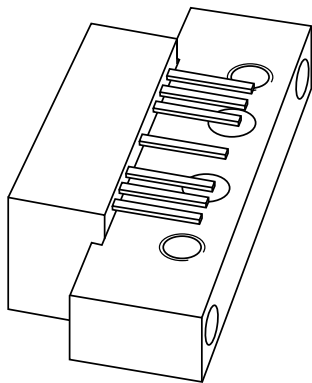


# DATA SHEET



## **BGD502**

550 MHz, 18.5 dB gain power  
doubler amplifier

Product specification  
Supersedes data of 1995 Oct 25

2001 Nov 15



# 550 MHz, 18.5 dB gain power doubler amplifier

**BGD502**

## FEATURES

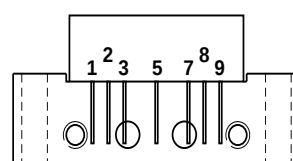
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

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



Side view

MSA319

Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 550 MHz           | 18.8 | 20.8 | 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 60134).

| 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   |

# 550 MHz, 18.5 dB gain power doubler amplifier

BGD502

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 550 MHz;  $V_B = 24\text{ V}$ ;  $T_{mb} = 35\text{ °C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS                                                              | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|-------------------------------------------------------------------------|------|------|-----------|------|
| $G_p$     | power gain                        | $f = 50\text{ MHz}$                                                     | 18   | –    | 19        | dB   |
|           |                                   | $f = 550\text{ MHz}$                                                    | 18.8 | –    | 20.8      | dB   |
| SL        | slope cable equivalent            | $f = 40\text{ to }550\text{ MHz}$                                       | 0.2  | –    | 2.2       | dB   |
| FL        | flatness of frequency response    | $f = 40\text{ to }550\text{ MHz}$                                       | –    | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                        | 20   | –    | –         | dB   |
|           |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –    | –         | dB   |
|           |                                   | $f = 160\text{ to }550\text{ MHz}$                                      | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                        | 20   | –    | –         | dB   |
|           |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –    | –         | dB   |
|           |                                   | $f = 160\text{ to }550\text{ MHz}$                                      | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50\text{ MHz}$                                                     | +135 | –    | +225      | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –    | –65       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –68       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1                                                                  | –    | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60\text{ dB}$ ; note 2                                       | 64   | –    | –         | dBmV |
| NF        | noise figure                      | $f = 550\text{ MHz}$                                                    | –    | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3                                                                  | –    | 415  | 435       | mA   |

## Notes

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

# 550 MHz, 18.5 dB gain power doubler amplifier

BGD502

**Table 2** Bandwidth 40 to 450 MHz;  $V_B = 24\text{ V}$ ;  $T_{mb} = 35\text{ °C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS                                                              | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|-------------------------------------------------------------------------|------|------|-----------|------|
| $G_p$     | power gain                        | $f = 50\text{ MHz}$                                                     | 18   | –    | 19        | dB   |
|           |                                   | $f = 450\text{ MHz}$                                                    | 18.6 | –    | 20.6      | dB   |
| SL        | slope cable equivalent            | $f = 40\text{ to }450\text{ MHz}$                                       | 0.2  | –    | 1.8       | dB   |
| FL        | flatness of frequency response    | $f = 40\text{ to }450\text{ MHz}$                                       | –    | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                        | 20   | –    | –         | dB   |
|           |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –    | –         | dB   |
|           |                                   | $f = 160\text{ to }450\text{ MHz}$                                      | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                        | 20   | –    | –         | dB   |
|           |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –    | –         | dB   |
|           |                                   | $f = 160\text{ to }450\text{ MHz}$                                      | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50\text{ MHz}$                                                     | +135 | –    | +225      | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –    | –67       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz  | –    | –    | –60       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –67       | dB   |
| $d_2$     | second order distortion           | note 1                                                                  | –    | –    | –75       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60\text{ dB}$ ; note 2                                       | 67   | –    | –         | dBmV |
| NF        | noise figure                      | $f = 450\text{ MHz}$                                                    | –    | –    | 7         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3                                                                  | –    | 415  | 435       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ; measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- Measured according to DIN45004B:  $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ; measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The modules normally operate at  $V_B = 24\text{ V}$ , but are able to withstand supply transients up to  $V_B = 30\text{ V}$ .

