



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

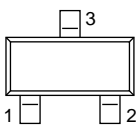
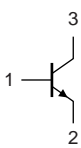
1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CE0}	collector-emitter voltage	open base	-	-	50	V
I_C	collector current		-	-	150	mA
h_{FE}	DC current gain	$V_{CE} = 6\text{ V}; I_C = 2\text{ mA}$				
	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.

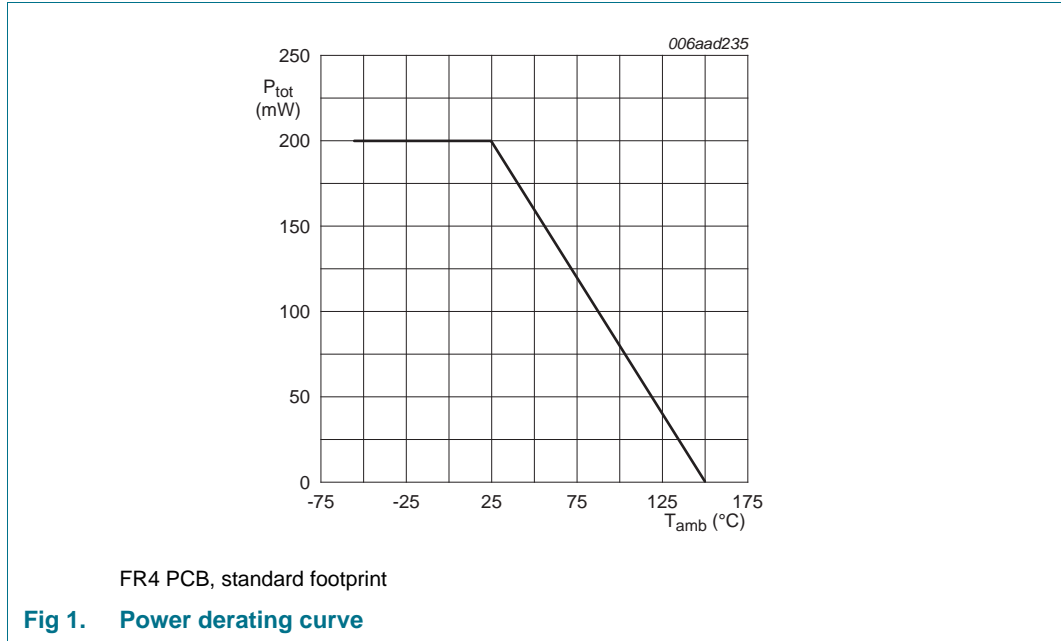
5. Limiting values

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.

