

PMP4501V; PMP4501G; PMP4501Y

NPN/NPN matched double transistors

Rev. 04 — 28 August 2009

Product data sheet

1. Product profile

1.1 General description

NPN/NPN matched double transistors in small Surface-Mounted Device (SMD) plastic packages. The transistors in the SOT666 and SOT363 (SC-88) packages are fully isolated internally.

Table 1. Product overview

Type number	Package		NPN/NPN h_{FE1}/h_{FE2} 0.98 complement	PNP/PNP complement
	NXP	JEITA		
PMP4501V	SOT666	-	PMP4201V	PMP5501V
PMP4501G	SOT353	SC-88A	PMP4201G	PMP5501G
PMP4501Y	SOT363	SC-88	PMP4201Y	PMP5501Y

1.2 Features

- Current gain matching
- Base-emitter voltage matching
- Common emitter configuration for SOT353 types
- Application-optimized pinout

1.3 Applications

- Current mirror
- Differential amplifier

1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V_{CE0}	collector-emitter voltage	open base	-	-	45	V
I_C	collector current		-	-	100	mA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	200	290	450	

Table 2. Quick reference data ...continued

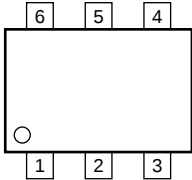
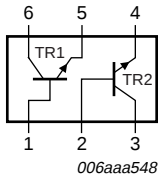
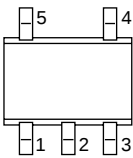
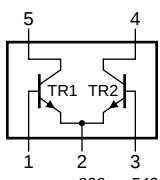
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per device						
h_{FE1}/h_{FE2}	h_{FE} matching	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	[1] 0.95	1	-	
$V_{BE1}-V_{BE2}$	V_{BE} matching	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	[2] -	-	2	mV

[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.

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
SOT666; SOT363			
1	base TR1		
2	base TR2		
3	collector TR2		
4	emitter TR2		
5	emitter TR1		
6	collector TR1		
001aab555			
SOT353			
1	base TR1		
2	emitter TR1, TR2		
3	base TR2		
4	collector TR2		
5	collector TR1		
006aaa549			

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
PMP4501V	-	plastic surface-mounted package; 6 leads	SOT666
PMP4501G	SC-88A	plastic surface-mounted package; 5 leads	SOT353
PMP4501Y	SC-88	plastic surface-mounted package; 6 leads	SOT363

4. Marking

Table 5. Marking codes

Type number	Marking code ^[1]
PMP4501V	EB
PMP4501G	R6*
PMP4501Y	S8*

- [1] * = -: made in Hong Kong
 * = p: made in Hong Kong
 * = t: made in Malaysia
 * = W: made in China

5. Limiting values

Table 6. 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	-	6	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			
	SOT666		^{[1][2]} -	200	mW
	SOT353		^[1] -	200	mW
	SOT363		^[1] -	200	mW
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C			
	SOT666		^{[1][2]} -	300	mW
	SOT353		^[1] -	300	mW
	SOT363		^[1] -	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.

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air				
	SOT666		[1][2] -	-	625	K/W
	SOT353		[1] -	-	625	K/W
	SOT363		[1] -	-	625	K/W
Per device						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air				
	SOT666		[1][2] -	-	416	K/W
	SOT353		[1] -	-	416	K/W
	SOT363		[1] -	-	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.

