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Kind regards,

Team Nexperia

PMP4201V; PMP4201G; PMP4201Y

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} 0.95 complement	PNP/PNP complement
	NXP	**JEITA**		
PMP4201V	SOT666	-	PMP4501V	PMP5201V
PMP4201G	SOT353	SC-88A	PMP4501G	PMP5201G
PMP4201Y	SOT363	SC-88	PMP4501Y	PMP5201Y

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_{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	200	290	450	

Table 2.   Quick reference data *…continued*
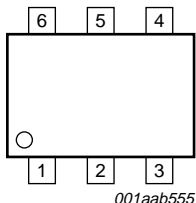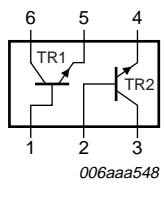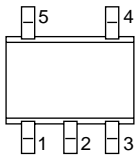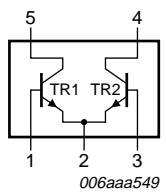
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per device						
h_{FE1}/h_{FE2}	h_{FE} matching	$V_{CE} = 5$ V; $I_C = 2$ mA	[1] 0.98	1	-	
$V_{BE1}-V_{BE2}$	V_{BE} matching	$V_{CE} = 5$ V; $I_C = 2$ mA	[2] -	-	2	mV

[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

006aaa548

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**
PMP4201V	-	plastic surface-mounted package; 6 leads	SOT666
PMP4201G	SC-88A	plastic surface-mounted package; 5 leads	SOT353
PMP4201Y	SC-88	plastic surface-mounted package; 6 leads	SOT363

4. Marking

Table 5.   Marking codes

Type number	Marking code[1]
PMP4201V	EA
PMP4201G	R7*
PMP4201Y	S7*

[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
$T_{amb} = 25\,°C$ unless otherwise specified

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

Table 8.   Characteristics *…continued*
T$_{amb}$ = 25 °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]	0.98	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.

$T_{amb} = 25\ °C$
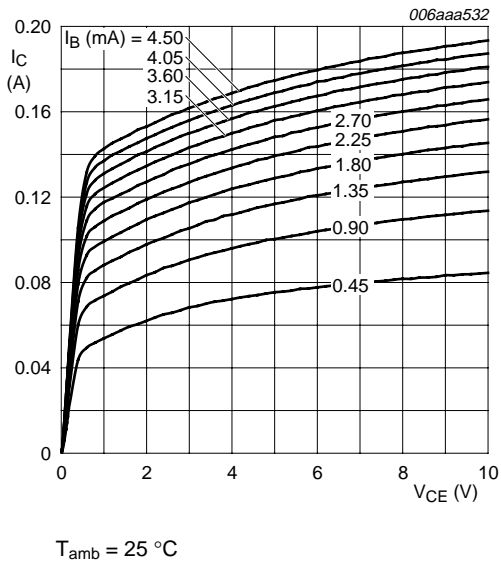
Fig 1. Collector current as a function of collector-emitter voltage; typical values

$V_{CE} = 5\ V$

(1) $T_{amb} = 100\ °C$

(2) $T_{amb} = 25\ °C$

(3) $T_{amb} = -55\ °C$
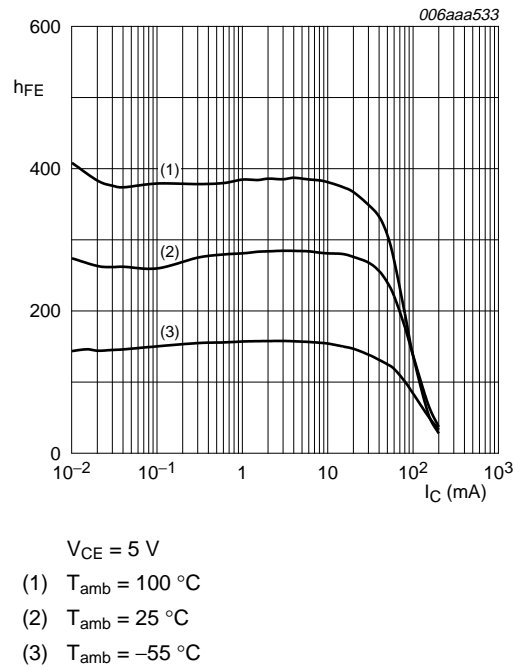
Fig 2. DC current gain as a function of collector current; typical values

