



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	<p>SOT23</p>	<p>sym021</p>
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		-	50	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	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	μA
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

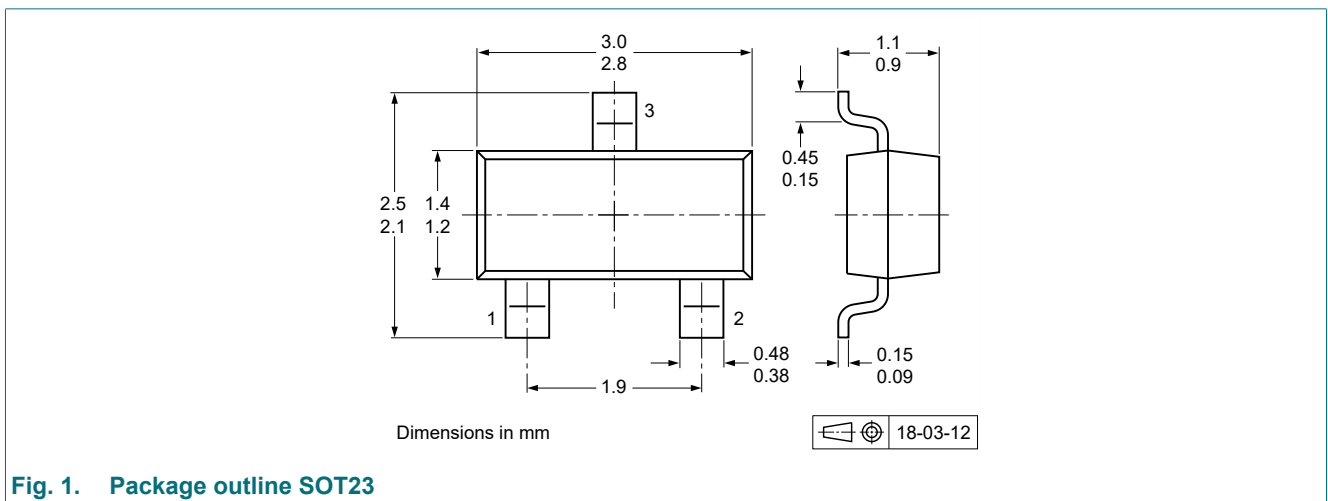


Fig. 1. Package outline SOT23

13. Soldering

