

# DATA SHEET

## **BFQ161** NPN video transistor

Product specification  
Supersedes data of November 1995  
File under Discrete Semiconductors, SC05

1997 Oct 02

## NPN video transistor

## BFQ161

## FEATURES

- Low output capacitance
- High gain bandwidth
- High current applicability
- Good thermal stability
- Gold metallization ensures excellent reliability.

## APPLICATIONS

- Pre-stage driver in high resolution colour graphics monitors.

## DESCRIPTION

NPN video transistor in a SOT54 (TO-92) plastic package.

## PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | base        |
| 2   | collector   |
| 3   | emitter     |

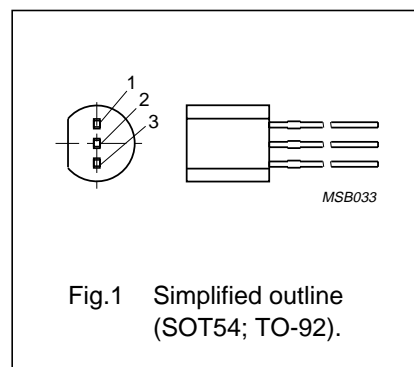


Fig. 1 Simplified outline (SOT54; TO-92).

## QUICK REFERENCE DATA

| SYMBOL    | PARAMETER                 | CONDITIONS  | MIN. | MAX. | UNIT             |
|-----------|---------------------------|---|------|------|------------------|
| $V_{CBO}$ | collector-base voltage    | open emitter  | –    | 20   | V                |
| $V_{CER}$ | collector-emitter voltage | $R_{BE} = 100 \Omega$   | –    | 19   | V                |
| $I_C$     | collector current (DC)    |   | –    | 500  | mA               |
| $P_{tot}$ | total power dissipation   | $T_s \leq 75 \text{ }^\circ\text{C}$ ; note 1   | –    | 1    | W                |
| $h_{FE}$  | DC current gain           | $I_C = 300 \text{ mA}$ ; $V_{CE} = 5 \text{ V}$   | 25   | –    |                  |
| $f_T$     | transition frequency      | $I_C = 300 \text{ mA}$ ; $V_{CE} = 5 \text{ V}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$ | 1    | –    | GHz              |
| $T_j$     | junction temperature      |   | –    | 150  | $^\circ\text{C}$ |

## Note

1.  $T_s$  is the temperature at the soldering point of the collector pin, 4 mm from the body.

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL    | PARAMETER                 | CONDITIONS  | MIN. | MAX. | UNIT             |
|-----------|---------------------------|---|------|------|------------------|
| $V_{CBO}$ | collector-base voltage    | open emitter  | –    | 20   | V                |
| $V_{CEO}$ | collector-emitter voltage | open base   | –    | 10   | V                |
| $V_{CER}$ | collector-emitter voltage | $R_{BE} = 100 \Omega$   | –    | 19   | V                |
| $V_{EBO}$ | emitter-base voltage      | open collector  | –    | 3    | V                |
| $I_C$     | collector current (DC)    |   | –    | 500  | mA               |
| $P_{tot}$ | total power dissipation   | $T_s \leq 75 \text{ }^\circ\text{C}$ ; notes 1 and 2; see Fig.3 | –    | 1    | W                |
| $T_{stg}$ | storage temperature range |   | –65  | +150 | $^\circ\text{C}$ |
| $T_j$     | junction temperature      |   | –    | 150  | $^\circ\text{C}$ |

## Notes

1.  $T_s$  is the temperature at the soldering point of the collector pin, 4 mm from the body.
2. Transistor mounted on a printed-circuit board with a metallized pad area of 10 mm<sup>2</sup>.

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## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER   | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th\ j-s}$ | thermal resistance from junction to soldering point | note 1     | 75    | K/W  |
| $R_{th\ j-a}$ | thermal resistance from junction to ambient         |            | 175   | K/W  |
| $R_{th\ s-a}$ | thermal resistance from soldering point to ambient  |            | 100   | K/W  |

## Note

1.  $T_s$  is the temperature at the soldering point of the collector pin, 4 mm from the body.

