PMP5501Y

45 V, 100 mA PNP/PNP matched double transistor

28 December 2022 Product data sheet

1. General description

PNP/PNP matched double transistor in a very small SOT363 (SC-88) Surface-Mounted Device (SMD) plastic package.

PNP/PNP hFE1/hFE2 0.98 complement: PMP5201Y

NPN/NPN complement: PMP4501Y

2. Features and benefits

- Current gain matching
- Base-emitter voltage matching
- Application-optimized pinout
- AEC-Q101 qualified

3. Applications

- Current mirror
- Differential amplifier

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		-	-	-45	V
I_C	collector current			-	-	-100	mA
h_{FE}	DC current gain	V_{CE} = -5 V; I_C = -2 mA; T_{amb} = 25 °C		200	290	450	
Per device							
h_{FE1}/h_{FE2}	DC current gain matching	V_{CE} = -5 V; I_C = -2 mA; T_{amb} = 25 °C		0.95	1	-	
$V_{BE1}-V_{BE2}$	base-emitter voltage matching			-	-	2	mV

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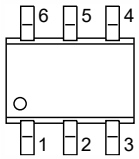
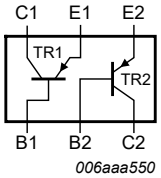
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B1	base TR1	 TSSOP6 (SOT363)	 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
PMP5501Y	TSSOP6	plastic, surface-mounted package; 6 leads; 0.65 mm pitch; 2.1 mm x 1.25 mm x 0.95 mm body	SOT363

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMP5501Y	S6%

[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						
V_{CBO}	collector-base voltage	open emitter		-	-50	V
V_{CEO}	collector-emitter voltage	open base		-	-45	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current			-	-100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1] [2]	-	200	mW
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1] [2]	-	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.
[2] Reflow soldering is the only recommended soldering method.

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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] [2]	-	-	625	K/W
Per device							
$R_{th(j-a)}$	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_{CBO}	collector-base cut-off current	V_{CB} = -30 V; I_E = 0 A; T_{amb} = 25 °C		-	-	-15	nA
		V_{CB} = -30 V; I_E = 0 A; T_j = 150 °C		-	-	-5	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = -5 V; I_C = 0 A; T_{amb} = 25 °C		-	-	-100	nA
h_{FE}	DC current gain	V_{CE} = -5 V; I_C = -10 µA; T_{amb} = 25 °C		-	250	-	
		V_{CE} = -5 V; I_C = -2 mA; T_{amb} = 25 °C		200	290	450	
V_{CEsat}	collector-emitter saturation voltage	I_C = -10 mA; I_B = -0.5 mA; T_{amb} = 25 °C		-	-50	-200	mV
		I_C = -100 mA; I_B = -5 mA; T_{amb} = 25 °C		-	-200	-400	mV
V_{BEsat}	base-emitter saturation voltage	I_C = -10 mA; I_B = -0.5 mA; T_{amb} = 25 °C	[1]	-	-760	-	mV
		I_C = -100 mA; I_B = -5 mA; T_{amb} = 25 °C	[1]	-	-920	-	mV
V_{BE}	base-emitter voltage	V_{CE} = -5 V; I_C = -2 mA; T_{amb} = 25 °C	[2]	-600	-650	-700	mV
		V_{CE} = -5 V; I_C = -10 mA	[2]	-	-	-760	mV
C_c	collector capacitance	V_{CB} = -10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	2.2	pF
C_e	emitter capacitance	V_{EB} = -0.5 V; I_C = 0 A; i_c = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	10	-	pF
f_T	transition frequency	V_{CE} = -5 V; I_C = -10 mA; f = 100 MHz; T_{amb} = 25 °C		100	175	-	MHz
NF	noise figure	V_{CE} = -5 V; I_C = -0.2 mA; R_S = 2 kΩ; f = 10 Hz to 15.7 kHz; T_{amb} = 25 °C		-	1.6	-	dB
		V_{CE} = -5 V; I_C = -0.2 mA; R_S = 2 kΩ; f = 1 kHz; B = 200 Hz		-	3.1	-	dB
Per device							
h_{FE1}/h_{FE2}	DC current gain matching	V_{CE} = -5 V; I_C = -2 mA; T_{amb} = 25 °C		0.95	1	-	
$V_{BE1}-V_{BE2}$	base-emitter voltage matching			-	-	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.