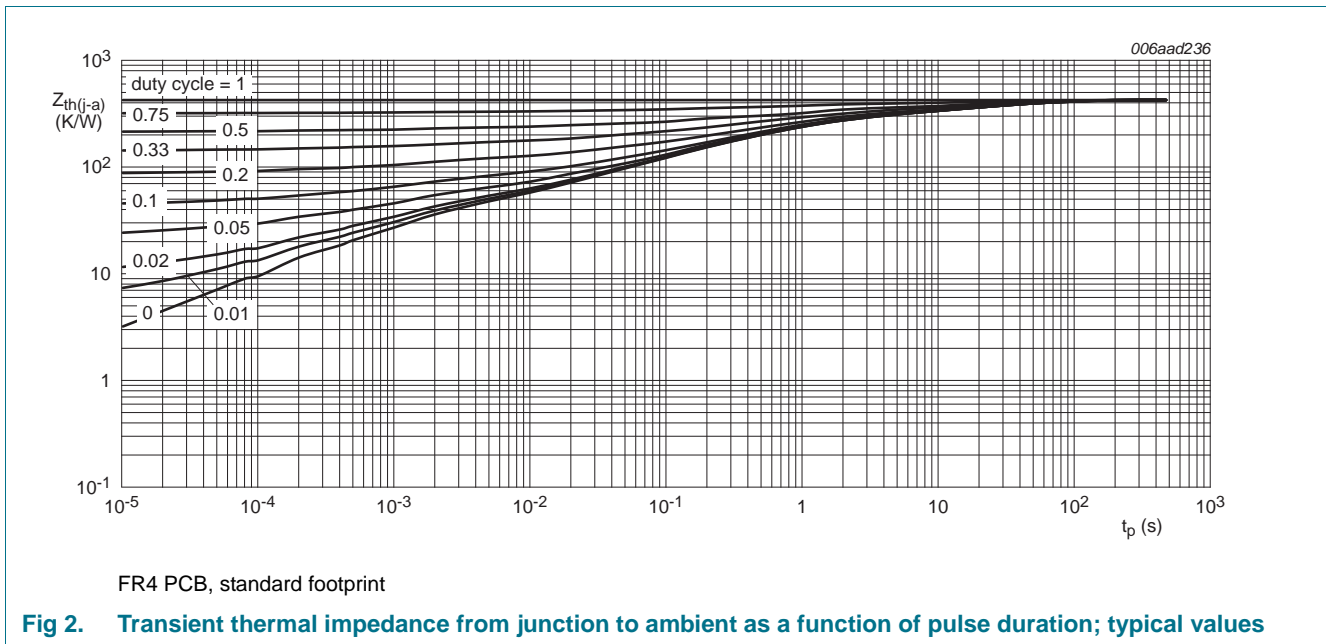


6. Thermal characteristics

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.

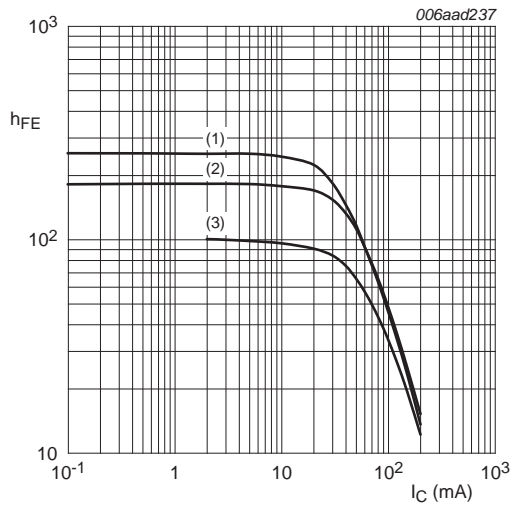


7. Characteristics

Table 7. Characteristics

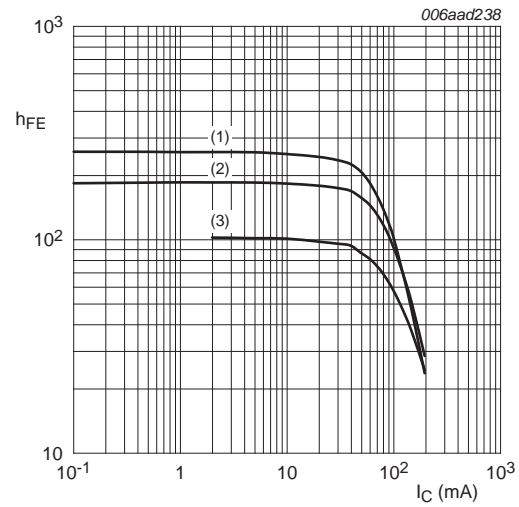
$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = 60\text{ V}; I_E = 0\text{ A}$	-	-	100	nA
		$V_{CB} = 60\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^{\circ}\text{C}$	-	-	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	$V_{CE} = 6\text{ V}; I_C = 2\text{ mA}$				
			NXP3875Y	120	-	240
	NXP3875G	200	-	400		
V_{CEsat}	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 10\text{ mA}$	-	-	250	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 10\text{ mA}$	-	-	1	V
f_T	transition frequency	$V_{CE} = 10\text{ V}; I_C = 1\text{ mA}; f = 100\text{ MHz}$	80	-	-	MHz
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	-	-	3.5	pF
NF	noise figure	$I_C = 0.1\text{ mA}; V_{CE} = 6\text{ V}; R_S = 10\text{ k}\Omega; f = 1\text{ kHz};$	-	-	10	dB