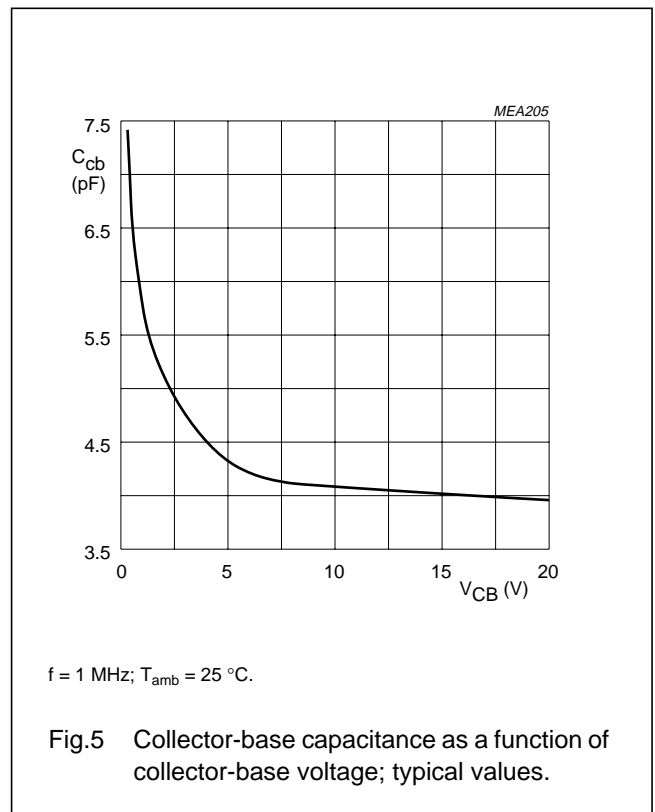
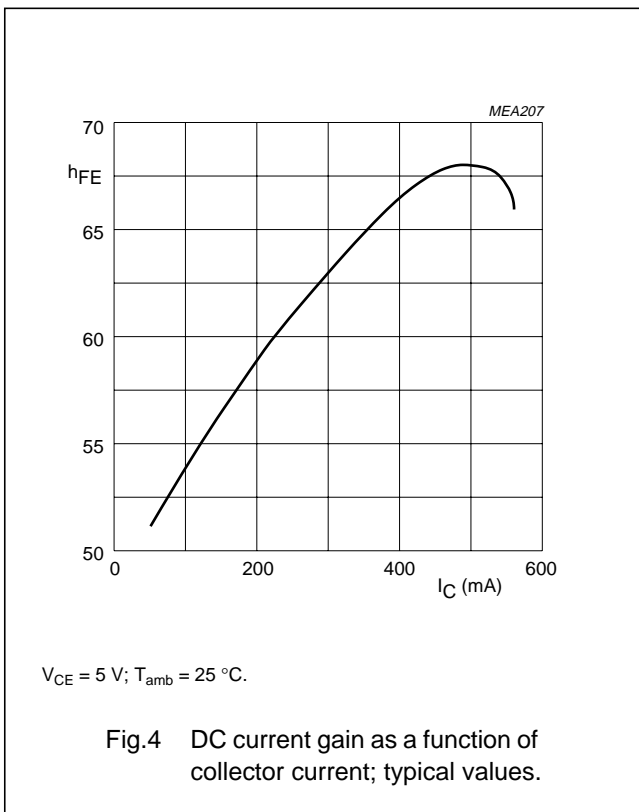
