



# PMP3906AYS

40 V, 200 mA PNP/PNP matched double transistor

27 July 2022

Product data sheet

## 1. General description

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

## 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

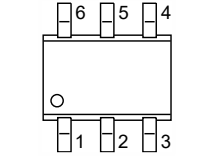
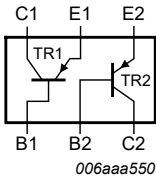
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor</b>						
$V_{CE0}$	collector-emitter voltage	open base	-	-	-40	V
$I_C$	collector current		-	-	-200	mA
$h_{FE}$	DC current gain	$V_{CE} = -1\text{ V}; I_C = -10\text{ mA}; T_{amb} = 25\text{ °C}$	100	180	300	
<b>Per device</b>						
$h_{FE1}/h_{FE2}$	DC current gain matching	$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}; T_{amb} = 25\text{ °C}$	[1]	0.95	1	-
$V_{BE1}-V_{BE2}$	base-emitter voltage matching		[2]	-	-	2 mV

[1] The smaller of the two values is taken as the numerator.

[2] The smaller of the two values is subtracted from the larger value.

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B1	base TR1	 <p>TSSOP6 (SOT363)</p>	 <p>006aaa550</p>
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="#">PMP3906AYS</a>	TSSOP6	plastic, surface-mounted package; 6 leads; 0.65 mm pitch; 2.1 mm x 1.25 mm x 0.95 mm body	<a href="#">SOT363</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
PMP3906AYS	2G%

[1] % = placeholder for manufacturing site code

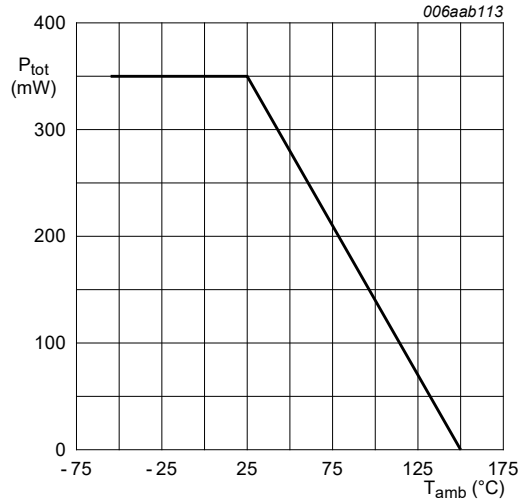
## 8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per transistor</b>					
$V_{CBO}$	collector-base voltage	open emitter	-	-40	V
$V_{CEO}$	collector-emitter voltage	open base	-	-40	V
$V_{EBO}$	emitter-base voltage	open collector	-	-6	V
$I_C$	collector current		-	-200	mA
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	-200	mA
$I_{BM}$	peak base current		-	-100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	230	mW
<b>Per device</b>					
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °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.



