

# DATA SHEET

## **BGD602** CATV amplifier module

Product specification  
File under Discrete Semiconductors, SC16

February 1994

**Philips Semiconductors**



**PHILIPS**

# CATV amplifier module

# BGD602

## FEATURES

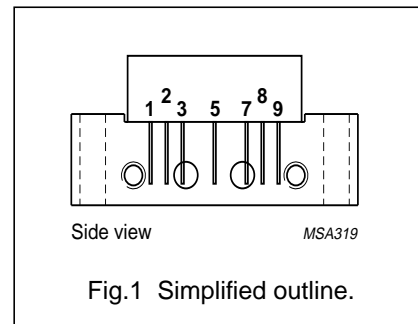
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module designed for applications in CATV systems with a bandwidth of 40 to 600 MHz operating with a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 600 MHz           | 19   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 435  | mA   |

## LIMITING VALUES

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

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

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**CHARACTERISTICS**

Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX. | UNIT |
|------------------|-----------------------------------|--|------|------|------|
| G <sub>p</sub>   | power gain                        | f = 50 MHz   | 18   | 19   | dB   |
|                  |                                   | f = 600 MHz  | 19   | –    | dB   |
| SL               | slope cable equivalent            | f = 40 to 600 MHz  | 0.2  | 2.2  | dB   |
| FL               | flatness of frequency response    | f = 40 to 600 MHz  | –    | ±0.3 | dB   |
| S <sub>11</sub>  | input return losses               | f = 40 to 80 MHz   | 20   | –    | dB   |
|                  |                                   | f = 80 to 160 MHz  | 19   | –    | dB   |
|                  |                                   | f = 160 to 600 MHz   | 18   | –    | dB   |
| S <sub>22</sub>  | output return losses              | f = 40 to 80 MHz   | 20   | –    | dB   |
|                  |                                   | f = 80 to 160 MHz  | 19   | –    | dB   |
|                  |                                   | f = 160 to 600 MHz   | 18   | –    | dB   |
| S <sub>21</sub>  | phase response                    | f = 50 MHz   | –45  | +45  | deg  |
| CTB              | composite triple beat             | 85 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 595.25 MHz | –    | –62  | dB   |
| X <sub>mod</sub> | cross modulation                  | 85 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 55.25 MHz  | –    | –66  | dB   |
| CSO              | composite second order distortion | 85 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 596.5 MHz  | –    | –60  | dB   |
| d <sub>2</sub>   | second order distortion           | note 1   | –    | –70  | dB   |
| V <sub>o</sub>   | output voltage                    | d <sub>im</sub> = –60 dB; note 2   | 63   | –    | dBmV |
| F                | noise figure                      | f = 600 MHz  | –    | 8    | dB   |
| I <sub>tot</sub> | total current consumption (DC)    | note 3   | –    | 435  | mA   |

**Notes**

1.  $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
2. Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
3. The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

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**CHARACTERISTICS**

Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 550$ MHz   | 18.8 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0.2  | 2.2       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –66       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –68       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –         | dBmV |
| F         | noise figure                      | $f = 550$ MHz   | –    | 7.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

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**CHARACTERISTICS**

Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX. | UNIT |
|------------------|-----------------------------------|--|------|------|------|
| G <sub>p</sub>   | power gain                        | f = 50 MHz   | 18   | 19   | dB   |
|                  |                                   | f = 450 MHz  | 18.6 | –    | dB   |
| SL               | slope cable equivalent            | f = 40 to 450 MHz  | 0.2  | 1.8  | dB   |
| FL               | flatness of frequency response    | f = 40 to 450 MHz  | –    | ±0.3 | dB   |
| S <sub>11</sub>  | input return losses               | f = 40 to 80 MHz   | 20   | –    | dB   |
|                  |                                   | f = 80 to 160 MHz  | 19   | –    | dB   |
|                  |                                   | f = 160 to 450 MHz   | 18   | –    | dB   |
| S <sub>22</sub>  | output return losses              | f = 40 to 80 MHz   | 20   | –    | dB   |
|                  |                                   | f = 80 to 160 MHz  | 19   | –    | dB   |
|                  |                                   | f = 160 to 450 MHz   | 18   | –    | dB   |
| S <sub>21</sub>  | phase response                    | f = 50 MHz   | –45  | +45  | deg  |
| CTB              | composite triple beat             | 60 channels flat;<br>V <sub>o</sub> = 46 dBmV;<br>measured at 445.25 MHz | –    | –67  | dB   |
| X <sub>mod</sub> | cross modulation                  | 60 channels flat;<br>V <sub>o</sub> = 46 dBmV;<br>measured at 55.25 MHz  | –    | –66  | dB   |
| CSO              | composite second order distortion | 60 channels flat;<br>V <sub>o</sub> = 46 dBmV<br>measured at 446.5 MHz   | –    | –60  | dB   |
| d <sub>2</sub>   | second order distortion           | note 1   | –    | –75  | dB   |
| V <sub>o</sub>   | output voltage                    | d <sub>im</sub> = –60 dB; note 2   | 67   | –    | dBmV |
| F                | noise figure                      | f = 450 MHz  | –    | 7    | dB   |
| I <sub>tot</sub> | total current consumption (DC)    | note 3   | –    | 435  | mA   |

**Notes**

1.  $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
2. Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
3. The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

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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.   |   |

**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.