



# 2PC4081R-Q

NPN general-purpose transistor

20 January 2022

Product data sheet

## 1. General description

NPN transistor in a SOT323 (SC-70) plastic package. The PNP complement is 2PA1576.

## 2. Features and benefits

- Low current (max. 150 mA)
- Low voltage (max. 50 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- General-purpose switching
- Small signal amplification

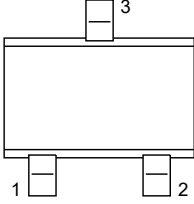
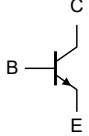
## 4. Quick reference data

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           | $V_{CE} = 6\text{ V}; I_C = 1\text{ mA}; T_{amb} = 25\text{ °C}$ | 180 | -   | 390 |      |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline  | Graphic symbol  |
|-----|--------|-------------|---|---|
| 1   | B      | base        |  <p>SC-70 (SOT323)</p> |  <p>aaa-027673</p> |
| 2   | E      | emitter     |   |   |
| 3   | C      | collector   |   |   |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description  | Version |
| 2PC4081R-Q  | 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 <sup>[1]</sup> |
|-------------|-----------------------------|
| 2PC4081R-Q  | Z%R                         |

[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                |     | -   | 60  | V    |
| $V_{CEO}$ | collector-emitter voltage | open base                   |     | -   | 50  | V    |
| $V_{EBO}$ | emitter-base voltage      | open collector              |     | -   | 7   | V    |
| $I_C$     | collector current         |                             |     | -   | 150 | mA   |
| $I_{CM}$  | peak collector current    |                             |     | -   | 200 | mA   |
| $I_{BM}$  | peak base current         |                             |     | -   | 200 | 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] Transistor mounted on an FR4 printed-circuit board, 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] Transistor mounted on an FR4 printed-circuit board, 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       | $V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$  |  | -   | -   | 100 | nA   |
|             |                                      | $V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$   |  | -   | -   | 5   | μA   |
| $I_{EBO}$   | emitter-base cut-off current         | $V_{EB} = 4\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$   |  | -   | -   | 100 | nA   |
| $h_{FE}$    | DC current gain                      | $V_{CE} = 6\text{ V}; I_C = 1\text{ mA}; T_{amb} = 25\text{ °C}$  |  | 180 | -   | 390 |      |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = 50\text{ mA}; I_B = 5\text{ mA}; t_p \leq 300\text{ μs}; \delta \leq 0.02; T_{amb} = 25\text{ °C}$ |  | -   | -   | 400 | mV   |
| $C_c$       | collector capacitance                | $V_{CB} = 12\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$      |  | -   | 2   | 3.5 | pF   |
| $f_T$       | transition frequency                 | $V_{CE} = 12\text{ V}; I_C = 2\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}$                     |  | 100 | -   | -   | MHz  |

## 11. Test information

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### 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