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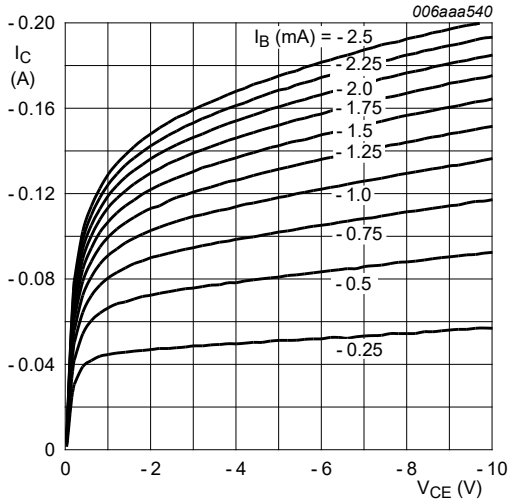
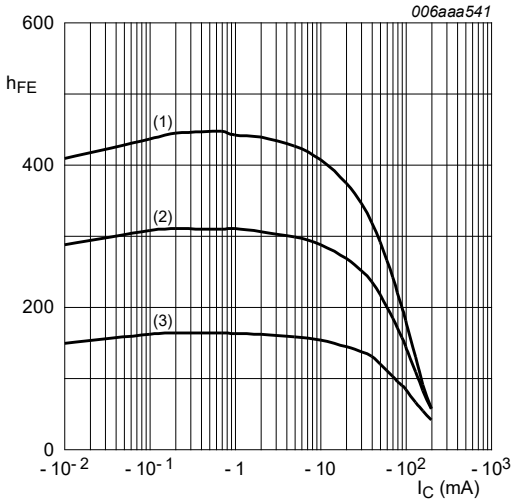


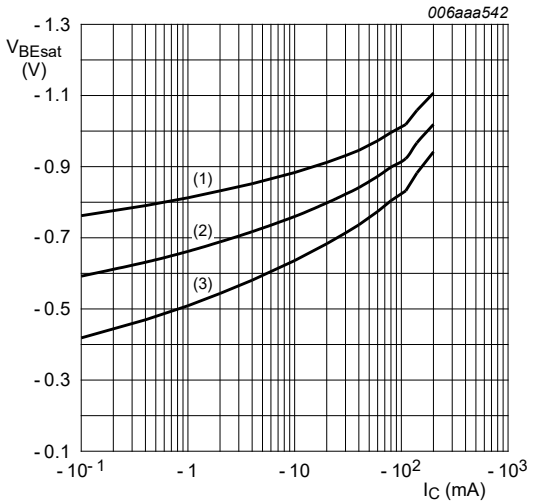
T_{amb} = 25 °C

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



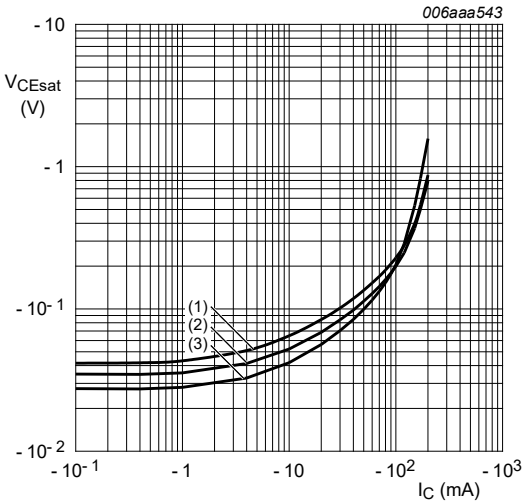
V_{CE} = -5 V
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

