



# PMP5201V

45 V, 100 mA PNP/PNP matched double transistor

28 December 2022

Product data sheet

## 1. General description

PNP/PNP matched double transistor in an ultra small flat lead Surface-Mounted Device (SMD) SOT666 plastic package. The transistors in the SOT666 package are fully isolated internally.

PNP/PNP  $h_{FE1}/h_{FE2}$  0.95 complement: PMP5501V

NPN/NPN complement: PMP4201V

## 2. Features and benefits

- Current gain matching
- Base-emitter voltage matching
- Application-optimized pinout

## 3. Applications

- Current mirror
- Differential amplifier

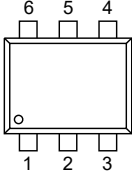
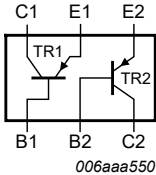
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor</b>						
$V_{CEO}$	collector-emitter voltage	open base	-	-	-45	V
$I_C$	collector current		-	-	-100	mA
$h_{FE}$	DC current gain	$V_{CE} = -5 \text{ V}; I_C = -2 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$	200	290	450	
<b>Per device</b>						
$h_{FE1}/h_{FE2}$	DC current gain matching	$V_{CE} = -5 \text{ V}; I_C = -2 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$	0.98	1	1.02	
$V_{BE1}-V_{BE2}$	base-emitter voltage matching		-2	-	2	mV

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B1	base TR1	 SOT666	 006aaa550
2	B2	base TR2		
3	C2	collector TR2		
4	E2	emitter TR2		
5	E1	emitter TR1		
6	C1	collector TR1		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">PMP5201V</a>	SOT666	plastic, surface-mounted package; 6 leads; 0.5 mm pitch; 1.6 mm x 1.2 mm x 0.55 mm body	<a href="#">SOT666</a>

7. Marking

Table 4. Marking codes

Type number	Marking code
PMP5201V	EC

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 <sub>CBO</sub>	collector-base voltage	open emitter		-	-50	V
V <sub>CEO</sub>	collector-emitter voltage	open base		-	-45	V
V <sub>EBO</sub>	emitter-base voltage	open collector		-	-5	V
I <sub>C</sub>	collector current			-	-100	mA
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms		-	-200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	<a href="#">[1]</a> <a href="#">[2]</a>	-	200	mW
Per device						
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	<a href="#">[1]</a> <a href="#">[2]</a>	-	300	mW
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-65	150	°C
T <sub>stg</sub>	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.

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per transistor</b>							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	625	K/W
<b>Per device</b>							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	416	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.

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = -30 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C		-	-	-15	nA
		V <sub>CB</sub> = -30 V; I <sub>E</sub> = 0 A; T <sub>J</sub> = 150 °C		-	-	-5	μA
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = -5 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C		-	-	-100	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -10 μA; T <sub>amb</sub> = 25 °C		-	250	-	
		V <sub>CE</sub> = -5 V; I <sub>C</sub> = -2 mA; T <sub>amb</sub> = 25 °C		200	290	450	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = -10 mA; I <sub>B</sub> = -0.5 mA; T <sub>amb</sub> = 25 °C		-	-50	-200	mV
		I <sub>C</sub> = -100 mA; I <sub>B</sub> = -5 mA; T <sub>amb</sub> = 25 °C		-	-200	-400	mV
V <sub>BEsat</sub>	base-emitter saturation voltage	I <sub>C</sub> = -10 mA; I <sub>B</sub> = -0.5 mA; T <sub>amb</sub> = 25 °C	[1]	-	-760	-	mV
		I <sub>C</sub> = -100 mA; I <sub>B</sub> = -5 mA; T <sub>amb</sub> = 25 °C	[1]	-	-920	-	mV
V <sub>BE</sub>	base-emitter voltage	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -2 mA; T <sub>amb</sub> = 25 °C	[2]	-600	-650	-700	mV
		V <sub>CE</sub> = -5 V; I <sub>C</sub> = -10 mA	[2]	-	-	-760	mV
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = -10 V; I <sub>E</sub> = 0 A; i <sub>e</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C		-	-	2.2	pF
C <sub>e</sub>	emitter capacitance	V <sub>EB</sub> = -0.5 V; I <sub>C</sub> = 0 A; i <sub>c</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C		-	10	-	pF
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -10 mA; f = 100 MHz; T <sub>amb</sub> = 25 °C		100	175	-	MHz
NF	noise figure	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -0.2 mA; R <sub>S</sub> = 2 kΩ; f = 10 Hz to 15.7 kHz; T <sub>amb</sub> = 25 °C		-	1.6	-	dB
		V <sub>CE</sub> = -5 V; I <sub>C</sub> = -0.2 mA; R <sub>S</sub> = 2 kΩ; f = 1 kHz; B = 200 Hz		-	3.1	-	dB
Per device							
h <sub>FE1</sub> /h <sub>FE2</sub>	DC current gain matching	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -2 mA; T <sub>amb</sub> = 25 °C		0.98	1	1.02	
V <sub>BE1</sub> -V <sub>BE2</sub>	base-emitter voltage matching			-2	-	2	mV