$I_C/I_B = 20$

(1) $T_{amb} = -55\ °C$
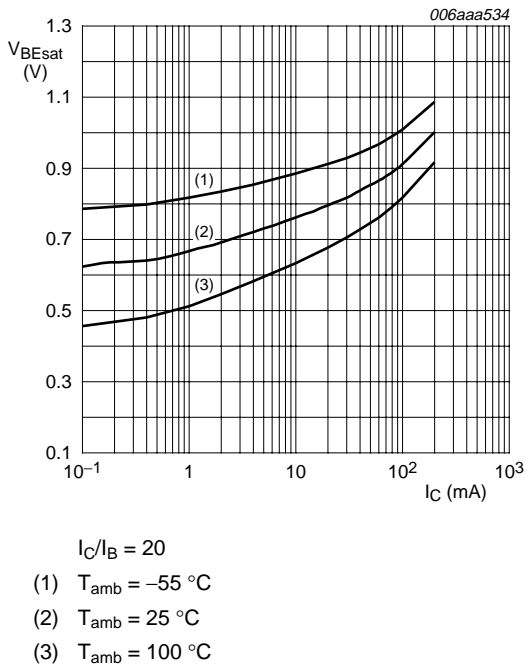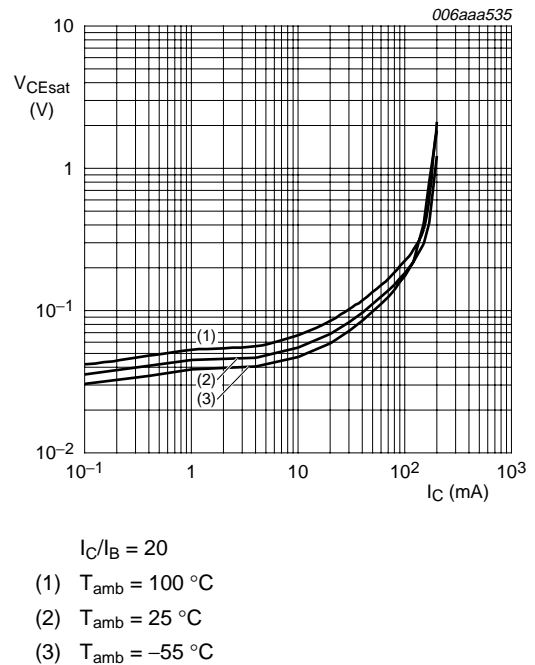
(2) $T_{amb} = 25\ °C$

(3) $T_{amb} = 100\ °C$

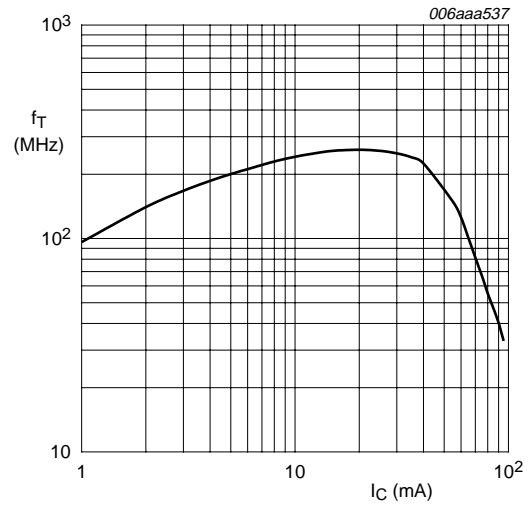**Fig 3.** Base-emitter saturation voltage as a function of collector current; typical values