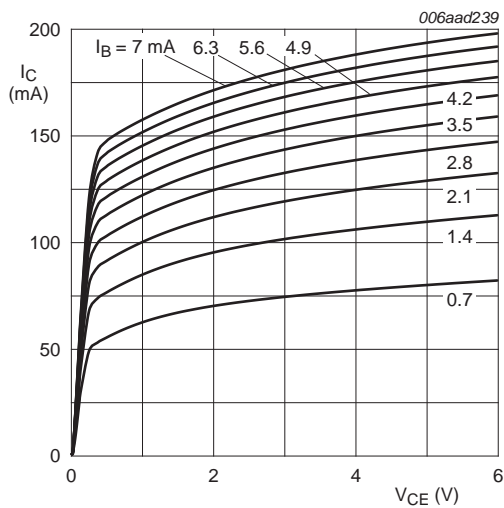
$V_{CE} = 1 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

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



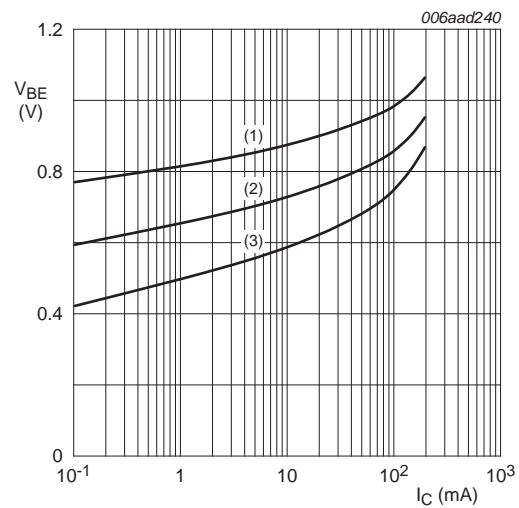
$V_{CE} = 6 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

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



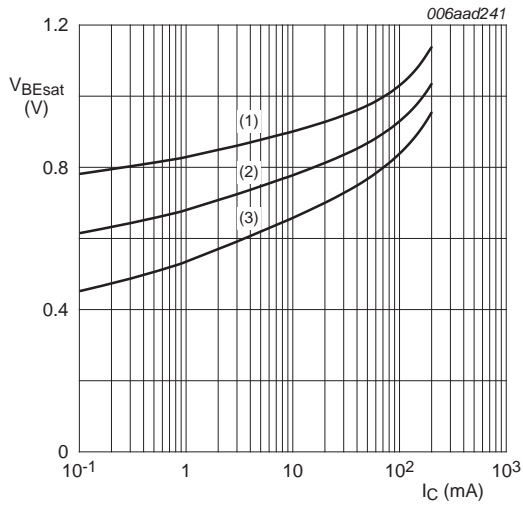
$T_{amb} = 25 \text{ }^\circ\text{C}$

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



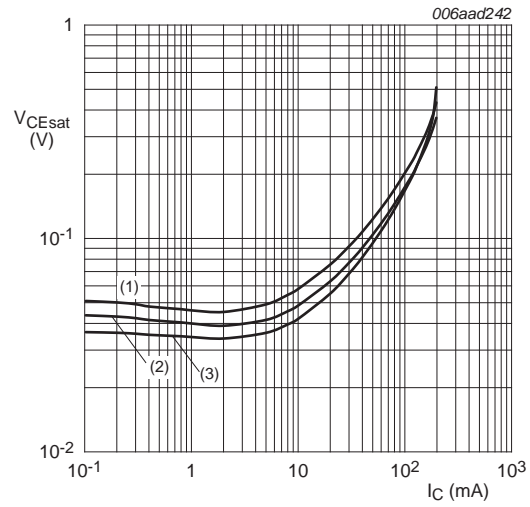
$V_{CE} = 6 \text{ V}$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 100 \text{ }^\circ\text{C}$

