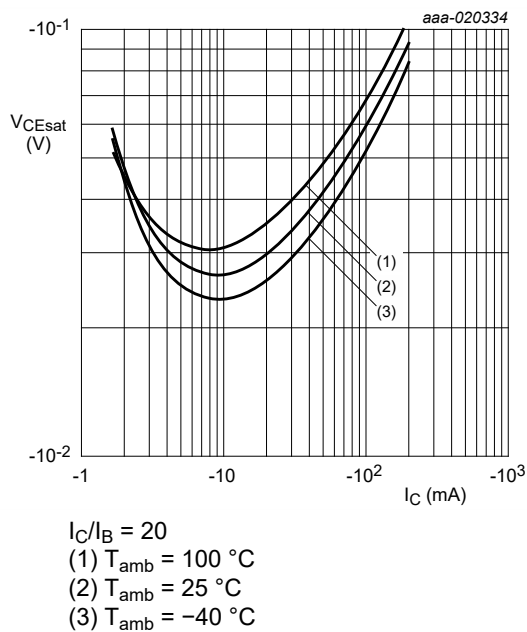


Fig. 10. Collector-emitter saturation voltage as a function of collector current; typical values

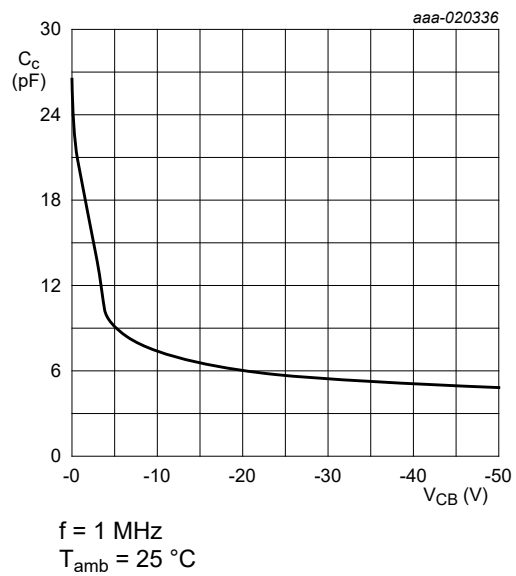
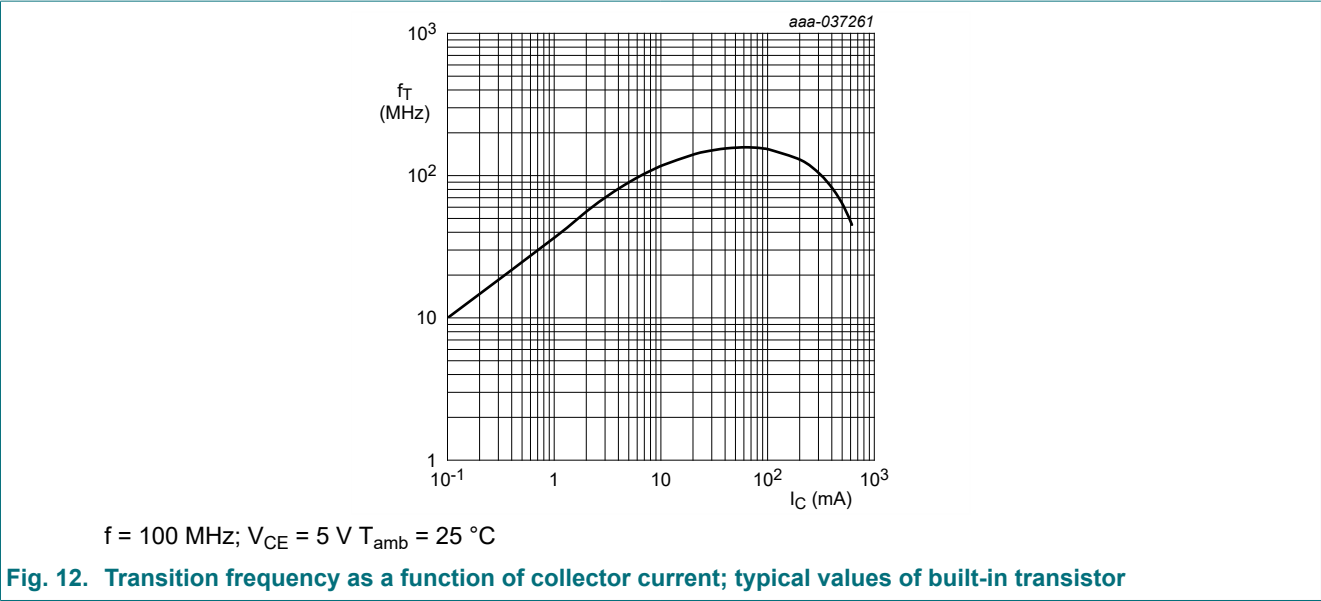