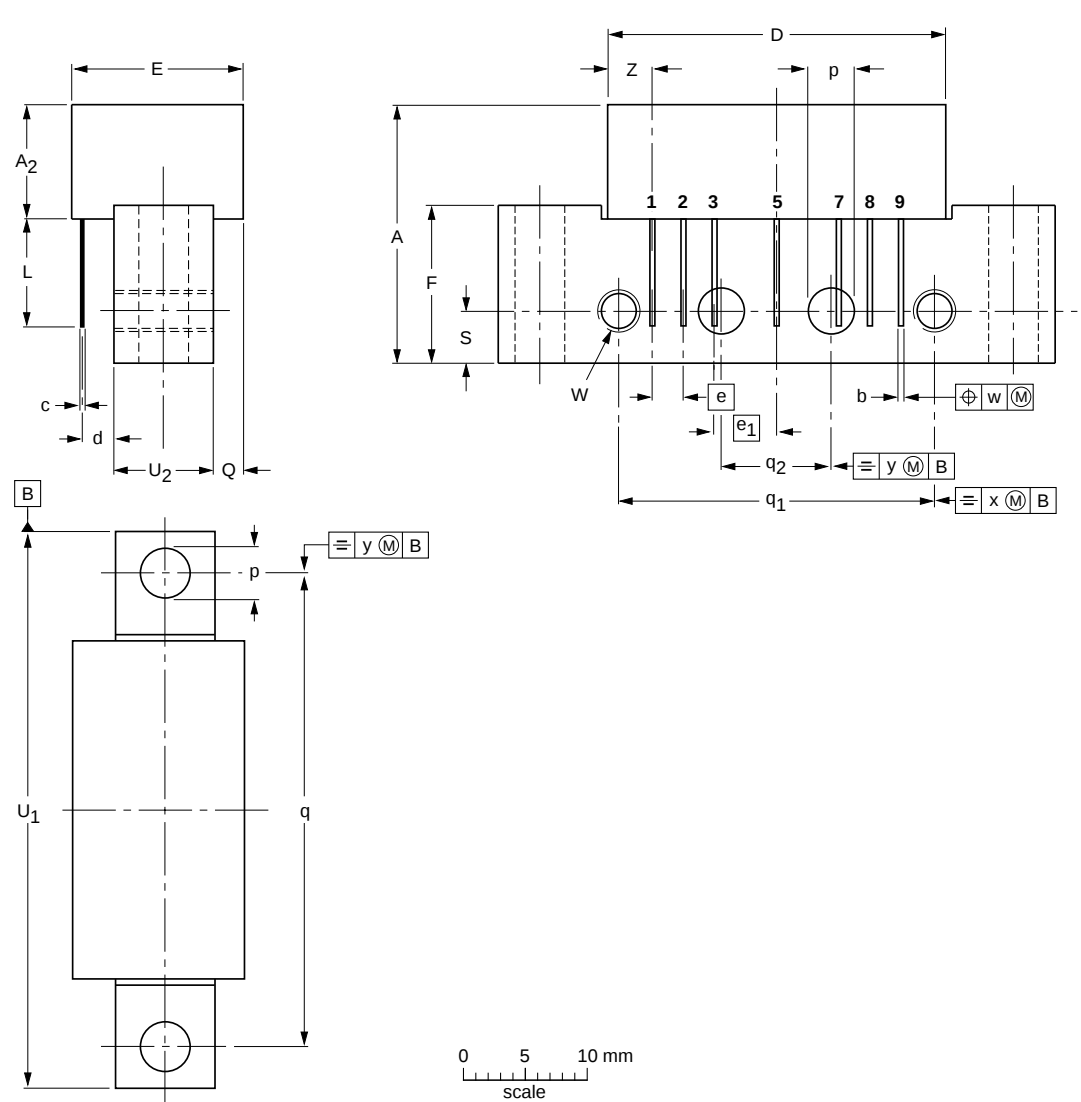
550 MHz, 18.5 dB gain power doubler  
amplifier

BGD502

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<br>max. | A <sub>2</sub><br>max. | b            | c    | D<br>max. | d            | E<br>max. | e    | e <sub>1</sub> | F    | L<br>min. | p            | Q<br>max. | q    | q <sub>1</sub> | q <sub>2</sub> | S   | U <sub>1</sub> | U <sub>2</sub> | W           | w    | x   | y   | Z<br>max. |
|------|-----------|------------------------|--------------|------|-----------|--------------|-----------|------|----------------|------|-----------|--------------|-----------|------|----------------|----------------|-----|----------------|----------------|-------------|------|-----|-----|-----------|
| mm   | 20.8      | 9.5                    | 0.51<br>0.38 | 0.25 | 27.2      | 2.04<br>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<br>44.25 | 8.2<br>7.8     | 6-32<br>UNC | 0.25 | 0.7 | 0.1 | 3.8       |

| OUTLINE<br>VERSION | REFERENCES |       |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE           |
|--------------------|------------|-------|-------|--|------------------------|----------------------|
|                    | IEC        | JEDEC | JEITA |  |                        |                      |
| SOT115J            |            |       |       |  |                        | 04-02-04<br>10-06-18 |

# 550 MHz, 18.5 dB gain power doubler amplifier

BGD502

## DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION                                                                            |
|--------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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## 550 MHz, 18.5 dB gain power doubler amplifier

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