7. Characteristics

Table 8. Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\text{ V};$ $I_E = 0\text{ A}$	-	-	15	nA
		$V_{CB} = 30\text{ V};$ $I_E = 0\text{ A};$ $T_j = 150\text{ }^{\circ}\text{C}$	-	-	5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V};$ $I_C = 0\text{ A}$	-	-	100	nA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V};$ $I_C = 10\text{ }\mu\text{A}$	-	250	-	
		$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	200	290	450	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA};$ $I_B = 0.5\text{ mA}$	-	50	200	mV
		$I_C = 100\text{ mA};$ $I_B = 5\text{ mA}$	-	200	400	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10\text{ mA};$ $I_B = 0.5\text{ mA}$	[1] -	760	-	mV
		$I_C = 100\text{ mA};$ $I_B = 5\text{ mA}$	[1] -	910	-	mV

Table 8. Characteristics ...continued $T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{BE}	base-emitter voltage	V _{CE} = 5 V; I _C = 2 mA	[2] 610	660	710	mV
		V _{CE} = 5 V; I _C = 10 mA	[2] -	-	770	mV
C _c	collector capacitance	V _{CB} = 10 V; I _E = i _e = 0 A; f = 1 MHz	-	-	1.5	pF
C _e	emitter capacitance	V _{EB} = 0.5 V; I _C = i _c = 0 A; f = 1 MHz	-	11	-	pF
f _T	transition frequency	V _{CE} = 5 V; I _C = 10 mA; f = 100 MHz	100	250	-	MHz
NF	noise figure	V _{CE} = 5 V; I _C = 0.2 mA; R _S = 2 kΩ; f = 10 Hz to 15.7 kHz	-	2.8	-	dB
		V _{CE} = 5 V; I _C = 0.2 mA; R _S = 2 kΩ; f = 1 kHz; B = 200 Hz	-	3.3	-	dB
Per device						
h _{FE1} /h _{FE2}	h _{FE} matching	V _{CE} = 5 V; I _C = 2 mA	[3] 0.95	1	-	
V _{BE1} –V _{BE2}	V _{BE} matching	V _{CE} = 5 V; I _C = 2 mA	[4] -	-	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.

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

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

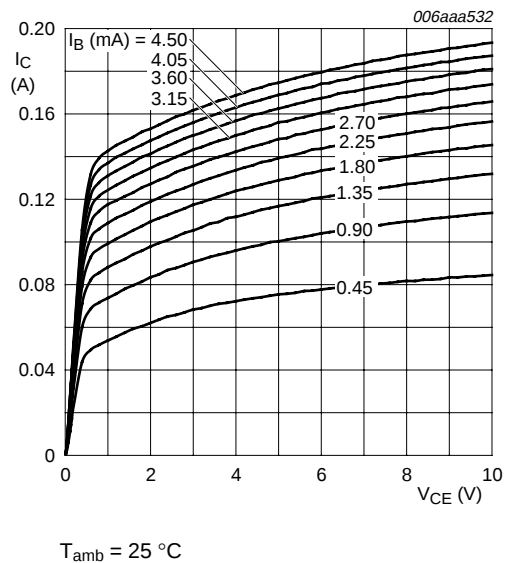


Fig 1. Collector current as a function of collector-emitter voltage; typical values

