



# BCV71-Q

NPN general purpose transistors

25 May 2022

Product data sheet

## 1. General description

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

## 2. Features and benefits

- Low current (max. 100 mA)
- Low voltage (max. 60 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- General purpose switching and amplification.

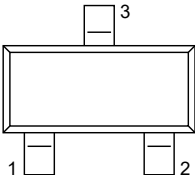
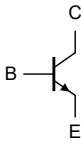
## 4. Quick reference data

Table 1. Quick reference data

| Symbol    | Parameter                 | Conditions                                                                             | Min | Typ | Max | Unit |
|-----------|---------------------------|----------------------------------------------------------------------------------------|-----|-----|-----|------|
| $V_{CEO}$ | collector-emitter voltage | open base                                                                              | -   | -   | 60  | V    |
| $I_C$     | collector current         |                                                                                        | -   | -   | 100 | mA   |
| $h_{FE}$  | DC current gain           | $V_{CE} = 5\text{ V}; I_C = 10\text{ }\mu\text{A}; T_{amb} = 25\text{ }^\circ\text{C}$ | -   | 90  | -   |      |
|           |                           | $V_{CE} = 5\text{ V}; I_C = 2\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$           | 110 | -   | 220 |      |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline                                                                           | Graphic symbol                                                                                  |
|-----|--------|-------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| 1   | B      | base        | <br>SOT23 | <br>sym021 |
| 2   | E      | emitter     |                                                                                              |                                                                                                 |
| 3   | C      | collector   |                                                                                              |                                                                                                 |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |                                                                                          |         |
|-------------|---------|------------------------------------------------------------------------------------------|---------|
|             | Name    | Description                                                                              | Version |
| BCV71-Q     | 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] |
|-------------|-----------------|
| BCV71-Q     | K7%             |

[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                  |     | -   | 80  | V    |
| $V_{CEO}$ | collector-emitter voltage | open base                     |     | -   | 60  | V    |
| $V_{EBO}$ | emitter-base voltage      | open collector                |     | -   | 5   | V    |
| $I_C$     | collector current         | single pulse; $t_p \leq 1$ ms |     | -   | 100 | mA   |
| $I_{CM}$  | peak collector current    |                               |     | -   | 200 | mA   |
| $I_{BM}$  | peak base current         |                               |     | -   | 200 | 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.

## 9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol        | Parameter                                   | Conditions |     | Min | Typ | Max | Unit |
|---------------|---------------------------------------------|------------|-----|-----|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient |            | [1] | -   | -   | 500 | K/W  |

[1] Transistor mounted on an FR4 printed-circuit board.

10. Characteristics

Table 7. Characteristics

| Symbol      | Parameter                            | Conditions                                                                                                                                             | Min | Typ | Max | Unit          |
|-------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|---------------|
| $I_{CBO}$   | collector-base cut-off current       | $V_{CB} = 20\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                         | -   | -   | 100 | nA            |
|             |                                      | $V_{CB} = 20\text{ V}; I_E = 0\text{ A}; T_j = 100\text{ }^{\circ}\text{C}$                                                                            | -   | -   | 10  | $\mu\text{A}$ |
| $I_{EBO}$   | emitter-base cut-off current         | $V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                          | -   | -   | 100 | nA            |
| $h_{FE}$    | DC current gain                      | $V_{CE} = 5\text{ V}; I_C = 10\text{ }\mu\text{A}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                               | -   | 90  | -   |               |
|             |                                      | $V_{CE} = 5\text{ V}; I_C = 2\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                         | 110 | -   | 220 |               |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                        | -   | 120 | 250 | mV            |
|             |                                      | $I_C = 50\text{ mA}; I_B = 2.5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                        | -   | 210 | -   | mV            |
| $V_{BEsat}$ | base-emitter saturation voltage      | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                        | -   | 750 | -   | mV            |
|             |                                      | $I_C = 50\text{ mA}; I_B = 2.5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                        | -   | 850 | -   | mV            |
| $V_{BE}$    | base-emitter voltage                 | $V_{CE} = 5\text{ V}; I_C = 2\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                         | 550 | -   | 700 | mV            |
| $C_c$       | collector capacitance                | $V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                     | -   | 2.5 | -   | pF            |
| $f_T$       | transition frequency                 | $V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                    | 100 | -   | -   | MHz           |
| NF          | noise figure                         | $V_{CE} = 5\text{ V}; I_C = 200\text{ }\mu\text{A}; R_S = 2\text{ k}\Omega; f = 1\text{ MHz}; B = 200\text{ Hz}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | -   | -   | 10  | dB            |

