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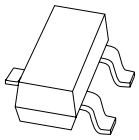
Team Nexperia



# PMBTA42

## 300 V, 100 mA NPN high-voltage transistor

Rev. 05 — 12 December 2008 Product data sheet

## 1. Product profile

### 1.1 General description

NPN high-voltage transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

PNP complement: PMBTA92.

### 1.2 Features

- High voltage (max. 300 V)

### 1.3 Applications

- Telephony and professional communication equipment

### 1.4 Quick reference data

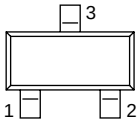
**Table 1. Quick reference data**

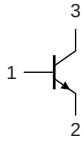
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | open base | - | - | 300 | V |
| $I_C$ | collector current | | - | - | 100 | mA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = 10 V | | | | |
| | | $I_C$ = 1 mA | 25 | - | - | |
| | | $I_C$ = 10 mA | 40 | - | - | |
| | | $I_C$ = 30 mA | 40 | - | - | |

## 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[1] | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMBTA42 | - | plastic surface-mounted package; 3 leads | SOT23 |
| PMBTA42/DG | | | |

[1] /DG: halogen-free

## 4. Marking

**Table 4. Marking codes**

| Type number[1] | Marking code[2] |
|---|---|
| PMBTA42 | *1D |
| PMBTA42/DG | *BV |

[1] /DG: halogen-free

[2] * = -: made in Hong Kong
* = p: made in Hong Kong
* = t: made in Malaysia
* = W: made in China

## 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 | | - | 300 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | | - | 300 | 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 |
| $I_{BM}$ | peak base current | single pulse; $t_p \leq 1$ ms | | - | 100 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 250 | 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] | - | - | 500 | K/W |