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



I_C/I_B = 20
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 100 °C

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



I_C/I_B = 20
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

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

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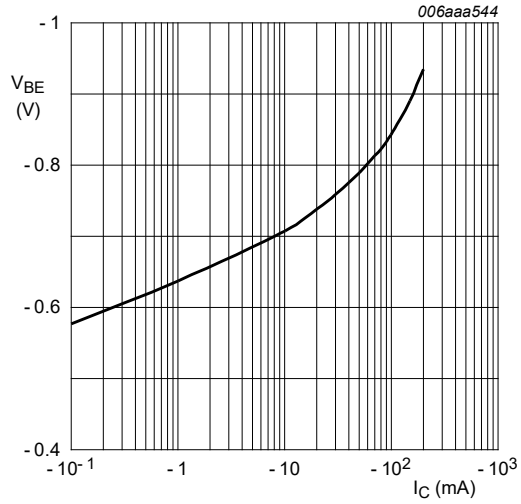
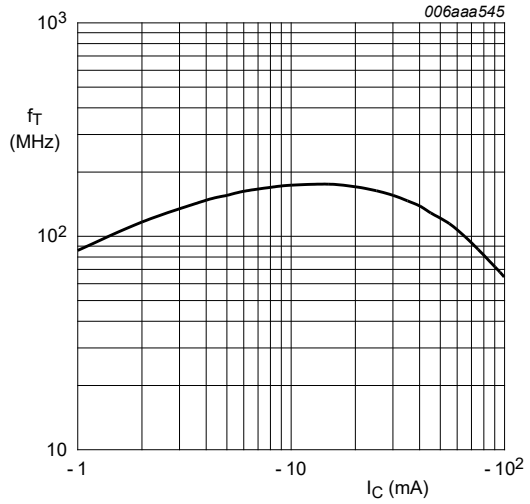


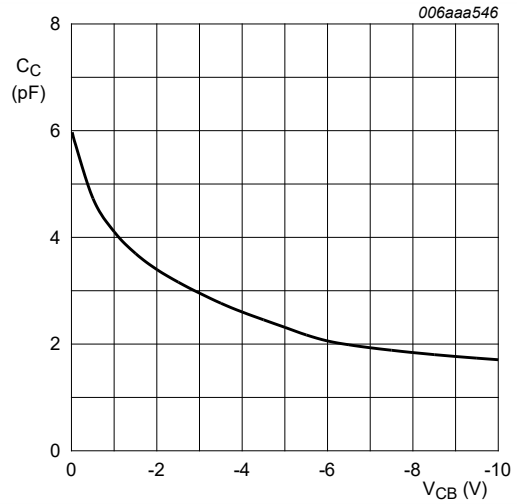
V_{CE} = -5 V; T_{amb} = 25 °C

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



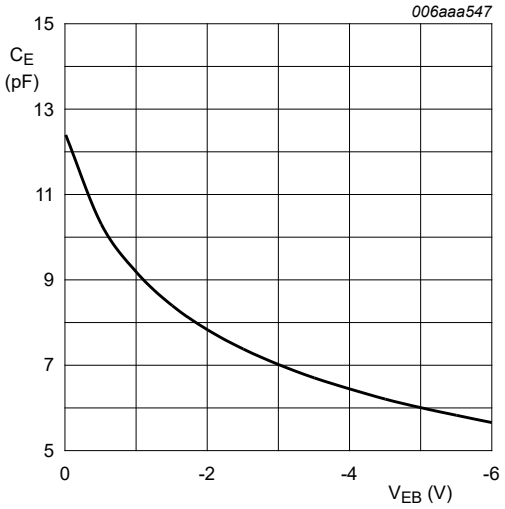
V_{CE} = -5 V; T_{amb} = 25 °C

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



f = 1 MHz; T_{amb} = 25 °C

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



f = 1 MHz; T_{amb} = 25 °C

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

11. Application information

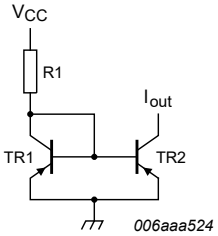


Fig. 9. Current mirror

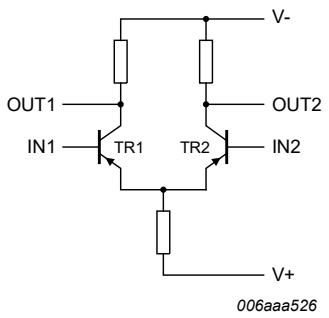


Fig. 10. Differential amplifier

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12. 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.