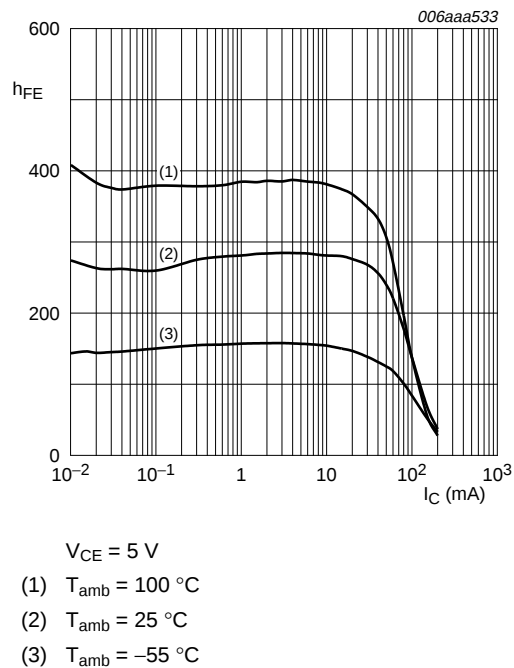


Fig 2. DC current gain as a function of collector current; typical values

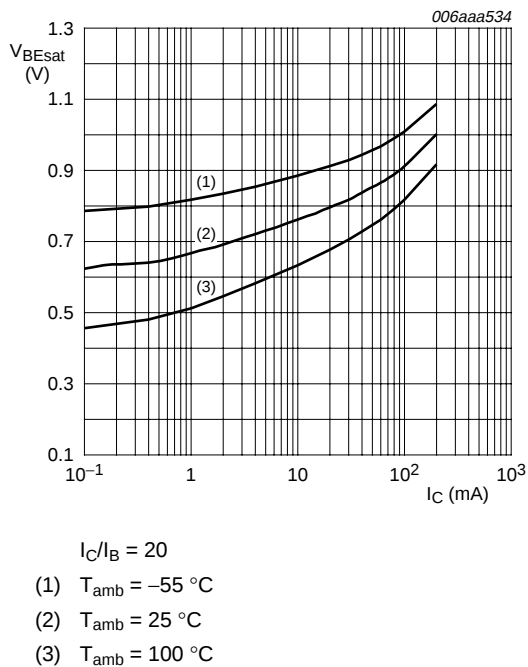


Fig 3. Base-emitter saturation voltage as a function of collector current; typical values

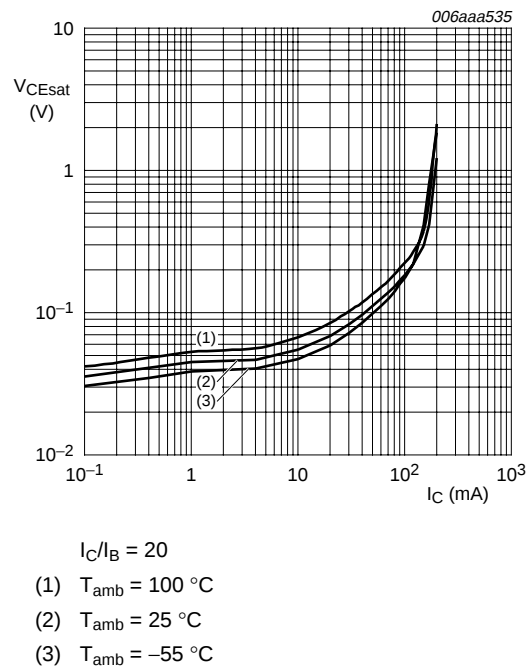
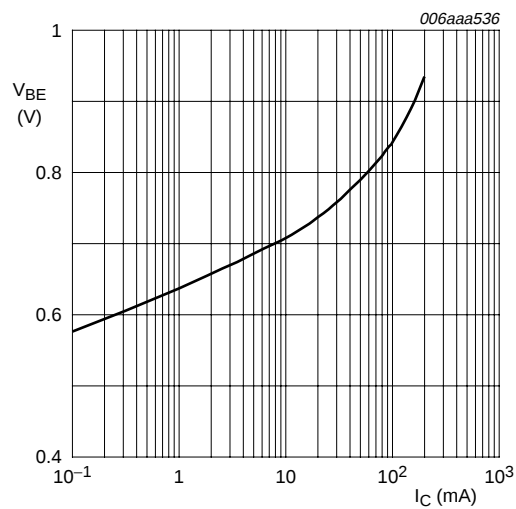
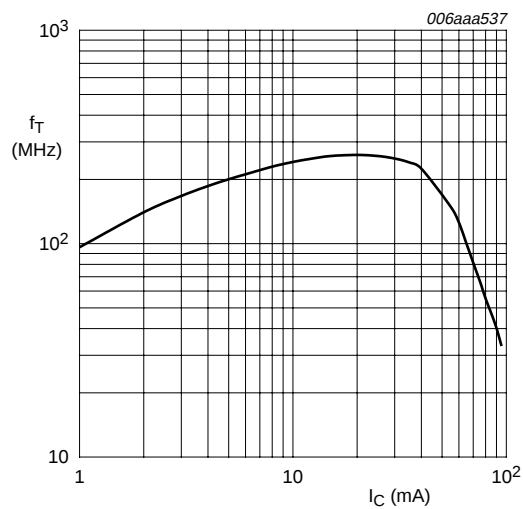