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

## 7. Characteristics

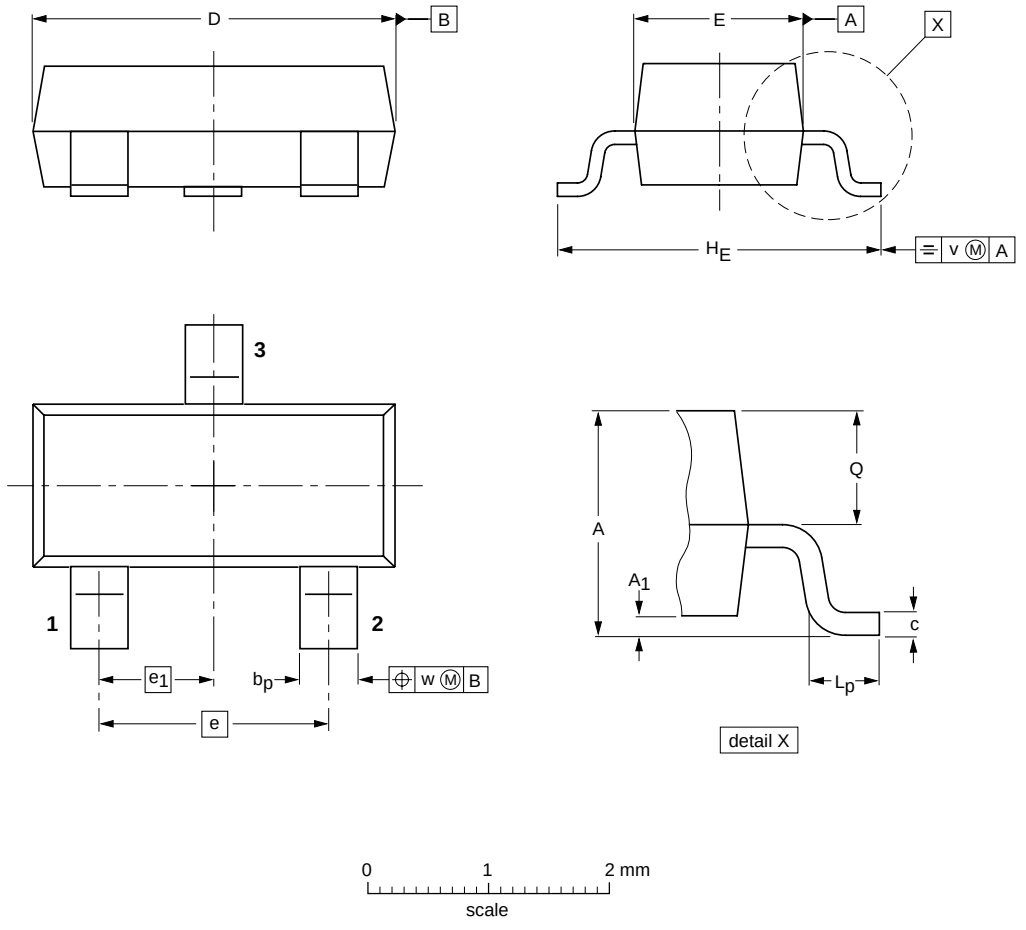
**Table 7. Characteristics**

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{CBO}$ | collector-base cut-off current | $V_{CB}$ = 200 V; $I_E$ = 0 A | - | - | 100 | nA |
| $I_{EBO}$ | emitter-base cut-off current | $V_{EB}$ = 6 V; $I_C$ = 0 A | - | - | 100 | nA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = 10 V | | | | |
| | | $I_C$ = 1 mA | 25 | - | - | |
| | | $I_C$ = 10 mA | 40 | - | - | |
| | | $I_C$ = 30 mA | 40 | - | - | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = 20 mA; $I_B$ = 2 mA | - | - | 500 | mV |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C$ = 20 mA; $I_B$ = 2 mA | - | - | 900 | mV |
| $C_{re}$ | feedback capacitance | $V_{CB}$ = 20 V; $I_C$ = $i_c$ = 0 A; f = 1 MHz | - | - | 3 | pF |
| $f_T$ | transition frequency | $V_{CE}$ = 20 V; $I_C$ = 10 mA; f = 100 MHz | 50 | - | - | MHz |

## 8. Package outline

**Plastic surface-mounted package; 3 leads** **SOT23**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max. | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.9 | 0.1 | 0.48<br>0.38 | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95 | 2.5<br>2.1 | 0.45<br>0.15 | 0.55<br>0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT23 | | TO-236AB | | | | ~~04-11-04~~<br>06-03-16 |

**Fig 1. Package outline SOT23 (TO-236AB)**

## 9. 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 | |
|---|---|---|---|---|
| | | | 3000 | 10000 |
| PMBTA42 | SOT23 | 4 mm pitch, 8 mm tape and reel | -215 | -235 |
| PMBTA42/DG | | | | |

[1] For further information and the availability of packing methods, see Section 13.

