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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 |
|-----------|---------------------------|------------------------------------------|-----|-----|-----|------|
| $V_{CE0}$ | 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 <sup>[1]</sup> |
|-------------|-----------------------------|
| NXP3875Y    | *JE                         |
| NXP3875G    | *JF                         |

[1] \* = placeholder for manufacturing site code.

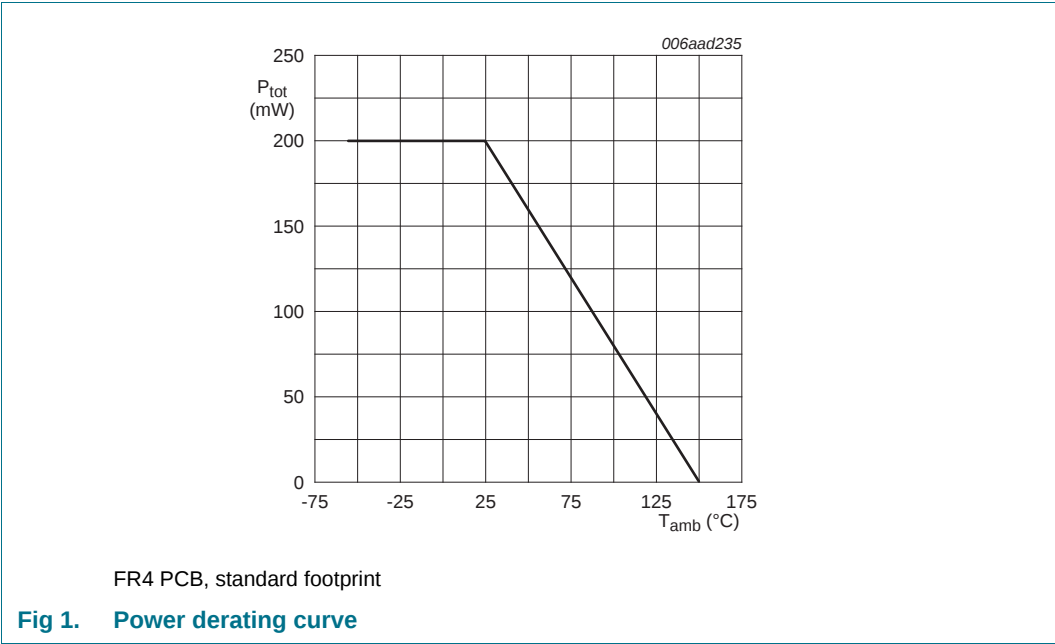
### 5. Limiting values

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;<br>$t_p \leq 1$ ms | -                | 200  | mA   |
| $I_B$     | base current              |                                  |                  | 30   | mA   |
| $I_{BM}$  | peak base current         | single pulse;<br>$t_p \leq 1$ ms | -                | 100  | mA   |
| $P_{tot}$ | total power dissipation   | $T_{amb} \leq 25$ °C             | <sup>[1]</sup> - | 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.