$I_C/I_B = 20$

(1) $T_{amb} = 100\ °C$

(2) $T_{amb} = 25\ °C$

(3) $T_{amb} = -55\ °C$

Fig 4. Collector-emitter saturation voltage as a function of collector current; typical values
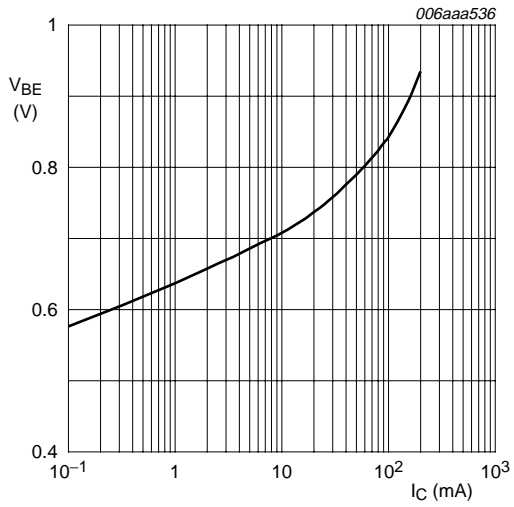
$V_{CE} = 5$ V; $T_{amb} = 25$ °C

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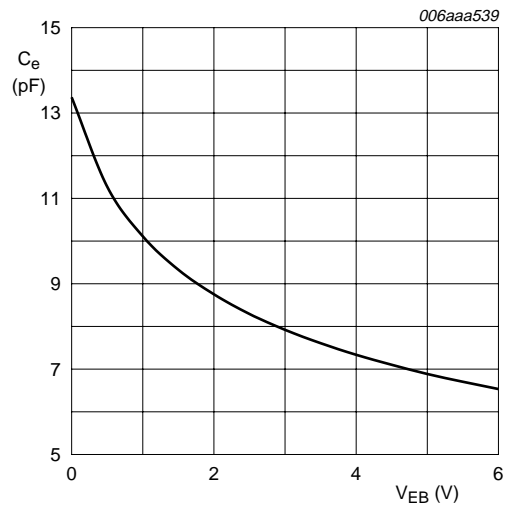

$V_{CE} = 5$ V; $T_{amb} = 25$ °C

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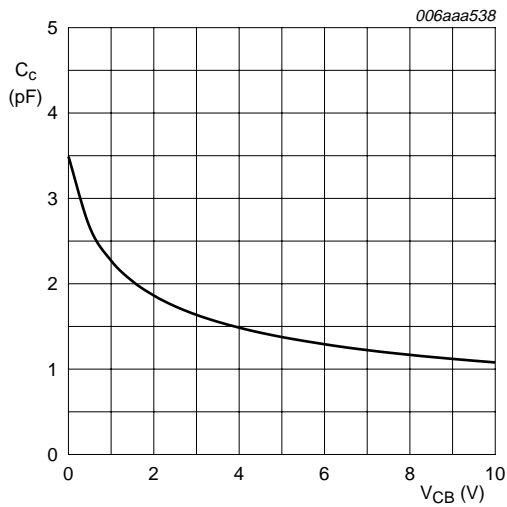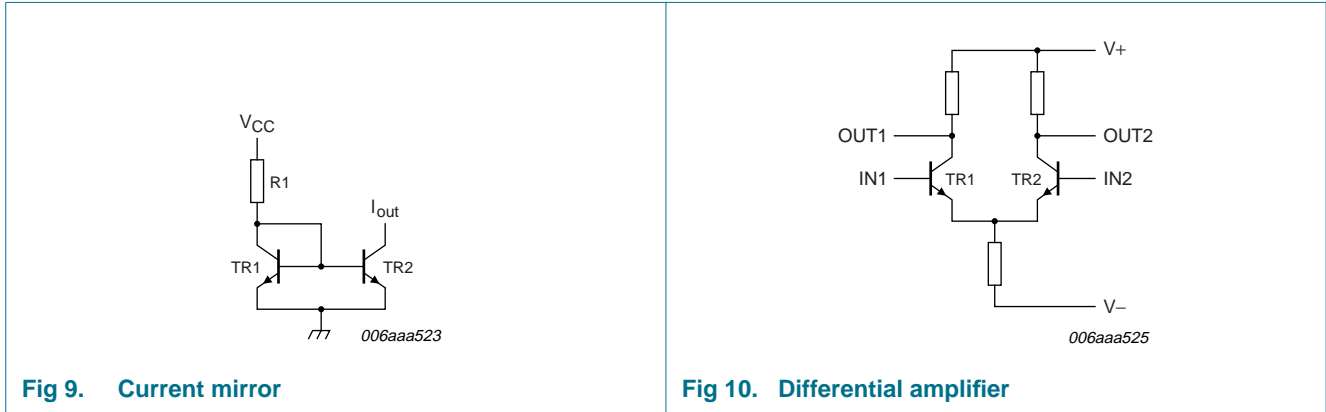