FR4 PCB, standard footprint

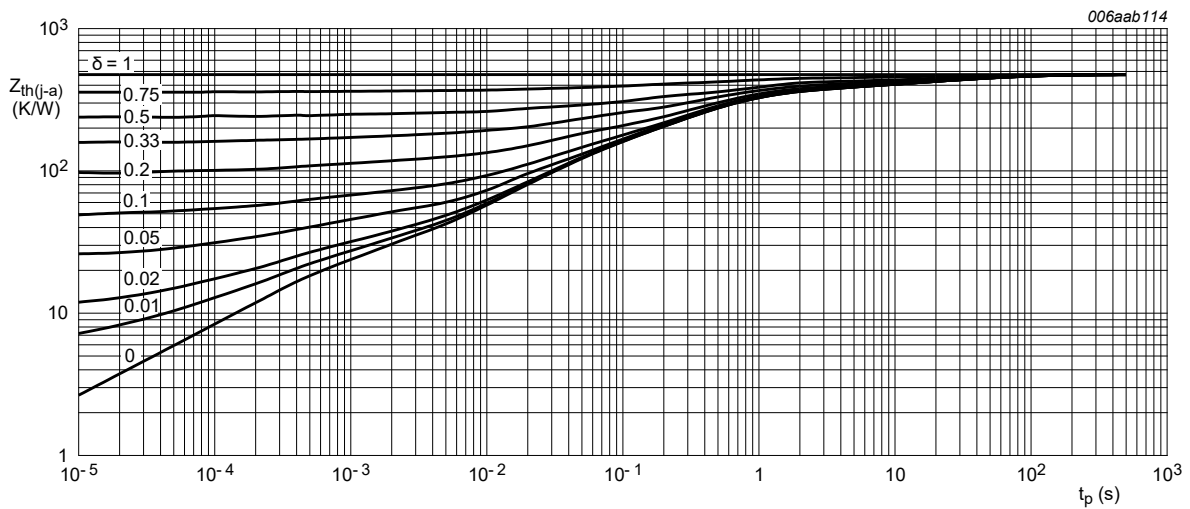
Fig. 1. Per device: Power derating curve

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per transistor</b>							
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	543	K/W
R <sub>th(j-sp)</sub>	thermal resistance from junction to solder point			-	-	290	K/W
<b>Per device</b>							
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	357	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.



FR4 PCB, standard footprint

Fig. 2. 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
<b>Per transistor</b>						
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100 \mu\text{A}$ ; $I_E = 0 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-40	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0 \text{ A}$ ; $I_E = -100 \mu\text{A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-6	-	-	V
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -32 \text{ V}$ ; $I_E = 0 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-50	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -6 \text{ V}$ ; $I_C = 0 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-50	nA
$h_{FE}$	DC current gain	$V_{CE} = -1 \text{ V}$ ; $I_C = -100 \mu\text{A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	60	180	-	
		$V_{CE} = -1 \text{ V}$ ; $I_C = -1 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	80	180	-	
		$V_{CE} = -1 \text{ V}$ ; $I_C = -10 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	100	180	300	
		$V_{CE} = -1 \text{ V}$ ; $I_C = -50 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	60	130	-	
		$V_{CE} = -1 \text{ V}$ ; $I_C = -100 \text{ mA}$ ; pulsed; $t_p \leq 300 \mu\text{s}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	30	50	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -10 \text{ mA}$ ; $I_B = -1 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-250	mV
		$I_C = -50 \text{ mA}$ ; $I_B = -5 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-400	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -10 \text{ mA}$ ; $I_B = -1 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-850	mV
		$I_C = -50 \text{ mA}$ ; $I_B = -5 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-950	mV
$t_d$	delay time	$I_C = -10 \text{ mA}$ ; $I_{B\text{on}} = -1 \text{ mA}$ ; $I_{B\text{off}} = 1 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	35	ns
$t_r$	rise time		-	-	35	ns
$t_{\text{on}}$	turn-on time		-	-	70	ns
$t_s$	storage time		-	-	225	ns
$t_f$	fall time		-	-	75	ns
$t_{\text{off}}$	turn-off time		-	-	300	ns
$C_c$	collector capacitance		$V_{CB} = -5 \text{ V}$ ; $I_E = 0 \text{ A}$ ; $i_e = 0 \text{ A}$ ; $f = 1 \text{ MHz}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	4.5
$C_e$	emitter capacitance	$V_{EB} = -0.5 \text{ V}$ ; $I_C = 0 \text{ A}$ ; $i_c = 0 \text{ A}$ ; $f = 1 \text{ MHz}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	10	pF
$f_T$	transition frequency	$V_{CE} = -20 \text{ V}$ ; $I_C = -10 \text{ mA}$ ; $f = 100 \text{ MHz}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	250	-	-	MHz
NF	noise figure	$V_{CE} = -5 \text{ V}$ ; $I_C = -100 \mu\text{A}$ ; $R_S = 1 \text{ k}\Omega$ ; $f = 1 \text{ kHz}$ ; $B = 10 \text{ to } 15700 \text{ Hz}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	4	dB
<b>Per device</b>						
$h_{FE1}/h_{FE2}$	DC current gain matching	$V_{CE} = -5 \text{ V}$ ; $I_C = -2 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	0.95	1	-
$V_{BE1}-V_{BE2}$	base-emitter voltage matching		[2]	-	-	2

[1] The smaller of the two values is taken as the numerator.

