

NXP3875YR Datasheet



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DiGi Electronics Part Number	NXP3875YR-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	NXP3875YR
Description	TRANS NPN 50V 0.15A TO236AB
Detailed Description	Bipolar (BJT) Transistor NPN 50 V 150 mA 80MHz 200 mW Surface Mount TO-236AB



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Purchase and inquiry

Manufacturer Product Number:

NXP3875YR

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

50 V

Current - Collector Cutoff (Max):

100nA (ICBO)

Power - Max:

200 mW

Operating Temperature:

150°C (TJ)

Qualification:

AEC-Q101

Package / Case:

TO-236-3, SC-59, SOT-23-3

Base Product Number:

NXP3875

Manufacturer:

Nexperia USA Inc.

Product Status:

Active

Current - Collector (Ic) (Max):

150 mA

Vce Saturation (Max) @ Ib, Ic:

250mV @ 10mA, 100mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

120 @ 2mA, 6V

Frequency - Transition:

80MHz

Grade:

Automotive

Mounting Type:

Surface Mount

Supplier Device Package:

TO-236AB

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



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.

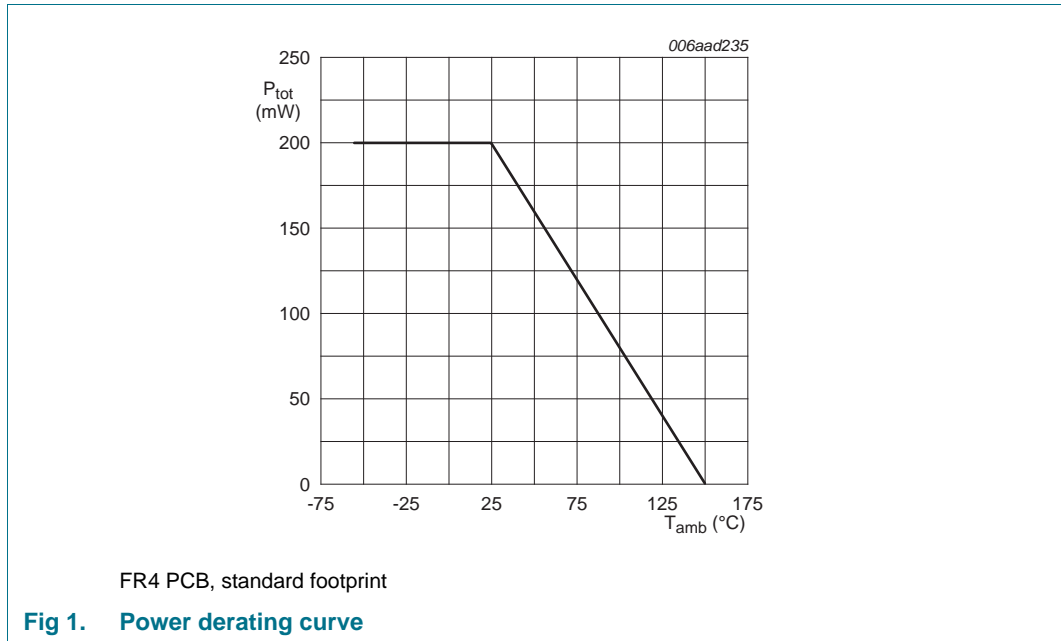
5. Limiting values

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.