f = 1 MHz; $T_{amb} = 25$ °C

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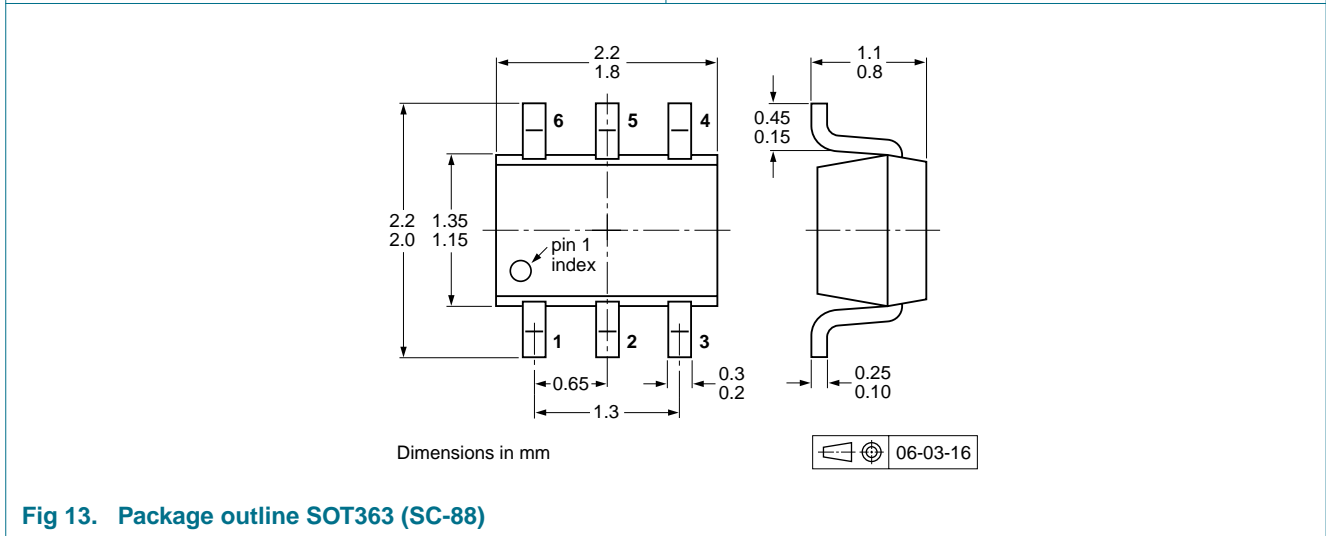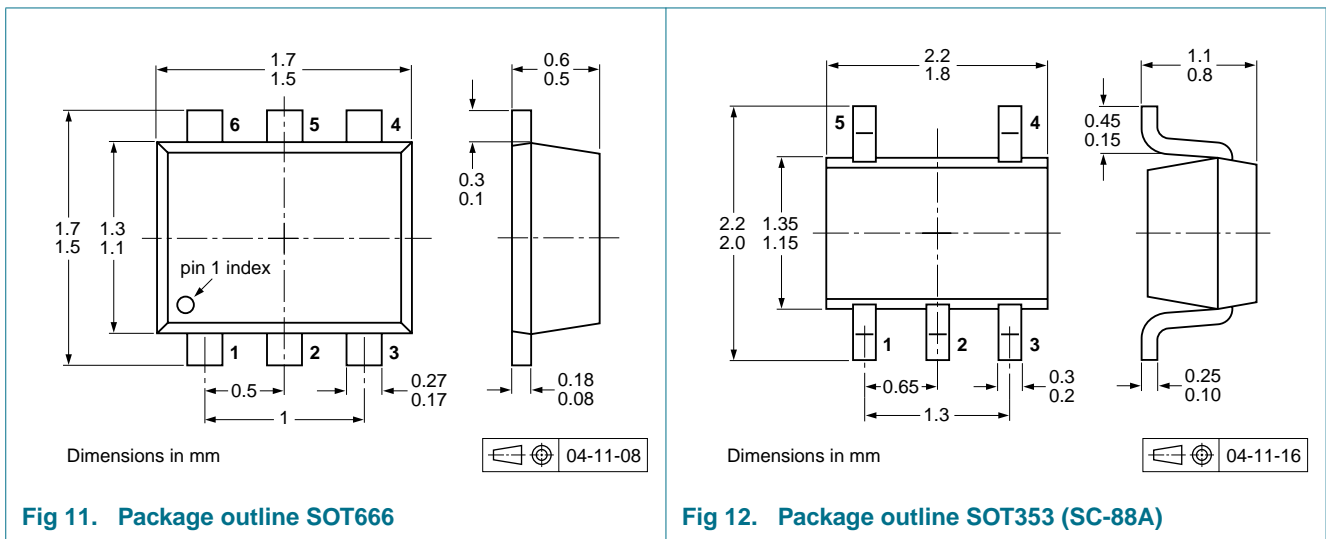

