

DATA SHEET

BFG16A

NPN 2 GHz wideband transistor

Product specification
Supersedes data of November 1992
File under Discrete Semiconductors, SC14

1995 Sep 12

NPN 2 GHz wideband transistor

BFG16A

FEATURES

- High power gain
- Good thermal stability
- Gold metallization ensures excellent reliability.

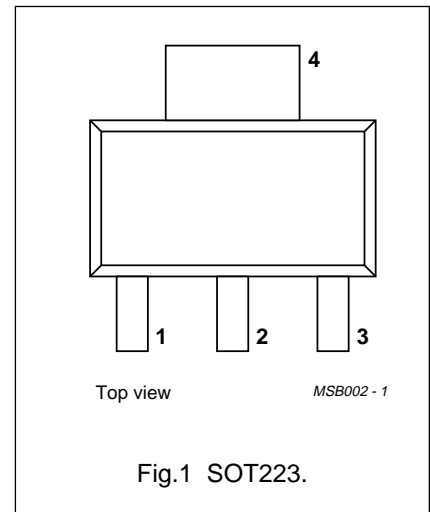
DESCRIPTION

NPN transistor mounted in a plastic SOT223 envelope.

It is primarily intended for use in wideband amplifiers, aerial amplifiers and vertical amplifiers in high speed oscilloscopes.

PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | emitter |
| 2 | base |
| 3 | emitter |
| 4 | collector |



QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-----------|-------------------------------|--|------|------|------|------|
| V_{CBO} | collector-base voltage | open emitter | – | – | 40 | V |
| V_{CEO} | collector-emitter voltage | open base | – | – | 25 | V |
| I_C | DC collector current | | – | – | 150 | mA |
| P_{tot} | total power dissipation | up to $T_s = 110\text{ °C}$; note 1 | – | – | 1 | W |
| h_{FE} | DC current gain | $I_C = 150\text{ mA}$; $V_{CE} = 5\text{ V}$; $T_j = 25\text{ °C}$ | 25 | 80 | – | |
| f_T | transition frequency | $I_C = 100\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$ | – | 1.5 | – | GHz |
| G_{UM} | maximum unilateral power gain | $I_C = 100\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$ | – | 10 | – | dB |

Note

1. T_s is the temperature at the soldering point of the collector tab.

LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|---------------------------|--------------------------------------|------|------|------|
| V_{CBO} | collector-base voltage | open emitter | – | 40 | V |
| V_{CEO} | collector-emitter voltage | open base | – | 25 | V |
| V_{EBO} | emitter-base voltage | open collector | – | 2 | V |
| I_C | DC collector current | | – | 150 | mA |
| P_{tot} | total power dissipation | up to $T_s = 110\text{ °C}$; note 1 | – | 1 | W |
| T_{stg} | storage temperature | | –65 | +150 | °C |
| T_j | junction temperature | | – | 150 | °C |

Note

1. T_s is the temperature at the soldering point of the collector tab.

NPN 2 GHz wideband transistor

BFG16A

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------|---|--------------------------------------|-------|------|
| $R_{th\ j-s}$ | thermal resistance from junction to soldering point | up to $T_s = 110\text{ °C}$; note 1 | 40 | K/W |

Note

- T_s is the temperature at the soldering point of the collector tab.

