



MMBTA42

NPN high-voltage transistor

12 October 2023

Product data sheet

1. General description

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

PNP complement: MMBTA92

2. Features and benefits

- Low current (max. 100 mA)
- High voltage (max. 300 V)

3. Applications

- Telephony
- Professional communication equipment

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 | $V_{CE} = 10\text{ V}; I_C = 10\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$ | 40 | - | - | |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--------------------|----------------|
| 1 | B | base | <p>SOT23</p> | <p>sym123</p> |
| 2 | E | emitter | | |
| 3 | C | collector | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| MMBTA42 | SOT23 | plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body | SOT23 |

7. Marking

Table 4. Marking codes

| Type number | Marking code[1] |
|-------------|-----------------|
| MMBTA42 | 7D% |

[1] % = placeholder for manufacturing site code

8. 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 | | | - | 200 | mA |
| I_{BM} | peak base current | | | - | 100 | mA |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [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.

9. 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.

10. Characteristics

Table 7. Characteristics

$T_{amb} = 25\text{ °C}$ unless otherwise specified

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

11. Package outline

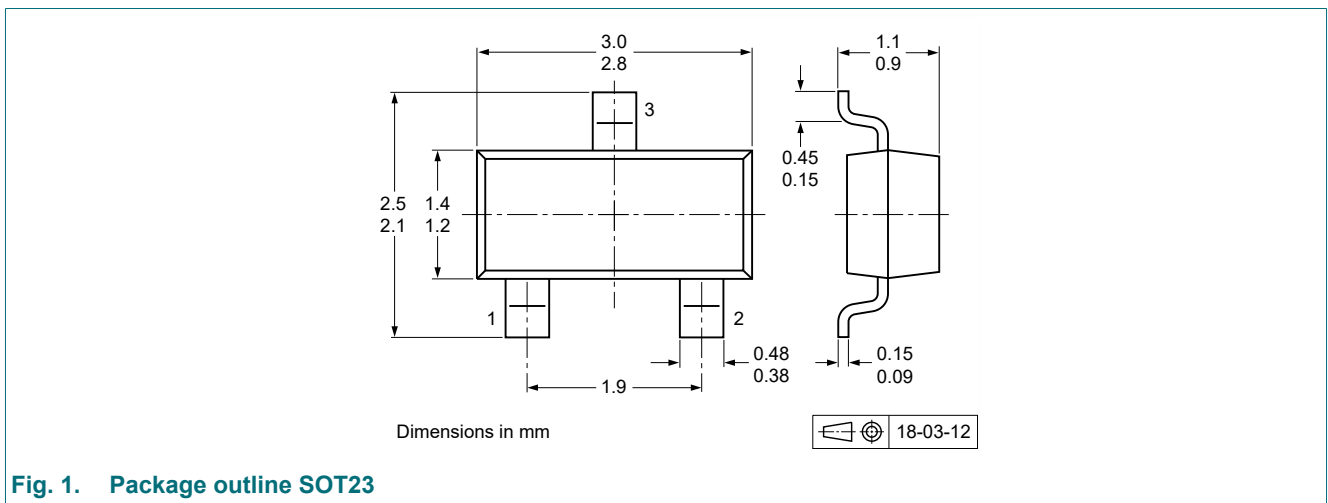


Fig. 1. Package outline SOT23

12. Soldering

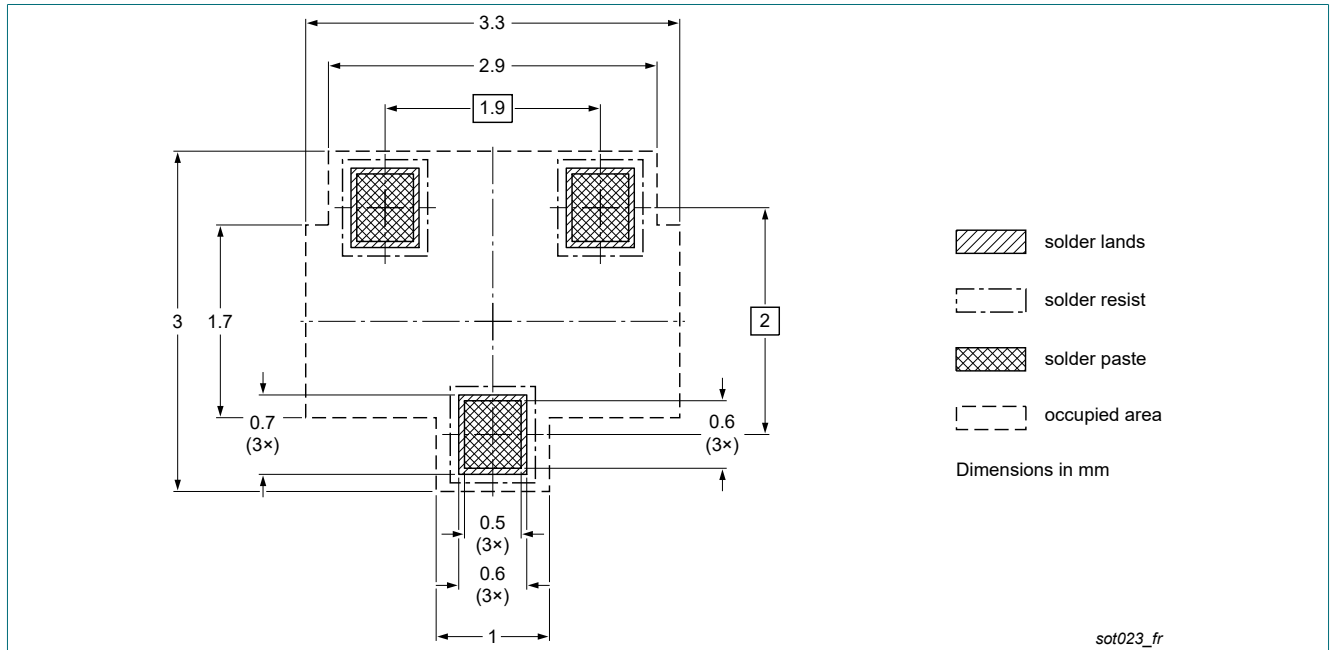


Fig. 2. Reflow soldering footprint for SOT23

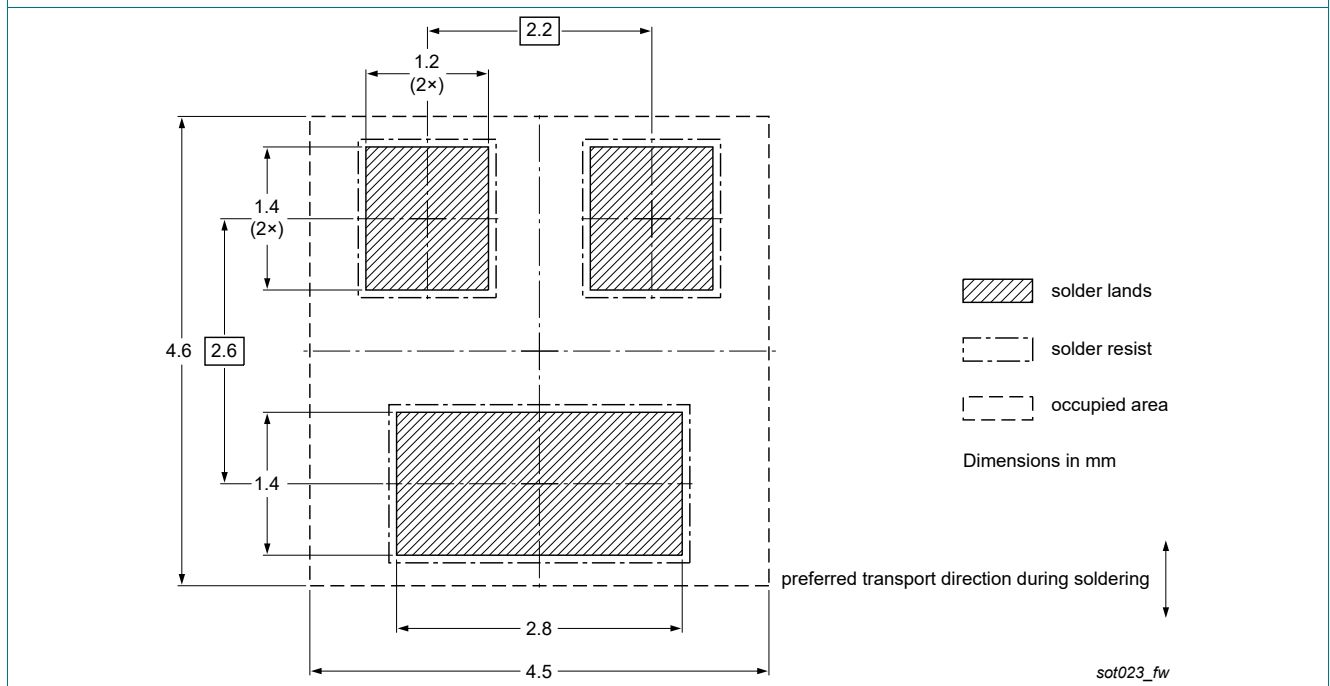


Fig. 3. Wave soldering footprint for SOT23

13. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|--------------------|---------------|-------------|
| MMBTA42 v.3 | 20231012 | Product data sheet | - | MMBTA42 v.2 |
| Modifications: | <ul style="list-style-type: none">Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). | | | |
| MMBTA42 v.2 | 20220809 | Product data sheet | - | MMBTA42 v.1 |
| MMBTA42 v.1 | 20200411 | Product data sheet | - | - |

14. Legal information

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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