

# ANTREX Electronics

Electronic Components Sourcing Information

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## Product Reference Information

**Part Number:** BF820-QVL  
**Manufacturer:** Nexperia USA Inc.  
**Package:** TO-236-3, SC-59, SOT-23-3  
**Availability:** Please confirm with sales

**Product Page:**

<https://antrexco.com/product/details/nexperia-usa-inc/bf820-qvl.html>

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**Note:**

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

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# BF820-Q

## NPN high voltage transistor

13 December 2022

Product data sheet

## 1. General description

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

PNP complement: BF821-Q

## 2. Features and benefits

- Low current (max. 50 mA)
- High voltage (max. 300 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Telephony and professional communication equipment

## 4. Quick reference data

Table 1. Quick reference data

| Symbol    | Parameter                 | Conditions                                                                                                        | Min | Typ | Max | Unit |
|-----------|---------------------------|-------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| $V_{CBO}$ | collector-base voltage    | open emitter                                                                                                      | -   | -   | 300 | V    |
| $V_{CEO}$ | collector-emitter voltage | open base                                                                                                         | -   | -   | 300 | V    |
| $I_C$     | collector current         |                                                                                                                   | -   | -   | 50  | mA   |
| $h_{FE}$  | DC current gain           | $V_{CE} = 20 \text{ V}$ ; $I_C = 25 \text{ mA}$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$                         | 50  | -   | -   |      |
| $f_T$     | transition frequency      | $V_{CE} = 10 \text{ V}$ ; $I_C = 10 \text{ mA}$ ; $f = 100 \text{ MHz}$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$ | 60  | -   | -   | MHz  |

## 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 |
| BF820-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] |
|-------------|-----------------|
| BF820-Q     | 1V%             |

[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                |     | -   | 5   | V    |
| $I_C$     | collector current         | single pulse; $t_p \leq 1$ ms |     | -   | 50  | mA   |
| $I_{CM}$  | peak collector current    |                               |     | -   | 100 | mA   |
| $I_{BM}$  | peak base current         |                               |     | -   | 50  | 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] Transistor mounted on an FR4 printed-circuit board.

## 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

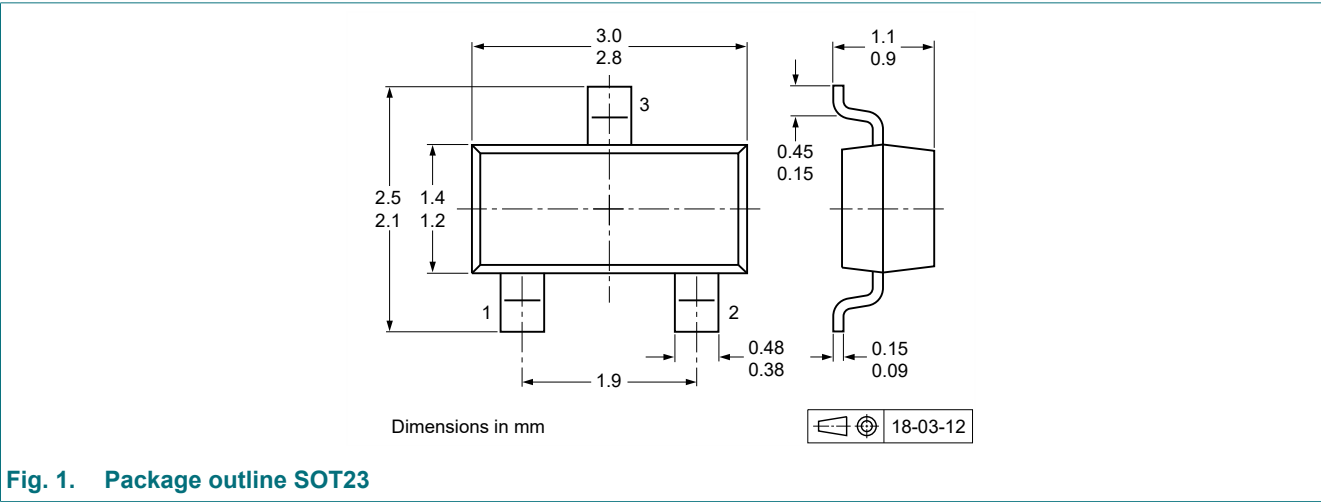
| Symbol      | Parameter                            | Conditions                                                                                                         | Min | Typ | Max | Unit          |
|-------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----|-----|-----|---------------|
| $I_{CBO}$   | collector-base cut-off current       | $V_{CB} = 200\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                    | -   | -   | 10  | nA            |
|             |                                      | $V_{CB} = 200\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^{\circ}\text{C}$                                       | -   | -   | 10  | $\mu\text{A}$ |
| $I_{EBO}$   | emitter-base cut-off current         | $V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                      | -   | -   | 50  | nA            |
| $h_{FE}$    | DC current gain                      | $V_{CE} = 20\text{ V}; I_C = 25\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                   | 50  | -   | -   |               |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = 30\text{ mA}; I_B = 5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                      | -   | -   | 600 | mV            |
| $f_T$       | transition frequency                 | $V_{CE} = 10\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$               | 60  | -   | -   | MHz           |
| $C_{re}$    | feedback capacitance                 | $i_c = 0\text{ A}; V_{CB} = 30\text{ V}; f = 1\text{ MHz}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | -   | -   | 1.6 | pF            |