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



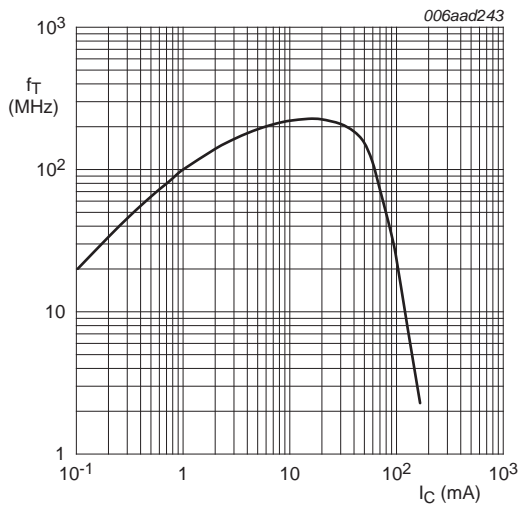
- $I_C/I_B = 10$
- (1) $T_{amb} = -55\text{ °C}$
 - (2) $T_{amb} = 25\text{ °C}$
 - (3) $T_{amb} = 100\text{ °C}$

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



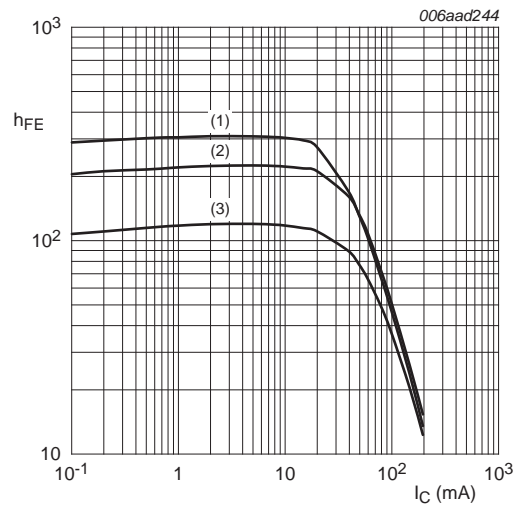
- $I_C/I_B = 10$
- (1) $T_{amb} = 100\text{ °C}$
 - (2) $T_{amb} = 25\text{ °C}$
 - (3) $T_{amb} = -55\text{ °C}$

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



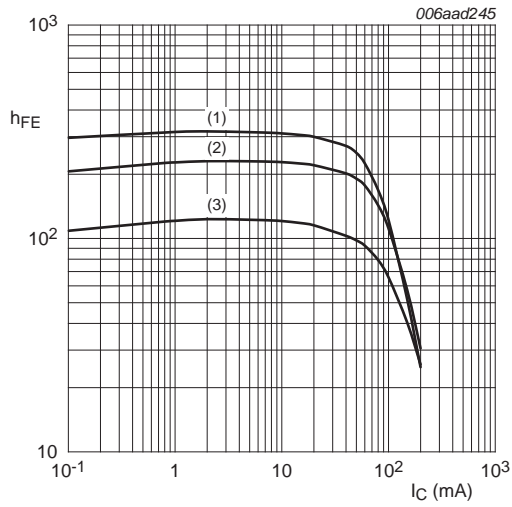
$V_{CE} = 10\text{ V}; T_{amb} = 25\text{ °C}$

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



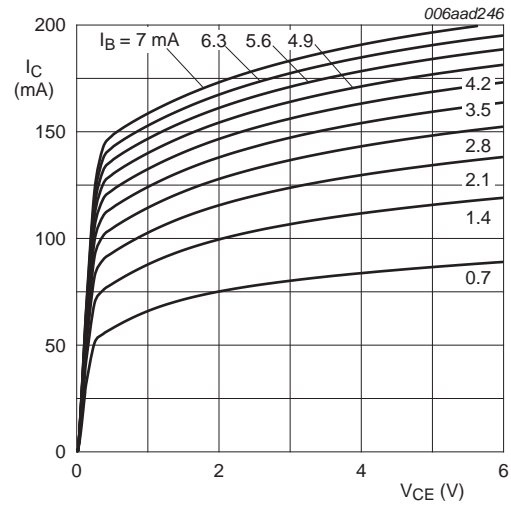
- $V_{CE} = 1\text{ V}$
- (1) $T_{amb} = 100\text{ °C}$
 - (2) $T_{amb} = 25\text{ °C}$
 - (3) $T_{amb} = -55\text{ °C}$

