



# MMBTA42-Q

NPN high-voltage transistor

9 August 2022

Product data sheet

## 1. General description

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

## 2. Features and benefits

- Low current (max. 100 mA)
- High voltage (max. 300 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Telephony
- Professional communication equipment

## 4. Quick reference data

Table 1. Quick reference data

| Symbol    | Parameter                 | Conditions   | Min | Typ | Max | Unit |
|-----------|---------------------------|--|-----|-----|-----|------|
| $V_{CE0}$ | 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               |
| <a href="#">MMBTA42-Q</a> | SOT23   | plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body | <a href="#">SOT23</a> |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code[1] |
|-------------|-----------------|
| MMBTA42-Q   | 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

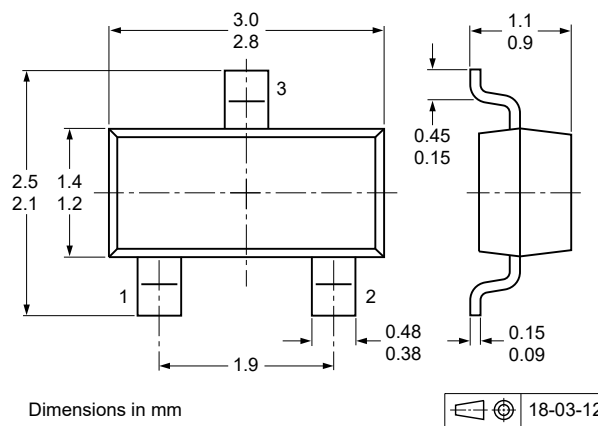
| Symbol      | Parameter                            | Conditions   | Min | Typ | Max | Unit |
|-------------|--------------------------------------|--|-----|-----|-----|------|
| $I_{CBO}$   | collector-base cut-off current       | $V_{CB} = 200\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$                                    | -   | -   | 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   |
| $f_T$       | transition frequency                 | $V_{CE} = 20\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}$               | 50  | -   | -   | MHz  |
| $C_{re}$    | feedback capacitance                 | $i_c = 0\text{ A}; V_{CB} = 20\text{ V}; f = 1\text{ MHz}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$ | -   | -   | 3   | F    |