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



13. Soldering

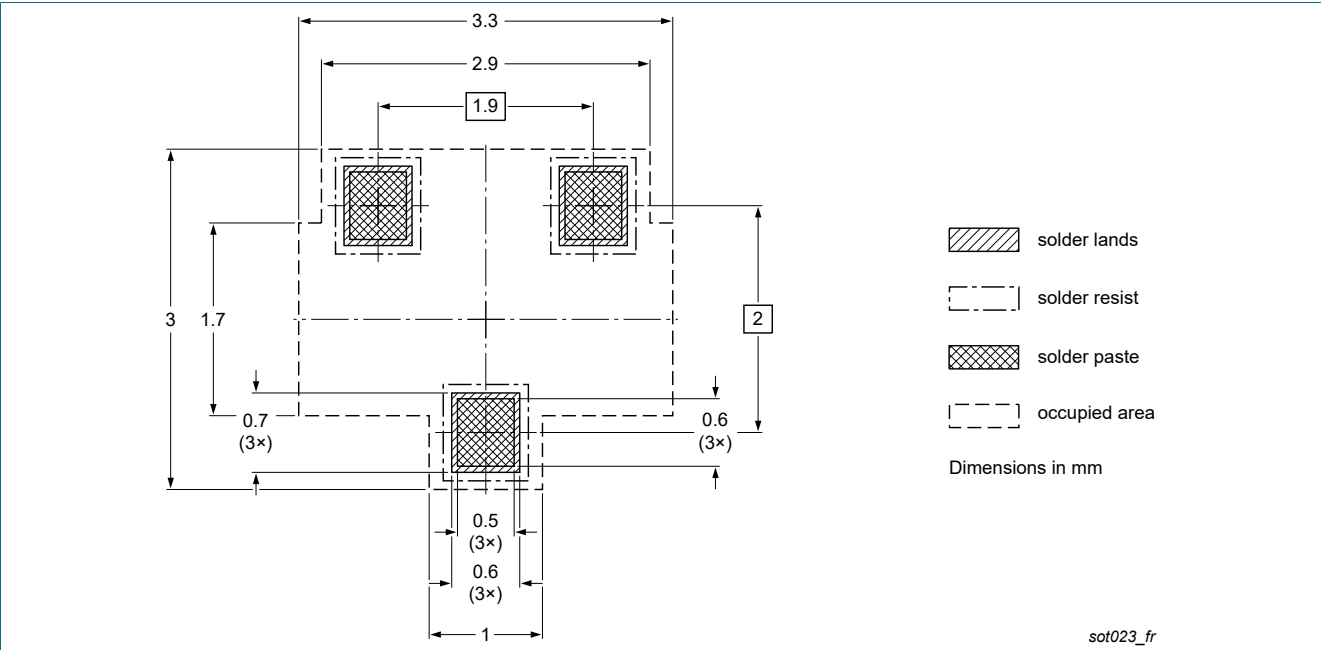


Fig. 2. Reflow soldering footprint for SOT23

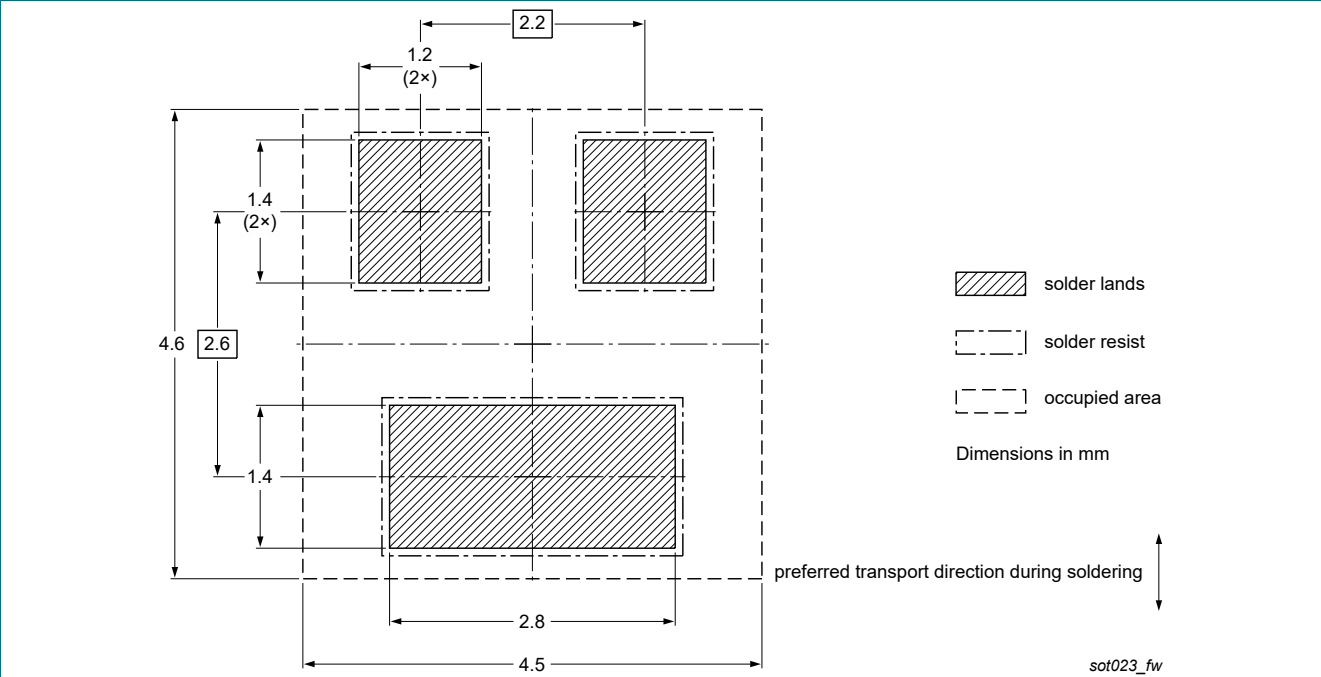


Fig. 3. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

| Data sheet ID  | Release date                                       | Data sheet status  | Change notice | Supersedes  |
|----------------|----------------------------------------------------|--------------------|---------------|-------------|
| BF820-Q v.2    | 20221213                                           | Product data sheet | -             | BF820-Q v.1 |
| Modifications: | PNP complement is adjusted in General description. |                    |               |             |
| BF820-Q v.1    | 20211020                                           | 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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## Contents

|                                 |   |
|---------------------------------|---|
| 1. General description.....     | 1 |
| 2. Features and benefits.....   | 1 |
| 3. Applications.....            | 1 |
| 4. Quick reference data.....    | 1 |
| 5. Pinning information.....     | 1 |
| 6. Ordering information.....    | 2 |
| 7. Marking.....                 | 2 |
| 8. Limiting values.....         | 2 |
| 9. Thermal characteristics..... | 2 |
| 10. Characteristics.....        | 3 |
| 11. Test information.....       | 3 |
| 12. Package outline.....        | 3 |
| 13. Soldering.....              | 4 |
| 14. Revision history.....       | 5 |
| 15. Legal information.....      | 6 |

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