



BF820W-Q

NPN high voltage transistor

7 July 2023

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

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

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BF820W-Q	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-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		-	100	mA
I_{BM}	peak base current		-	50	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[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	$I_C = 30\text{ mA}; I_B = 5\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	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. 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

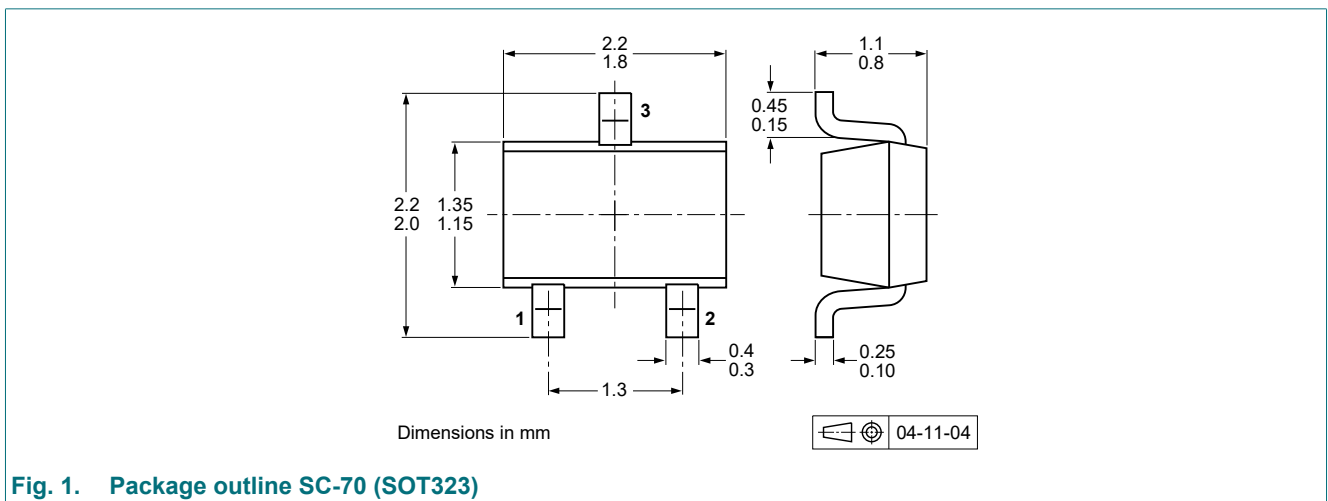


Fig. 1. Package outline SC-70 (SOT323)

13. Soldering

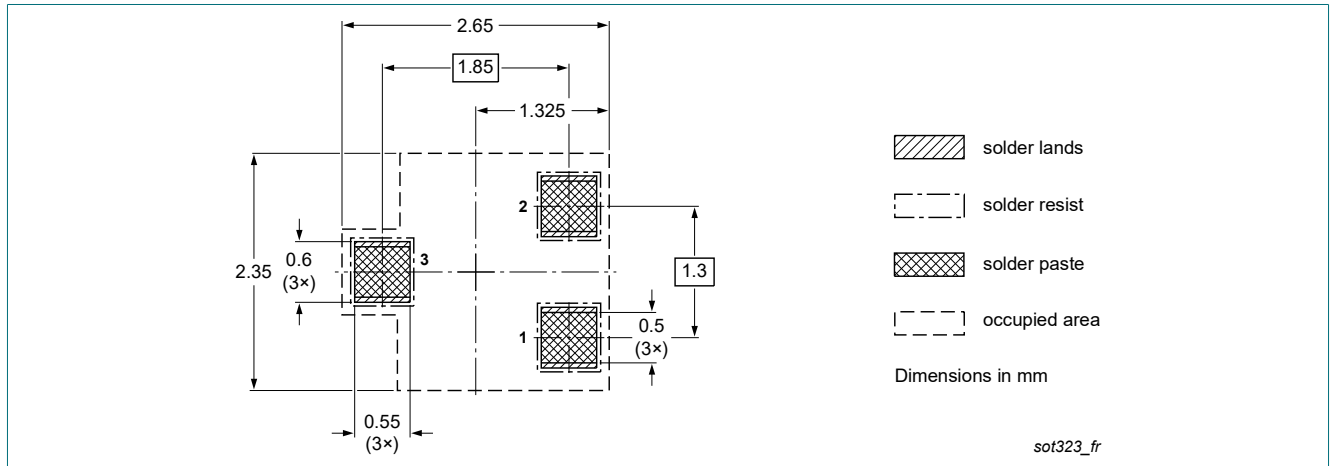


Fig. 2. Reflow soldering footprint for SC-70 (SOT323)

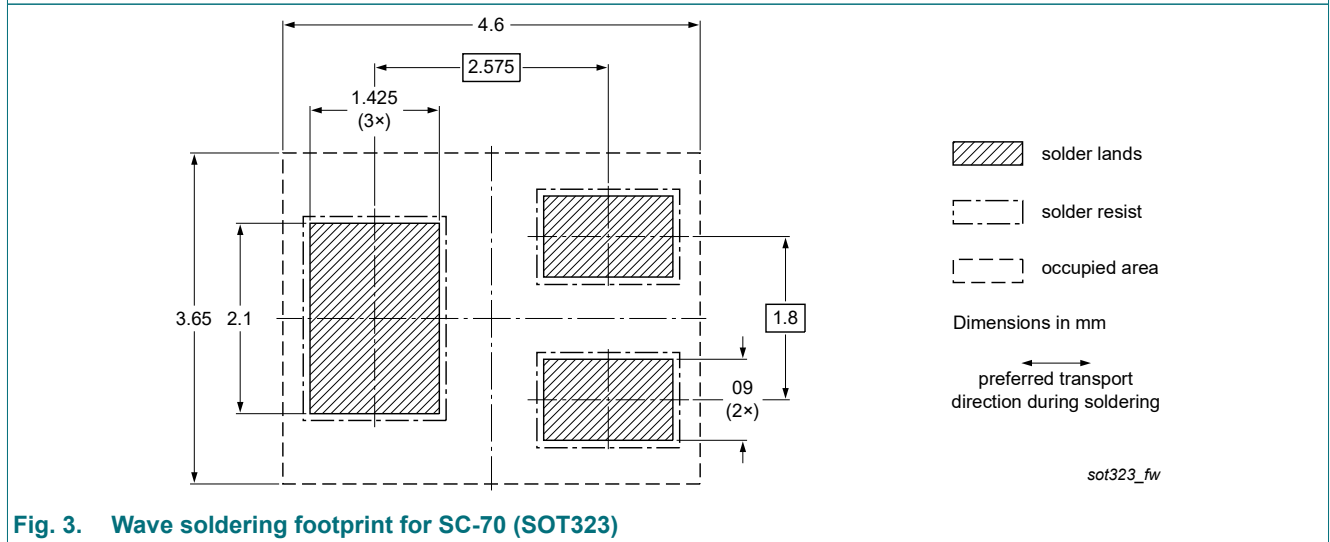


Fig. 3. Wave soldering footprint for SC-70 (SOT323)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BF820W-Q v.1	20230707	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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