

# BF620-Q

NPN high-voltage transistor

23 June 2023

Product data sheet

## 1. General description

NPN high-voltage transistor in a SOT89 (SC-62) flat lead 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

- Video output stages

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	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	-	-	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E	emitter	<p>SOT89</p>	<p>sym042</p>
2	C	collector		
3	B	base		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">BF620-Q</a>	SOT89	plastic, surface-mounted package; 3 leads; 1.5 mm pitch; 4.5 mm x 2.5 mm x 1.5 mm body	<a href="#">SOT89</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BF620-Q	DC

## 8. Limiting values

Table 5. Limiting values

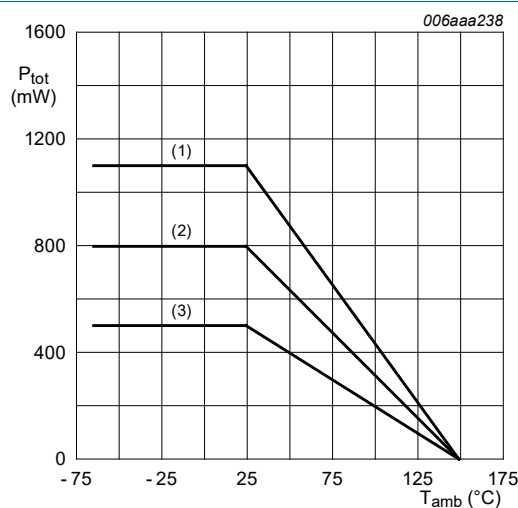
In accordance with the Absolute Maximum Rating System (IEC 60134).

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]	-	0.5	W
			[2]	-	0.8	W
			[3]	-	1.1	W
$T_j$	junction temperature		-	150	°C	
$T_{amb}$	ambient temperature		-65	150	°C	
$T_{stg}$	storage temperature		-65	150	°C	

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 1 cm<sup>2</sup>.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 6 cm<sup>2</sup>.



(1) FR4 PCB; 6 cm<sup>2</sup> mounting pad for collector.

(2) FR4 PCB; 1 cm<sup>2</sup> mounting pad for collector.

(3) FR4 PCB; standard footprint.

Fig. 1. Power derating curves

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	250	K/W
			[2]	-	-	156	K/W
			[3]	-	-	113	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	30	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 1 cm<sup>2</sup>.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 6 cm<sup>2</sup>.