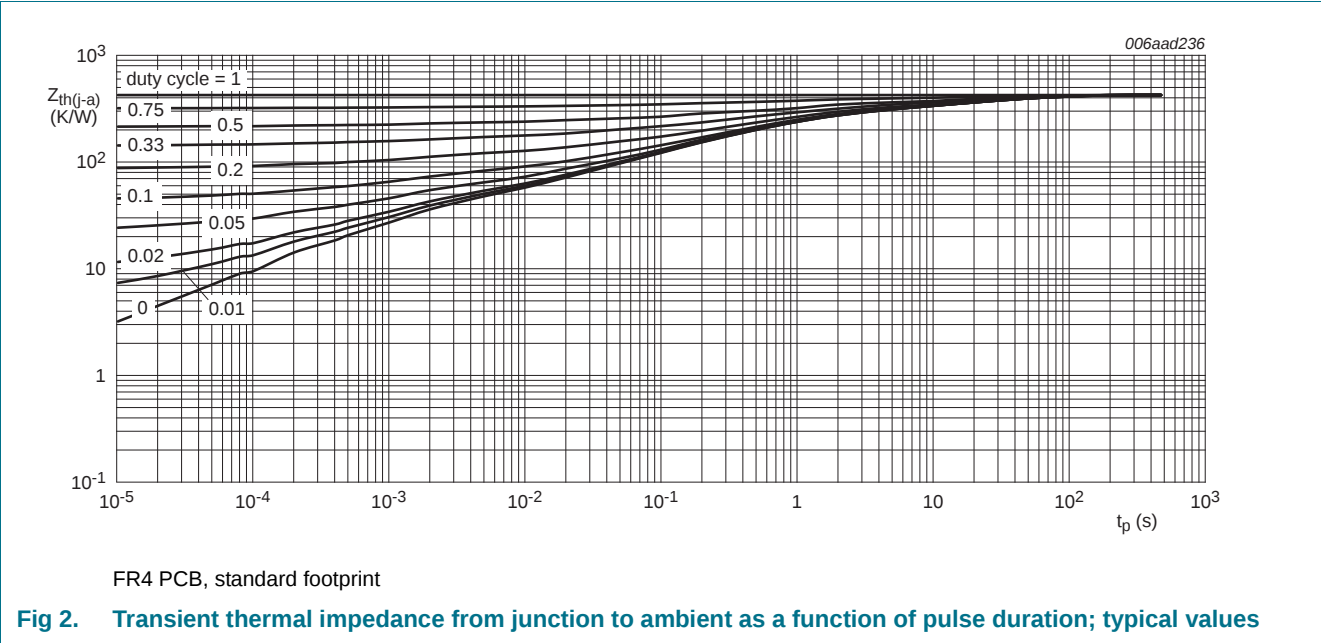


6. Thermal characteristics

Table 6. Thermal characteristics

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

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

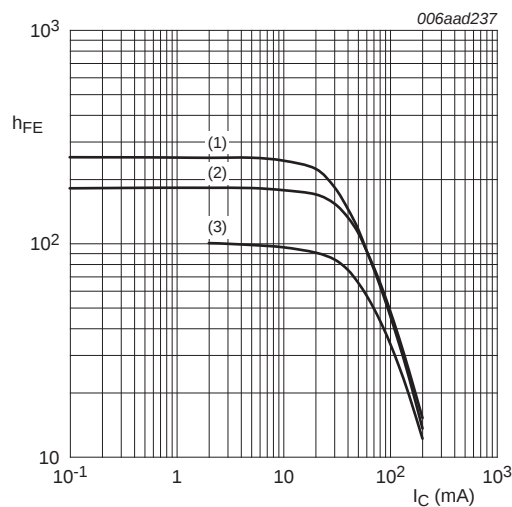


## 7. Characteristics

**Table 7. Characteristics**

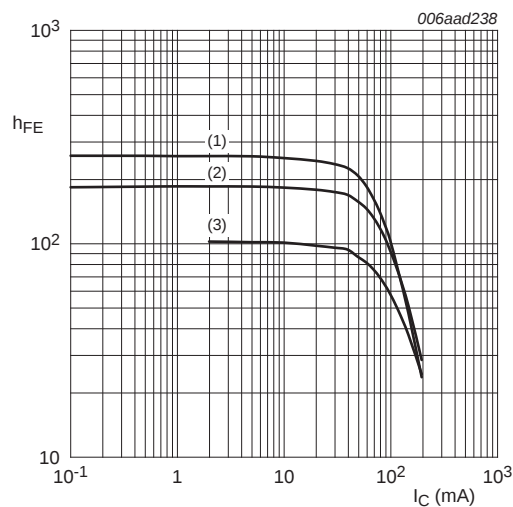
$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| 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   | $\mu\text{A}$ |
| $I_{EBO}$   | 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            |