[2] /DG: halogen-free

## 10. Soldering

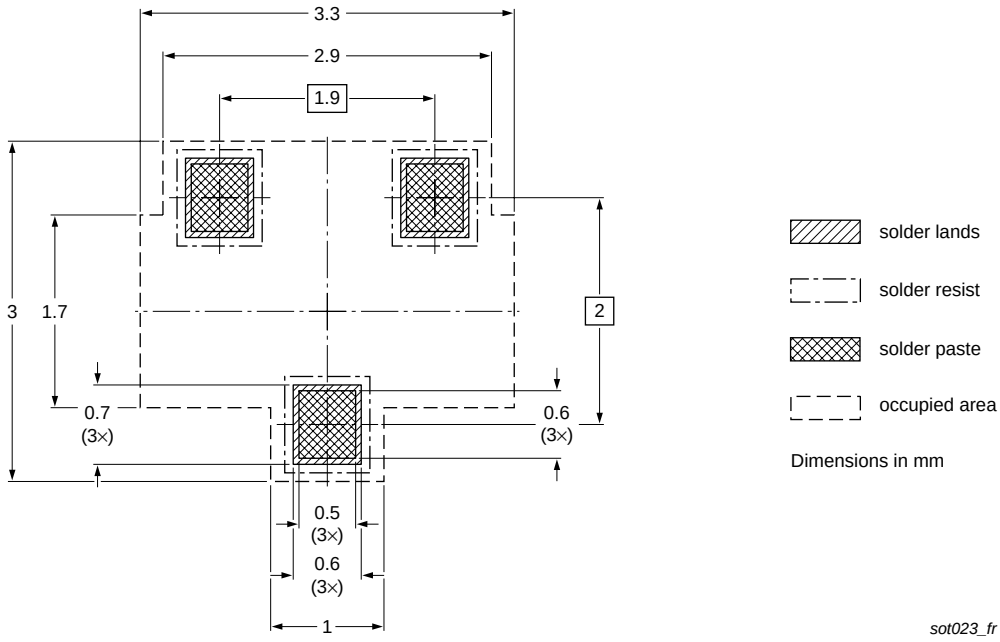



**Fig 2. Reflow soldering footprint SOT23 (TO-236AB)**

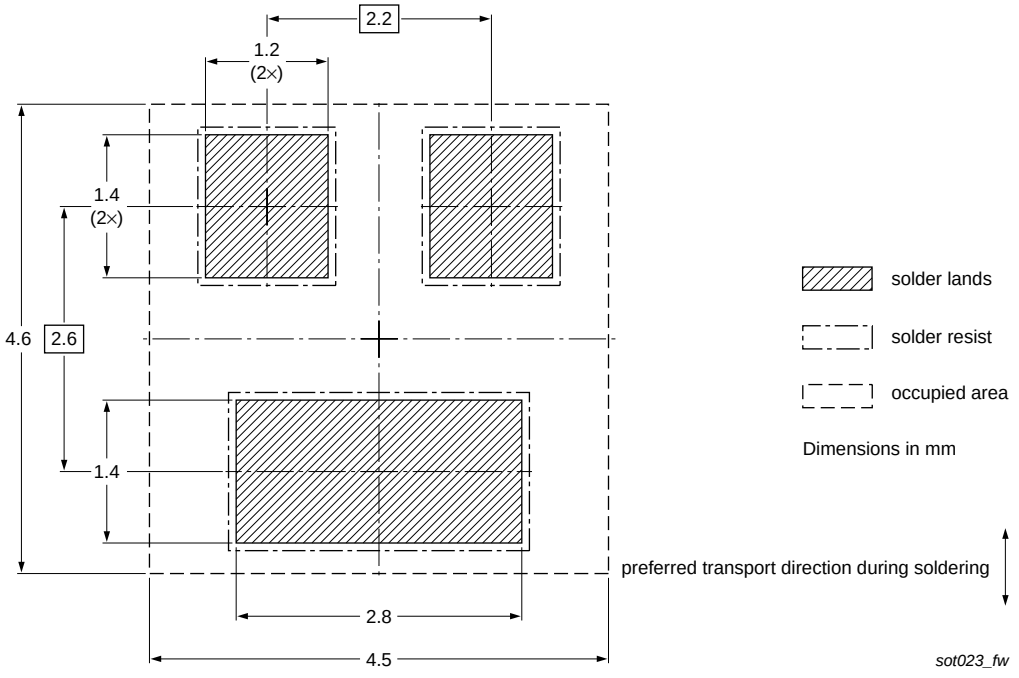



**Fig 3. Wave soldering footprint SOT23 (TO-236AB)**

## 11. Revision history

**Table 9. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMBTA42_5 | 20081212 | Product data sheet | - | PMBTA42_4 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• Type number PMBTA42/DG added<br>• Table 4 “Marking codes”: enhanced<br>• Section 12 “Legal information”: updated | | | |
| PMBTA42_4 | 20040122 | Product specification | - | PMBTA42_3 |
| PMBTA42_3 | 19990422 | Product specification | - | PMBTA42_43_CNV_2 |

# 12. Legal information

## 12.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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**Document identifier: PMBTA42_5**

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