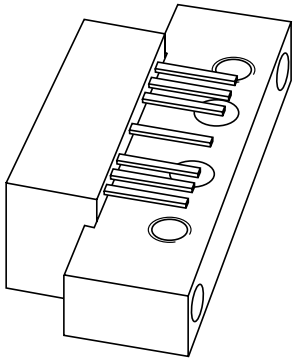
# DATA SHEET



# BGD816
## CATV amplifier module

Objective specification

2000 Apr 12

Philips
Semiconductors

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# CATV amplifier module BGD816

## FEATURES

- Excellent linearity
- Extremely low noise
- Excellent return loss properties
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

- CATV systems operating in the 40 to 870 MHz frequency range.

## DESCRIPTION

Hybrid amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION |
|---|---|
| 1 | input |
| 2 and 3 | common |
| 5 | $+V_B$ |
| 7 and 8 | common |
| 9 | output |

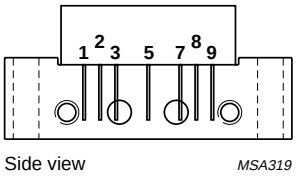



Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $G_p$ | power gain | f = 45 MHz | 21.2 | 21.8 | dB |
| | | f = 870 MHz | 22 | 23 | dB |
| $I_{tot}$ | total current consumption (DC) | $V_B$ = 24 V | 380 | 410 | mA |

## LIMITING VALUES

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

| SYMBOL | PARAMETER | MIN. | MAX. | UNIT |
|---|---|---|---|---|
| $V_B$ | supply voltage | – | 30 | V |
| $V_i$ | RF input voltage | – | 70 | dBmV |
| $T_{stg}$ | storage temperature | –40 | +100 | °C |
| $T_{mb}$ | operating mounting base temperature | –20 | +100 | °C |

**CHARACTERISTICS**

Bandwidth 40 to 870 MHz; $V_B$ = 24 V; $T_{mb}$ = 35 °C; $Z_S = Z_L$ = 75 Ω

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $G_p$ | power gain | f = 45 MHz | 21.2 | – | 21.8 | dB |
| | | f = 870 MHz | 22 | – | 23 | dB |
| SL | slope straight line | f = 45 to 870 MHz; note 1 | 0.5 | 1 | 1.5 | dB |
| FL | flatness straight line | f = 45 to 100 MHz | – | – | ±0.35 | dB |
| | | f = 100 to 800 MHz | – | – | ±0.5 | dB |
| | | f = 800 to 870 MHz | – | – | ±0.15 | dB |
| $s_{11}$ | input return losses | f = 45 to 80 MHz | 21 | – | – | dB |
| | | f = 80 to 160 MHz | 20 | – | – | dB |
| | | f = 160 to 320 MHz | 19 | – | – | dB |
| | | f = 320 to 550 MHz | 18 | – | – | dB |
| | | f = 550 to 650 MHz | 17 | – | – | dB |
| | | f = 650 to 750 MHz | 16 | – | – | dB |
| | | f = 750 to 870 MHz | 15 | – | – | dB |
| | | f = 870 to 914 MHz | 14 | – | – | dB |
| $s_{22}$ | output return losses | f = 45 to 80 MHz | 21 | – | – | dB |
| | | f = 80 to 160 MHz | 20 | – | – | dB |
| | | f = 160 to 320 MHz | 19 | – | – | dB |
| | | f = 320 to 550 MHz | 18 | – | – | dB |
| | | f = 550 to 650 MHz | 17 | – | – | dB |
| | | f = 650 to 750 MHz | 16 | – | – | dB |
| | | f = 750 to 870 MHz | 15 | – | – | dB |
| | | f = 870 to 914 MHz | 14 | – | – | dB |
| $s_{21}$ | phase response | f = 50 MHz | –45 | – | +45 | deg |
| CTB | composite triple beat | 79 chs flat; $V_o$ = 44 dBmV; $f_m$ = 547.25 MHz | – | – | –66 | dB |
| | | 112 chs flat; $V_o$ = 44 dBmV; $f_m$ = 745.25 MHz | – | – | –60 | dB |
| | | 132 chs flat; $V_o$ = 44 dBmV; $f_m$ = 859.25 MHz | – | – | –56 | dB |
| | | 112 chs; $f_m$ = tbd MHz; $V_o$ = 48.2 dBmV at 745 MHz; note 2 | – | – | –59 | dB |
| | | 79 chs; $f_m$ = tbd MHz; $V_o$ = 45.3 dBmV at 547 MHz; note 3 | – | – | –67 | dB |
| $X_{mod}$ | cross modulation | 79 chs flat; $V_o$ = 44 dBmV; $f_m$ = 55.25 MHz | – | – | –65 | dB |
| | | 112 chs flat; $V_o$ = 44 dBmV; $f_m$ = 55.25 MHz | – | – | –61 | dB |
| | | 132 chs flat; $V_o$ = 44 dBmV; $f_m$ = 55.25 MHz | – | – | –60 | dB |
| | | 112 chs; $f_m$ = tbd MHz; $V_o$ = 48.2 dBmV at 745 MHz; note 2 | – | – | –56 | dB |
| | | 79 chs; $f_m$ = tbd MHz; $V_o$ = 45.3 dBmV at 547 MHz; note 3 | – | – | –65 | dB |

