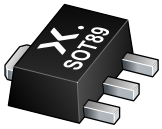



# BF620

## NPN high-voltage transistor

8 October 2024 **Product data sheet**

## 1. General description

NPN high-voltage transistor in a SOT89 (SC-62) flat lead Surface-Mounted Device (SMD) plastic package.

PNP complement: BF621

## 2. Features and benefits

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

## 3. Applications

- Video output stages

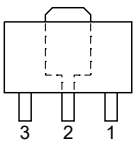
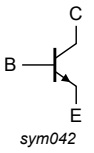
## 4. Quick reference data

**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 V; $I_C$ = 25 mA; $T_{amb}$ = 25 °C | | 50 | - | - | |

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | E | emitter |   SOT89 |   sym042 |
| 2 | C | collector | | |
| 3 | B | base | | |

## 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BF620 | SOT89 | plastic, surface-mounted package; 3 leads; 1.5 mm pitch; 4.5 mm x 2.5 mm x 1.5 mm body | SOT89 |

nexperia

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code |
|---|---|
| BF620 | DC |

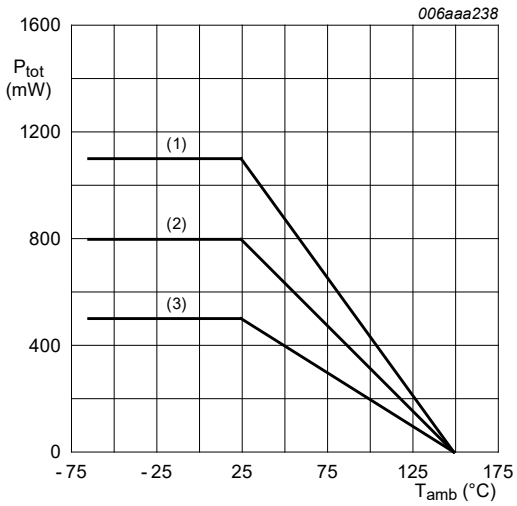
# 8. Limiting values

**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 $cm^2$.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 6 $cm^2$.




(1) FR4 PCB; 6 $cm^2$ mounting pad for collector.
(2) FR4 PCB; 1 $cm^2$ mounting pad for collector.
(3) FR4 PCB; standard footprint.