f = 1 MHz; $T_{amb} = 25$ °C

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

8. Application information

Fig 9. Current mirror

Fig 10. Differential amplifier

9. Package outline

Dimensions in mm

Fig 11. Package outline SOT666

Dimensions in mm

Fig 12. Package outline SOT353 (SC-88A)

Dimensions in mm

Fig 13. Package outline SOT363 (SC-88)

10. Packing information

Table 9. Packing methods

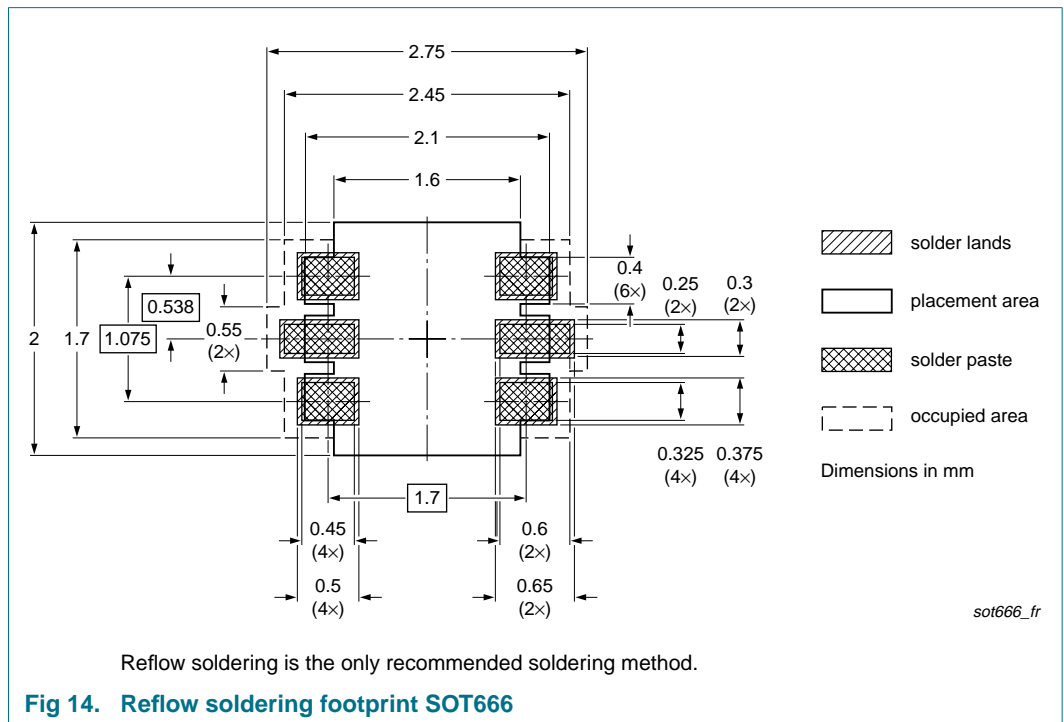*The indicated -xxx are the last three digits of the 12NC ordering code.*[1]

Type number	Package	Description		Packing quantity			
				3000	4000	8000	10000
PMP4201V	SOT666	2 mm pitch, 8 mm tape and reel		-	-	-315	-
		4 mm pitch, 8 mm tape and reel		-	-115	-	-
PMP4201G	SOT353	4 mm pitch, 8 mm tape and reel		-115	-	-	-135
PMP4201Y	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

