



# 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	$V_{CE} = 20\text{ V}$ ; $I_C = 25\text{ mA}$ ; $T_{amb} = 25\text{ °C}$	50	-	-	
$f_T$	transition frequency	$V_{CE} = 10\text{ V}$ ; $I_C = 10\text{ mA}$ ; $f = 100\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	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
<a href="#">BF820-Q</a>	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	<a href="#">SOT23</a>

## 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	$\mu\text{A}$
$I_{EBO}$	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

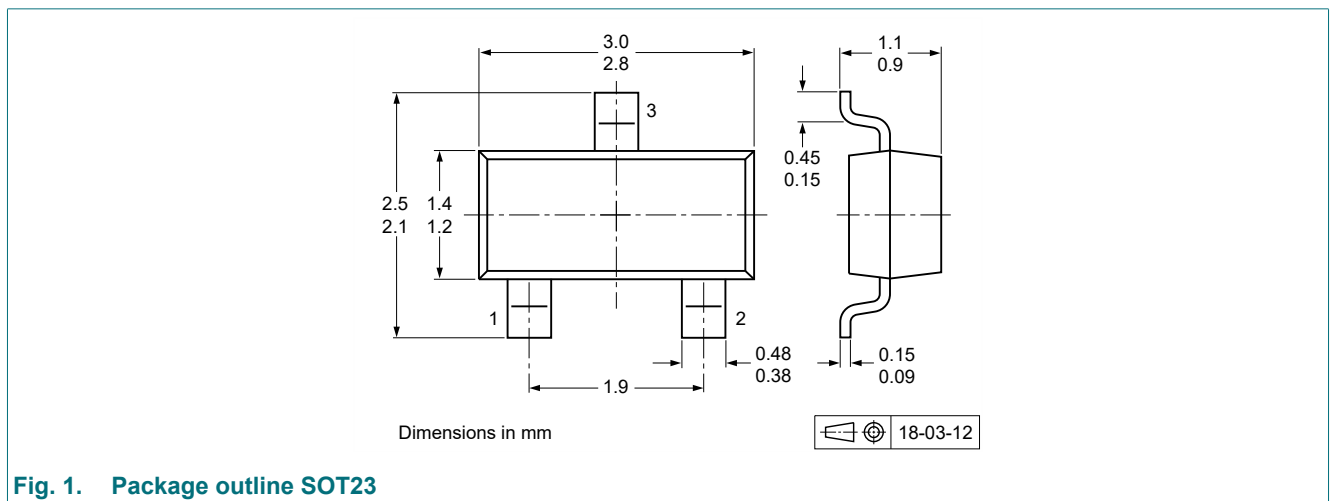


Fig. 1. Package outline SOT23

### 13. Soldering

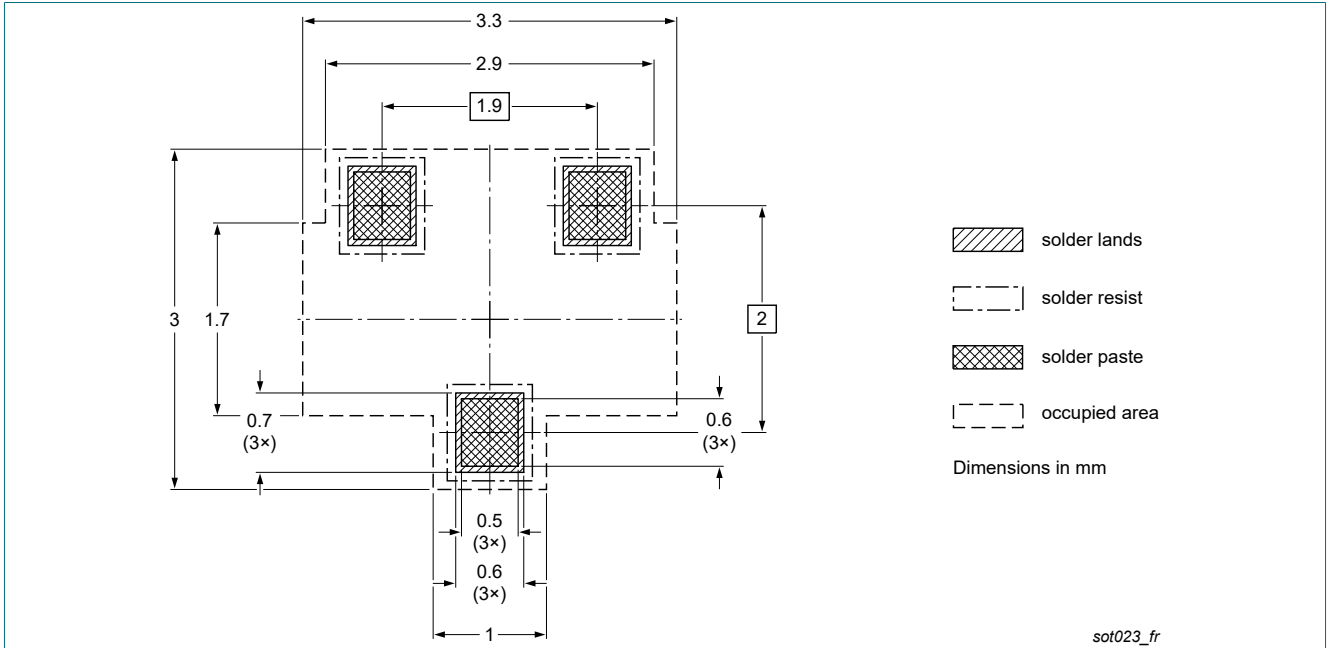


Fig. 2. Reflow soldering footprint for SOT23

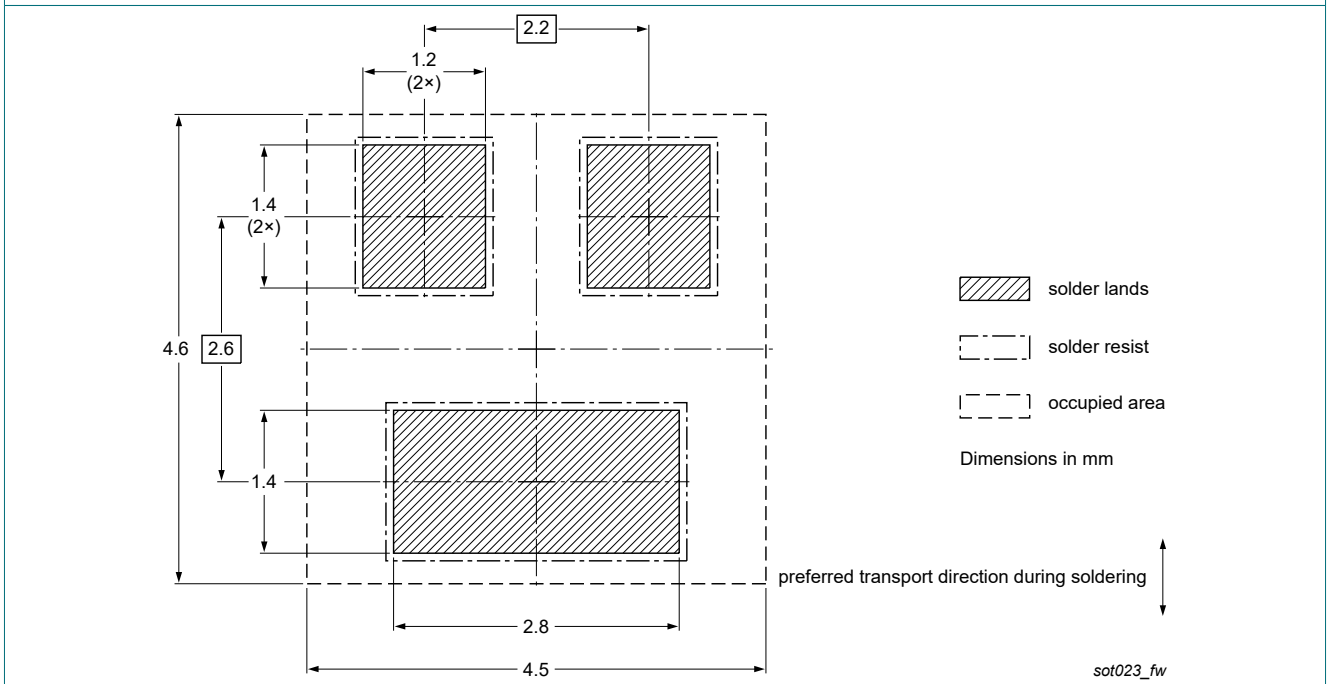


Fig. 3. Wave soldering footprint for SOT23

## 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".
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For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)  
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