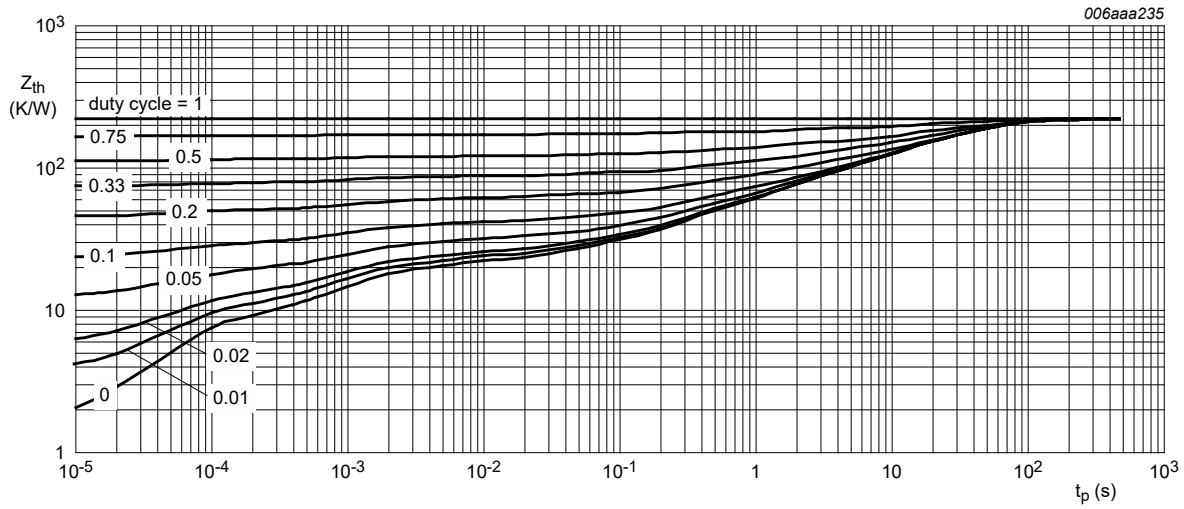
**Fig. 1. Power derating curves**

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

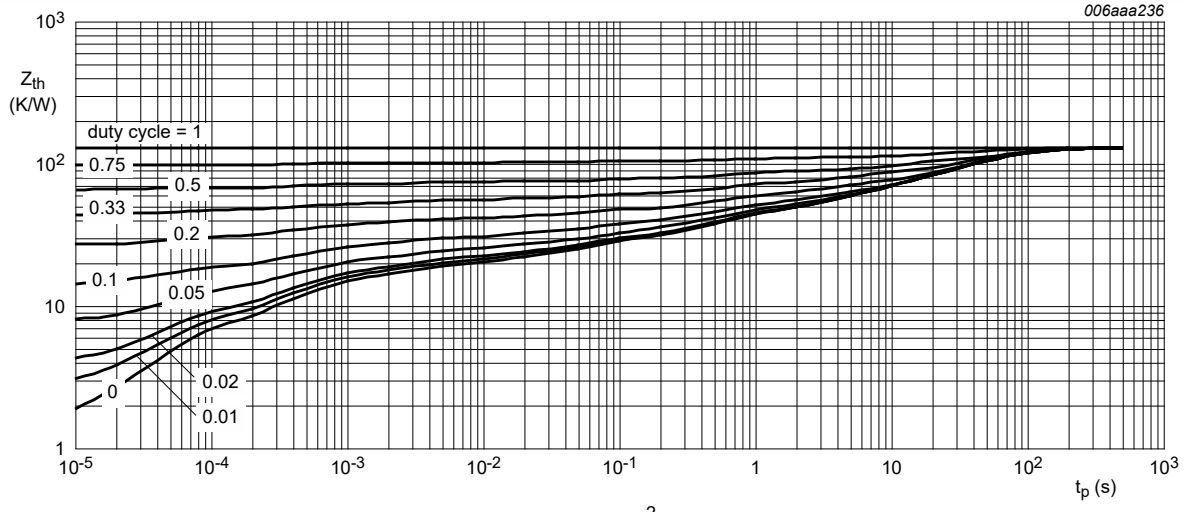
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 250 | K/W |
| | | | [2] | - | - | 156 | K/W |
| | | | [3] | - | - | 113 | K/W |
| $R_{th(j-sp)}$ | thermal resistance 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 $cm^2$.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 6 $cm^2$.