Fig 4. Collector-emitter saturation voltage as a function of collector current; typical values



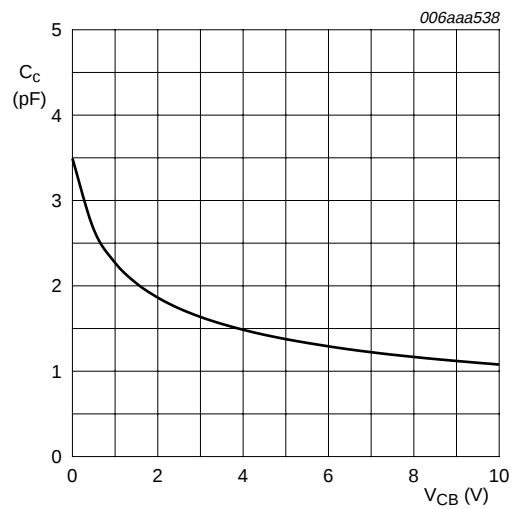
$V_{CE} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$

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



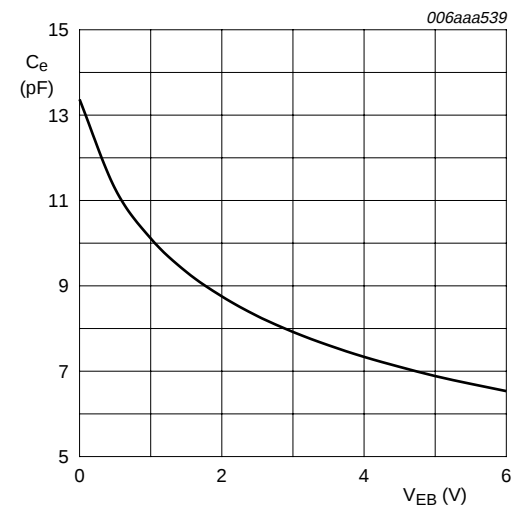
$V_{CE} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$

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



$f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$

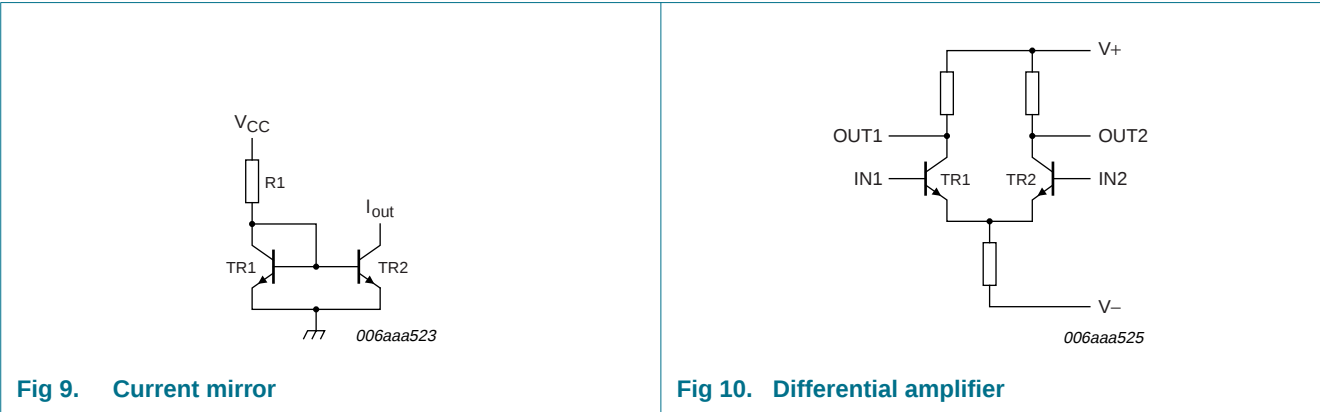
Fig 7. Collector capacitance as a function of collector-base voltage; typical values