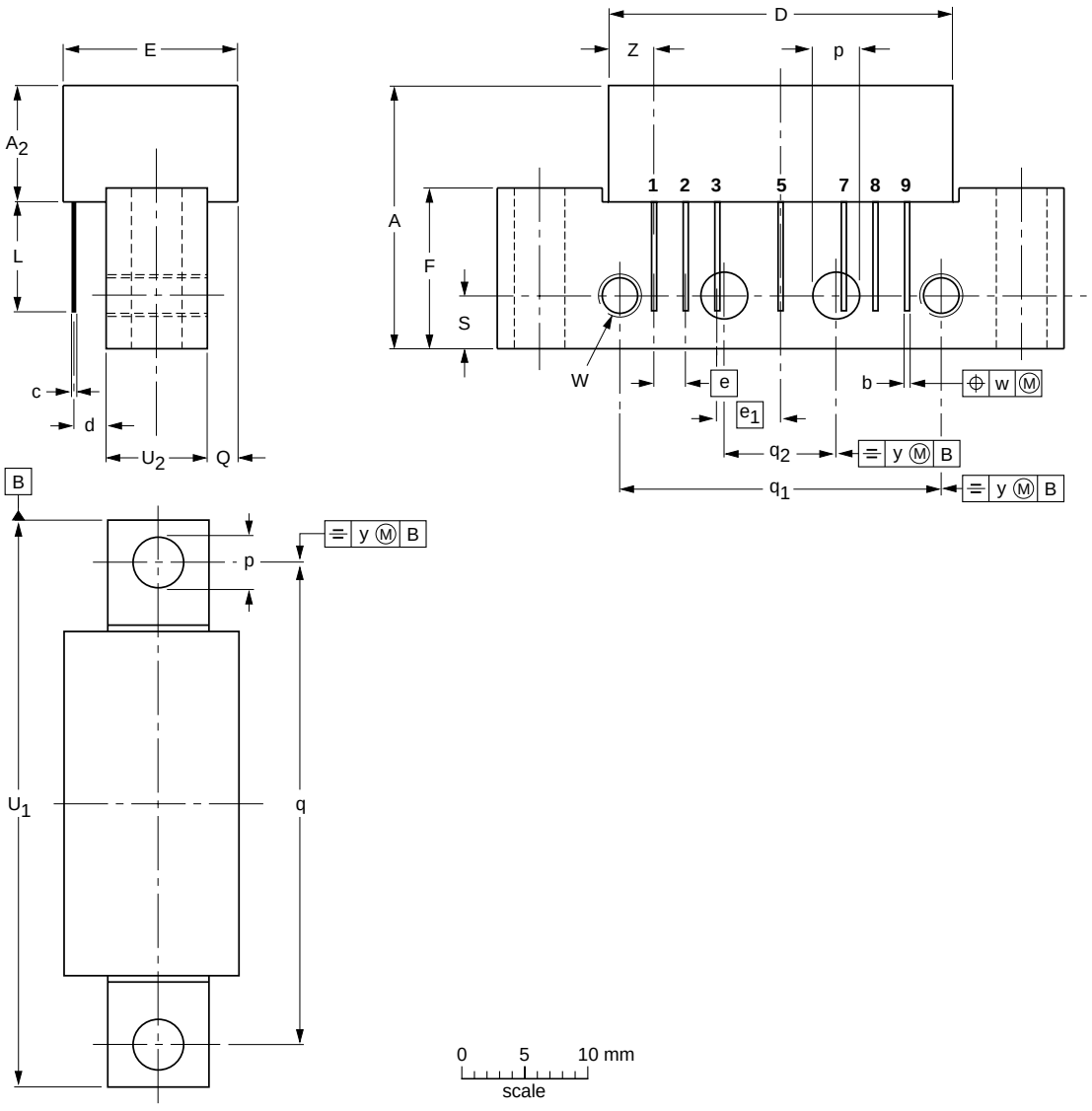
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| CSO | composite second order distortion | 79 chs flat; $V_o$ = 44 dBmV; $f_m$ = 548.5 MHz | – | – | –65 | dB |
| | | 112 chs flat; $V_o$ = 44 dBmV; $f_m$ = 746.5 MHz | – | – | –58 | dB |
| | | 132 chs flat; $V_o$ = 44 dBmV; $f_m$ = 860.5 MHz | – | – | –54 | dB |
| | | 112 chs; $f_m$ = tbd MHz; $V_o$ = 48.2 dBmV at 745 MHz; note 2 | – | – | –56 | dB |
| | | 79 chs; $f_m$ = tbd MHz; $V_o$ = 45.3 dBmV at 547 MHz; note 3 | – | – | –63 | dB |
| $d_2$ | second order distortion | note 4 | – | – | –74 | dB |
| $V_o$ | output voltage | $d_{im}$ = –60 dB; note 5 | 64.5 | – | – | dBmV |
| | | CTB compression = 1 dB; 132 chs flat; f = tbd MHz | tbd | – | – | dBmV |
| | | CSO compression = 1 dB; 132 chs flat; f = tbd MHz | tbd | – | – | dBmV |
| F | noise figure | f = 50 MHz | – | – | 5.5 | dB |
| | | f = 550 MHz | – | – | 5.5 | dB |
| | | f = 750 MHz | – | – | 6.5 | dB |
| | | f = 870 MHz | – | – | 7.5 | dB |
| $I_{tot}$ | total current consumption (DC) | note 6 | 380 | 395 | 410 | mA |