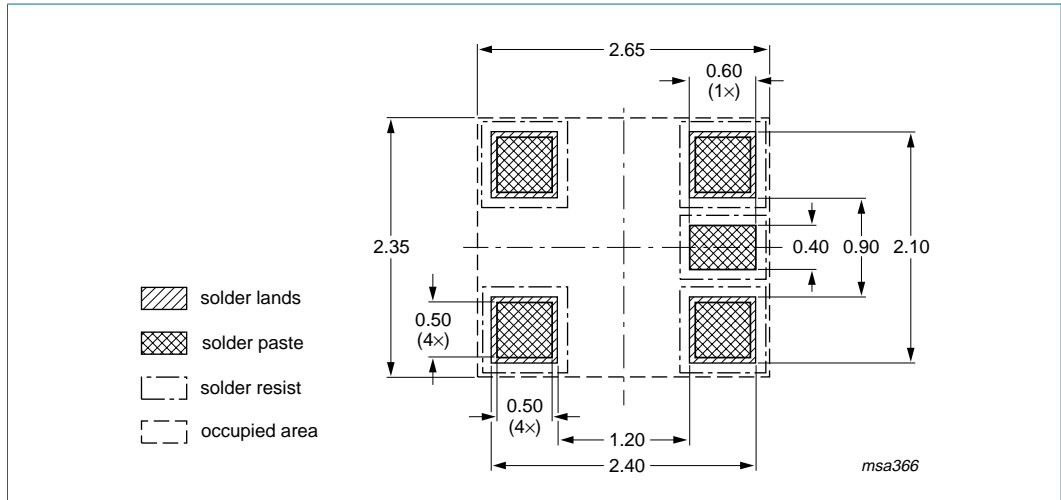[1] For further information and the availability of packing methods, see Section 14.
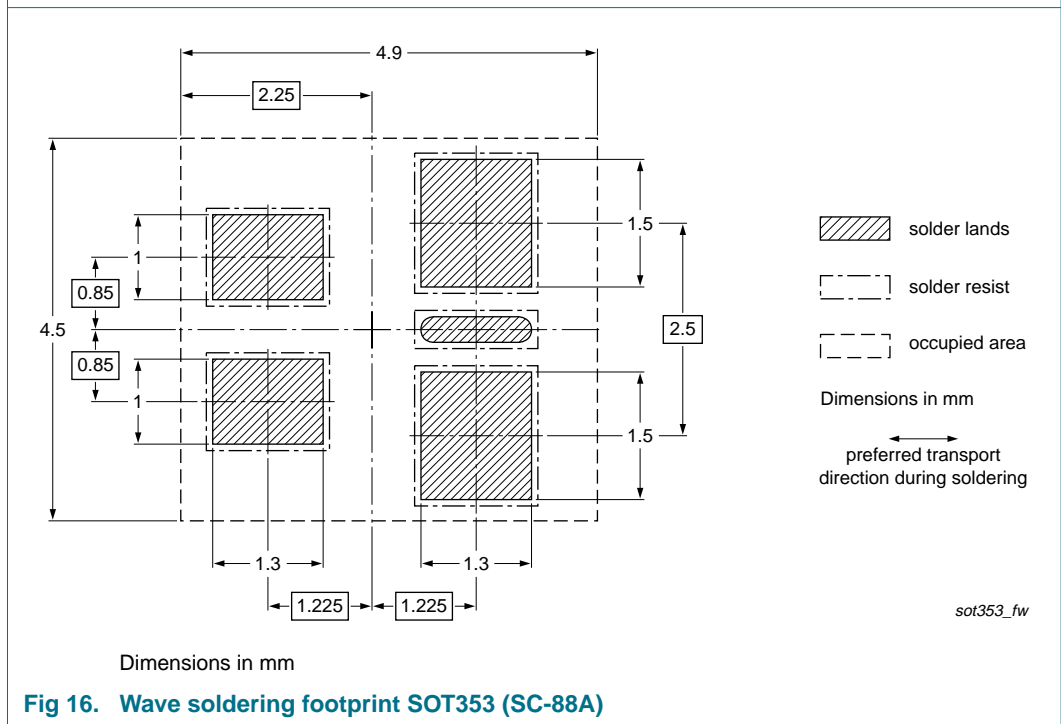
[2] T1: normal taping

[3] T2: reverse taping

11. Soldering

Reflow soldering is the only recommended soldering method.

