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Kind regards,

Team Nexperia

NXP3875Y; NXP3875G

50 V, 150 mA NPN general-purpose transistors

Rev. 1 — 12 December 2012 Product data sheet

1. Product profile

1.1 General description

NPN general-purpose transistors in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- General-purpose transistors
- Small SMD plastic packages
- Two different current gain selections
- AEC-Q101 qualified

1.3 Applications

- General-purpose switching and amplification

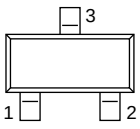
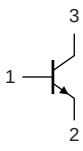
1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	50	V
I_C	collector current		-	-	150	mA
h_{FE}	DC current gain	V_{CE} = 6 V; I_C = 2 mA				
	NXP3875Y		120	-	240	
	NXP3875G		200	-	400	

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	base		
2	emitter		
3	collector		

sym021

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
NXP3875Y	TO-236AB	plastic surface-mounted package; 3 leads	SOT23
NXP3875G			

4. Marking

Table 4. Marking codes

Type number	Marking code[1]
NXP3875Y	*JE
NXP3875G	*JF

[1] * = placeholder for manufacturing site code.

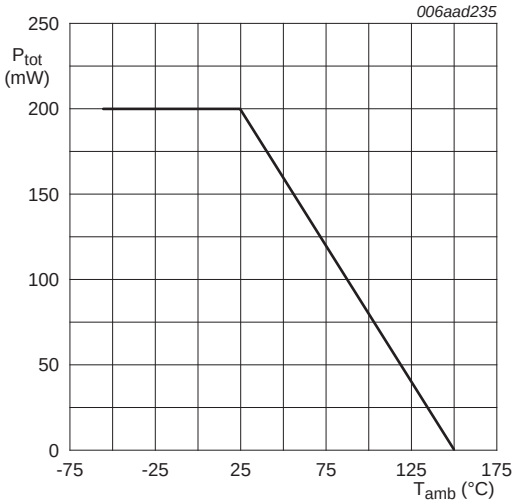
5. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	60	V
V_{CEO}	collector-emitter voltage	open base		-	50	V
V_{EBO}	emitter-base voltage	open collector		-	5	V
I_C	collector current			-	150	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	200	mA
I_B	base current				30	mA
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms		-	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	200	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.