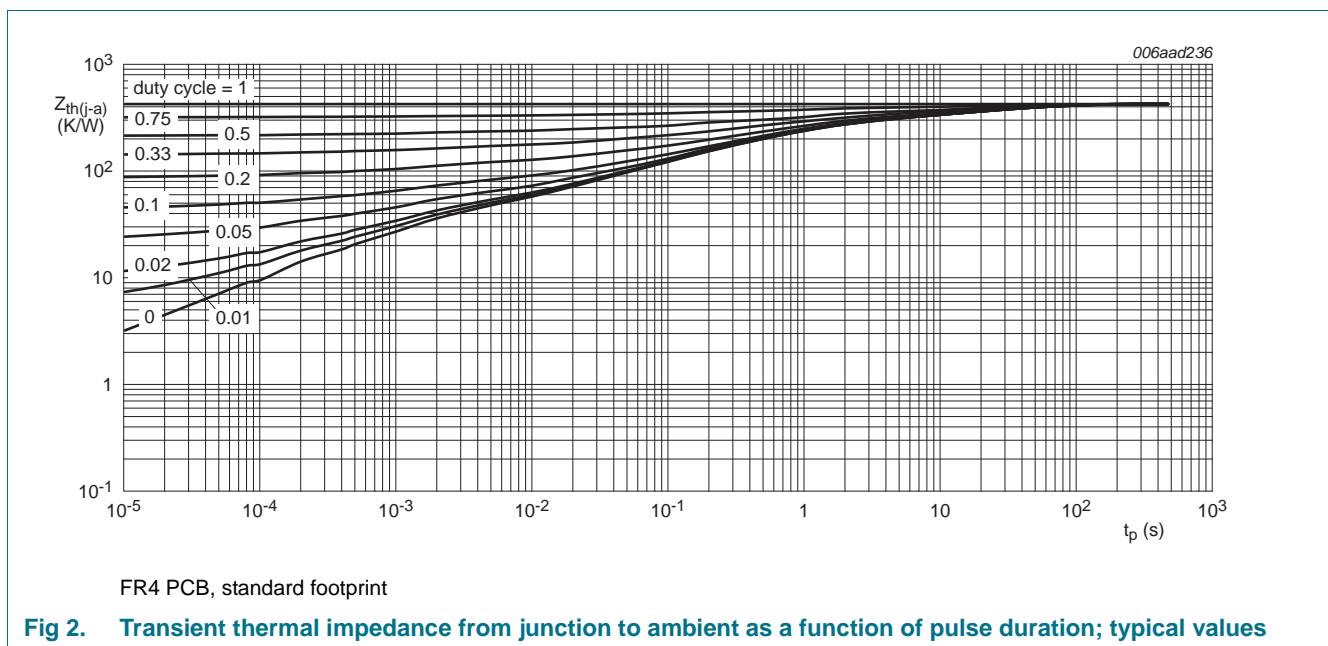


6. Thermal characteristics

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.

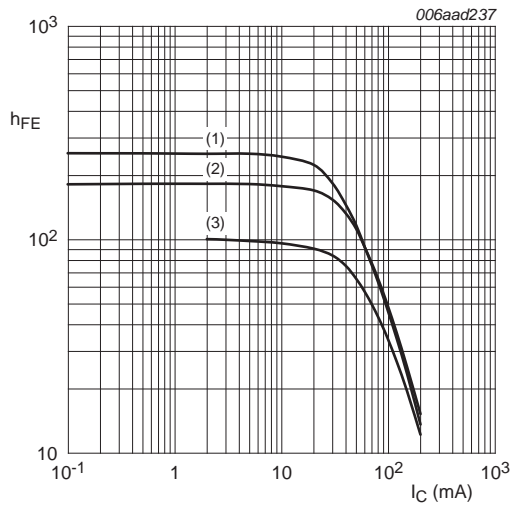


7. Characteristics

Table 7. Characteristics

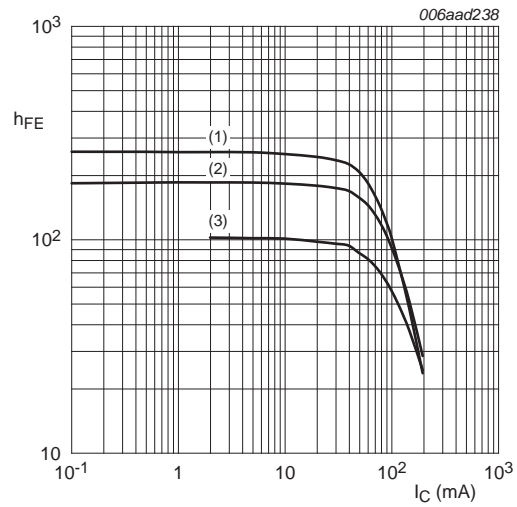
$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

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	



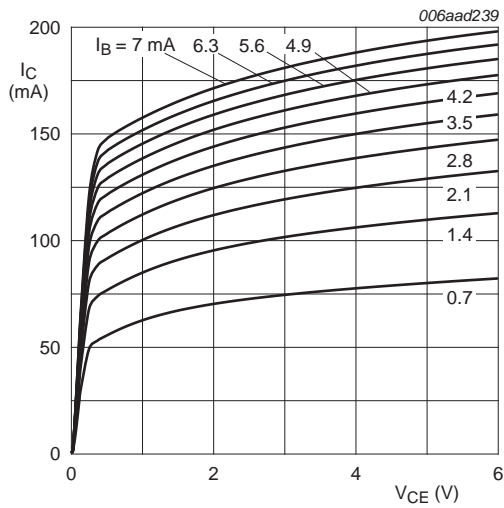
$V_{CE} = 1 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