CHARACTERISTICS

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

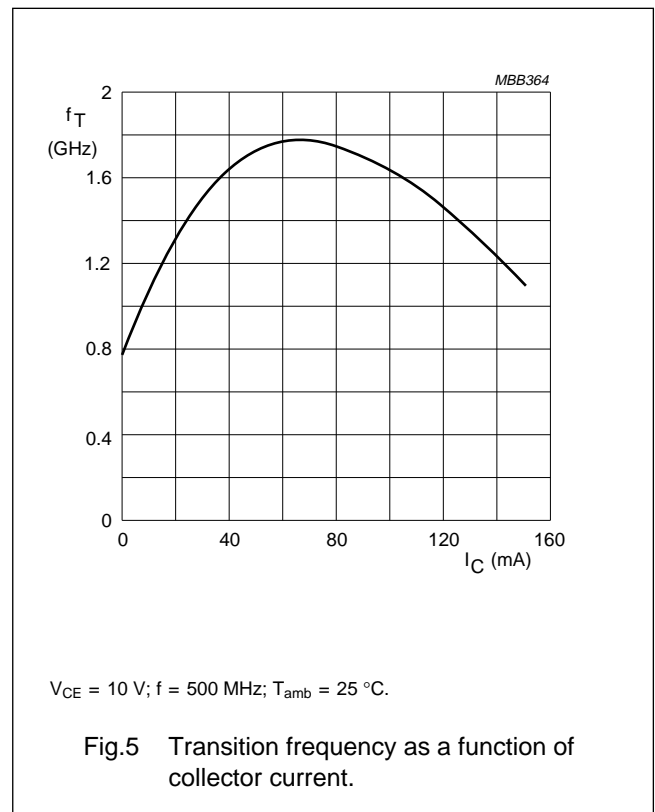
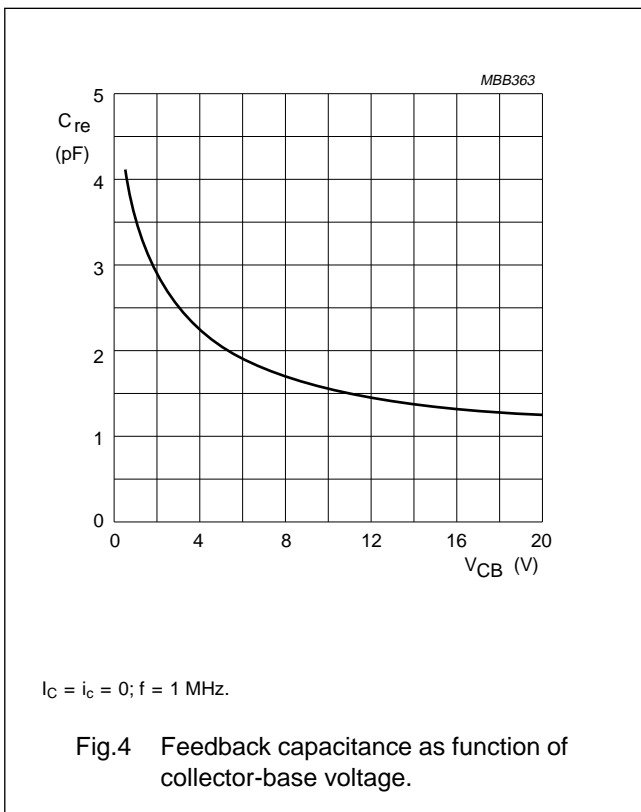
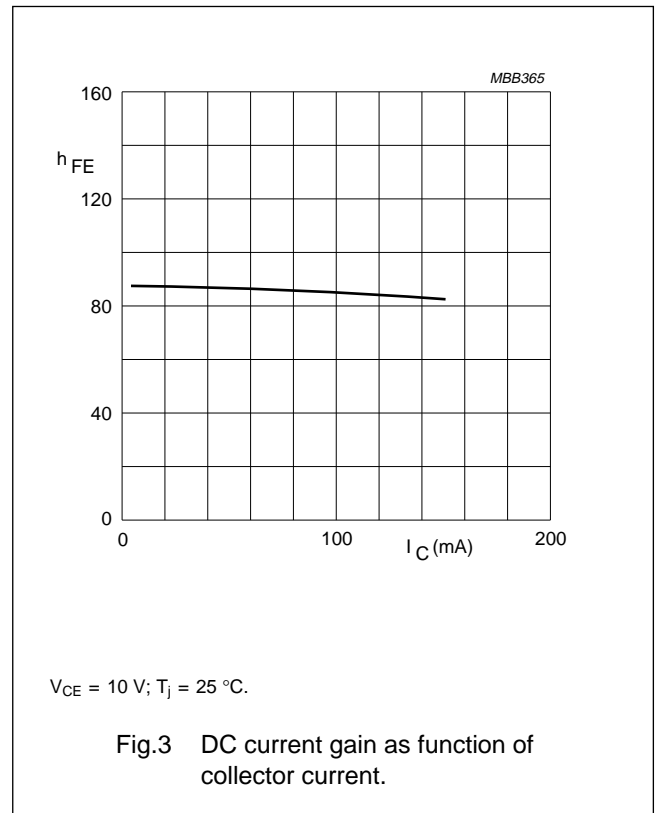
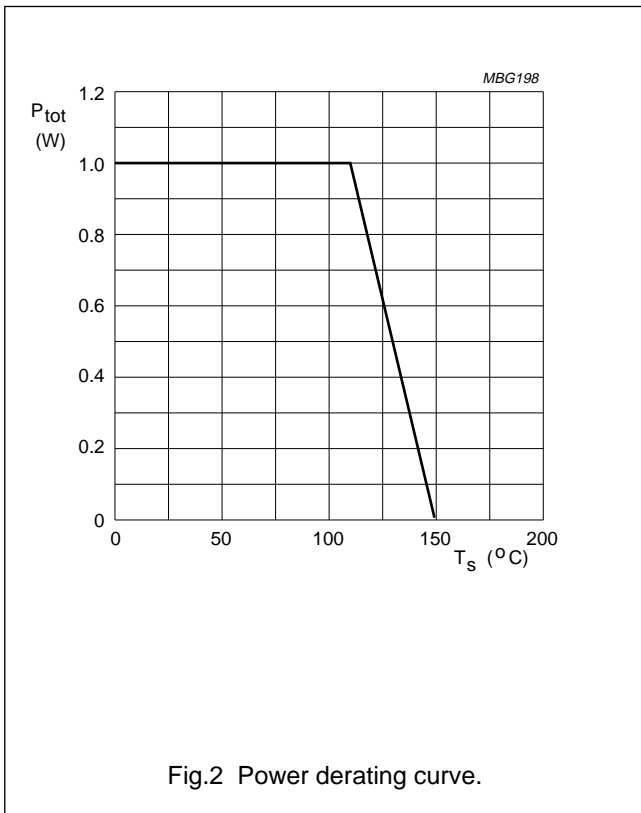
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------|---|---|------|------|------|---------------|
| $V_{(BR)CBO}$ | collector-base breakdown voltage | open emitter; $I_C = 0.1\text{ mA}$ | 25 | – | – | V |
| $V_{(BR)CEO}$ | collector-emitter breakdown voltage | open base; $I_C = 10\text{ mA}$ | 18 | – | – | V |
| $V_{(BR)EBO}$ | emitter-base breakdown voltage | open collector; $I_E = 0.1\text{ mA}$ | 3 | – | – | V |
| I_{CBO} | collector cut-off current | $I_E = 0$; $V_{CB} = 28\text{ V}$ | – | – | 20 | μA |
| h_{FE} | DC current gain | $I_C = 150\text{ mA}$; $V_{CE} = 5\text{ V}$ | 25 | 80 | – | |
| C_c | collector capacitance | $I_E = i_e = 0$; $V_{CB} = 10\text{ V}$; $f = 1\text{ MHz}$ | – | 2.5 | – | pF |
| C_e | emitter capacitance | $I_C = i_c = 0$; $V_{EB} = 0.5\text{ V}$; $f = 1\text{ MHz}$ | – | 10.0 | – | pF |
| C_{re} | feedback capacitance | $I_C = 0$; $V_{CB} = 10\text{ V}$; $f = 1\text{ MHz}$ | – | 1.5 | – | pF |
| f_T | transition frequency | $I_C = 100\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$ | – | 1.5 | – | GHz |
| G_{UM} | maximum unilateral power gain note 1 | $I_C = 100\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$ | – | 10 | – | dB |