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



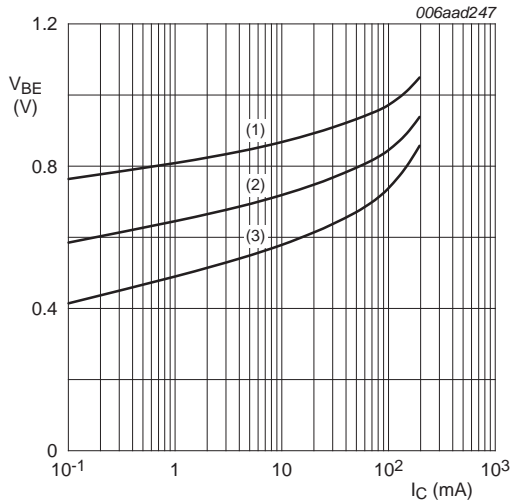
$V_{CE} = 6\text{ V}$
 (1) $T_{amb} = 100\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



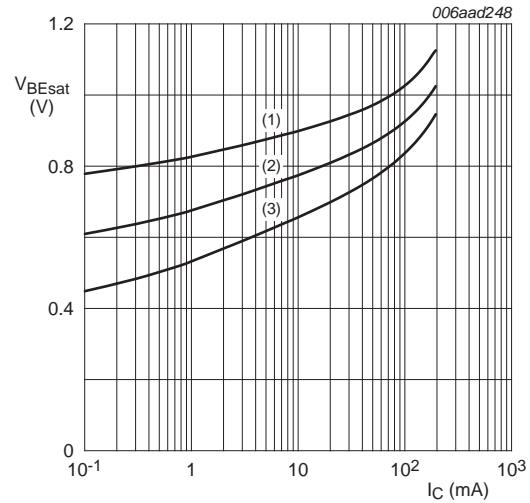
$T_{amb} = 25\text{ °C}$

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



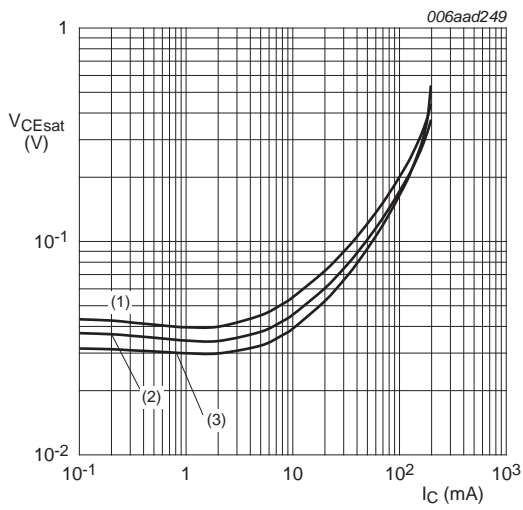
$V_{CE} = 6\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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



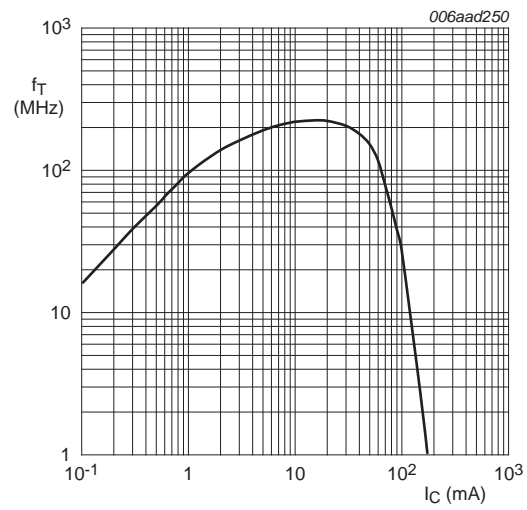
$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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



- $I_C/I_B = 10$
- (1) $T_{amb} = 100\text{ °C}$
 - (2) $T_{amb} = 25\text{ °C}$
 - (3) $T_{amb} = -55\text{ °C}$