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



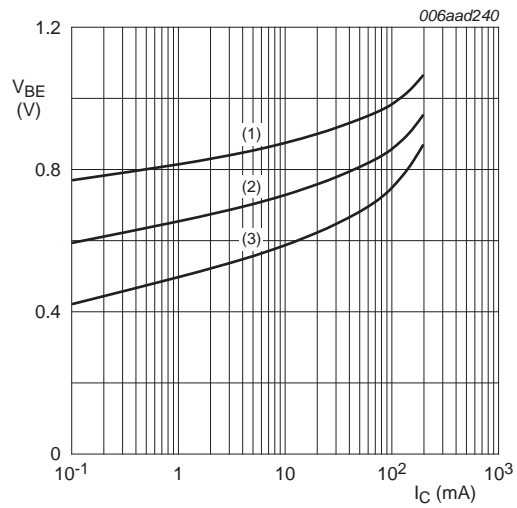
$V_{CE} = 6 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

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



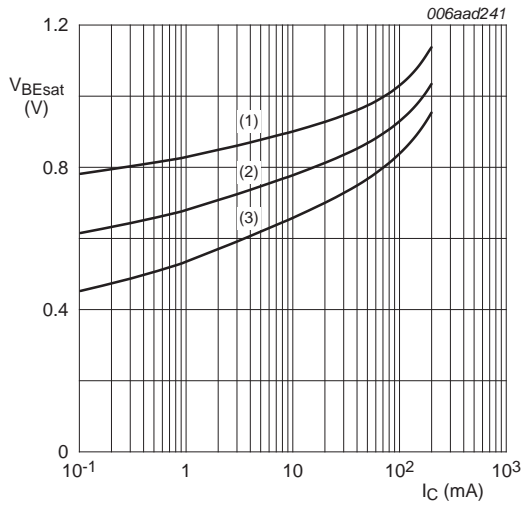
$T_{amb} = 25 \text{ }^\circ\text{C}$

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



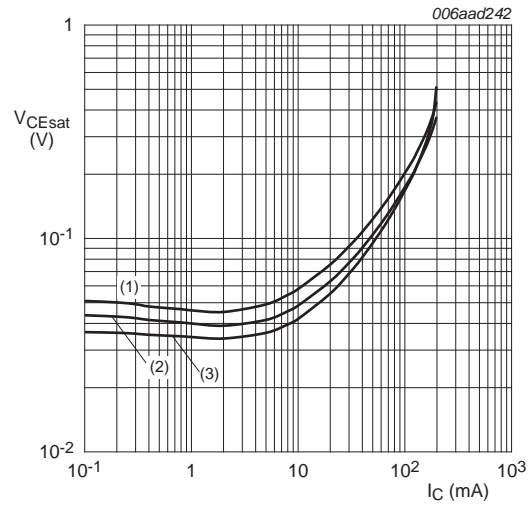
$V_{CE} = 6 \text{ V}$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 100 \text{ }^\circ\text{C}$

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



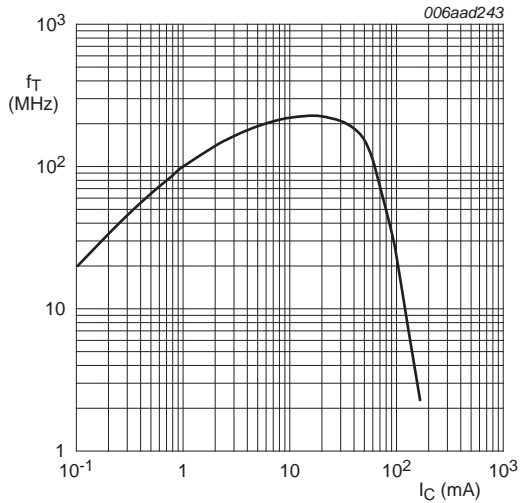
$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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



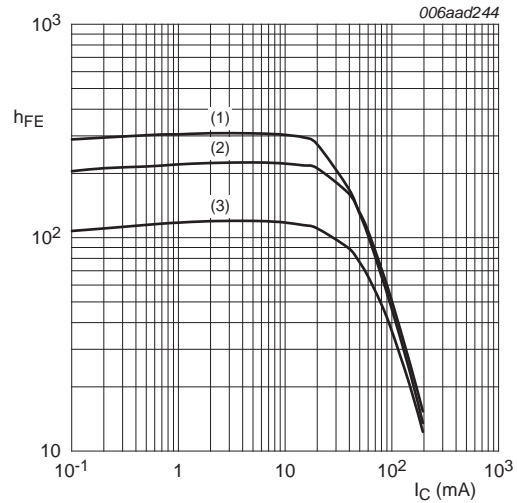
$I_C/I_B = 10$
 (1) $T_{amb} = 100\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