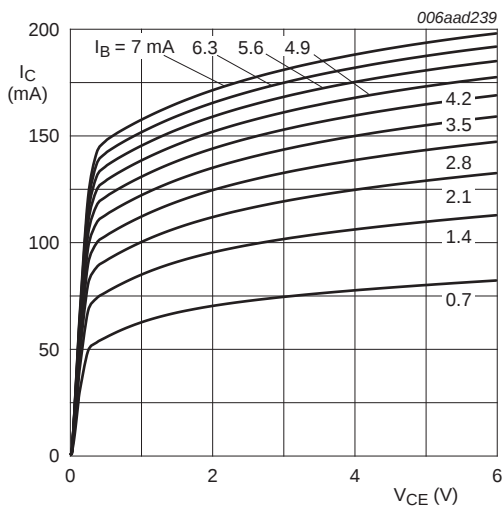
$V_{CE} = 1$  V  
(1)  $T_{amb} = 100$  °C  
(2)  $T_{amb} = 25$  °C  
(3)  $T_{amb} = -55$  °C

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



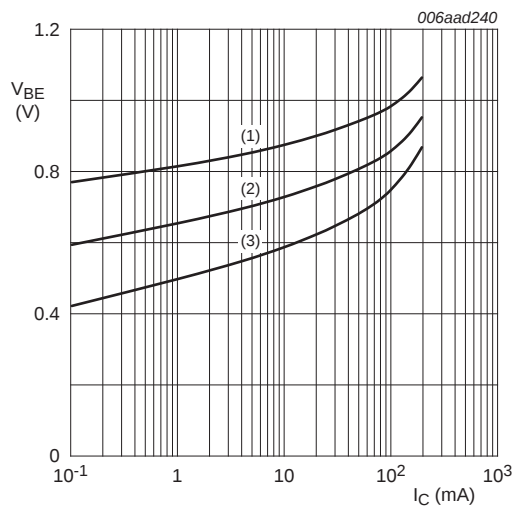
$V_{CE} = 6$  V  
(1)  $T_{amb} = 100$  °C  
(2)  $T_{amb} = 25$  °C  
(3)  $T_{amb} = -55$  °C

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



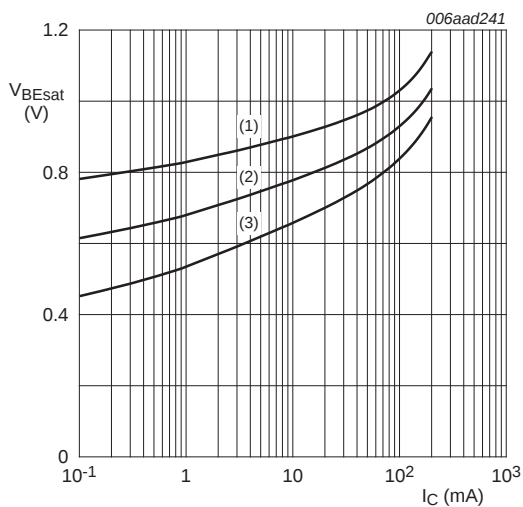
$T_{amb} = 25$  °C

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



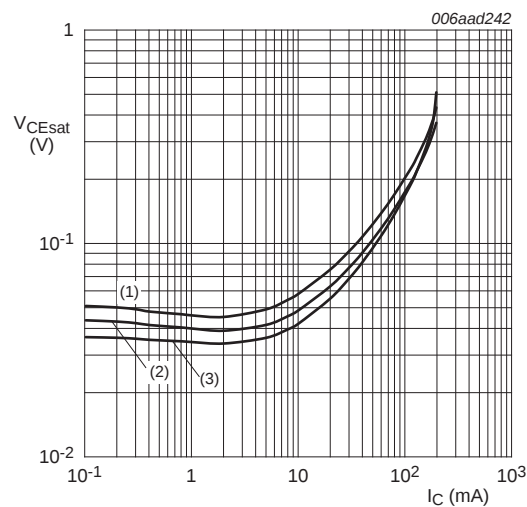
$V_{CE} = 6$  V  
(1)  $T_{amb} = -55$  °C  
(2)  $T_{amb} = 25$  °C  
(3)  $T_{amb} = 100$  °C