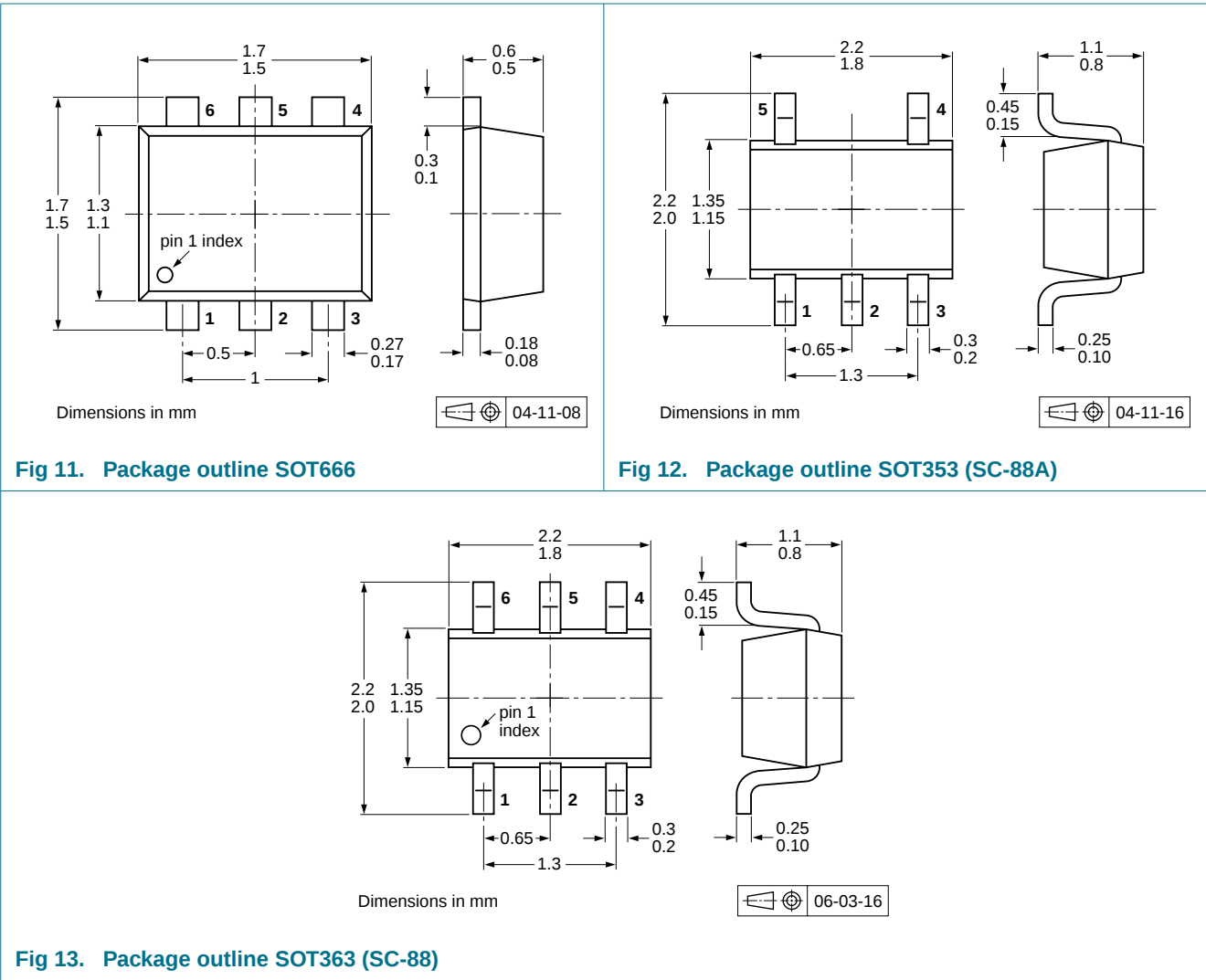
$f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$