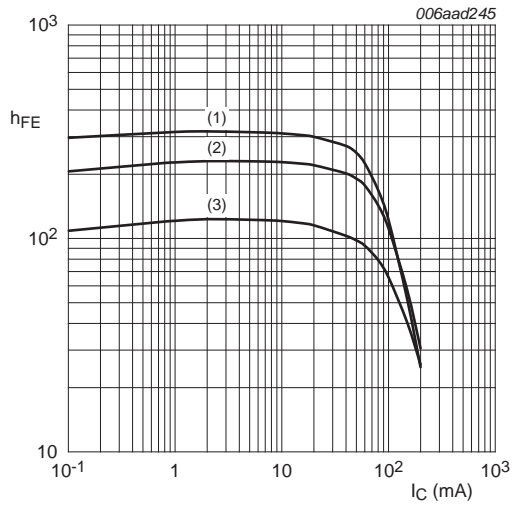
$V_{CE} = 10\text{ V}; T_{amb} = 25\text{ °C}$

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



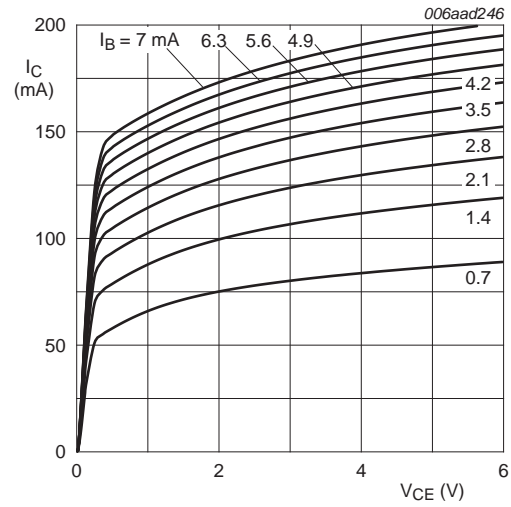
$V_{CE} = 1\text{ V}$
 (1) $T_{amb} = 100\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



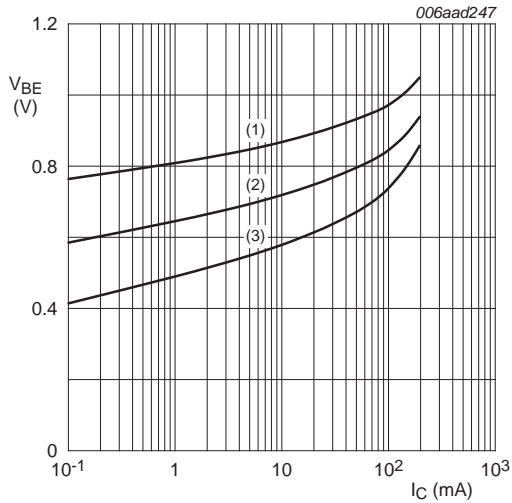
$V_{CE} = 6\text{ V}$
 (1) $T_{amb} = 100\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