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



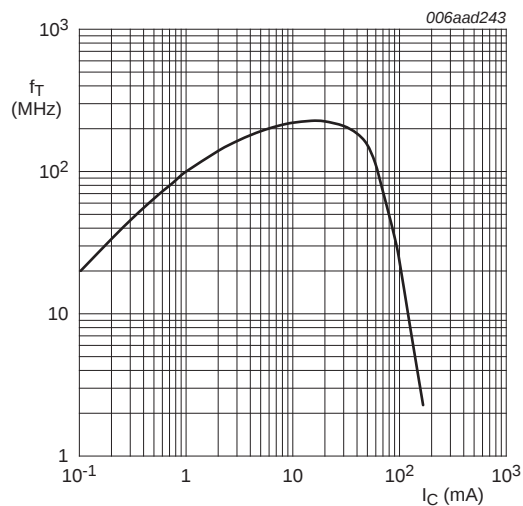
- $I_C/I_B = 10$
- (1)  $T_{amb} = -55^\circ\text{C}$
  - (2)  $T_{amb} = 25^\circ\text{C}$
  - (3)  $T_{amb} = 100^\circ\text{C}$

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



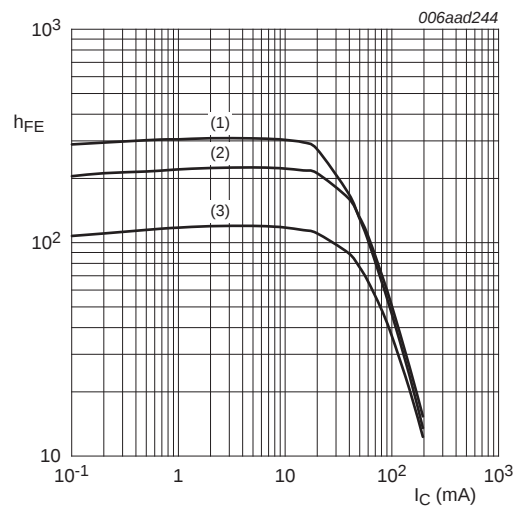
- $I_C/I_B = 10$
- (1)  $T_{amb} = 100^\circ\text{C}$
  - (2)  $T_{amb} = 25^\circ\text{C}$
  - (3)  $T_{amb} = -55^\circ\text{C}$

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



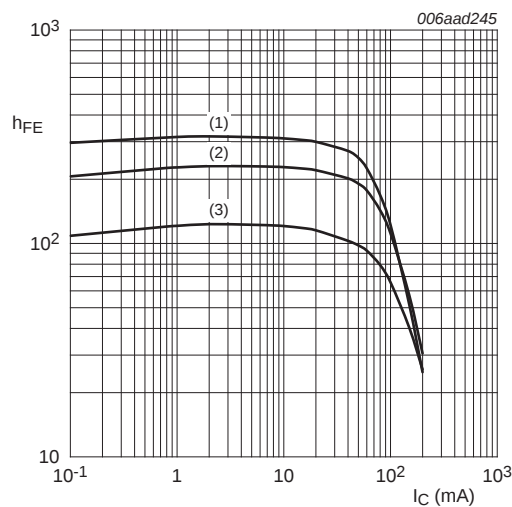
$V_{CE} = 10\text{ V}; T_{amb} = 25^\circ\text{C}$