13. Package outline

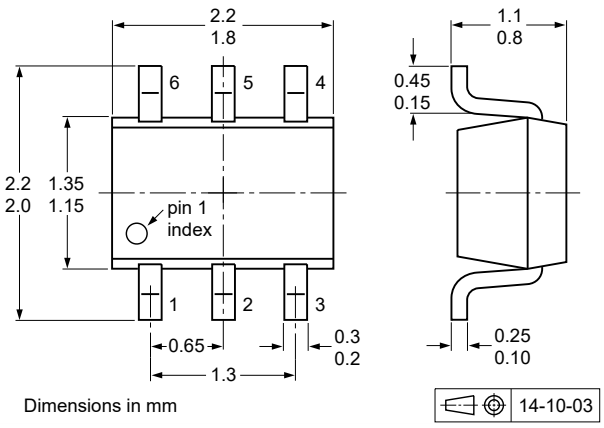

Fig. 11. Package outline TSSOP6 (SOT363)

14. Soldering

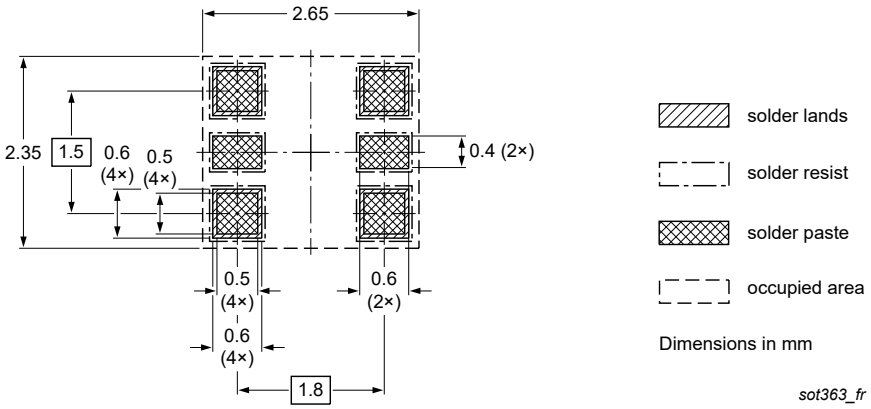

Fig. 12. Reflow soldering footprint for TSSOP6 (SOT363)

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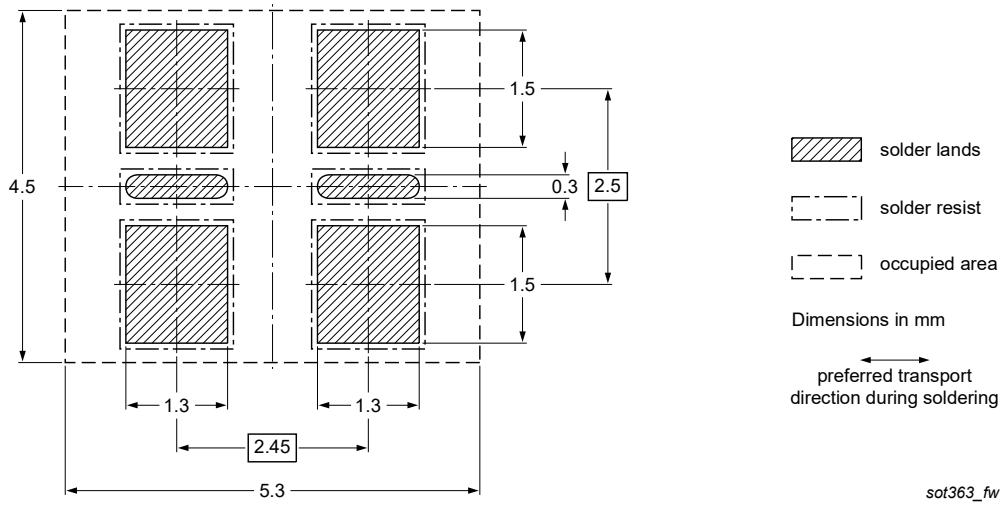

Fig. 13. Wave soldering footprint for TSSOP6 (SOT363)

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15. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMP5501Y v.4	20221228	Product data sheet	-	PMP5501V_G_Y_3
Modifications:	• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • Family data sheet splitted to single type data sheets. • Packing information removed.			
PMP5501V_G_Y_3	20090828	Product data sheet	-	PMP5501V_G_Y_2
PMP5501V_G_Y_2	20060919	Product data sheet	-	PMP5501G_Y_1
PMP5501G_Y_1	20060221	Product data sheet	-	-

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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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