[1]  $V_{BEsat}$  decreases by about 1.7 mV/K with increasing temperature.

[2]  $V_{BE}$  decreases by about 2 mV/K with increasing temperature.

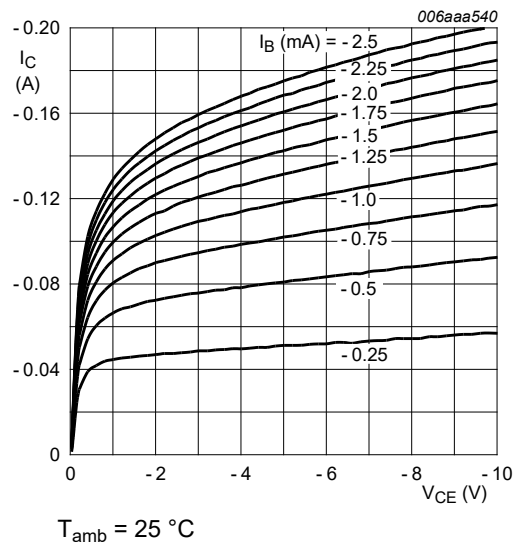


Fig. 1. Per transistor: Collector current as a function of collector-emitter voltage; typical values

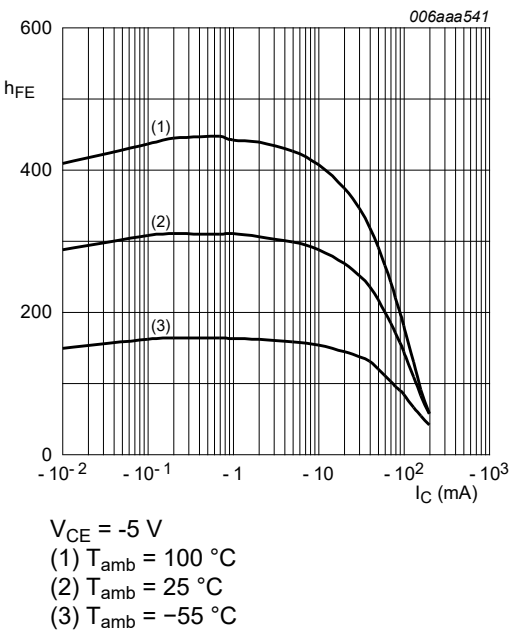


Fig. 2. Per transistor: DC current gain as a function of collector current; typical values