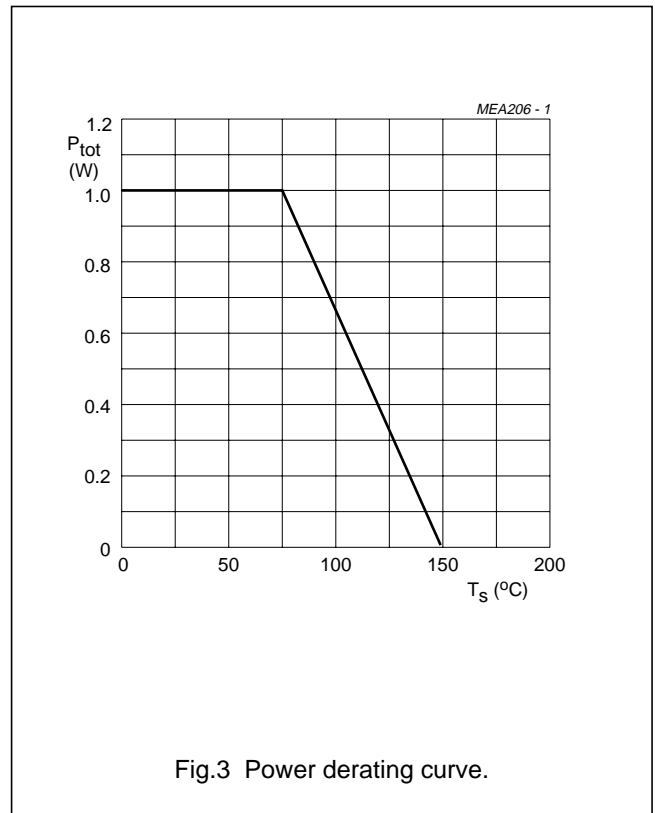
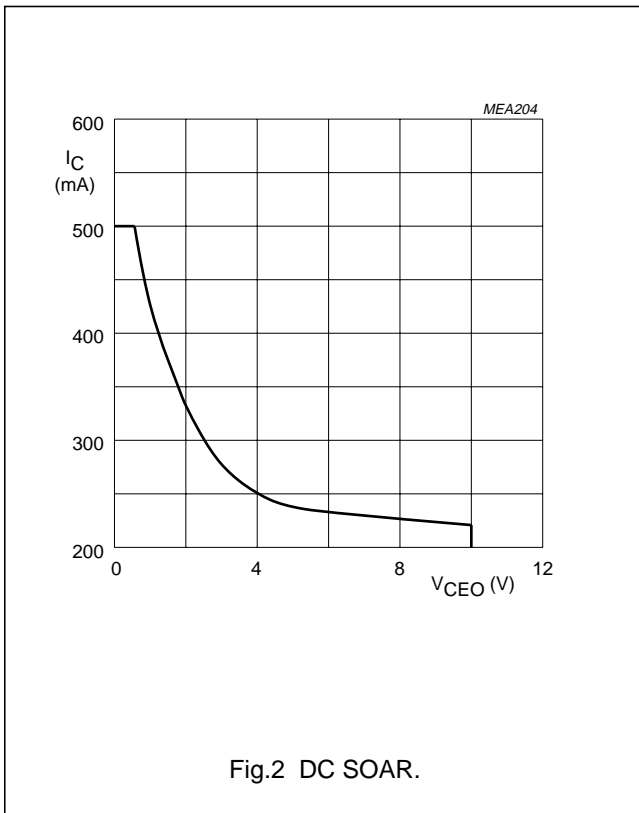
## CHARACTERISTICS