FR4 PCB, standard footprint

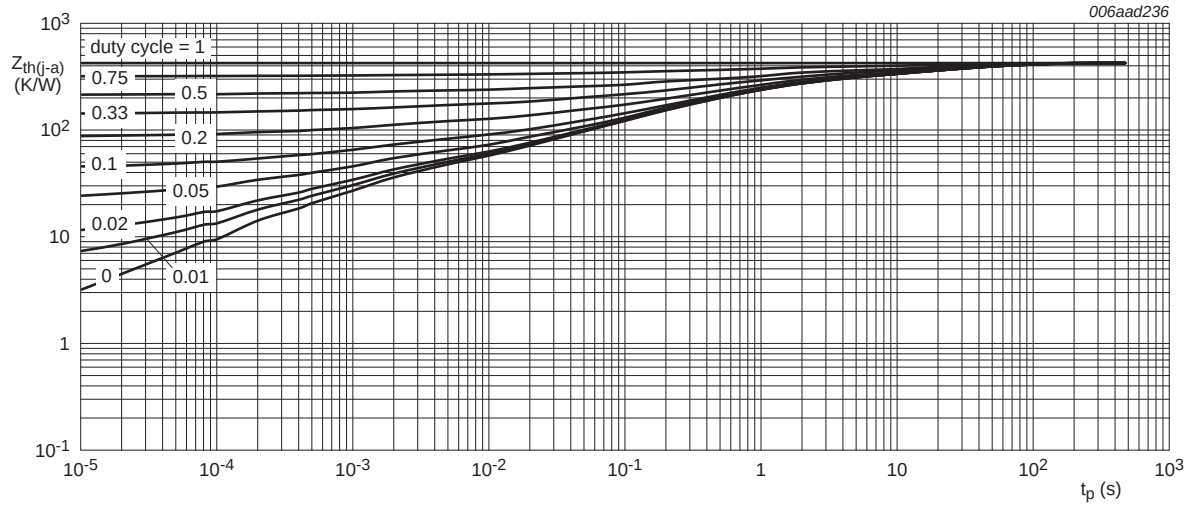
Fig 1. Power derating curve

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W

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



FR4 PCB, standard footprint

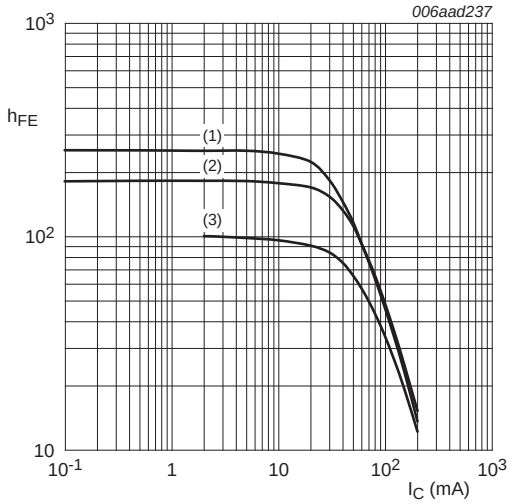
Fig 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

7. Characteristics

Table 7. Characteristics

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = 60 V; I_E = 0 A	-	-	100	nA
		V_{CB} = 60 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} = 6 V; I_C = 2 mA				
	NXP3875Y		120	-	240	
	NXP3875G		200	-	400	
V_{CEsat}	collector-emitter saturation voltage	I_C = 100 mA; I_B = 10 mA	-	-	250	mV
V_{BEsat}	base-emitter saturation voltage	I_C = 100 mA; I_B = 10 mA	-	-	1	V
f_T	transition frequency	V_{CE} = 10 V; I_C = 1 mA; f = 100 MHz	80	-	-	MHz
C_c	collector capacitance	V_{CB} = 10 V; I_E = i_e = 0 A; f = 1 MHz	-	-	3.5	pF
NF	noise figure	I_C = 0.1 mA; V_{CE} = 6 V; R_S = 10 kΩ; f = 1 kHz;	-	-	10	dB



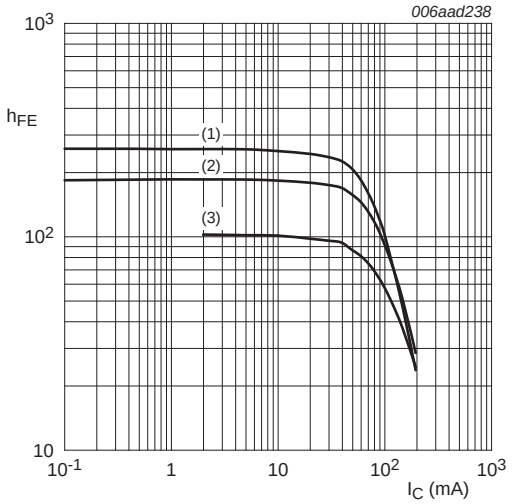
V_{CE} = 1 V

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

Fig 3. NXP3875Y: DC current gain as a function of collector current; typical values



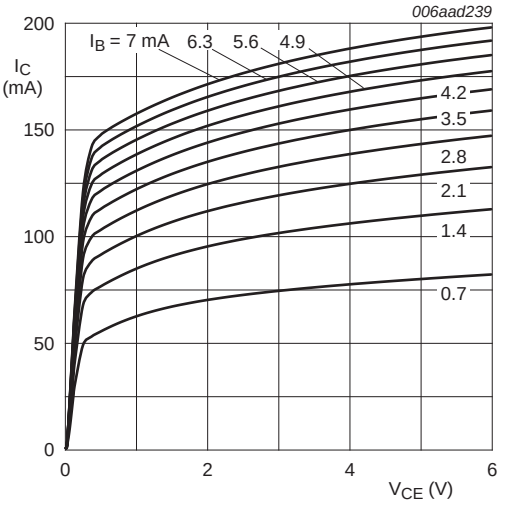
V_{CE} = 6 V

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

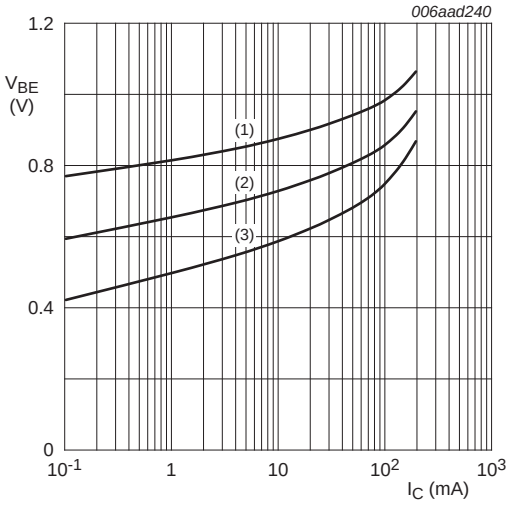
(3) T_{amb} = −55 °C

Fig 4. NXP3875Y: DC current gain as a function of collector current; typical values