Fig. 11. Collector capacitance as a function of collector-base voltage; typical values

50 V, 500 mA PNP/PNP Resistor-Equipped double Transistor; R1 = 2.2 kΩ, R2 = 10 kΩ



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.

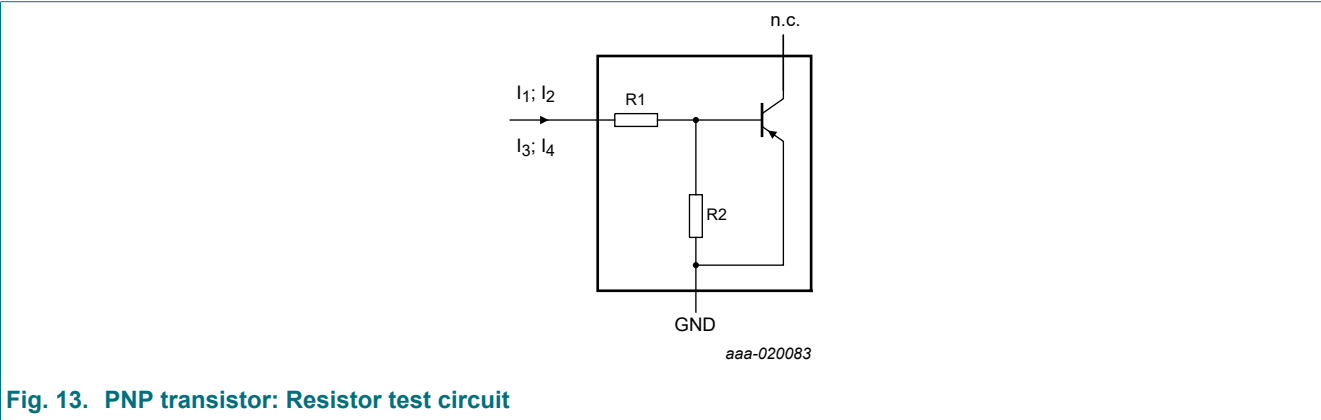
Resistor calculation

- Calculation of bias resistor 1 (R1):

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

- Calculation of bias resistor ratio (R2/R1):

