



PMSTA42

NPN high-voltage transistor

29 June 2023

Product data sheet

1. General description

NPN high-voltage transistor in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

PNP complements: PMSTA92

2. Features and benefits

- High current (max. 500 mA)
- High voltage (max. 200 V)
- AEC-Q101 qualified

3. Applications

- High-voltage switching in telephony applications

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 | $V_{CE} = 10 \text{ V}; I_C = 1 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$ | 25 | - | - | |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|-----------------------|----------------|
| 1 | B | base | <p>SC-70 (SOT323)</p> | <p>sym021</p> |
| 2 | E | emitter | | |
| 3 | C | collector | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| PMSTA42 | SC-70 | plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body | SOT323 |

7. Marking

Table 4. Marking codes

| Type number | Marking code[1] |
|-------------|-----------------|
| PMSTA42 | %1D |

[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] | - | 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.

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] | - | - | 625 | K/W |

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

10. Characteristics

Table 7. Characteristics

| 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 | - | - | |
| | | $V_{CE} = 10\text{ V}$; $I_C = 30\text{ mA}$; pulsed; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_{amb} = 25\text{ °C}$ | 40 | - | - | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 20\text{ mA}$; $I_B = 2\text{ mA}$; $T_{amb} = 25\text{ °C}$ | - | - | 500 | mV |
| 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. 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

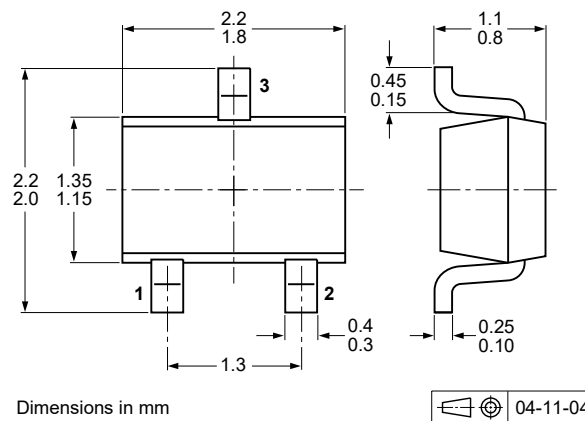


Fig. 1. Package outline SC-70 (SOT323)

13. Soldering

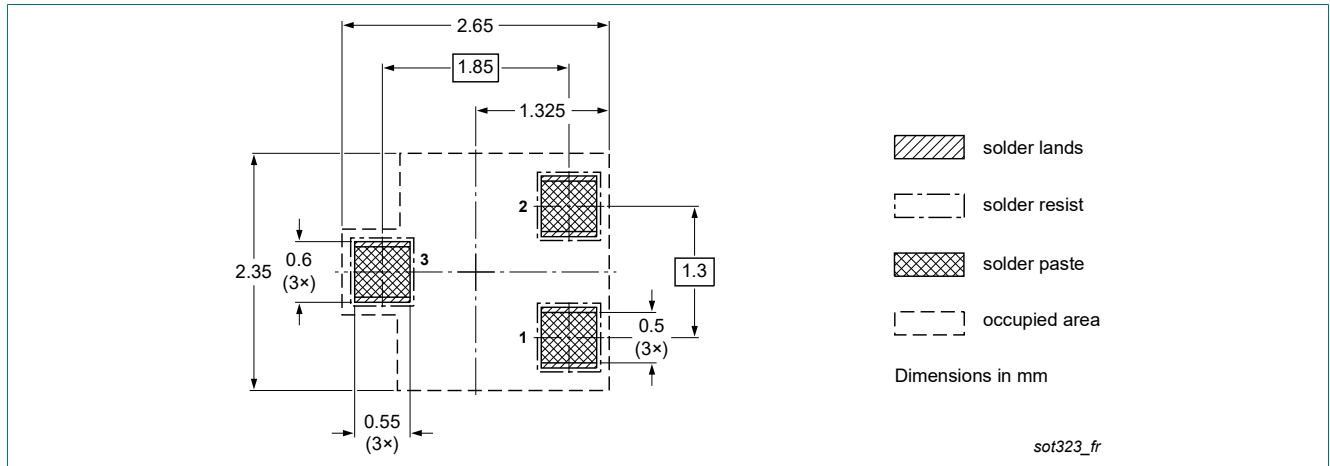


Fig. 2. Reflow soldering footprint for SC-70 (SOT323)

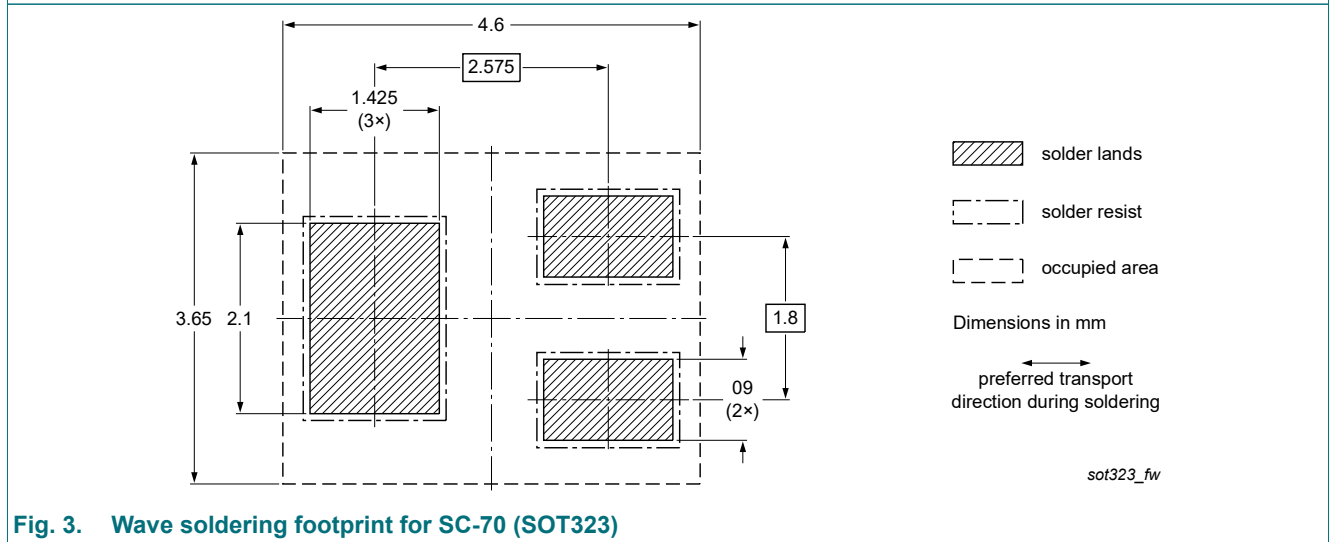


Fig. 3. Wave soldering footprint for SC-70 (SOT323)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|--------------------|---------------|----------------|
| PMSTA42 v.3 | 20230629 | Product data sheet | - | PMSTA42_43 v.2 |
| Modifications: | <ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.Legal texts have been adapted to the new company name where appropriate. | | | |
| PMSTA42_43 v.2 | 19990521 | Product data sheet | - | PMSTA42_43 v.1 |
| PMSTA42_43 v.1 | 19970619 | 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. |

- [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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