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

8. Application information



9. Package outline



10. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[\[1\]](#)

Type number	Package	Description	Packing quantity			
			3000	4000	8000	10000
PMP4501V	SOT666	2 mm pitch, 8 mm tape and reel	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	-	-115	-	-
PMP4501G	SOT353	4 mm pitch, 8 mm tape and reel	-115	-	-	-135
PMP4501Y	SOT363	4 mm pitch, 8 mm tape and reel; T1 [2]	-115	-	-	-135
		4 mm pitch, 8 mm tape and reel; T2 [3]	-125	-	-	-165

[1]

For further information and the availability of packing methods, see [Section 14](#).

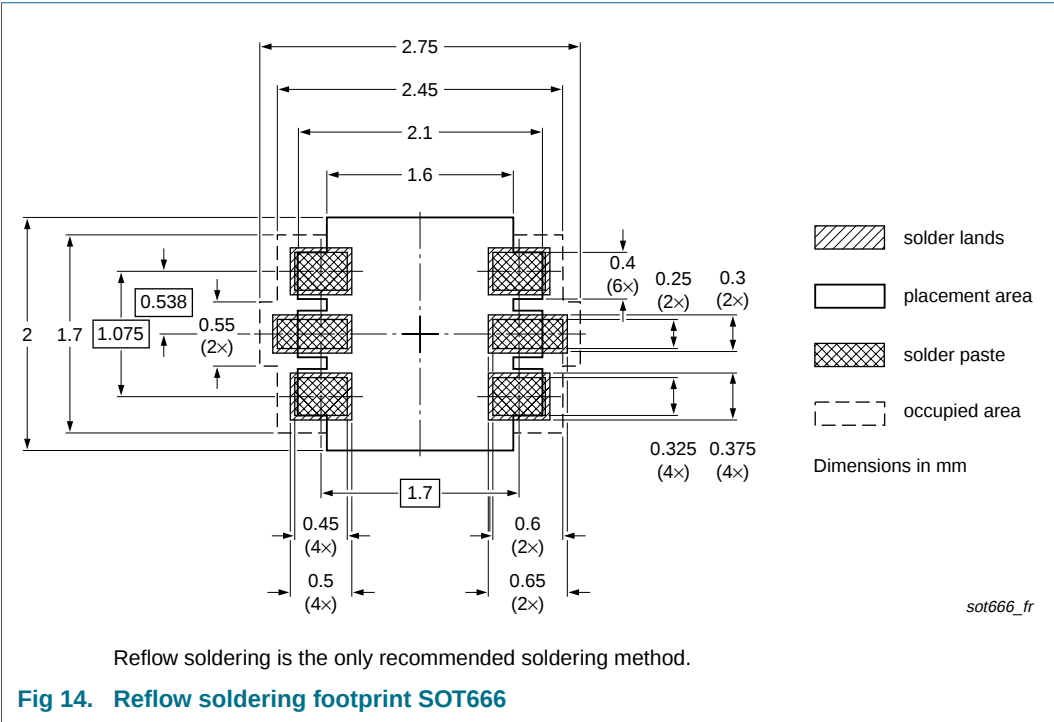
[2]