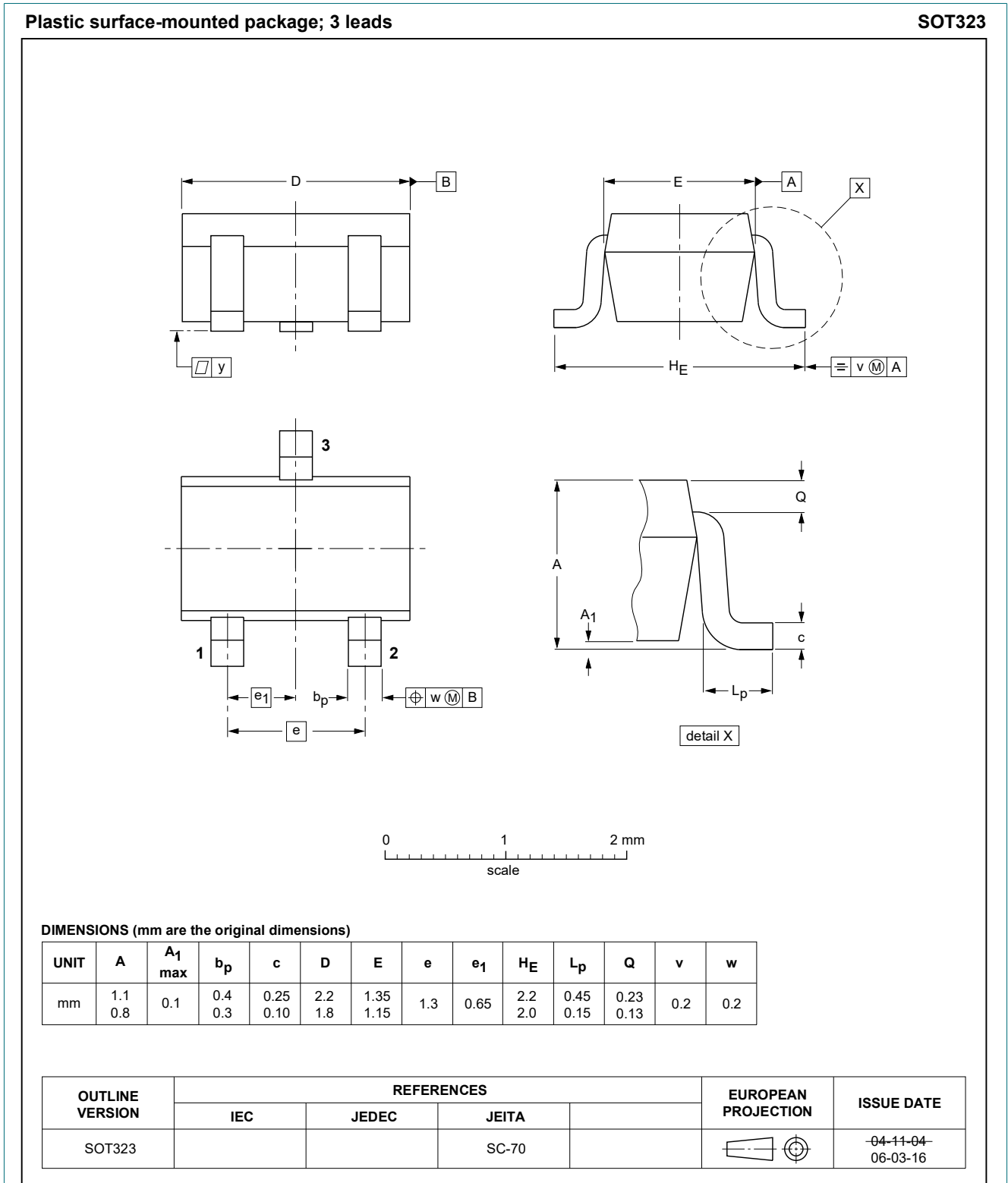


Fig. 1. Package outline SC-70 (SOT323)