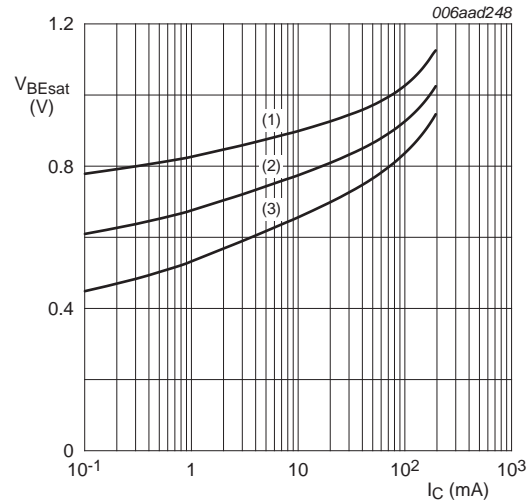
$T_{amb} = 25\text{ °C}$

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



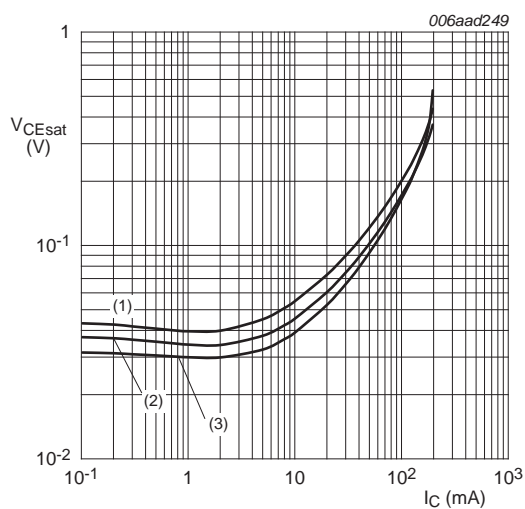
$V_{CE} = 6\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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) $T_{amb} = 100\text{ °C}$

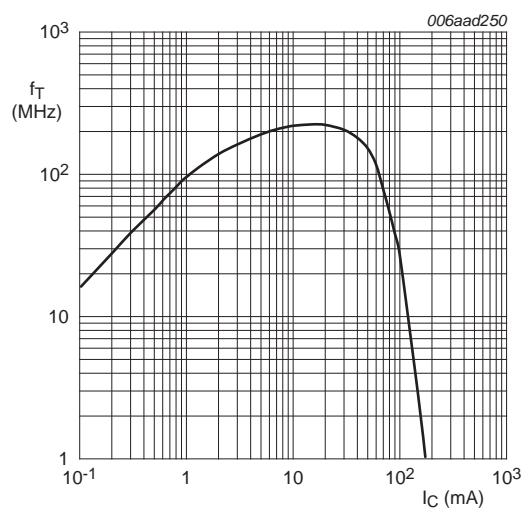
Fig 14. NXP3875G: Base-emitter saturation voltage as a function of collector current; typical values



$$I_C/I_B = 10$$

- (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



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

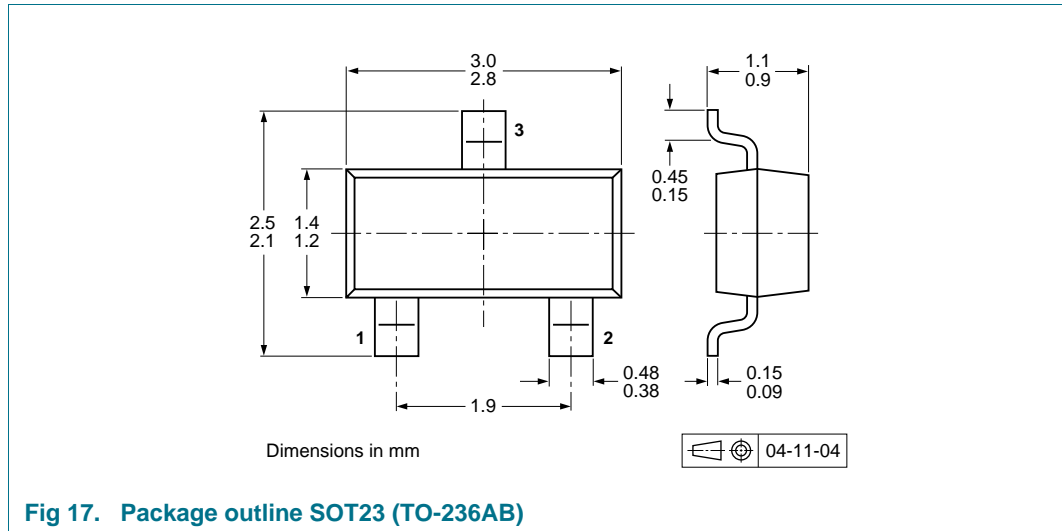
Fig 16. NXP3875G: Transition frequency as a function of collector current; typical values