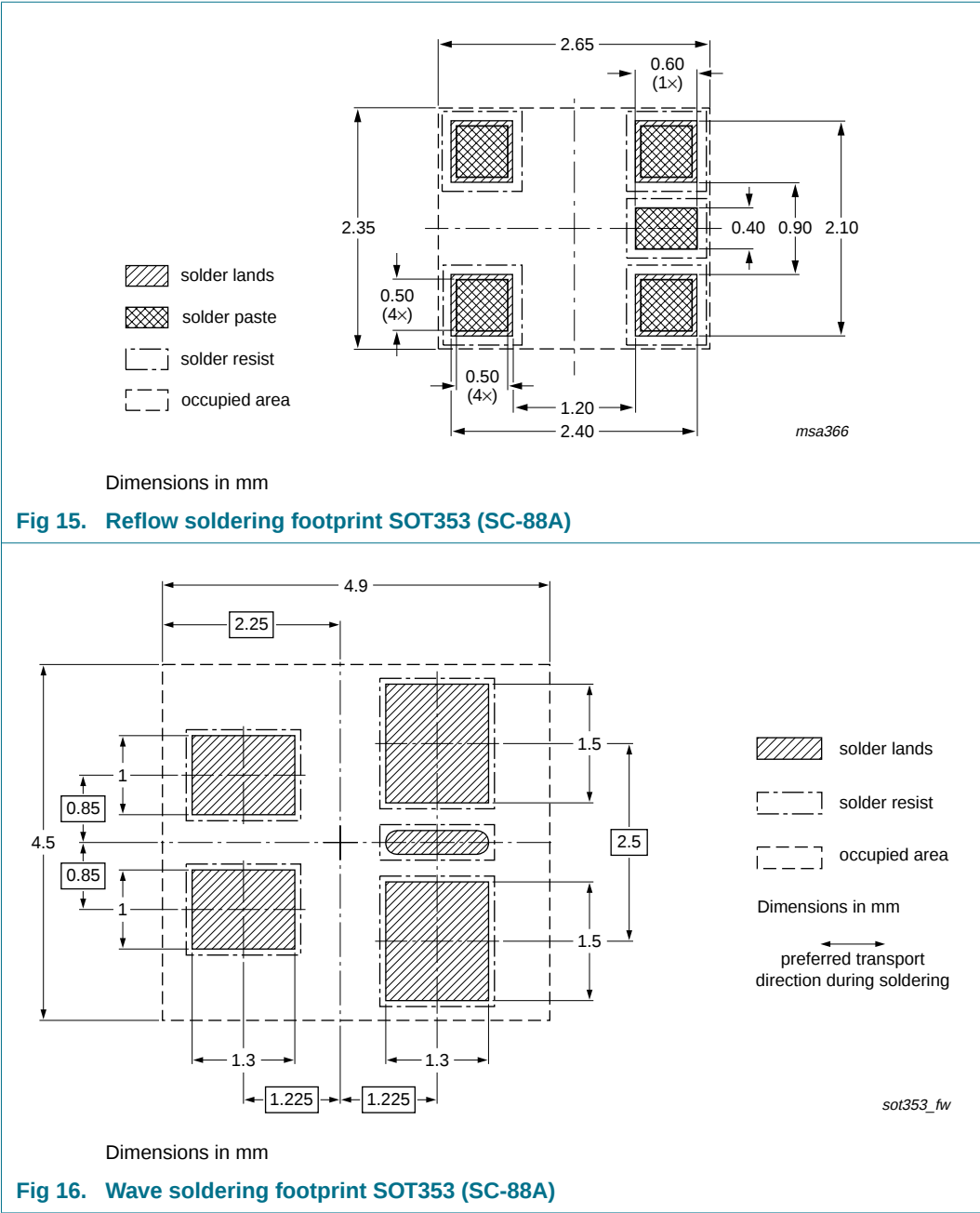
T1: normal taping

[3]