$T_j = 25\text{ °C}$  unless otherwise specified.

| SYMBOL        | PARAMETER                           | CONDITIONS   | MIN. | TYP. | MAX. | UNIT          |
|---------------|-------------------------------------|--|------|------|------|---------------|
| $V_{(BR)CBO}$ | collector-base breakdown voltage    | $I_C = 5\text{ mA}; I_E = 0$   | 20   | –    | –    | V             |
| $V_{(BR)CEO}$ | collector-emitter breakdown voltage | $I_C = 10\text{ mA}; I_B = 0$  | 10   | –    | –    | V             |
| $V_{(BR)EBO}$ | emitter-base breakdown voltage      | $I_E = 0.1\text{ mA}; I_C = 0$   | 3    | –    | –    | V             |
| $I_{CES}$     | collector-emitter cut-off current   | $I_B = 0; V_{CE} = 10\text{ V}$  | –    | –    | 100  | $\mu\text{A}$ |
| $h_{FE}$      | DC current gain                     | $I_C = 300\text{ mA}; V_{CE} = 5\text{ V};$<br>$T_{amb} = 25\text{ °C};$ see Fig.4 | 25   | –    | –    |               |
|               |                                     | $I_C = 100\text{ mA}; V_{CE} = 5\text{ V};$<br>$T_{amb} = 25\text{ °C};$ see Fig.4 | 40   | 50   | –    |               |
| $C_{cb}$      | collector-base capacitance          | $I_C = 0; V_{CB} = 5\text{ V}; f = 1\text{ MHz};$<br>see Fig.5                     | –    | 4.3  | –    | pF            |
| $C_c$         | collector capacitance               | $I_E = I_e = 0; V_{CB} = 5\text{ V}; f = 1\text{ MHz}$                             | –    | 6    | –    | pF            |
| $f_T$         | transition frequency                | $I_C = 300\text{ mA}; V_{CE} = 5\text{ V};$ see Fig.6                              | 1    | –    | –    | GHz           |

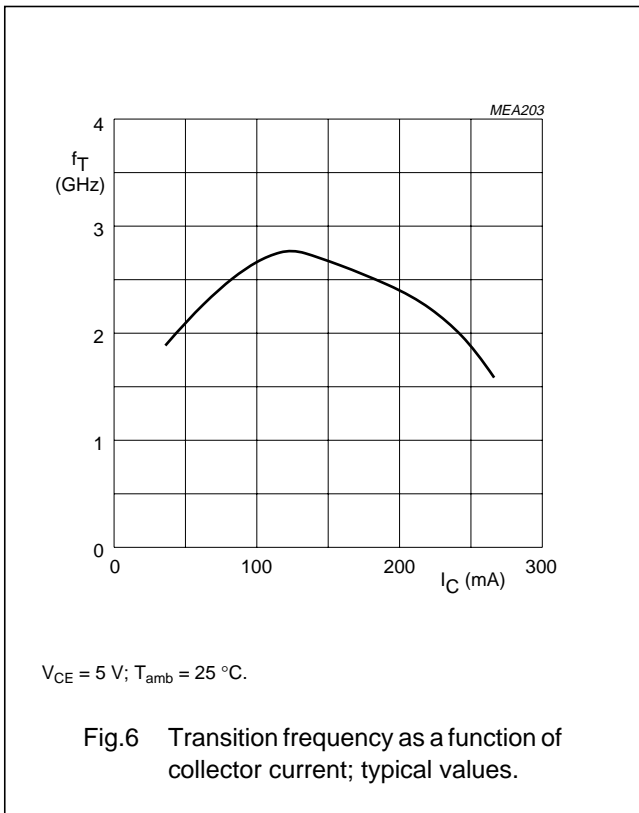
NPN video transistor

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PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | b            | b <sub>1</sub> | c            | D          | d          | E          | e    | e <sub>1</sub> | L            | L <sub>1</sub> <sup>(1)</sup> |
|------|------------|--------------|----------------|--------------|------------|------------|------------|------|----------------|--------------|-------------------------------|
| mm   | 5.2<br>5.0 | 0.48<br>0.40 | 0.66<br>0.56   | 0.45<br>0.40 | 4.8<br>4.4 | 1.7<br>1.4 | 4.2<br>3.6 | 2.54 | 1.27           | 14.5<br>12.7 | 2.5                           |

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

| OUTLINE VERSION | REFERENCES |       |       | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|-------|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ  |                     |            |
| SOT54           |            | TO-92 | SC-43 |                     | 97-02-28   |

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**DEFINITIONS**

| <b>Data sheet status</b>  |   |
|---|---|
| Objective specification   | This data sheet contains target or goal specifications for product development.       |
| Preliminary specification   | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification   | This data sheet contains final product specifications.                                |
| <b>Limiting values</b>  |   |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. |   |
| <b>Application information</b>  |   |
| Where application information is given, it is advisory and does not form part of the specification.   |   |

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