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



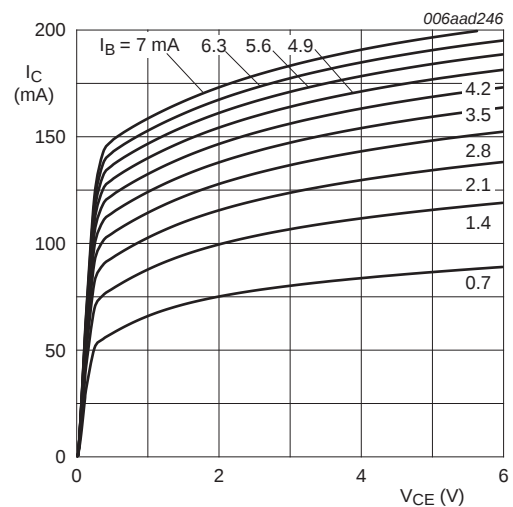
- $V_{CE} = 1\text{ V}$
- (1)  $T_{amb} = 100^\circ\text{C}$
  - (2)  $T_{amb} = 25^\circ\text{C}$
  - (3)  $T_{amb} = -55^\circ\text{C}$

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



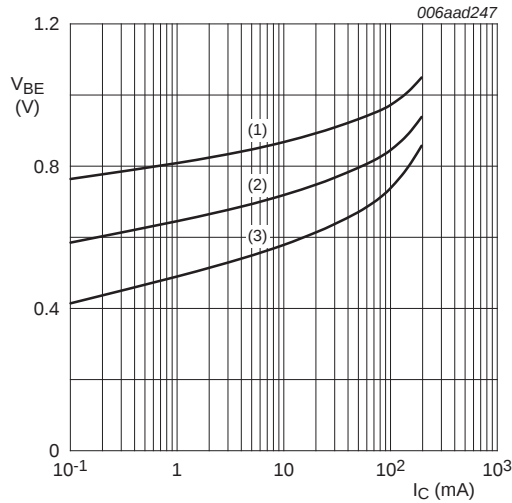
- $V_{CE} = 6\text{ V}$
- (1)  $T_{amb} = 100\text{ }^{\circ}\text{C}$
  - (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
  - (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

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



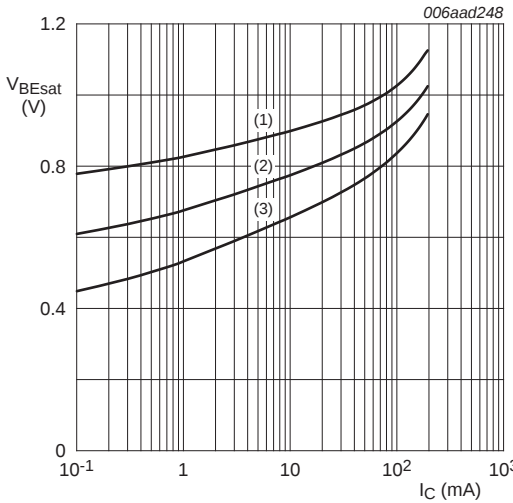
$T_{amb} = 25\text{ }^{\circ}\text{C}$

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



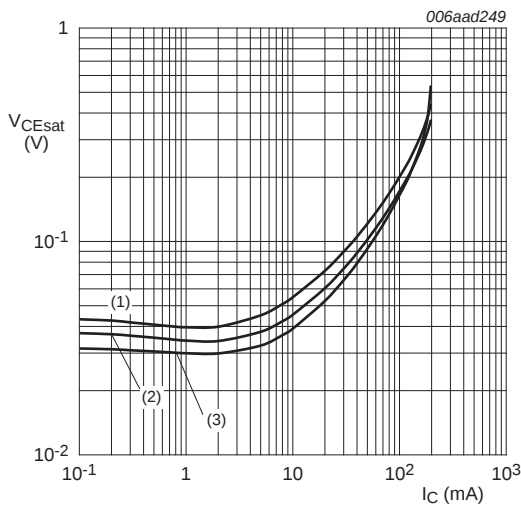
- $V_{CE} = 6\text{ V}$
- (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$
  - (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
  - (3)  $T_{amb} = 100\text{ }^{\circ}\text{C}$