Note

- G_{UM} is the maximum unilateral power gain, assuming s_{12} is zero. $G_{UM} = 10 \log \frac{|s_{21}|^2}{(1 - |s_{11}|^2)(1 - |s_{22}|^2)}$ dB.

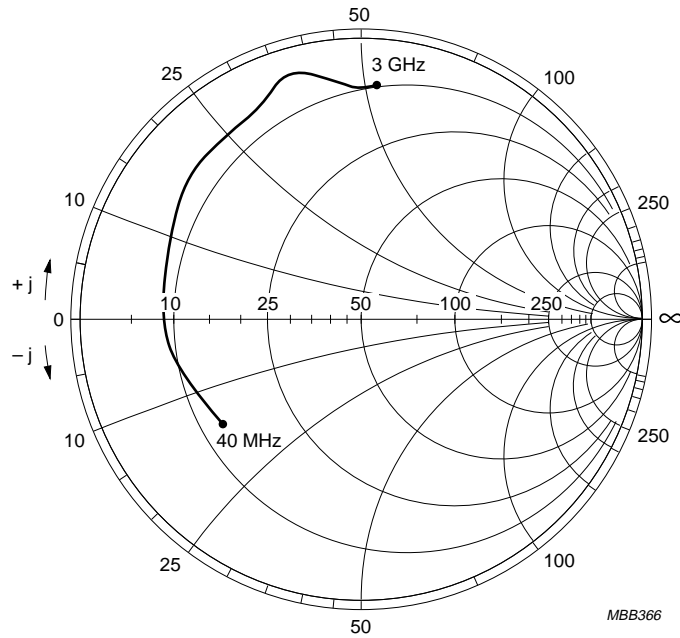
NPN 2 GHz wideband transistor

BFG16A



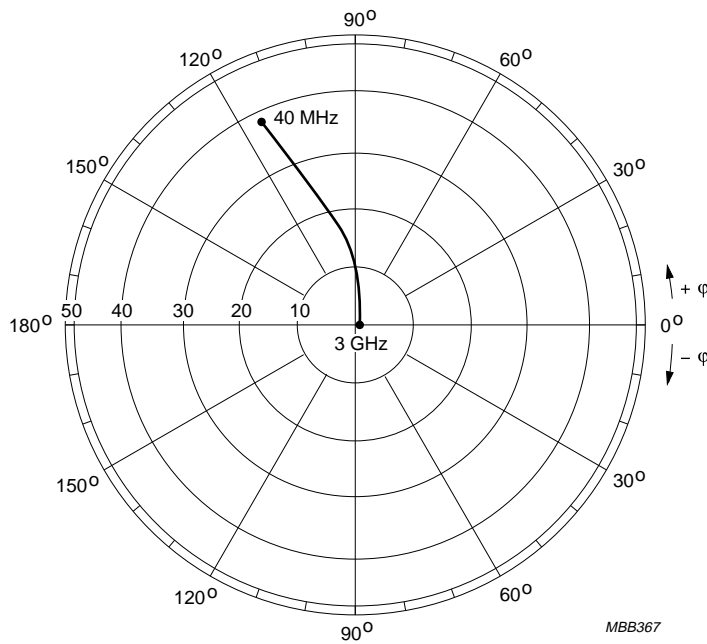
NPN 2 GHz wideband transistor

BFG16A



$I_C = 70 \text{ mA}; V_{CE} = 15 \text{ V}; Z_0 = 50 \Omega.$

Fig.6 Common emitter input reflection coefficient (S_{11}).

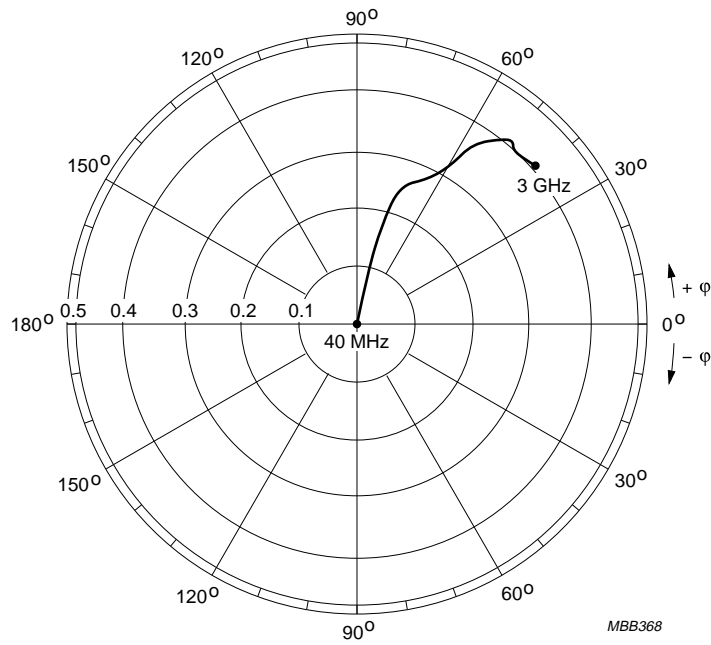


$I_C = 70 \text{ mA}; V_{CE} = 15 \text{ V}.$

Fig.7 Common emitter forward transmission coefficient (S_{21}).