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



$V_{CE} = 10\text{ V}; T_{amb} = 25\text{ °C}$

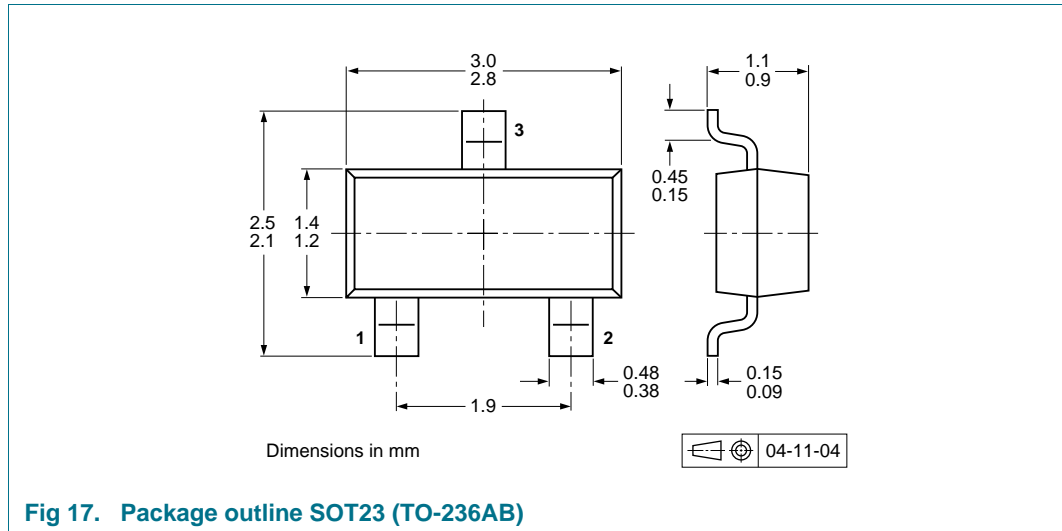
Fig 16. NXP3875G: Transition frequency as a function of collector current; typical values

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



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

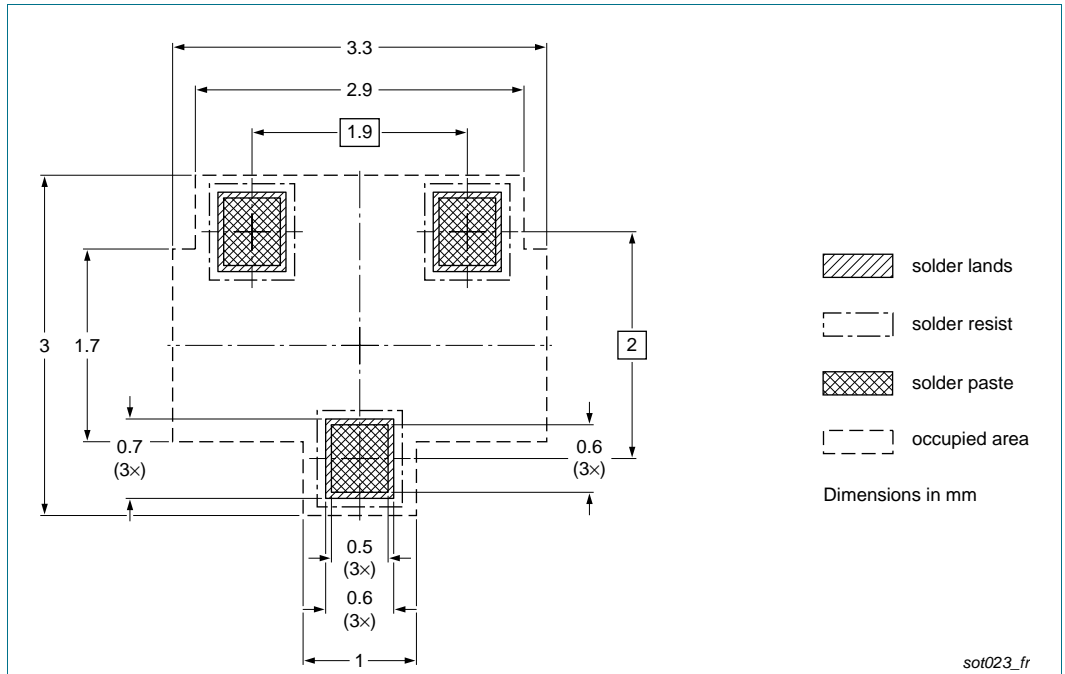


Fig 18. Reflow soldering footprint SOT23 (TO-236AB)