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



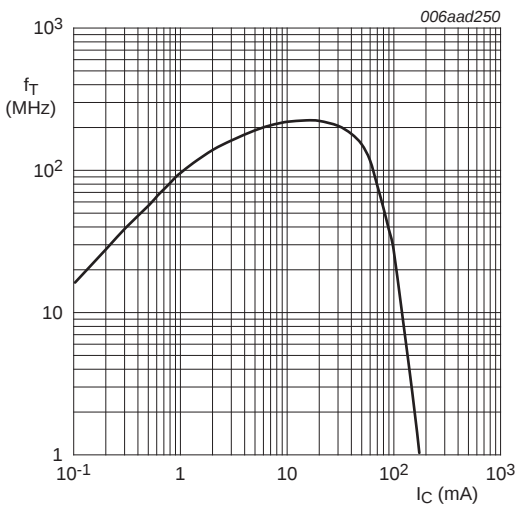
- $I_C/I_B = 10$
- (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$
  - (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
  - (3)  $T_{amb} = 100\text{ }^{\circ}\text{C}$

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



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

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



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

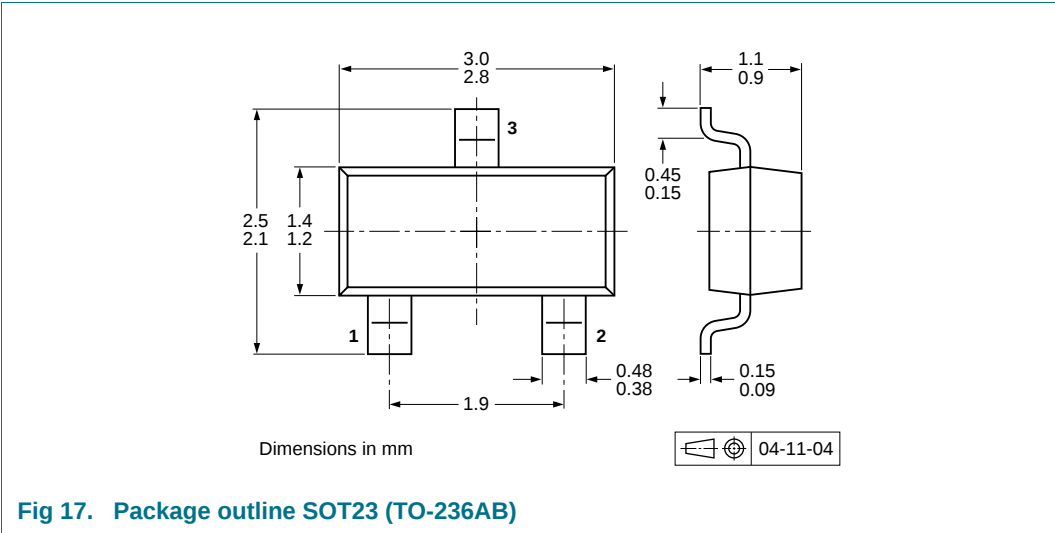
Fig 16. NXP3875G: Transition frequency as a function of collector current; typical values