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

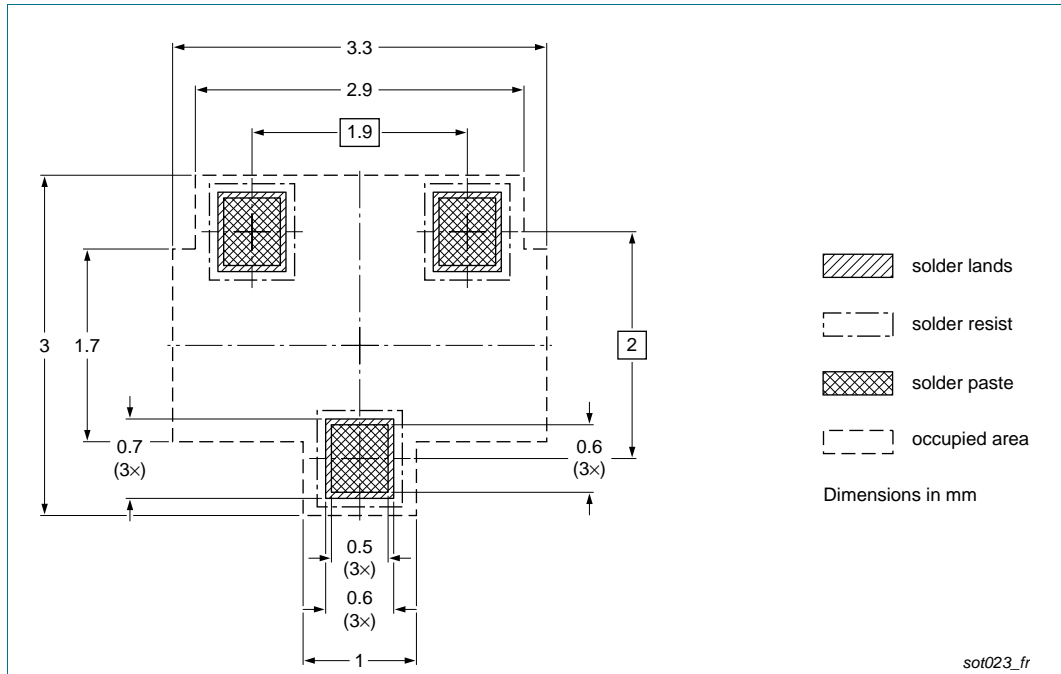


Fig 18. Reflow soldering footprint SOT23 (TO-236AB)

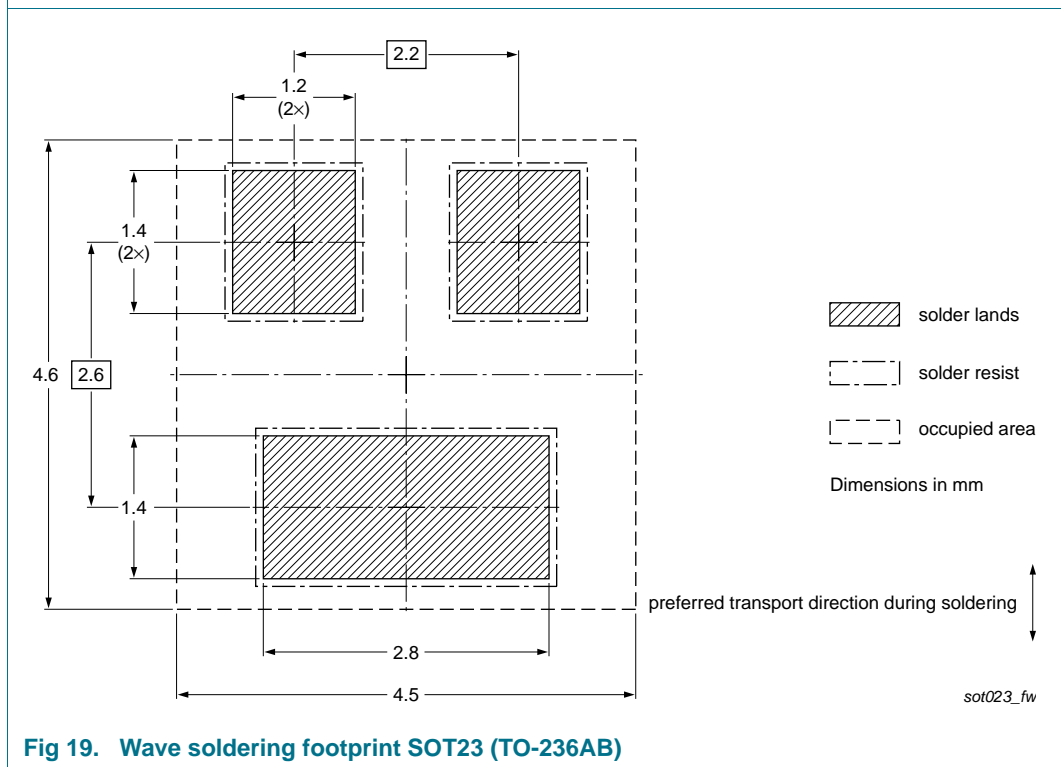


Fig 19. Wave soldering footprint SOT23 (TO-236AB)

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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