



BF820W

NPN high voltage transistor

8 October 2024

Product data sheet

1. General description

NPN high-voltage transistor in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Low current (max. 50 mA)
- High voltage (max. 300 V)

3. Applications

- Telephony and professional communication equipment

4. Quick reference data

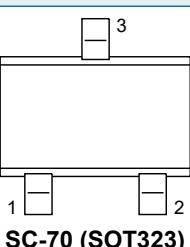
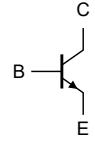
Table 1. Quick reference data

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_{CM}	peak collector current		-	-	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25^\circ C$	[1]	-	200	mW
h_{FE}	DC current gain	$V_{CE} = 20 V$; $I_C = 25 \text{ mA}$; $T_{amb} = 25^\circ C$	50	-	-	
C_{re}	feedback capacitance	$V_{CB} = 30 V$; $I_C = 0 A$; $i_c = 0 A$; $f = 1 \text{ MHz}$; $T_{amb} = 25^\circ C$	-	-	1.6	pF
f_T	transition frequency	$V_{CE} = 10 V$; $I_C = 10 \text{ mA}$; $f = 100 \text{ MHz}$; $T_{amb} = 25^\circ C$	60	-	-	MHz

[1] Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm^2 .

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		
2	E	emitter		
3	C	collector	 SC-70 (SOT323)	 sym021

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BF820W	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 ^[1]
BF820W	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			-	100	mA
I_{BM}	peak base current			-	50	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25^\circ C$	[1]	-	200	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm².

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]	-	-	625	K/W

[1] Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm².

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	$I_C = 30 \text{ mA}$; $I_B = 5 \text{ mA}$; pulsed; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	600	mV
C_{re}	feedback capacitance	$V_{CB} = 30 \text{ V}$; $I_C = 0 \text{ A}$; $i_c = 0 \text{ A}$; $f = 1 \text{ MHz}$; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	1.6	pF
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

11. Package outline

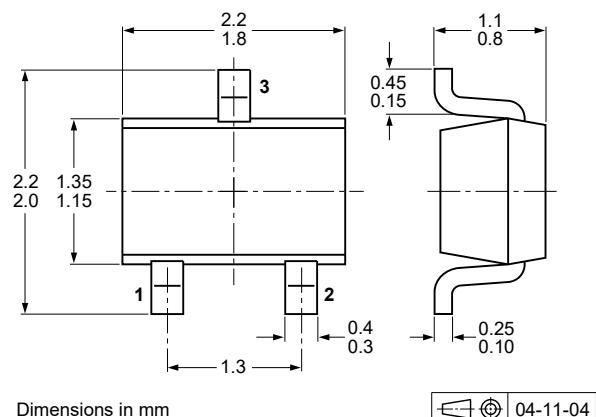
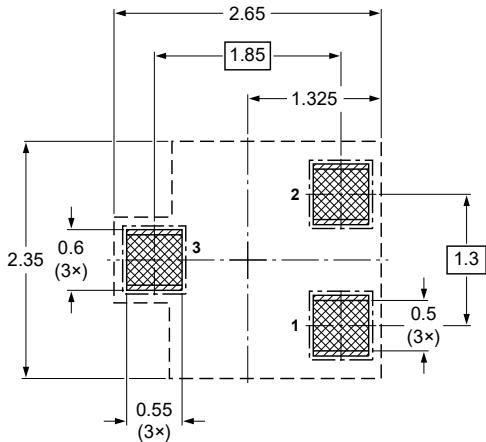


Fig. 1. Package outline SC-70 (SOT323)

12. Soldering



solder lands

solder resist

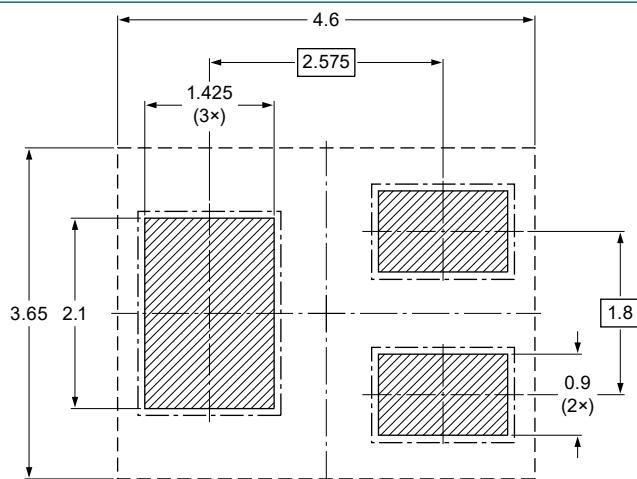
solder paste

occupied area

Dimensions in mm

sot323_fr

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



solder lands

solder resist

occupied area

Dimensions in mm

preferred transport
direction during soldering

sot323_fw

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

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BF820W v.4	20241008	Product data sheet	-	BF820W v.3
Modifications:	<ul style="list-style-type: none">Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
BF820W v.3	20230628	Product data sheet	-	BF820W v.2
BF820W v.2	20030909	Product data sheet	-	BF820W v.1
BF820W v.1	19970903	Product specification	-	-

14. 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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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. Package outline.....	3
12. Soldering.....	4
13. Revision history.....	5
14. Legal information.....	6

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