### 13. Soldering

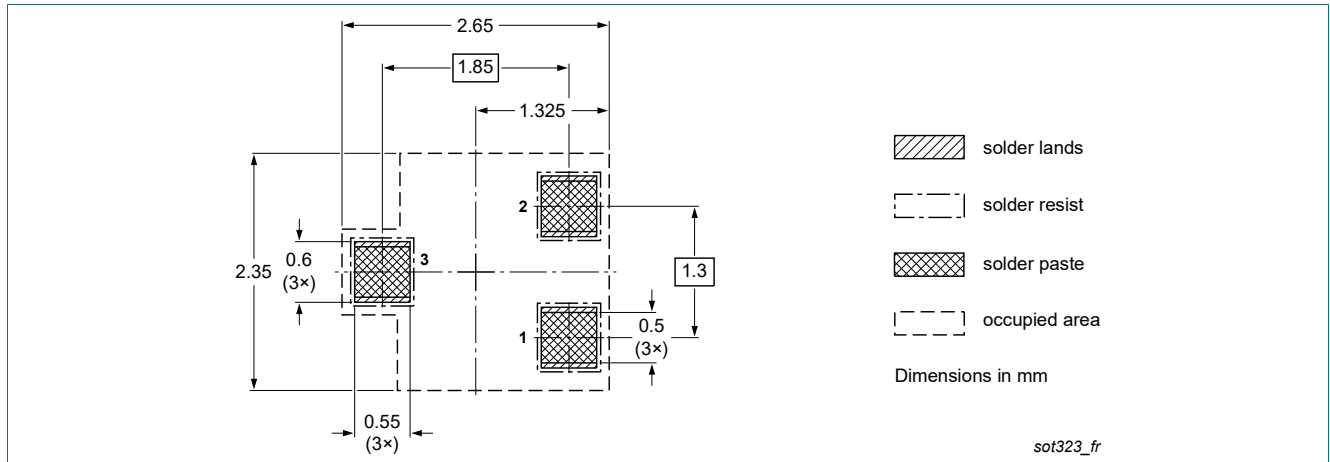


Fig. 2. Reflow soldering footprint for SC-70 (SOT323)

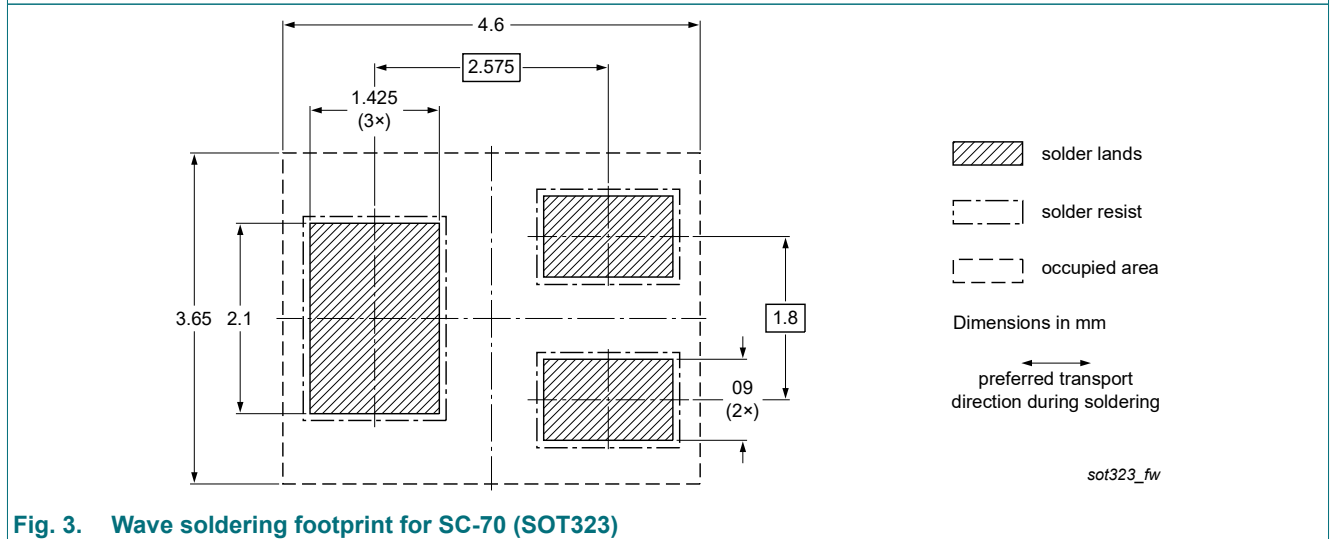


Fig. 3. Wave soldering footprint for SC-70 (SOT323)

## 14. Revision history

Table 8. Revision history

| Data sheet ID  | Release date | Data sheet status  | Change notice | Supersedes |
|----------------|--------------|--------------------|---------------|------------|
| 2PC4081R-Q v.1 | 20220120     | 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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