T_{amb} = 25 °C

Fig 5. NXP3875Y: Collector current as a function of collector-emmiter voltage; typical values



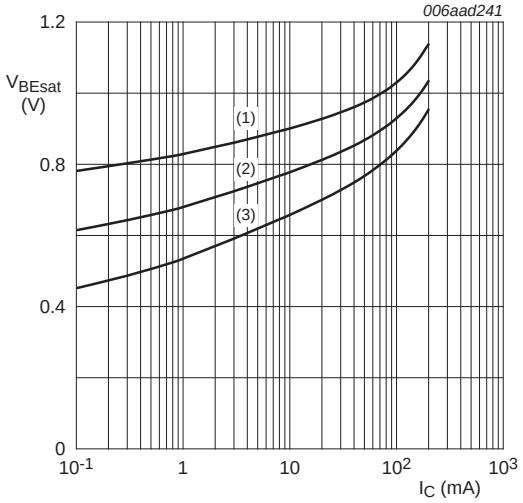
V_{CE} = 6 V

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 6. NXP3875Y: Base-emmiter voltage as a function of collector current; typical values



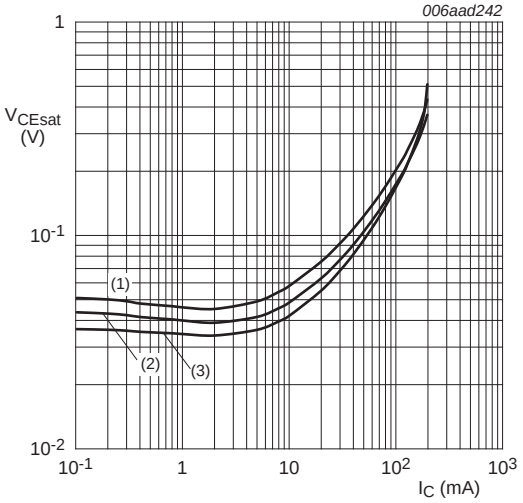
$I_C/I_B = 10$

(1) $T_{amb} = -55$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 100$ °C

Fig 7. NXP3875Y: Base-emitter saturation voltage as a function of collector currant; typical values



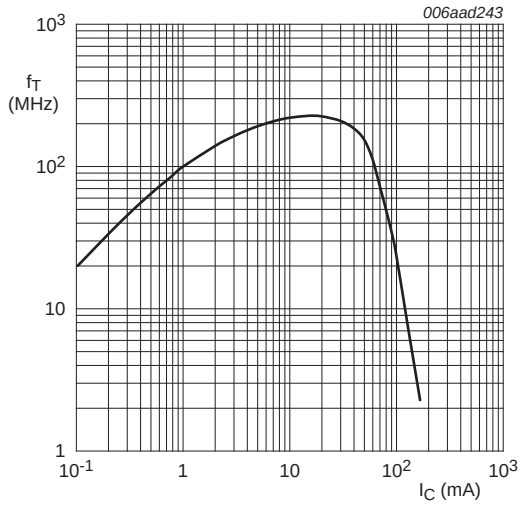
$I_C/I_B = 10$

(1) $T_{amb} = 100$ °C

(2) $T_{amb} = 25$ °C

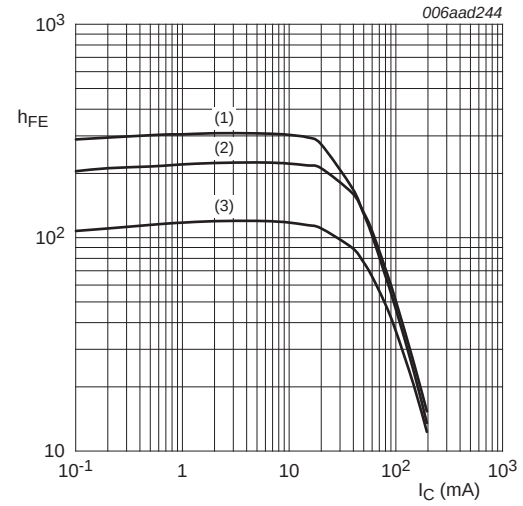
(3) $T_{amb} = -55$ °C

Fig 8. NXP3875Y: Collector-emmiter saturation voltage as a function of collector current; typical values