## 11. Test information

### 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.

## 12. Package outline



**Fig. 1. Package outline SOT23**

### 13. Soldering

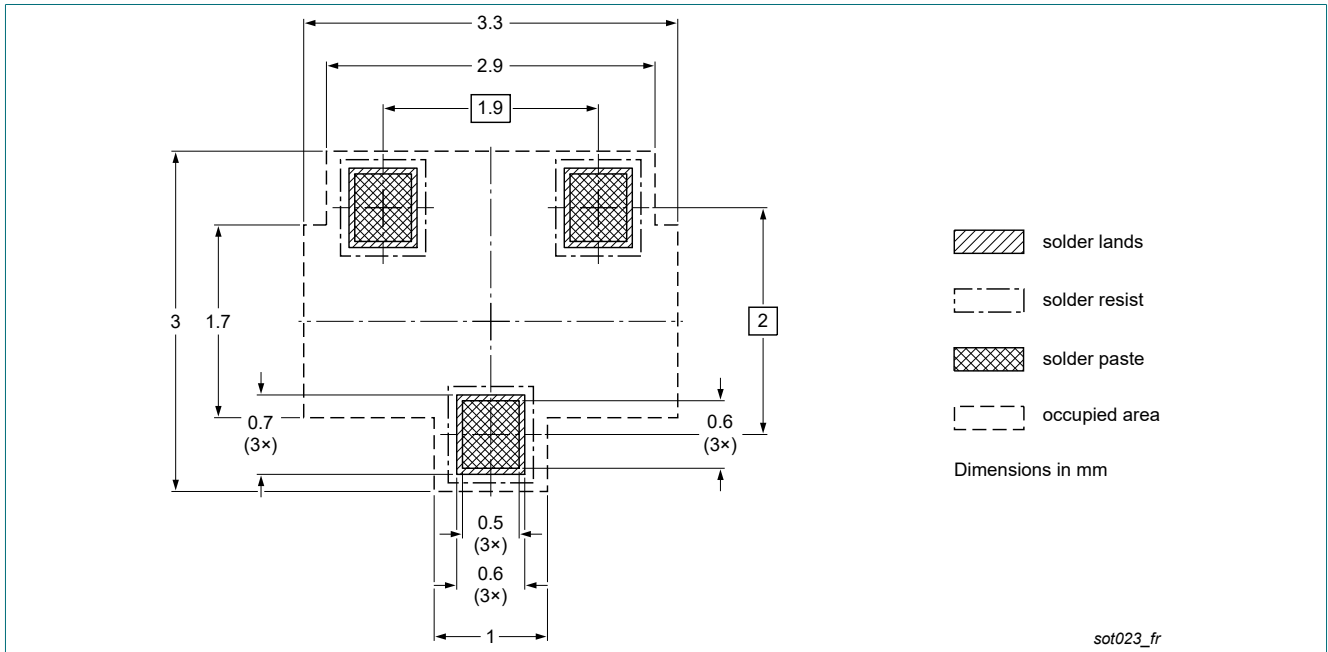


Fig. 2. Reflow soldering footprint for SOT23

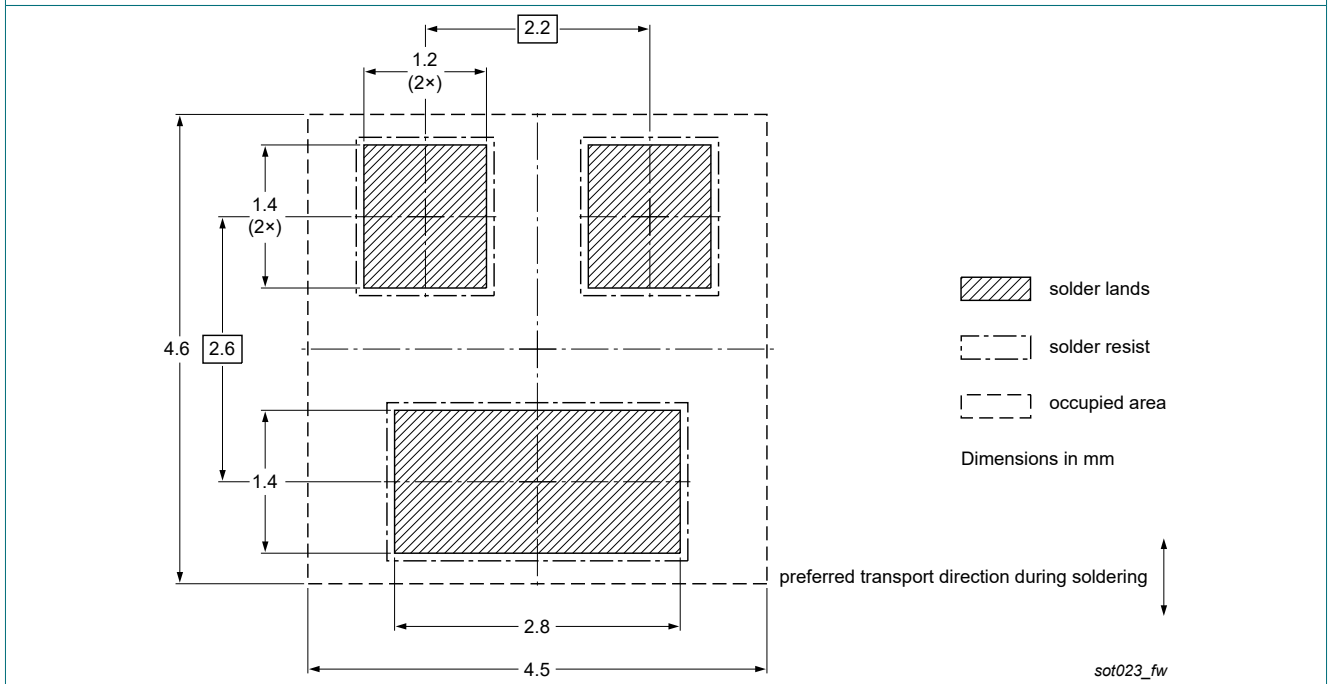


Fig. 3. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status  | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| MMBTA42-Q v.1 | 20220809     | Product data sheet | -             | -          |

## 15. 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.                                     |

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