**Notes**

1. Slope straight line is defined as gain at 870 MHz against gain at 45 MHz.
2. Tilt = 10.2 dB (55 to 745 MHz).
3. Tilt = 7.3 dB (55 to 547 MHz).
4. $f_p$ = 55.25 MHz; $V_p$ = 44 dBmV;
   $f_q$ = 805.25 MHz; $V_q$ = 44 dBmV;
   measured at $f_p + f_q$ = 860.5 MHz.
5. Measured according to DIN45004B:
   $f_p$ = 851.25 MHz; $V_p = V_o$;
   $f_q$ = 858.25 MHz; $V_q = V_o$ – 6 dB;
   $f_r$ = 860.25 MHz; $V_r = V_o$ – 6 dB;
   measured at $f_p + f_q - f_r$ = 849.25 MHz.
6. The module normally operates at $V_B$ = 24 V, but is able to withstand supply transients up to 35 V.

## PACKAGE OUTLINE

**Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads** **SOT115J**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A max. | $A_2$ max. | b | c | D max. | d max. | E max. | e | $e_1$ | F | L min. | p | Q max. | q | $q_1$ | $q_2$ | S | $U_1$ max. | $U_2$ | W | w | y | Z max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 20.8 | 9.1 | 0.51<br>0.38 | 0.25 | 27.2 | 2.54 | 13.75 | 2.54 | 5.08 | 12.7 | 8.8 | 4.15<br>3.85 | 2.4 | 38.1 | 25.4 | 10.2 | 4.2 | 44.75 | 8 | 6-32<br>UNC | 0.25 | 0.1 | 3.8 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOT115J | | | | | | 99-02-06 |

**DATA SHEET STATUS**

| DATA SHEET STATUS | PRODUCT STATUS | DEFINITIONS (1) |
|---|---|---|
| Objective specification | Development | This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice. |
| Preliminary specification | Qualification | This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product. |
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**Note**

1. Please consult the most recently issued data sheet before initiating or completing a design.

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**Short-form specification** — The data in a short-form 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 definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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|---|
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