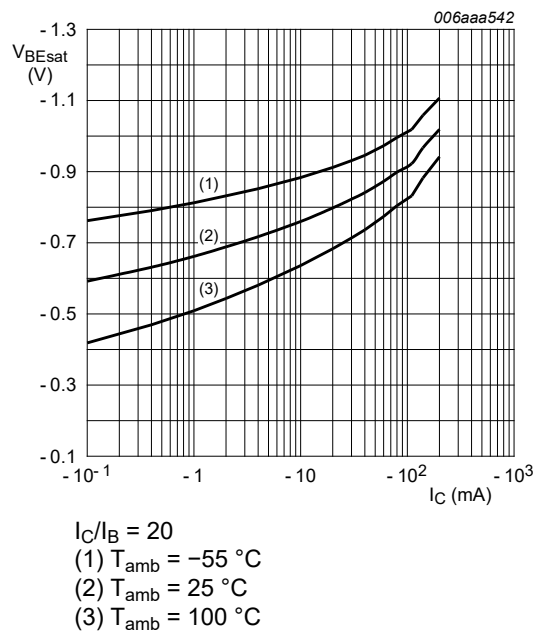


Fig. 3. Per transistor: Base-emitter saturation voltage as a function of collector current; typical values

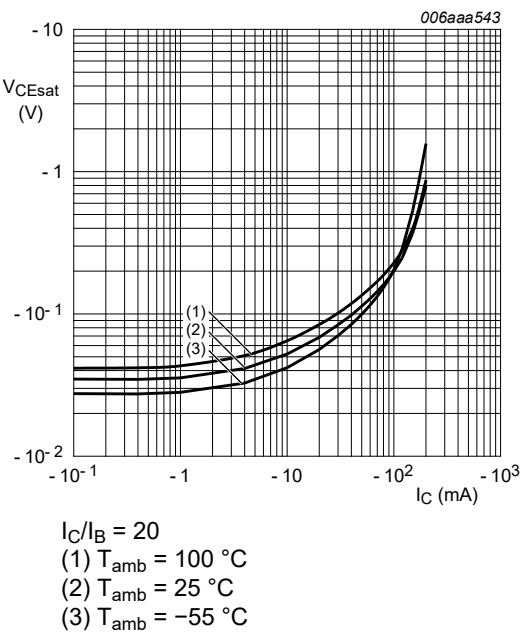


Fig. 4. Per transistor: Collector-emitter saturation voltage as a function of collector current; typical values

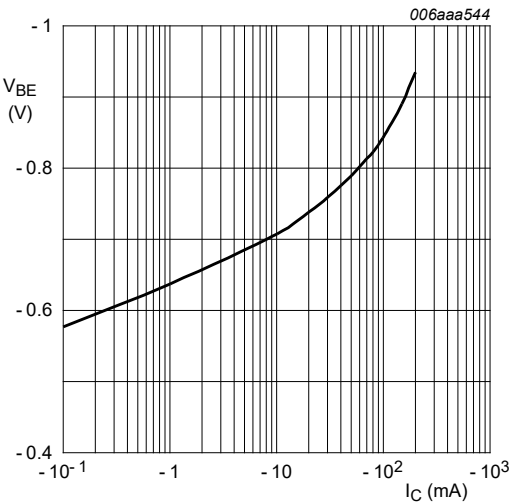


Fig. 5. Per transistor: Base-emitter voltage as a function of collector current; typical values

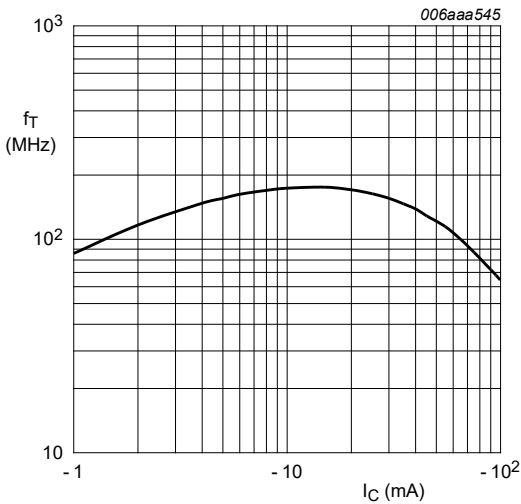


Fig. 6. Per transistor: Transition frequency as a function of collector current; typical values