[2] The smaller of the two values is subtracted from the larger value.

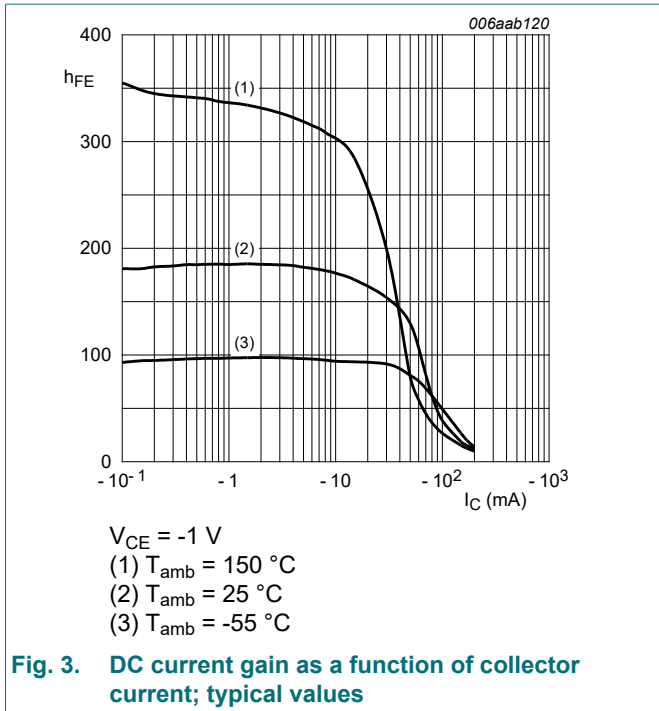


Fig. 3. DC current gain as a function of collector current; typical values

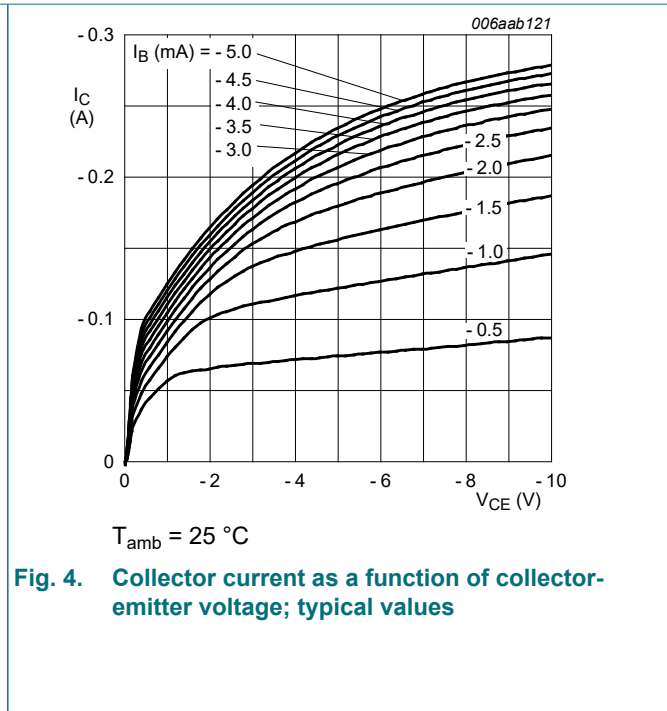


Fig. 4. Collector current as a function of collector-emitter voltage; typical values