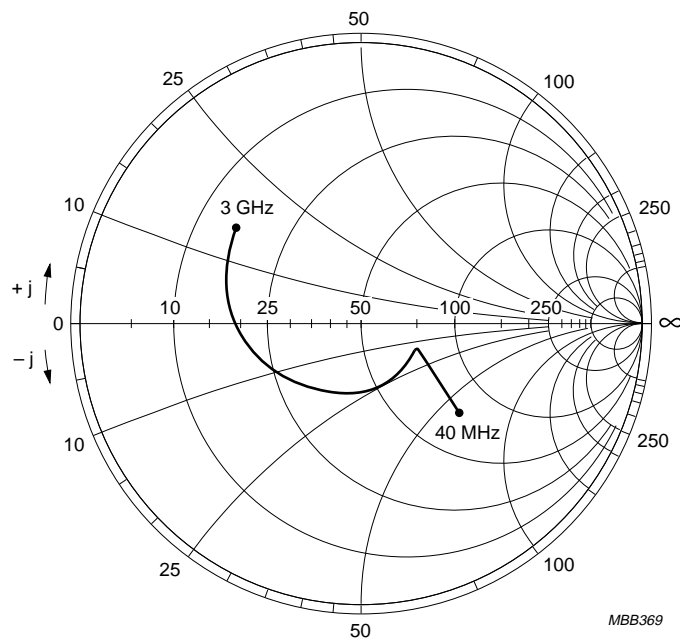
NPN 2 GHz wideband transistor

BFG16A



$I_C = 70 \text{ mA}; V_{CE} = 15 \text{ V}.$

Fig.8 Common emitter reverse transmission coefficient (S_{12}).



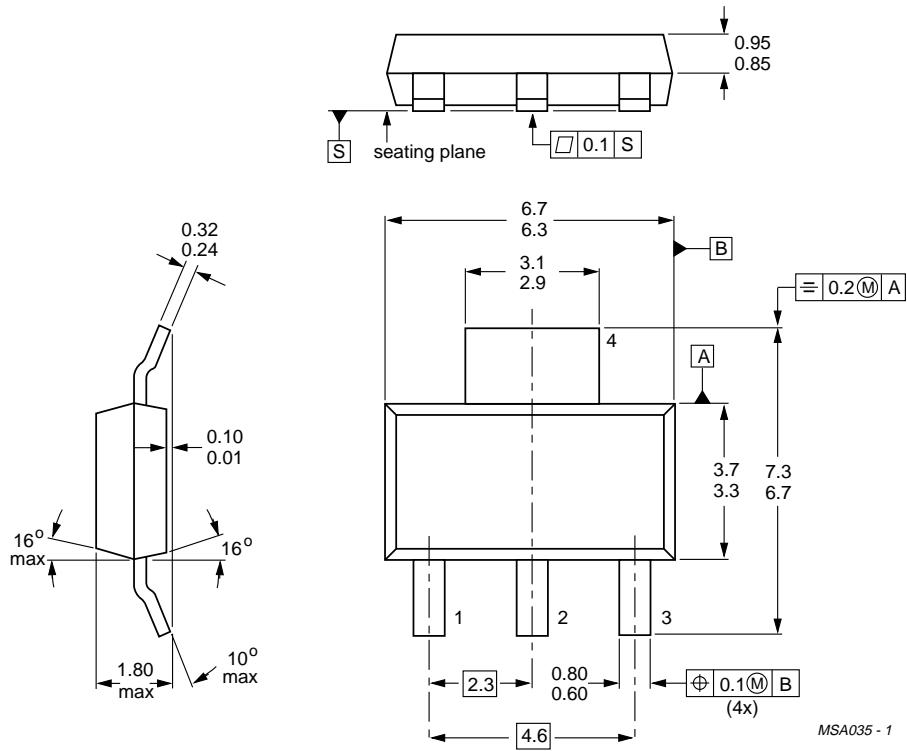
$I_C = 70 \text{ mA}; V_{CE} = 15 \text{ V}; Z_0 = 50 \Omega.$

Fig.9 Common emitter output transmission coefficient (S_{22}).

NPN 2 GHz wideband transistor

BFG16A

PACKAGE OUTLINE



Dimensions in mm.

Fig.10 SOT223.

NPN 2 GHz wideband transistor

BFG16A

DEFINITIONS

| Data sheet status | |
|---|--|
| 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. |
| Short-form specification | The data in this specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook. |
| Limiting values | |
| 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. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.