$V_{CE} = 10$ V; $T_{amb} = 25$ °C

Fig 9. NXP3875Y: Transition frequency as a function of collector current; typical values



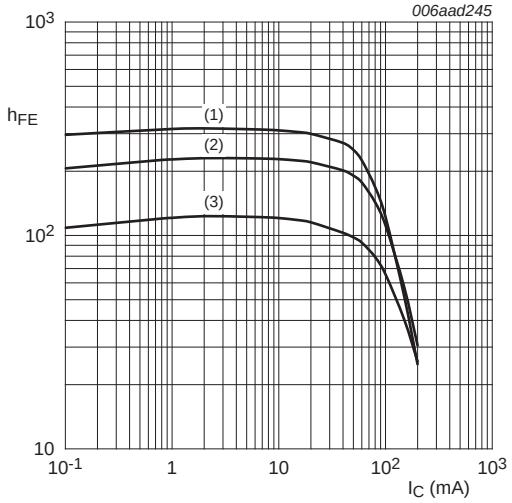
$V_{CE} = 1$ V

(1) $T_{amb} = 100$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = -55$ °C

Fig 10. NXP3875G: DC current gain as a function of collector current; typical values



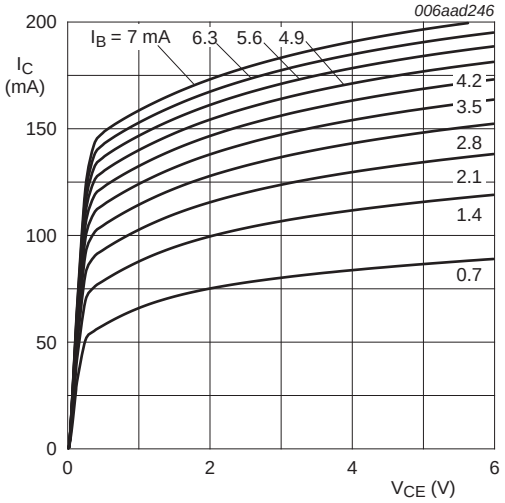
V_{CE} = 6 V

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

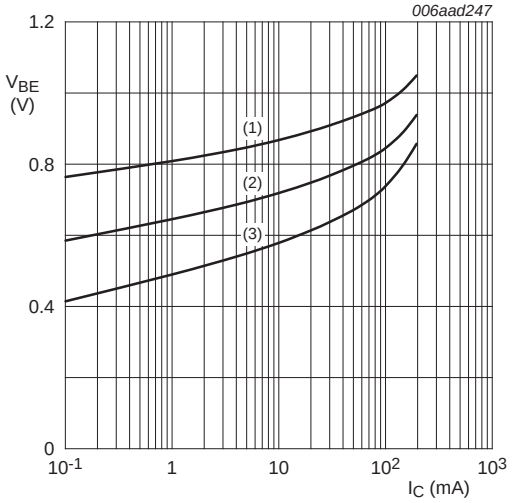
(3) T_{amb} = −55 °C

Fig 11. NXP3875G: DC current gain as a function of collector current; typical values



T_{amb} = 25 °C

Fig 12. NXP3875G: Collector current as a function of collector-emmiter voltage; typical values



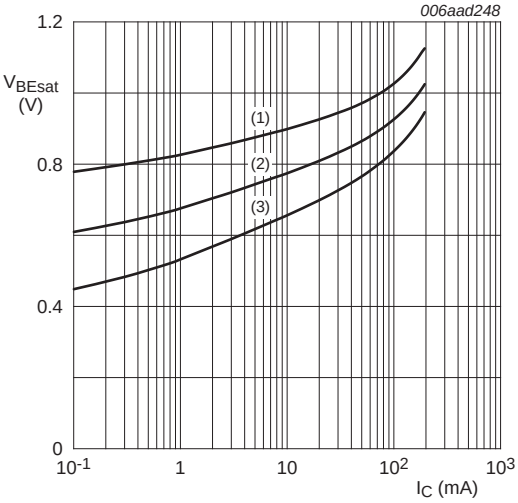
V_{CE} = 6 V

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 13. NXP3875G: Base-emmiter voltage as a function of collector current; typical values