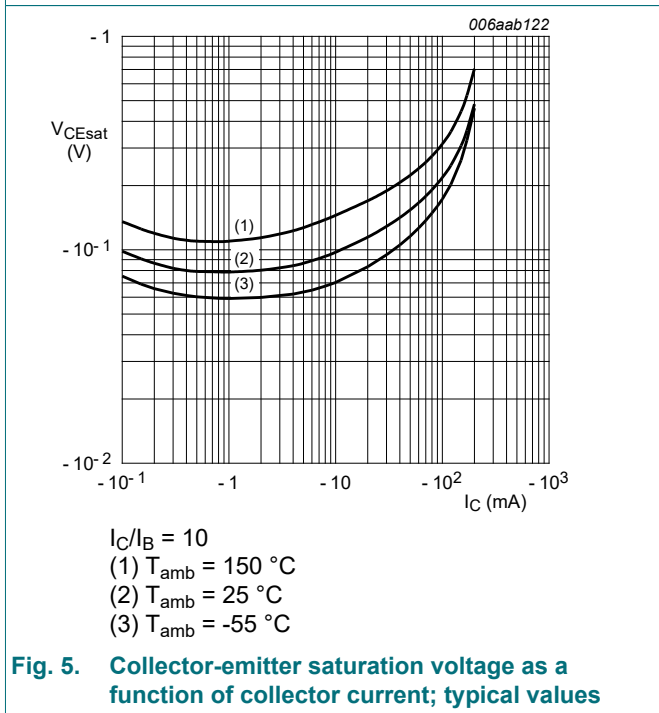


Fig. 5. Collector-emitter saturation voltage as a function of collector current; typical values

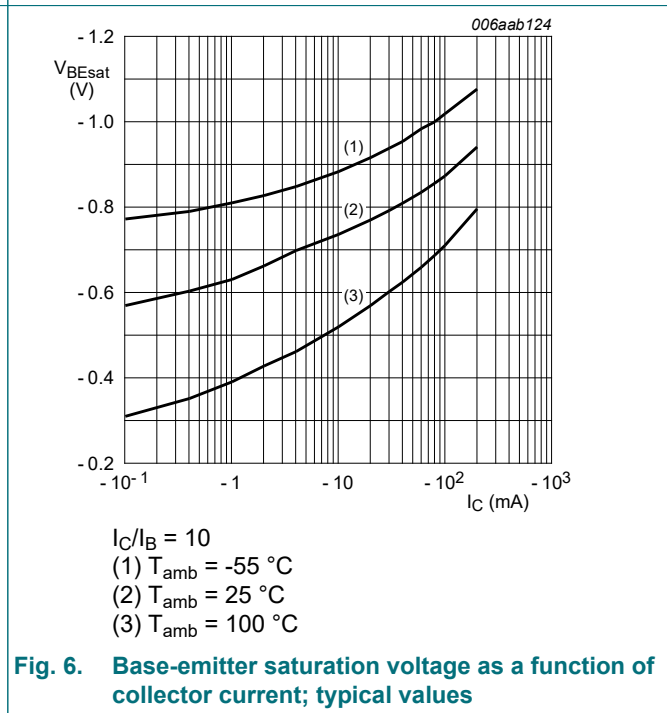
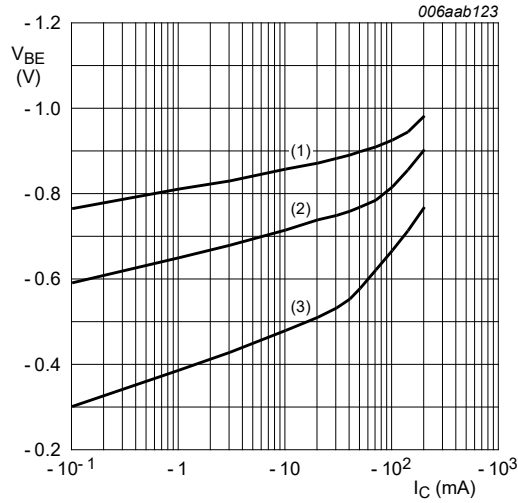


Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values



$V_{CE} = -1\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

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

### 11. Test information

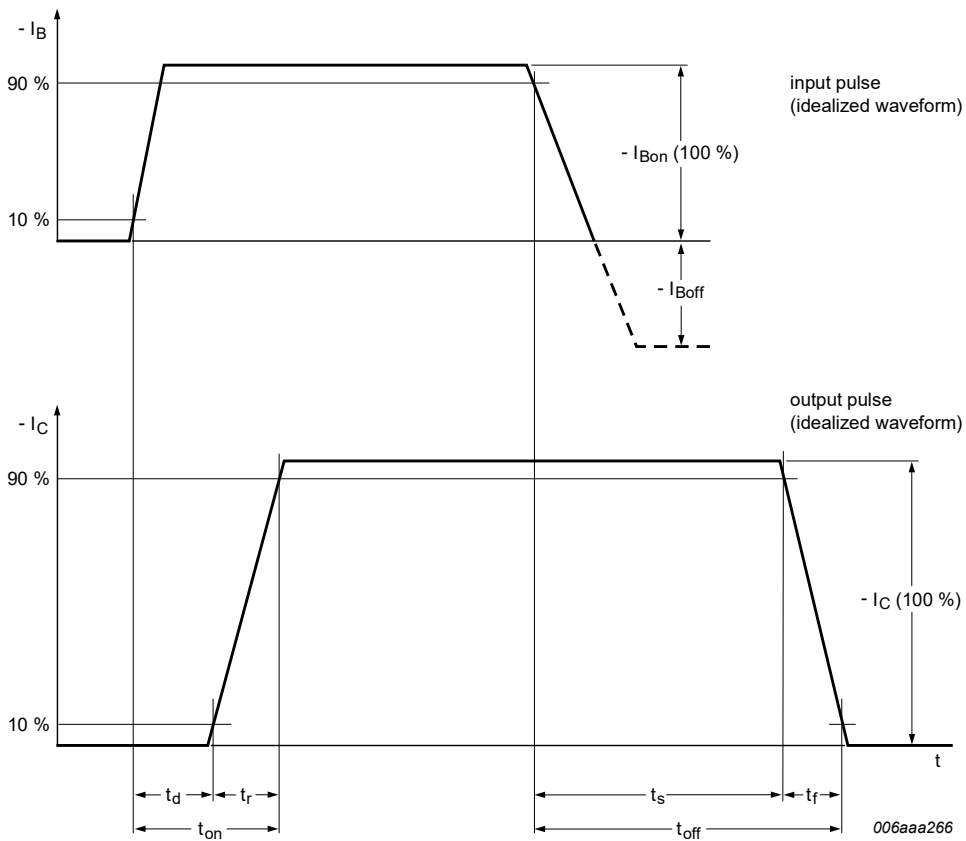