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

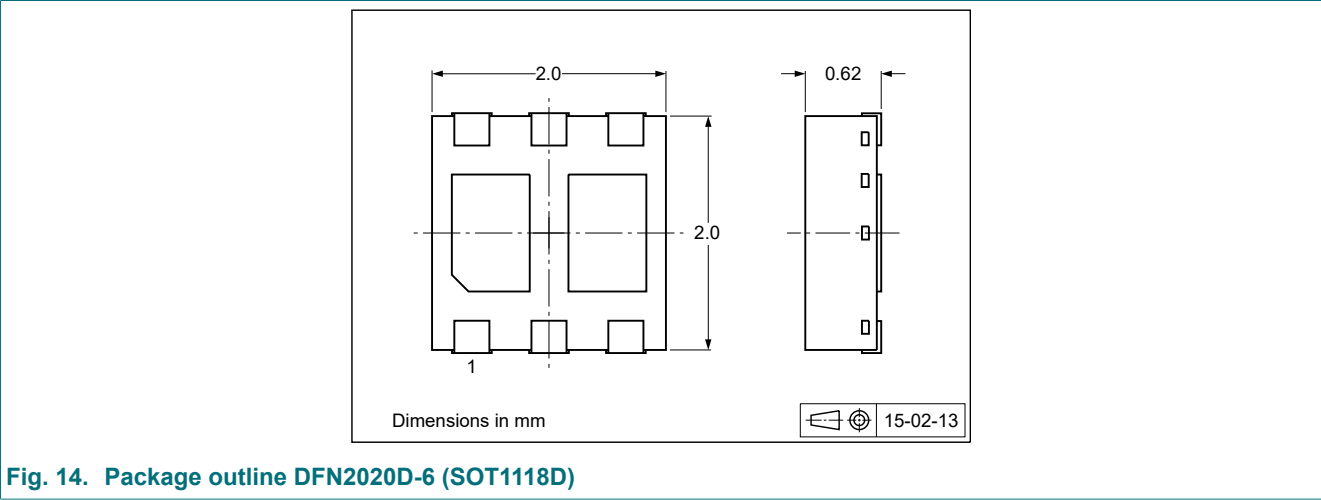


Resistor test conditions

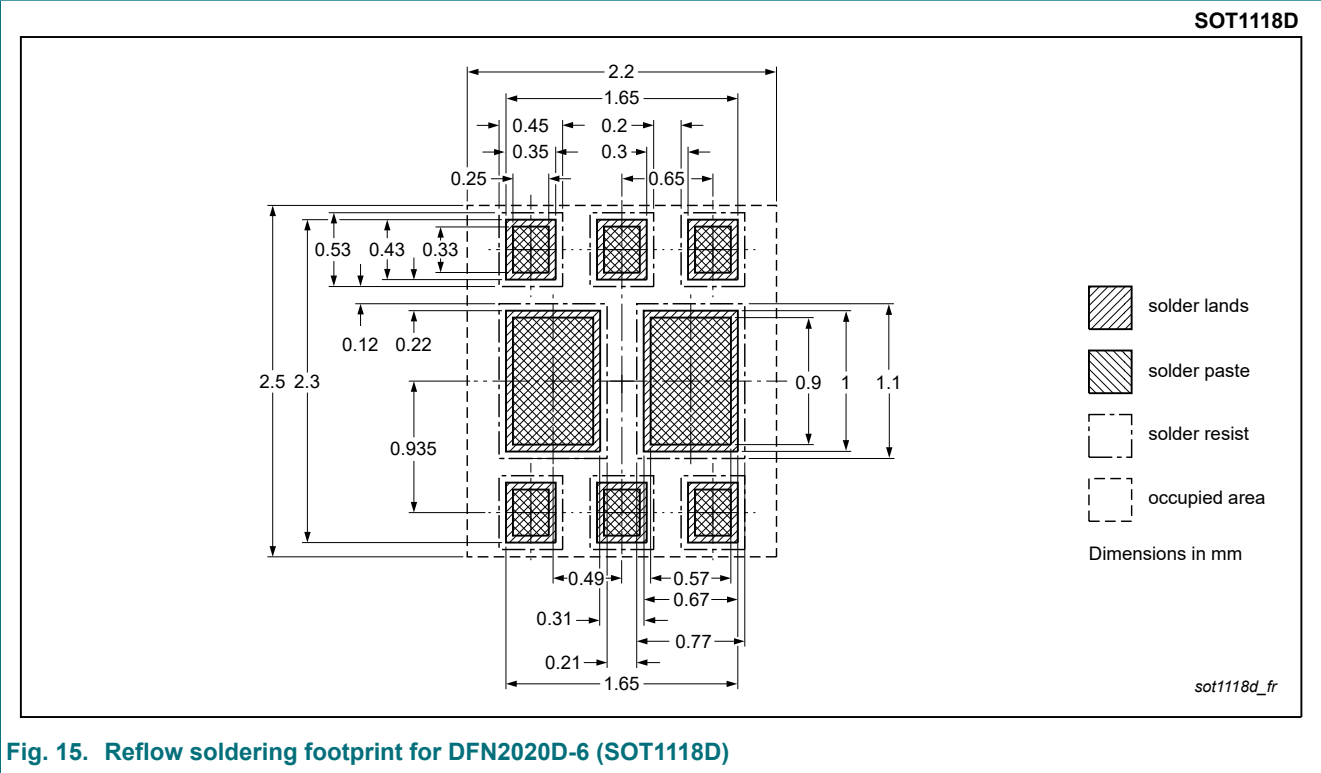
Table 8. Resistor test conditions

PIMP32PAS-Q	R1 (kΩ)	R2 (kΩ)	Test conditions			
			I ₁	I ₂	I ₃	I ₄
TR1/TR2 (PNP)	2.2	10	-0.7 mA	-0.8 mA	0.45 mA	0.55 mA

12. Package outline



13. Soldering



50 V, 500 mA PNP/PNP Resistor-Equipped double Transistor; R1 = 2.2 kΩ, R2 = 10 kΩ

14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PIMP32PAS-Q v.1	20230901	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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