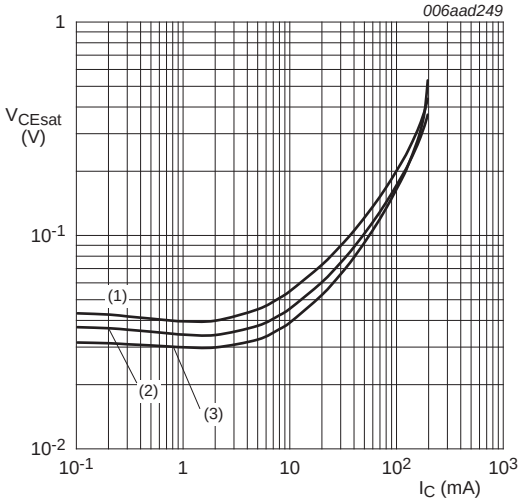
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 14. NXP3875G: Base-emitter saturation voltage as a function of collector currant; typical values



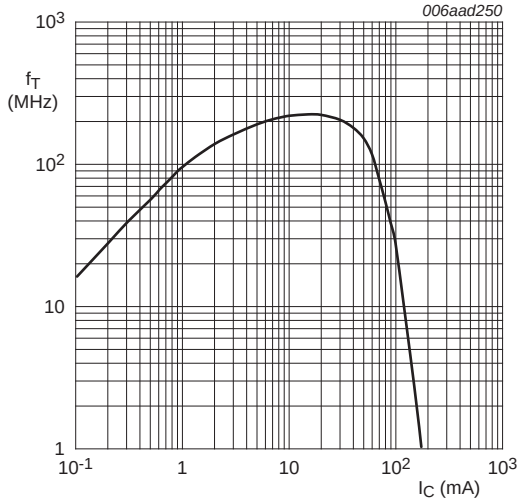
I_C/I_B = 10

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = − 55 °C

Fig 15. NXP3875G: Collector-emmiter saturation voltage as a function of collector current; typical values



V_{CE} = 10 V; T_{amb} = 25 °C

Fig 16. NXP3875G: Transition frequency as a function of collector current; typical values

8. Test information

8.1 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.

9. Package outline

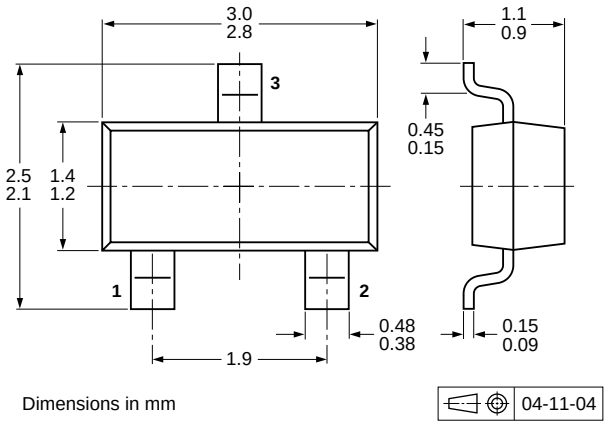


Fig 17. Package outline SOT23 (TO-236AB)

10. Packing information

Table 8. Packing methods

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

Type number	Package	Description	Packing quantity	
			1000	4000
NXP3875Y	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
NXP3875G				