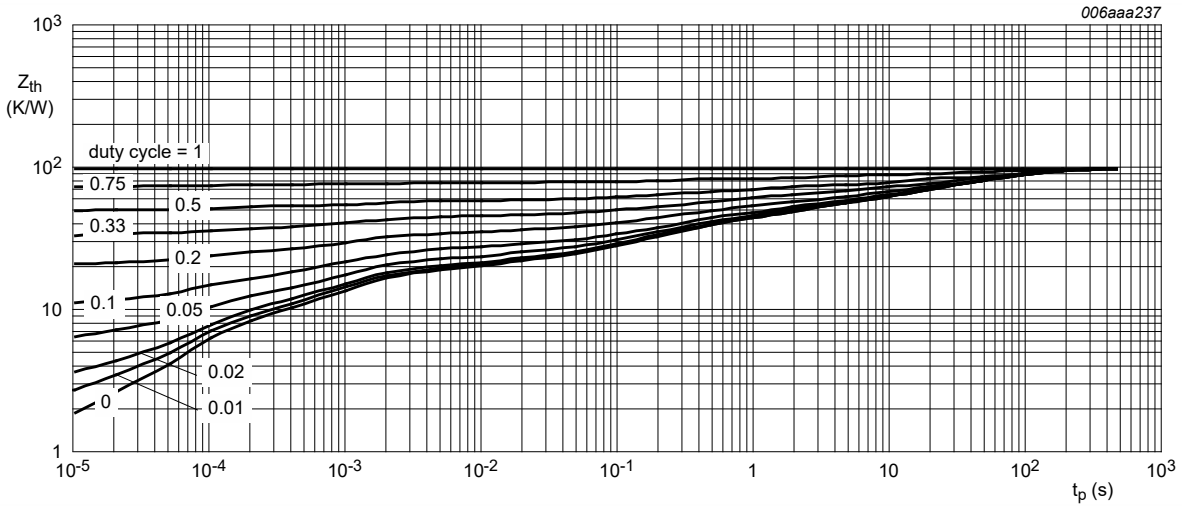

Mounted on FR4 PCB; standard footprint.

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




Mounted on FR4 PCB; mounting pad for collector 1 $cm^2$.

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




Mounted on FR4 PCB; mounting pad for collector 6 $cm^2$.

**Fig. 4. Transient thermal impedance as a function of pulse time; typical values**

## 10. Characteristics

**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CBO}$ | collector-base cut-off current | $V_{CB}$ = 200 V; $I_E$ = 0 A; $T_{amb}$ = 25 °C | | - | - | 10 | nA |
| | | $V_{CB}$ = 200 V; $I_E$ = 0 A; $T_j$ = 150 °C | | - | - | 10 | µA |
| $I_{EBO}$ | emitter-base cut-off current | $V_{EB}$ = 5 V; $I_C$ = 0 A; $T_{amb}$ = 25 °C | | - | - | 50 | nA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = 20 V; $I_C$ = 25 mA; $T_{amb}$ = 25 °C | | 50 | - | - | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = 30 mA; $I_B$ = 5 mA; $T_{amb}$ = 25 °C | | - | - | 600 | mV |
| $C_{re}$ | feedback capacitance | $V_{CB}$ = 30 V; $I_C$ = 0 A; $i_c$ = 0 A; f = 1 MHz; $T_{amb}$ = 25 °C | | - | - | 1.6 | pF |
| $f_T$ | transition frequency | $V_{CE}$ = 10 V; $I_C$ = -10 mA; f = 100 MHz; $T_{amb}$ = 25 °C | | 60 | - | - | MHz |