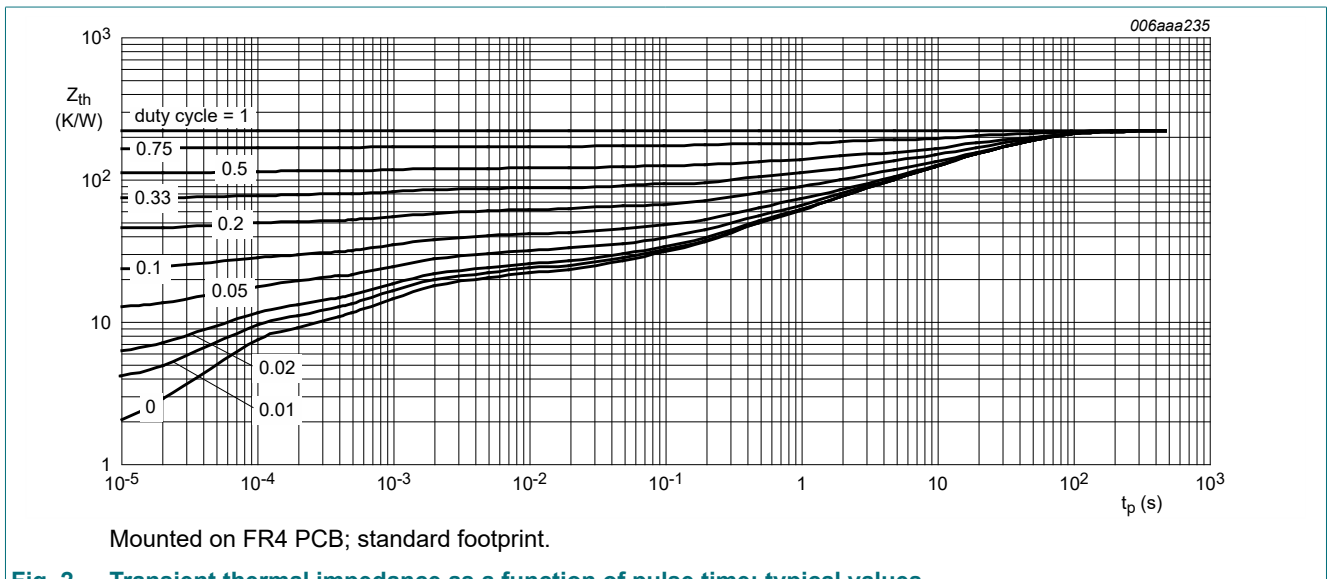


Fig. 2. Transient thermal impedance as a function of pulse