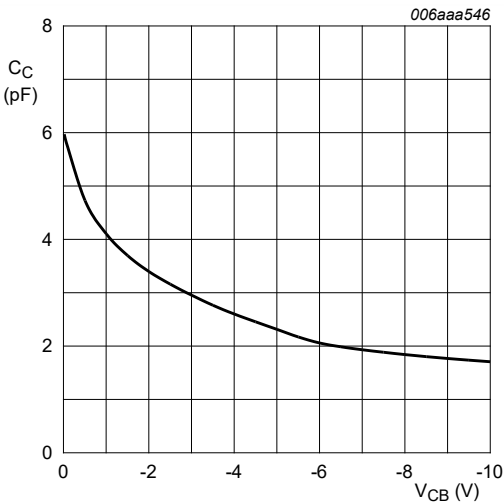


Fig. 7. Per transistor: Collector capacitance as a function of collector-base voltage; typical values

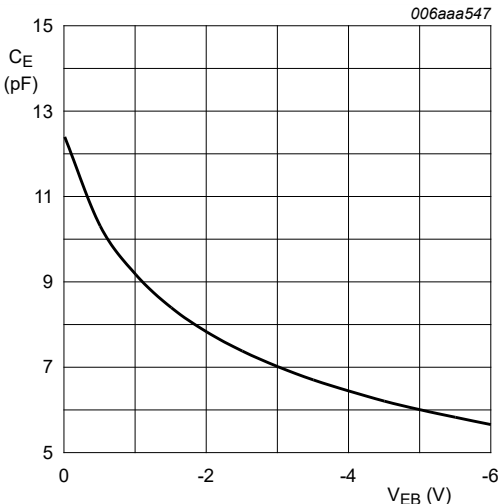


Fig. 8. Per transistor: Emitter capacitance as a function of emitter-base voltage; typical values