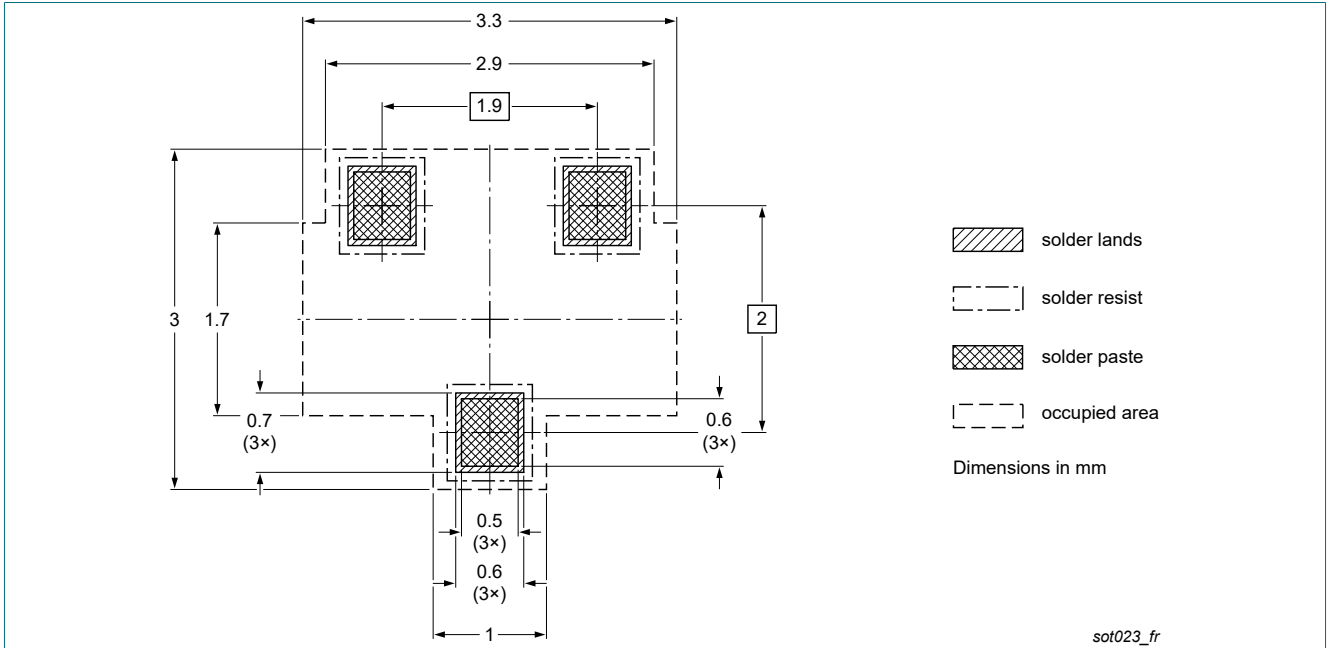


Fig. 2. Reflow soldering footprint for SOT23

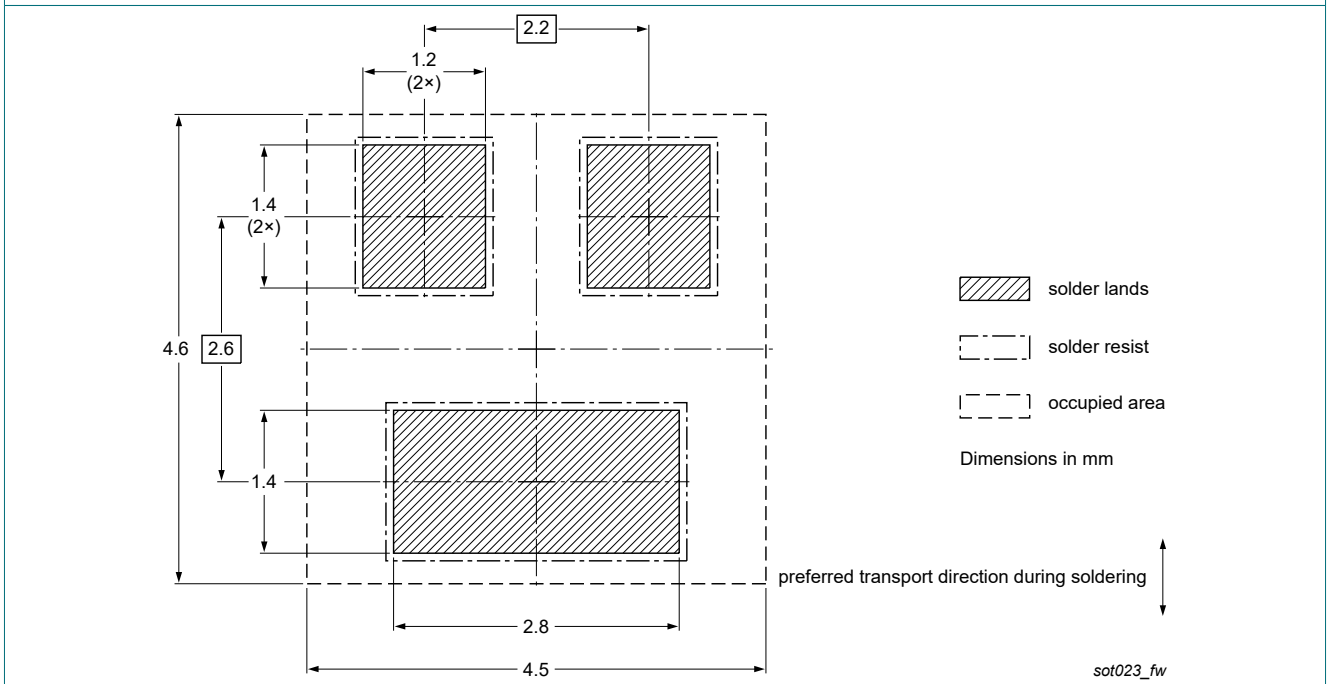


Fig. 3. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
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 [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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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