## 11. Package outline

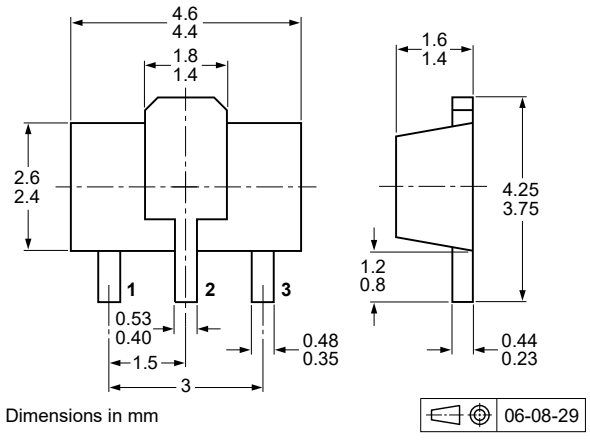



**Fig. 5. Package outline SOT89**

## 12. Soldering

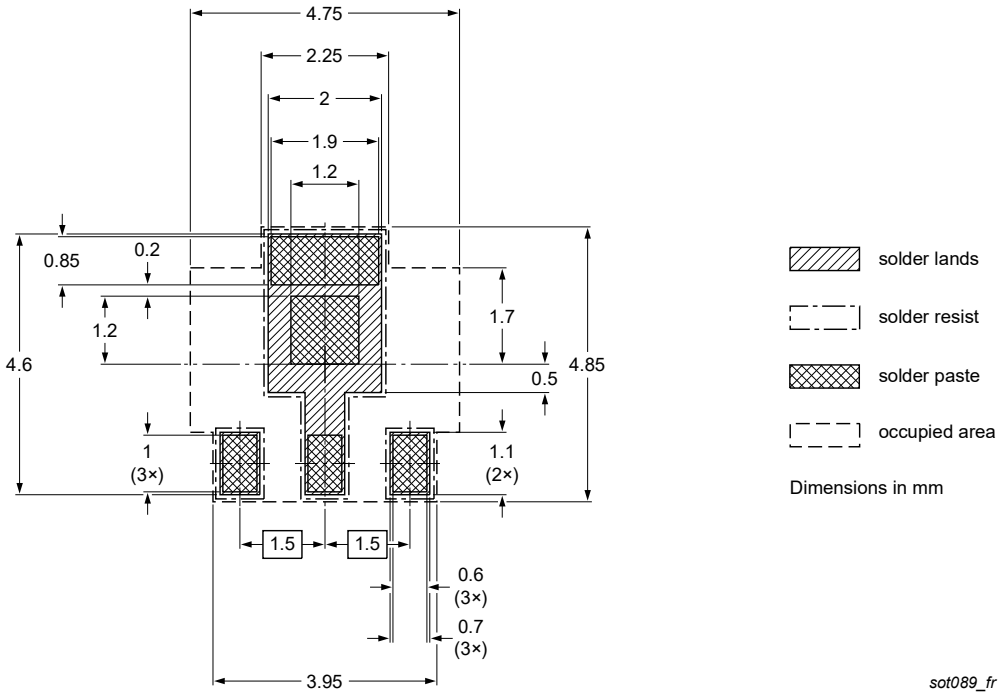



**Fig. 6. Reflow soldering footprint for SOT89**

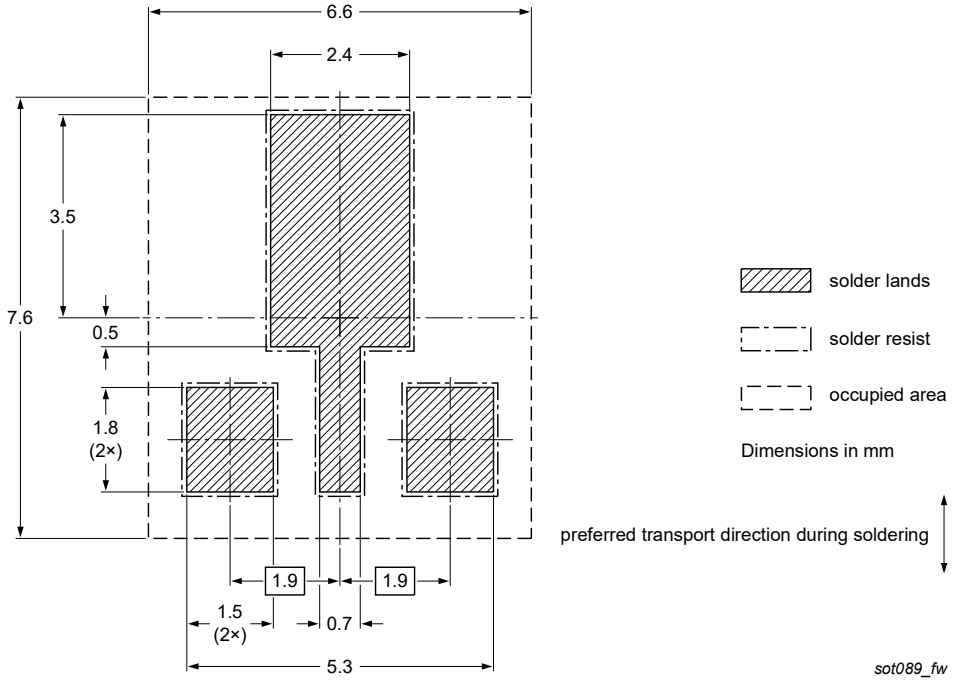



**Fig. 7. Wave soldering footprint for SOT89**

# 13. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BF620 v.4 | 20241008 | Product data sheet | - | BF620 v.3 |
| Modifications: | • Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). | | | |
| BF620 v.3 | 20230623 | Product data sheet | - | BF620_622 v.2 |
| BF620_622 v.2 | 20041214 | Product data sheet | - | BF620_622 v.1 |
| BF620_622 v.1 | 19990421 | Product data sheet | - | - |

# 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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**Date of release: 8 October 2024**