Fig. 8. BISS transistor switching time definition

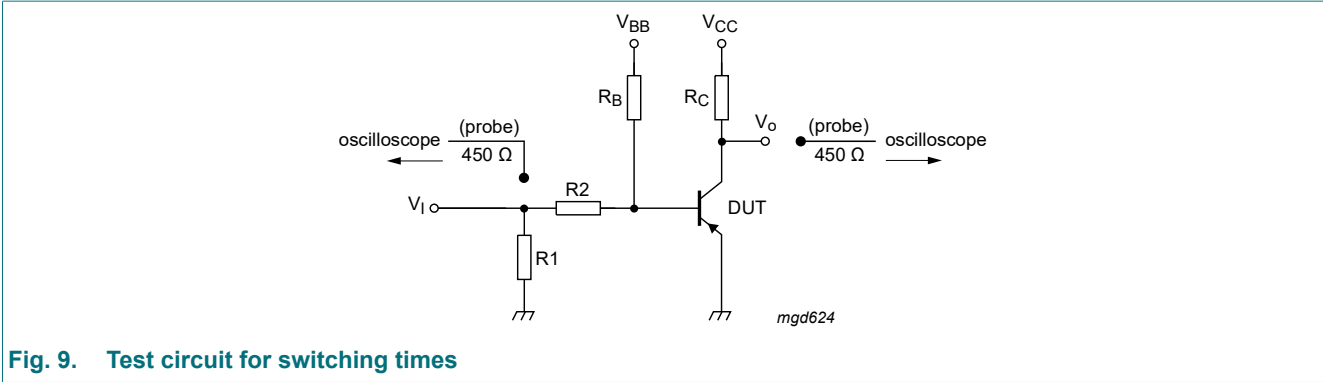


Fig. 9. Test circuit for switching times

## 12. Package outline

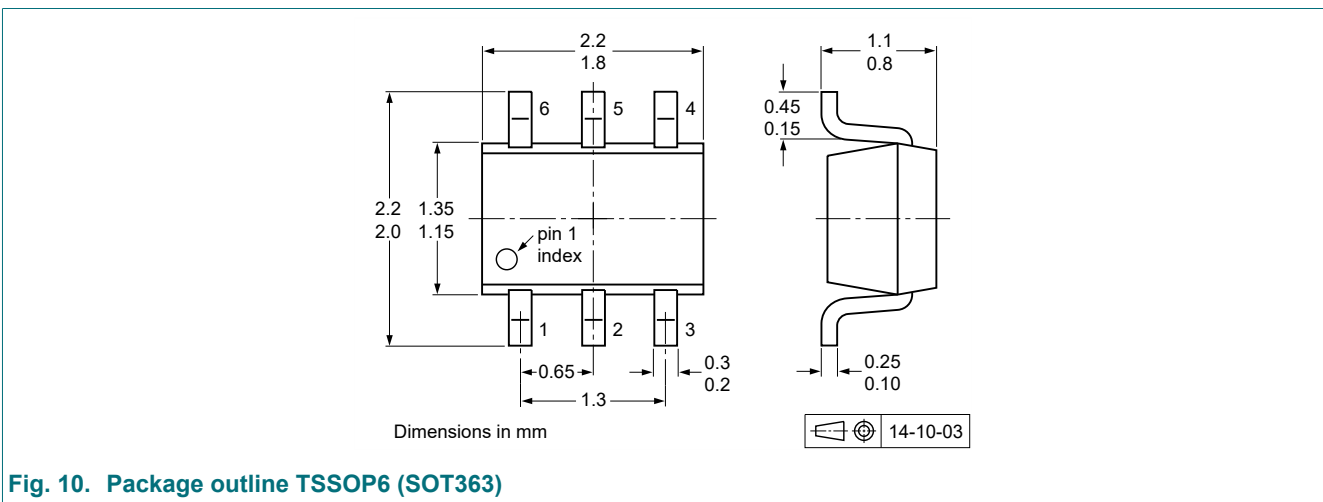


Fig. 10. Package outline TSSOP6 (SOT363)