time; typical values

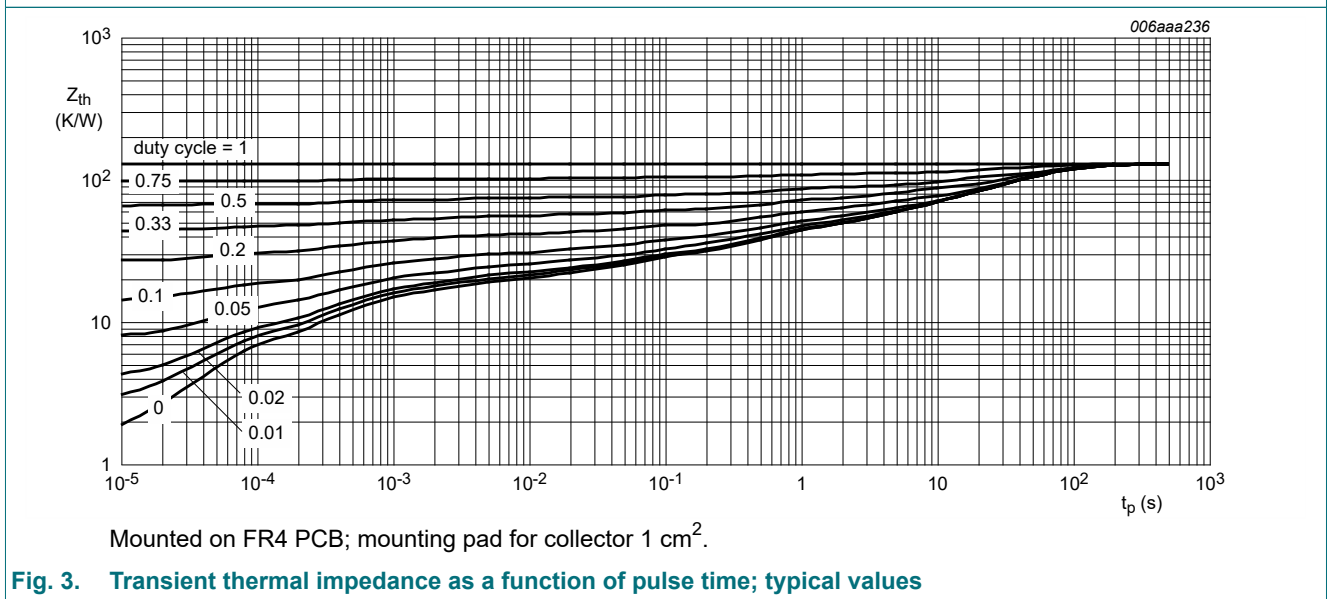
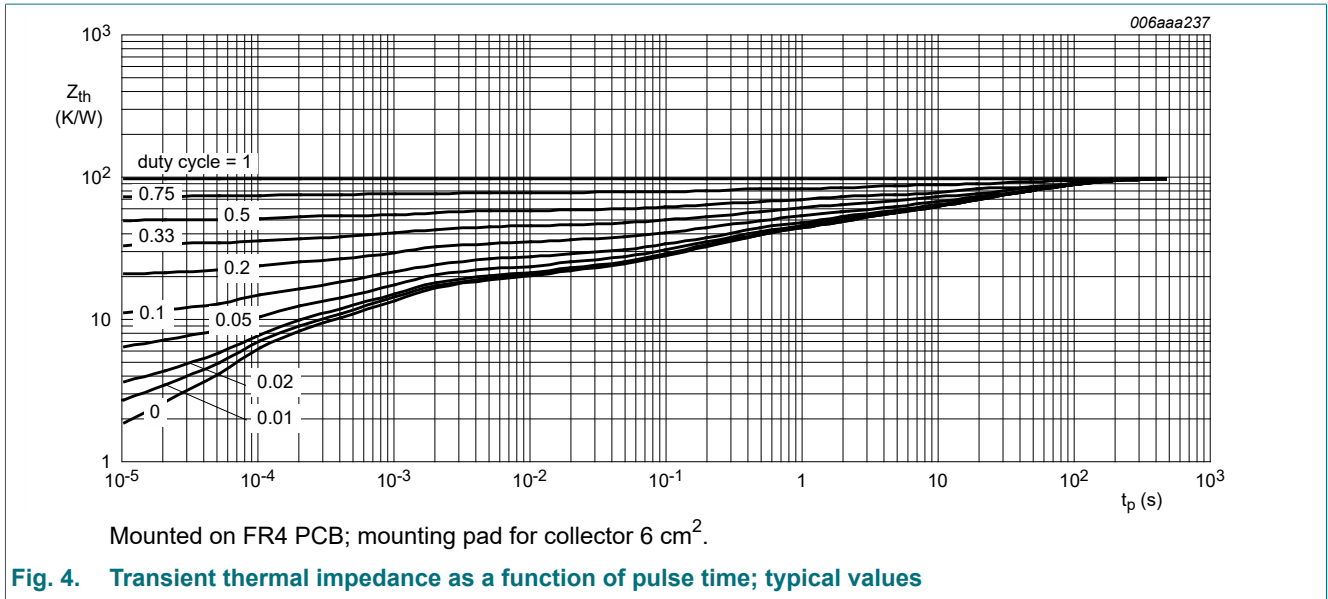