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

11. Soldering

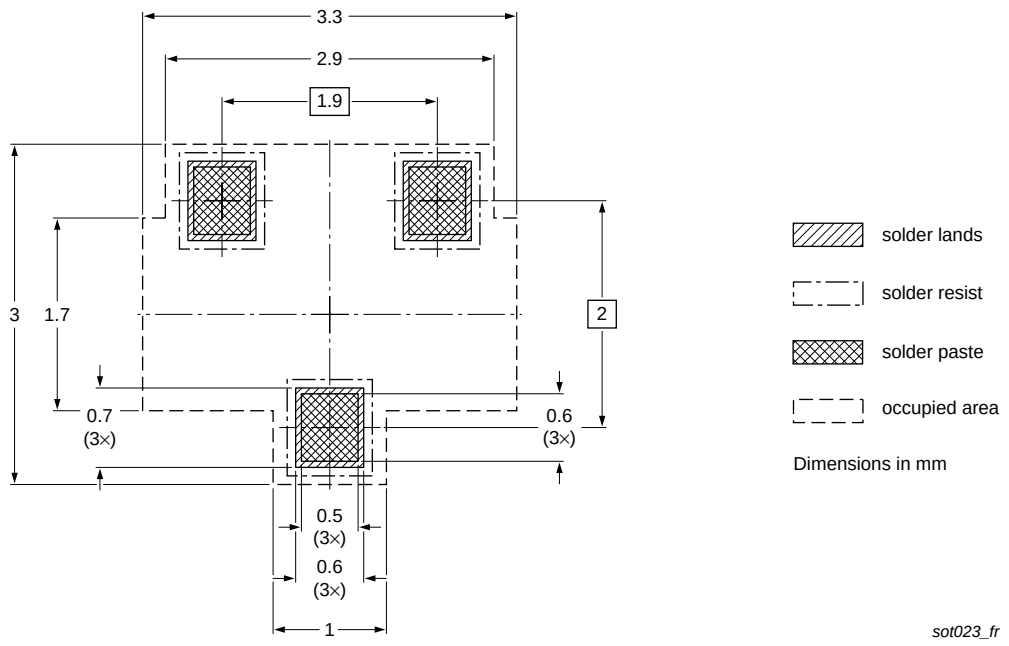


Fig 18. Reflow soldering footprint SOT23 (TO-236AB)

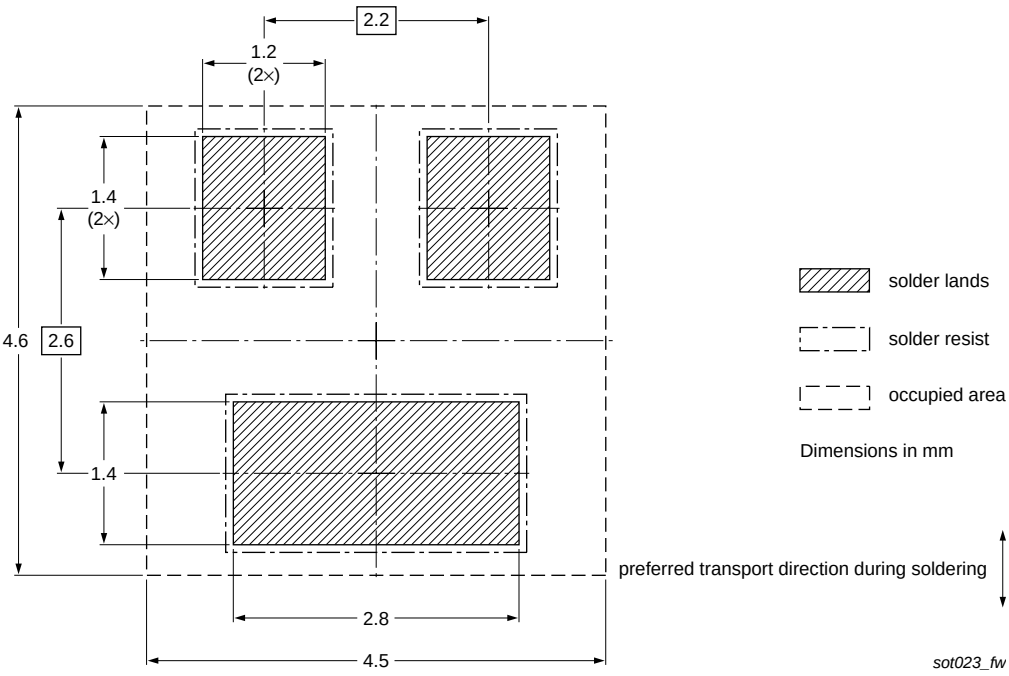


Fig 19. Wave soldering footprint SOT23 (TO-236AB)

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
NXP3875Y_NXP3875G v.1	20121212	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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15. Contents

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Document identifier: NXP3875Y_NXP3875G