11. Application information

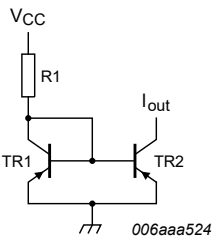


Fig. 9. Current mirror

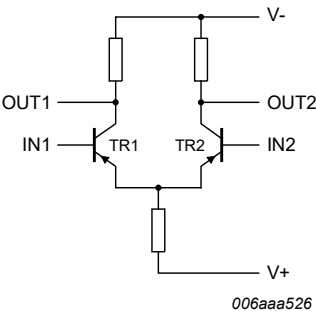
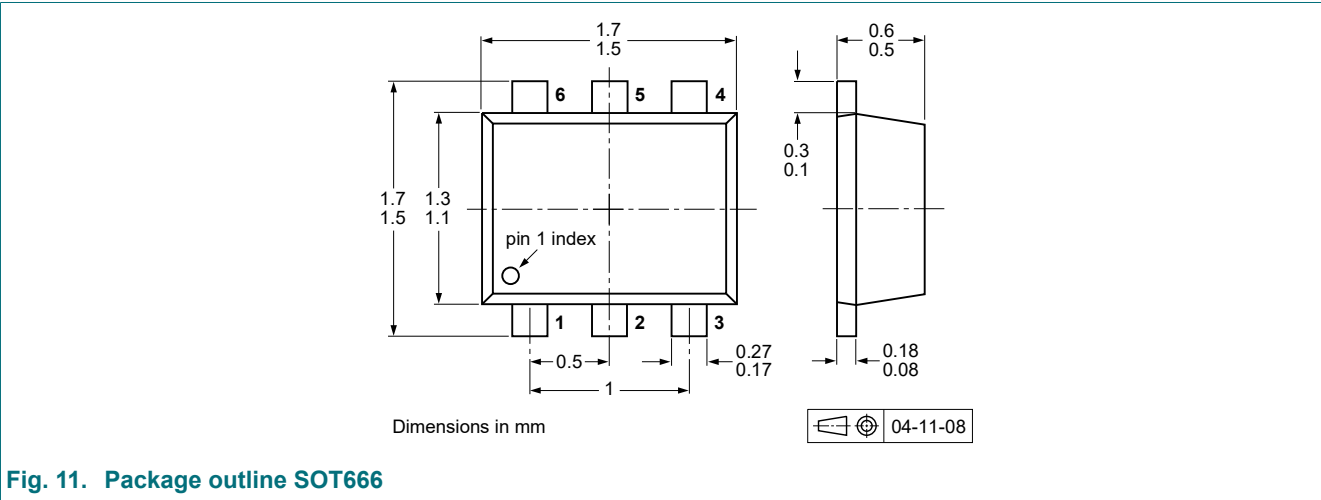
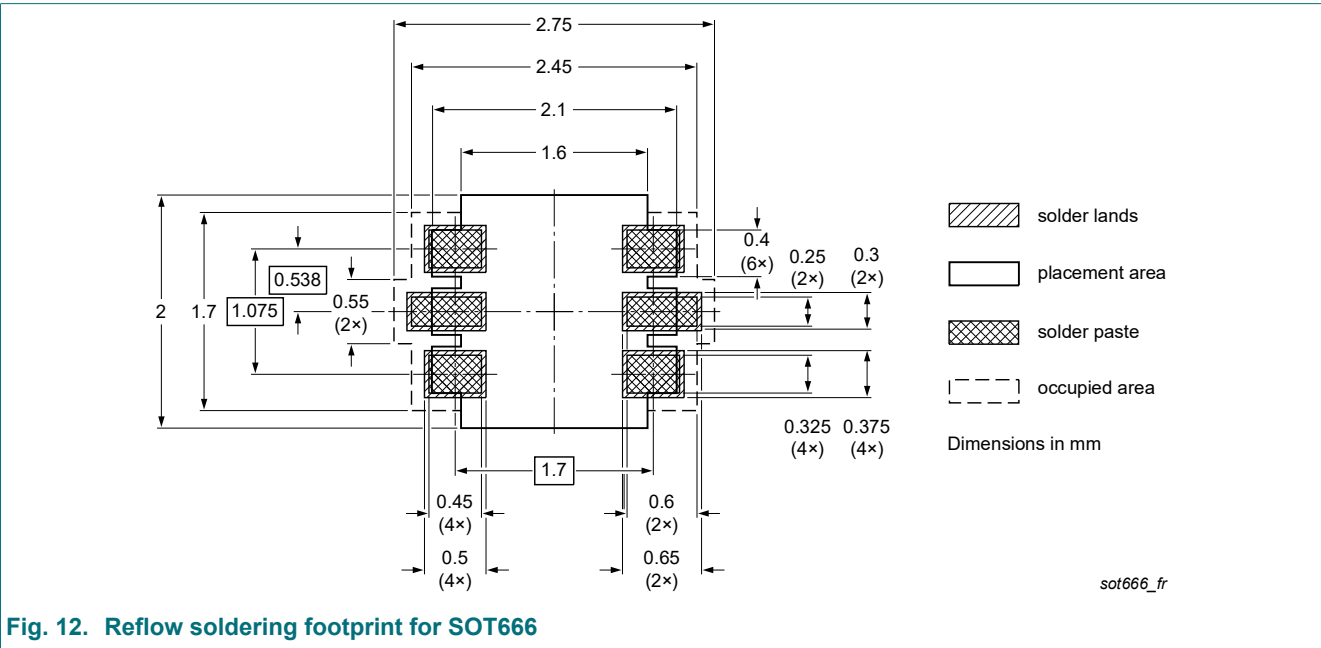


Fig. 10. Differential amplifier

12. Package outline



13. Soldering



## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMP5201V v.4	20221228	Product data sheet	-	PMP5201V_G_Y_3
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Family data sheet splitted to single type data sheets.</li><li>• Packing information removed.</li><li>• Product(s) changed to non-automotive qualification.</li></ul>			
PMP5201V_G_Y_3	20090828	Product data sheet	-	PMP5201V_G_Y_2
PMP5201V_G_Y_2	20060214	Product data sheet	-	PMP5201G_Y_1
PMP5201G_Y_1	20060214	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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## Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	2
9. Thermal characteristics.....	3
10. Characteristics.....	3
11. Application information.....	5
12. Package outline.....	6
13. Soldering.....	6
14. Revision history.....	7
15. Legal information.....	8

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