Fig. 3. Transient thermal impedance as a function of pulse time; typical values



## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 200 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C	-	-	10	nA
		V <sub>CB</sub> = 200 V; I <sub>E</sub> = 0 A; T <sub>j</sub> = 150 °C	-	-	10	μA
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C	-	-	50	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 20 V; I <sub>C</sub> = 25 mA; T <sub>amb</sub> = 25 °C	50	-	-	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 30 mA; I <sub>B</sub> = 5 mA; T <sub>amb</sub> = 25 °C	-	-	600	mV
C <sub>re</sub>	feedback capacitance	i <sub>c</sub> = 0 A; V <sub>CB</sub> = 30 V; f = 1 MHz; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C	-	-	1.6	pF
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = 10 V; I <sub>C</sub> = -10 mA; f = 100 MHz; T <sub>amb</sub> = 25 °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

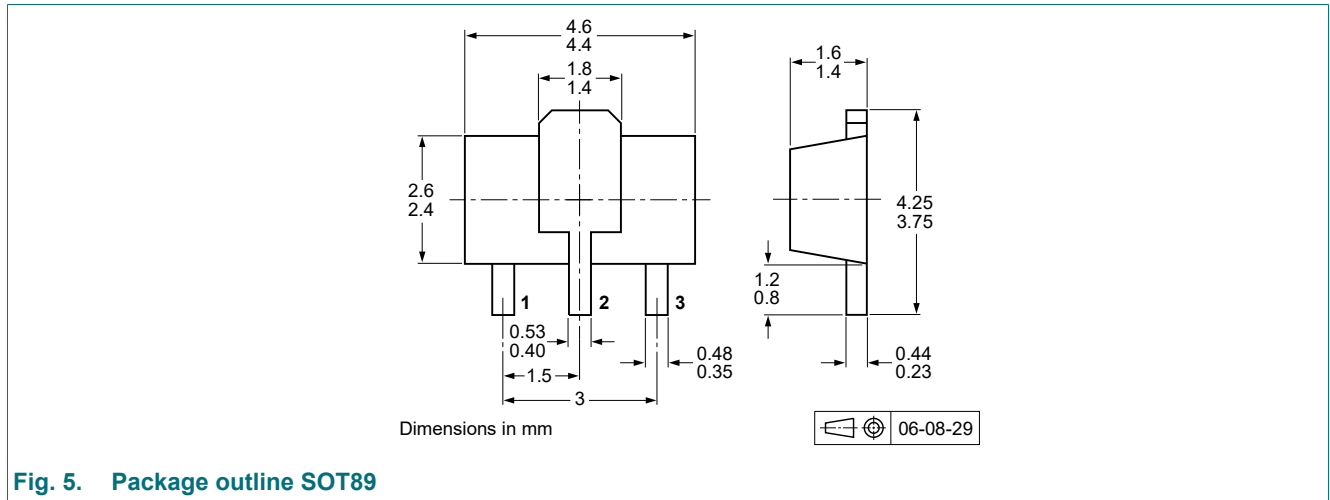


Fig. 5. Package outline SOT89

## 13. Soldering

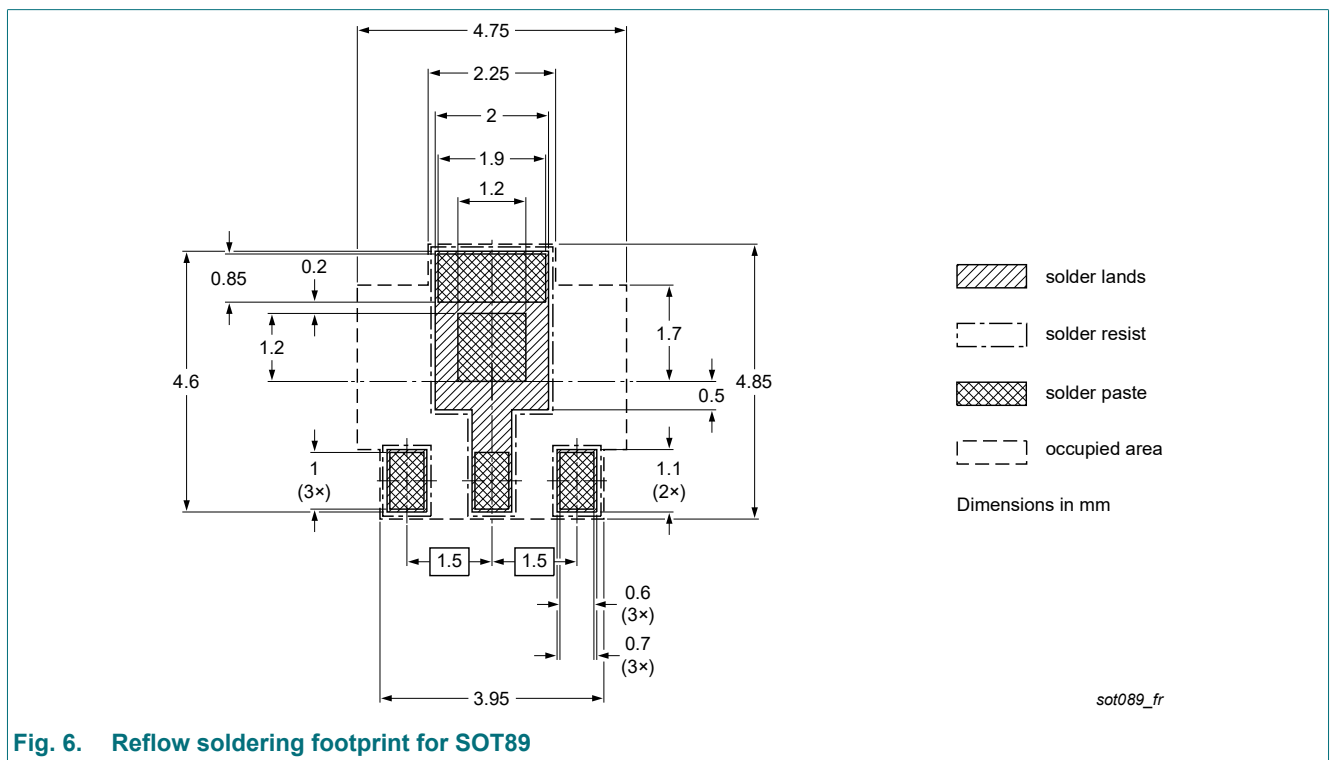


Fig. 6. Reflow soldering footprint for SOT89

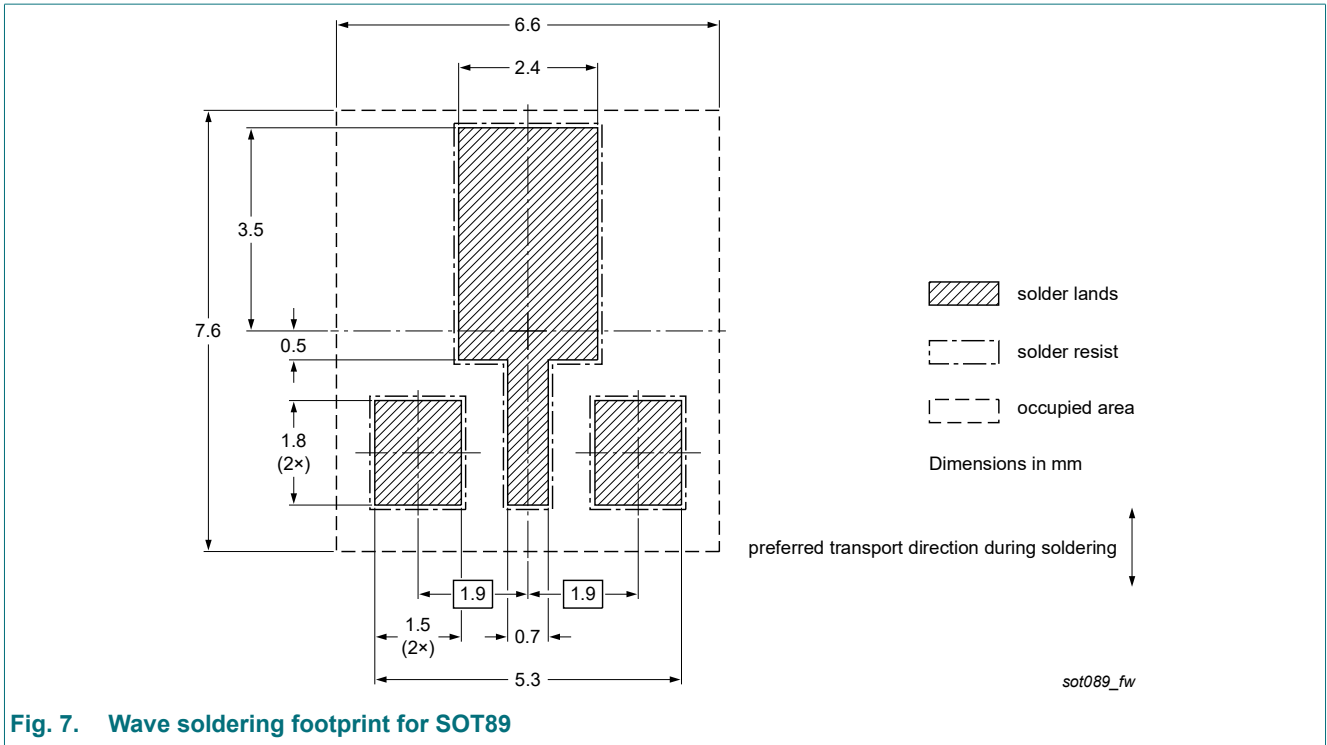


Fig. 7. Wave soldering footprint for SOT89

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BF620-Q v.1	20230623	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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