Fig 14. Reflow soldering footprint SOT666

Dimensions in mm

Fig 15.   Reflow soldering footprint SOT353 (SC-88A)

Dimensions in mm
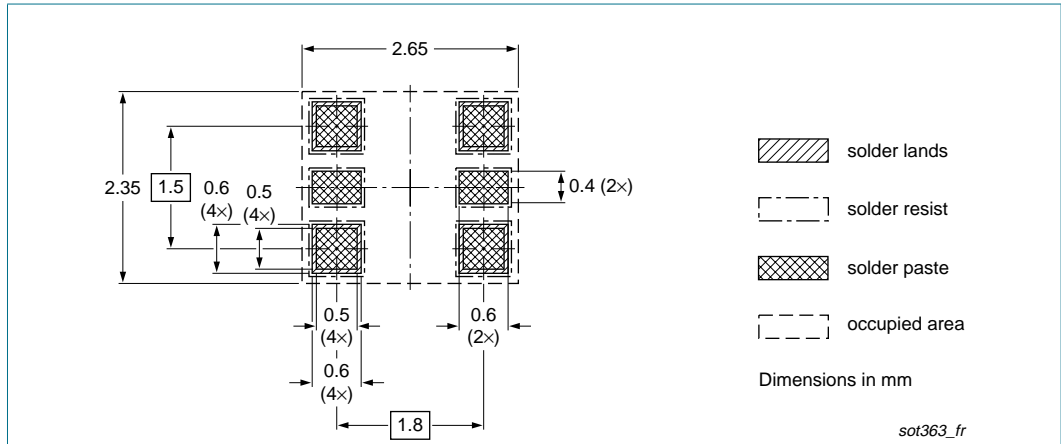
Fig 16.   Wave soldering footprint SOT353 (SC-88A)
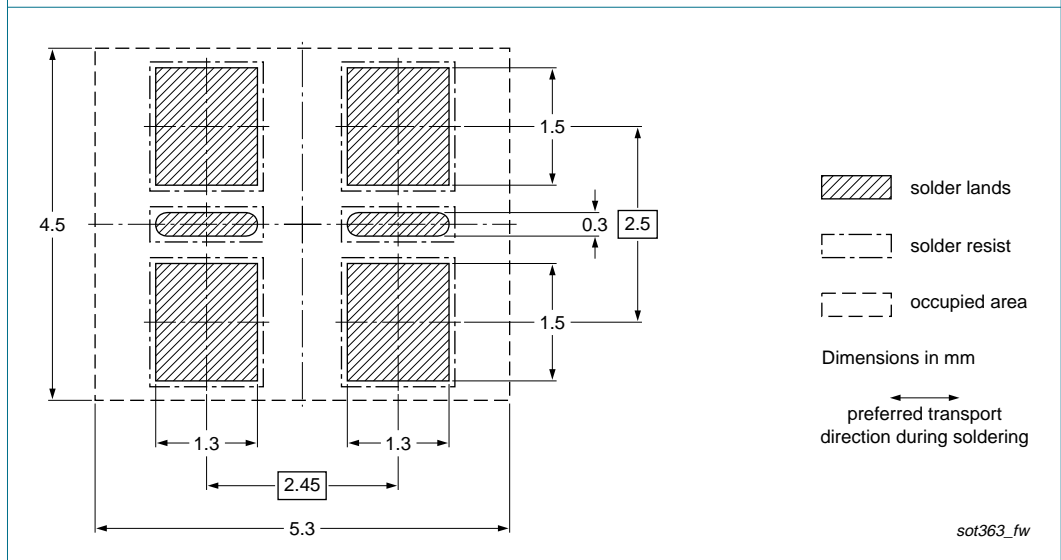
Fig 17. Reflow soldering footprint SOT363 (SC-88)

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
PMP4201V_G_Y_4	20090828	Product data sheet	-	PMP4201V_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			
PMP4201V_G_Y_3	20060915	Product data sheet	-	PMP4201G_Y_2
PMP4201G_Y_2	20060214	Product data sheet	-	PMP4201G_Y_1
PMP4201G_Y_1	20060131	Product data sheet	-	-

13. Legal information

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.
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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