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

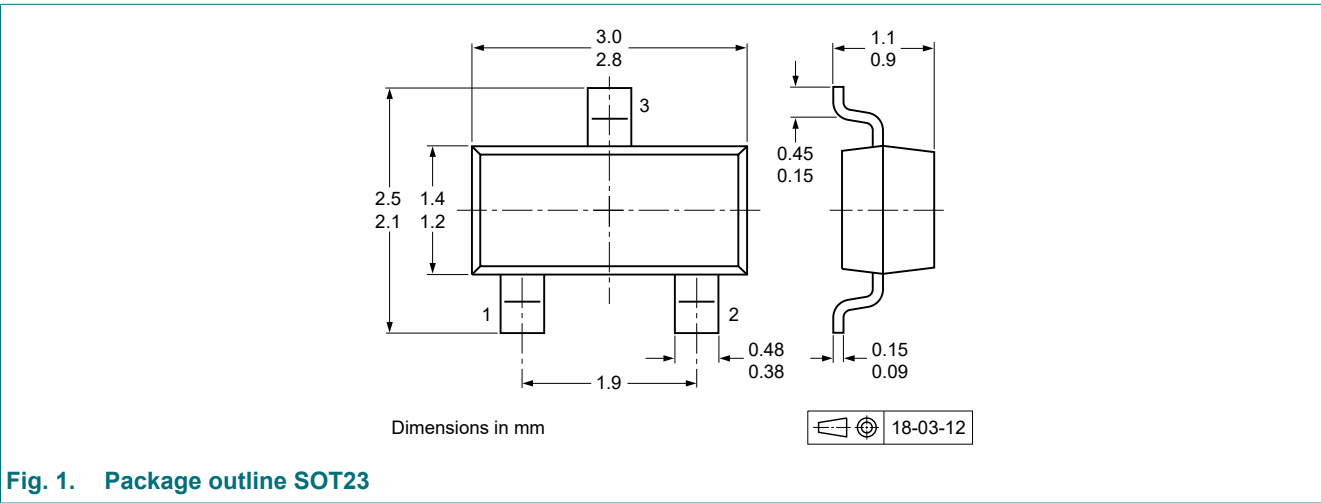


Fig. 1. Package outline SOT23

13. Soldering

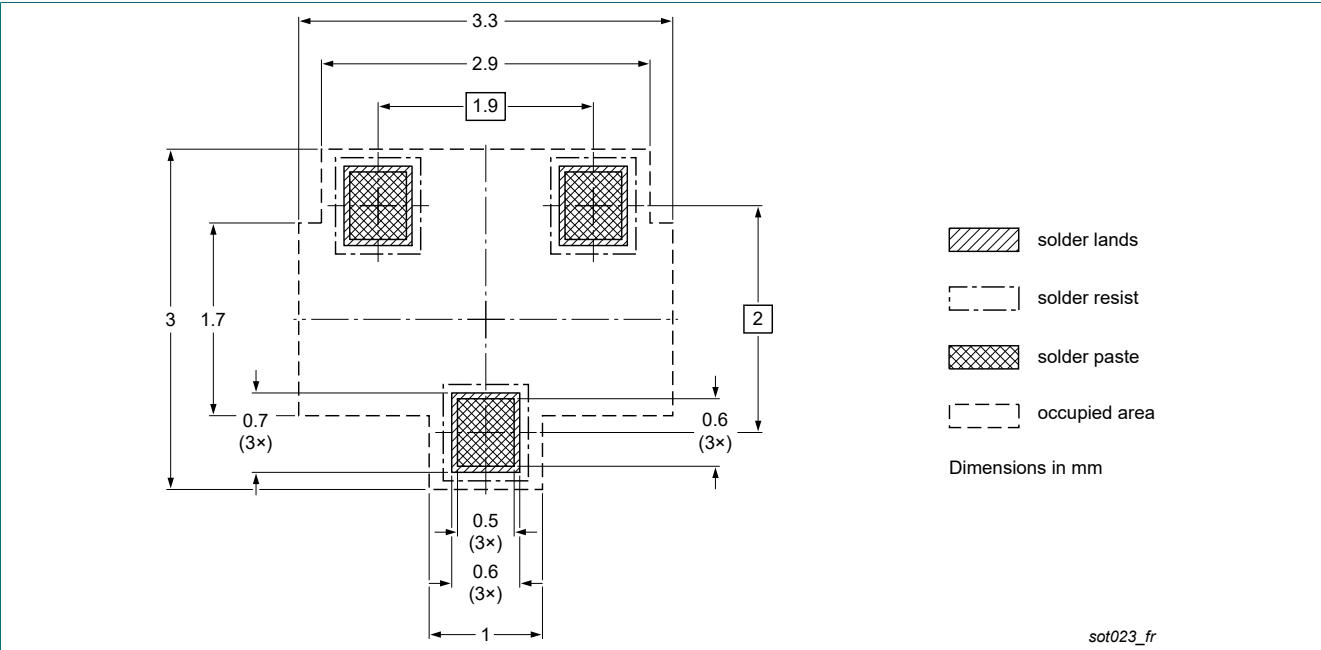


Fig. 2. Reflow soldering footprint for SOT23

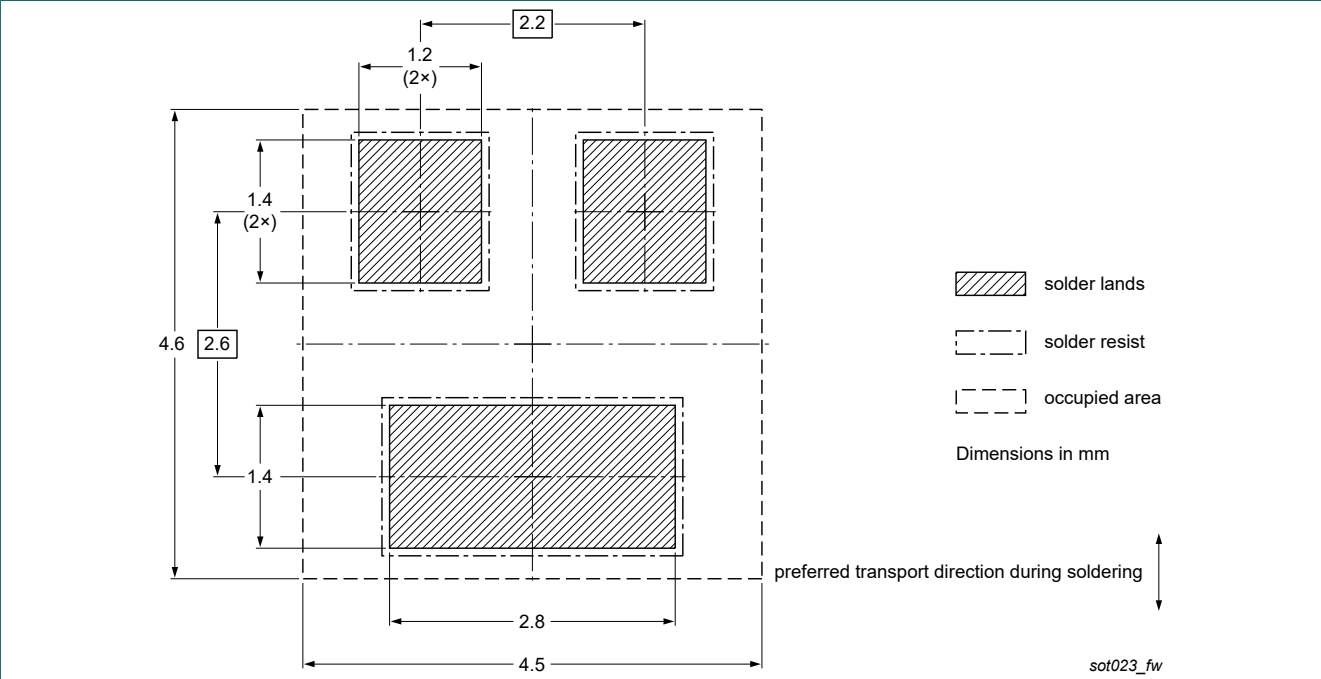


Fig. 3. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status  | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BCV71-Q v.1   | 20220525     | Product data sheet | -             | -          |

15. Legal information

Data sheet status

| Document status<br>[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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- [2] The term 'short data sheet' is explained in section "Definitions".
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