T2: reverse taping

11. Soldering





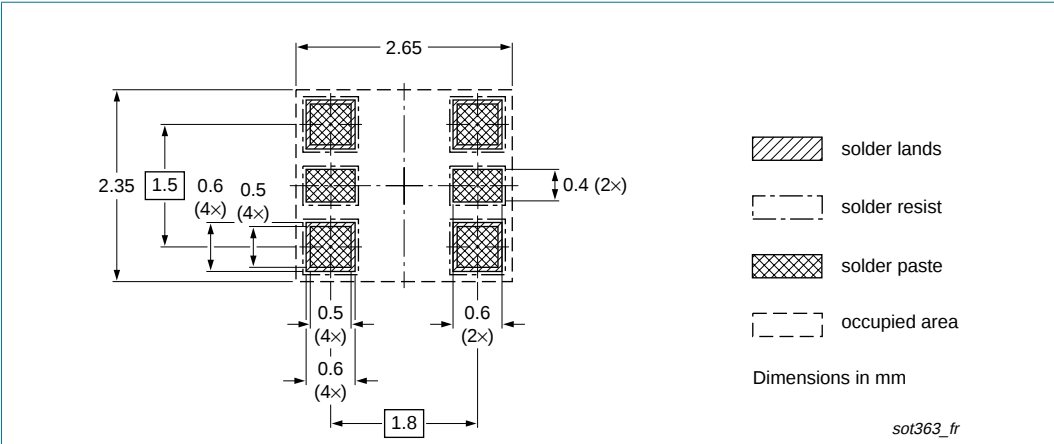


Fig 17. Reflow soldering footprint SOT363 (SC-88)

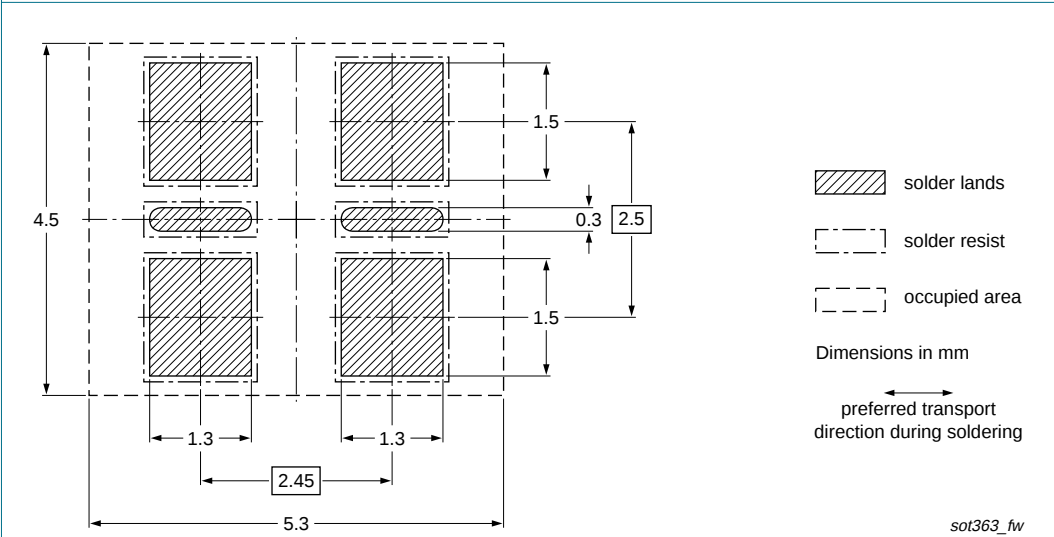


Fig 18. Wave soldering footprint SOT363 (SC-88)

12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMP4501V_G_Y_4	20090828	Product data sheet	-	PMP4501V_G_Y_3
Modifications:	• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content. • Figure 14 "Reflow soldering footprint SOT666": updated • Figure 16 "Wave soldering footprint SOT353 (SC-88A)": updated • Figure 17 "Reflow soldering footprint SOT363 (SC-88)": updated • Figure 18 "Wave soldering footprint SOT363 (SC-88)": updated			
PMP4501V_G_Y_3	20060919	Product data sheet	-	PMP4501G_Y_2
PMP4501G_Y_2	20060214	Product data sheet	-	PMP4501G_Y_1
PMP4501G_Y_1	20060202	Product data sheet	-	-

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13.1 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.
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[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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Date of release: 28 August 2009

Document identifier: PMP4501V_G_Y_4

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