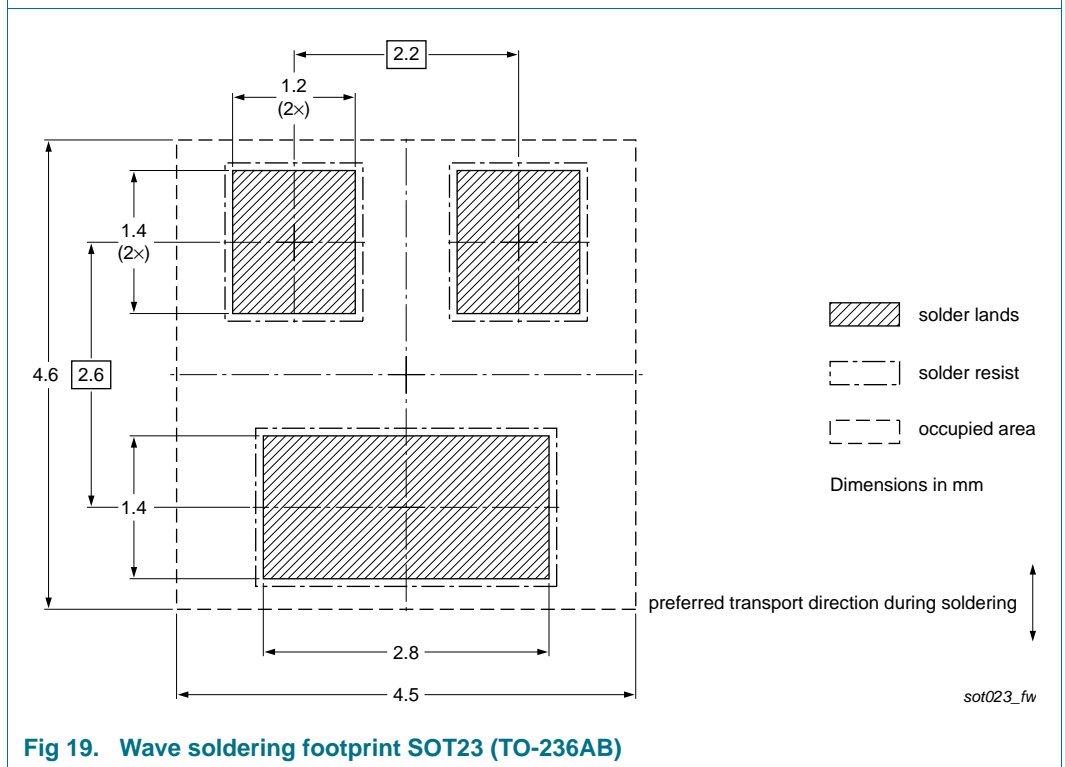


Fig 19. Wave soldering footprint SOT23 (TO-236AB)

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

1	Product profile	1
1.1	General description	1
1.2	Features and benefits	1
1.3	Applications	1
1.4	Quick reference data	1
2	Pinning information	1
3	Ordering information	2
4	Marking	2
5	Limiting values	2
6	Thermal characteristics	3
7	Characteristics	4
8	Test information	8
8.1	Quality information	8
9	Package outline	9
10	Packing information	9
11	Soldering	10
12	Revision history	11
13	Legal information	12
13.1	Data sheet status	12
13.2	Definitions	12
13.3	Disclaimers	12
13.4	Trademarks	13
14	Contact information	13
15	Contents	14

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Date of release: 12 December 2012

Document identifier: NXP3875Y_NXP3875G



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