## 13. Soldering

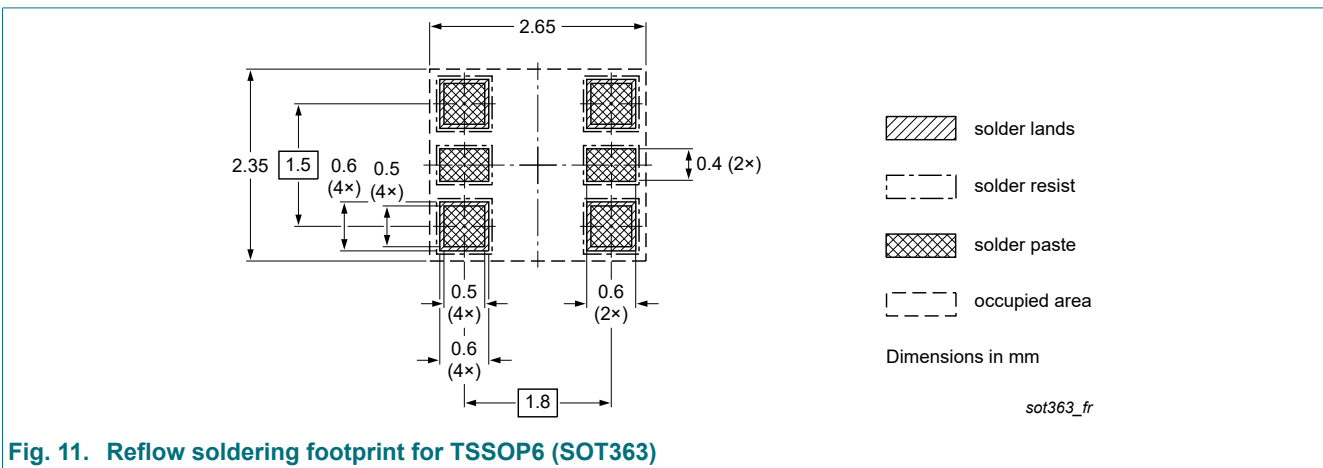
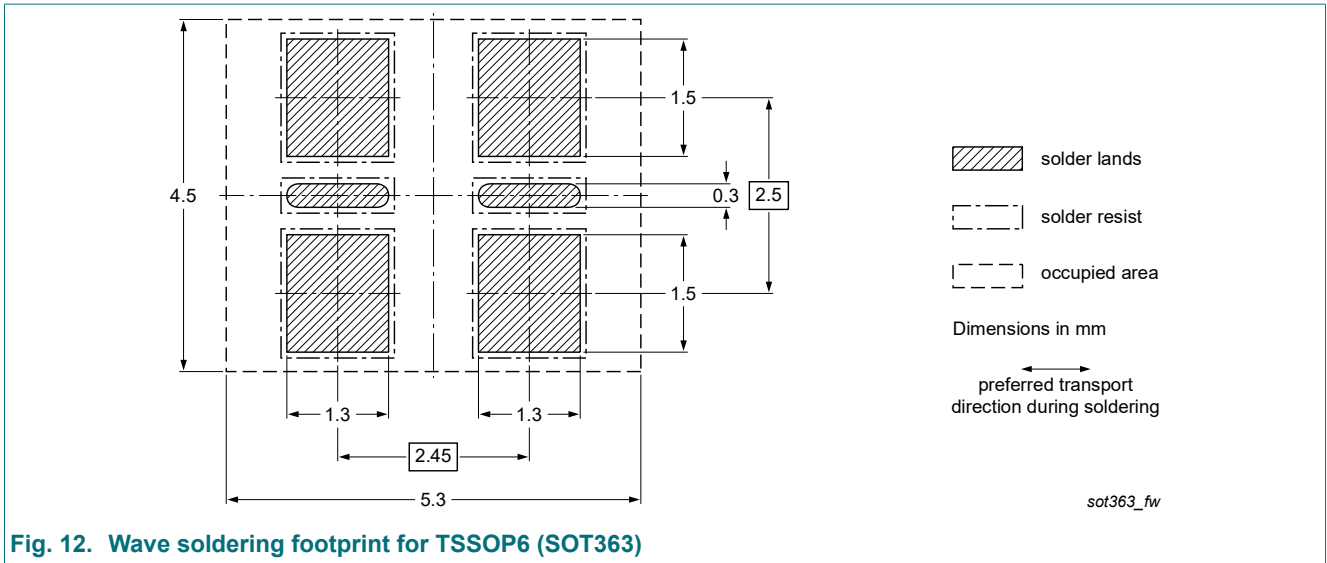


Fig. 11. Reflow soldering footprint for TSSOP6 (SOT363)





## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMP3906AYS v.1	20220727	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.
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