## 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

| 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

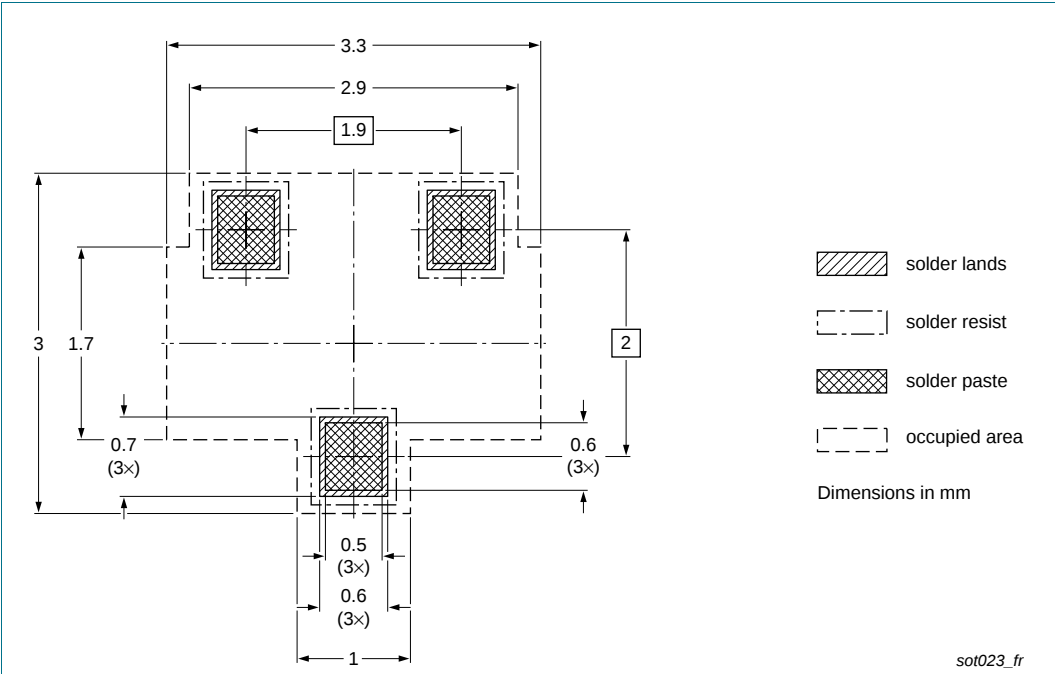


Fig 18. Reflow soldering footprint SOT23 (TO-236AB)

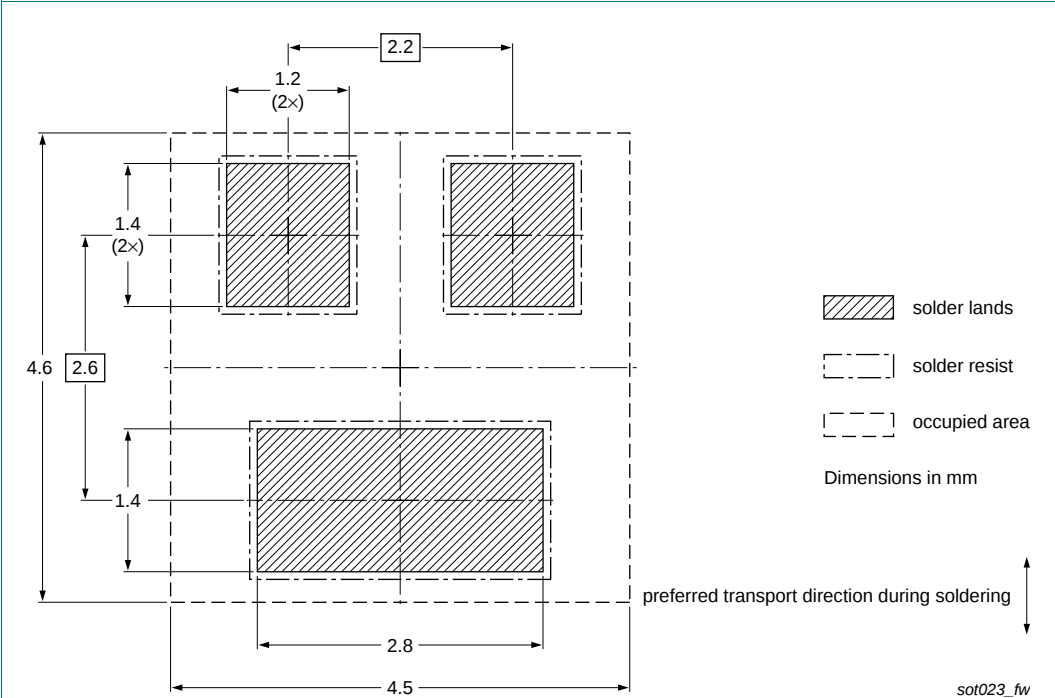


Fig 19. Wave soldering footprint SOT23 (TO-236AB)

## 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 <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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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Date of release: 12 December 2012

Document identifier: NXP3875Y\_NXP3875G



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- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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