# DATA SHEET

# BGY887B
## CATV amplifier module

Product specification
Supersedes data of February 1995

1997 Apr 15

# CATV amplifier module BGY887B

## FEATURES

- Excellent linearity
- Extremely low noise
- High gain
- Excellent return loss properties.

## APPLICATIONS

- Single-module line extender in CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC). This high gain module consists of two cascaded stages, both in cascode configuration.

## PINNING - SOT115J

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

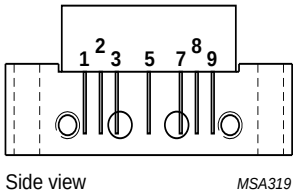



Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $G_p$ | power gain | f = 50 MHz | 28.5 | 29.5 | dB |
| | | f = 860 MHz | 29 | – | dB |
| $I_{tot}$ | total current consumption (DC) | $V_B$ = 24 V | – | 340 | mA |

## LIMITING VALUES

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

| SYMBOL | PARAMETER | MIN. | MAX. | UNIT |
|---|---|---|---|---|
| $V_i$ | RF input voltage | – | 55 | dBmV |
| $T_{stg}$ | storage temperature | −40 | +100 | °C |
| $T_{mb}$ | operating mounting base temperature | −20 | +100 | °C |

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz; $V_B$ = 24 V; $T_{mb}$ = 30 °C; $Z_S = Z_L$ = 75 Ω

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $G_p$ | power gain | f = 50 MHz | 28.5 | 29.5 | dB |
| | | f = 860 MHz | 29 | – | dB |
| SL | slope cable equivalent | f = 40 to 860 MHz | 0.5 | 2.5 | dB |
| FL | flatness of frequency response | f = 40 to 860 MHz | – | ±0.5 | dB |
| $S_{11}$ | input return losses | f = 40 to 80 MHz | 20 | – | dB |
| | | f = 80 to 160 MHz | 18.5 | – | dB |
| | | f = 160 to 320 MHz | 17 | – | dB |
| | | f = 320 to 640 MHz | 15.5 | – | dB |
| | | f = 640 to 860 MHz | 14 | – | dB |
| $S_{22}$ | output return losses | f = 40 to 80 MHz | 20 | – | dB |
| | | f = 80 to 160 MHz | 18.5 | – | dB |
| | | f = 160 to 320 MHz | 17 | – | dB |
| | | f = 320 to 640 MHz | 15.5 | – | dB |
| | | f = 640 to 860 MHz | 14 | – | dB |
| CTB | composite triple beat | 49 channels flat; $V_o$ = 44 dBmV; measured at 859.25 MHz | – | −60 | dB |
| $X_{mod}$ | cross modulation | 49 channels flat; $V_o$ = 44 dBmV; measured at 55.25 MHz | – | −60 | dB |
| CSO | composite second order distortion | 49 channels flat; $V_o$ = 44 dBmV; measured at 860.5 MHz | – | −60 | dB |
| $d_2$ | second order distortion | note 1 | – | −70 | dB |
| $V_o$ | output voltage | $d_{im}$ = −60 dB; note 2 | 58.5 | – | dBmV |
| F | noise figure | f = 50 MHz | – | 5 | dB |
| | | f = 550 MHz | – | 5.5 | dB |
| | | f = 600 MHz | – | 5.5 | dB |
| | | f = 650 MHz | – | 5.5 | dB |
| | | f = 750 MHz | – | 6 | dB |
| | | f = 860 MHz | – | 6.5 | dB |
| $I_{tot}$ | total current consumption (DC) | note 3 | – | 340 | mA |

**Notes**

1. $f_p$ = 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.
2. 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.
3. The module normally operates at $V_B$ = 24 V, but is able to withstand supply transients up to 30 V.

**Table 2** Bandwidth 40 to 860 MHz; $V_B$ = 24 V; $T_{mb}$ = 30 °C; $Z_S = Z_L$ = 75 Ω

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $G_p$ | power gain | f = 50 MHz | 28.5 | 29.5 | dB |
| | | f = 860 MHz | 29 | – | dB |
| SL | slope cable equivalent | f = 40 to 860 MHz | 0.5 | 2.5 | dB |
| FL | flatness of frequency response | f = 40 to 860 MHz | – | ±0.5 | dB |
| $S_{11}$ | input return losses | f = 40 to 80 MHz | 20 | – | dB |
| | | f = 80 to 160 MHz | 18.5 | – | dB |
| | | f = 160 to 320 MHz | 17 | – | dB |
| | | f = 320 to 640 MHz | 15.5 | – | dB |
| | | f = 640 to 860 MHz | 14 | – | dB |
| $S_{22}$ | output return losses | f = 40 to 80 MHz | 20 | – | dB |
| | | f = 80 to 160 MHz | 18.5 | – | dB |
| | | f = 160 to 320 MHz | 17 | – | dB |
| | | f = 320 to 640 MHz | 15.5 | – | dB |
| | | f = 640 to 860 MHz | 14 | – | dB |
| CTB | composite triple beat | 129 channels flat; $V_o$ = 44 dBmV; measured at 859.25 MHz | – | −46 | dB |
| $X_{mod}$ | cross modulation | 129 channels flat; $V_o$ = 44 dBmV; measured at 55.25 MHz | – | −52 | dB |
| CSO | composite second order distortion | 129 channels flat; $V_o$ = 44 dBmV; measured at 860.5 MHz | – | −53 | dB |
| $d_2$ | second order distortion | note 1 | – | −70 | dB |
| $V_o$ | output voltage | $d_{im}$ = −60 dB; note 2 | 58.5 | – | dBmV |
| F | noise figure | see Table 1 | – | – | dB |
| $I_{tot}$ | total current consumption (DC) | note 3 | – | 340 | mA |

**Notes**

1. $f_p$ = 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.
2. 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.
3. The module normally operates at $V_B$ = 24 V, but is able to withstand supply transients up to 30 V.

**Table 3** Bandwidth 40 to 750 MHz; $V_B$ = 24 V; $T_{mb}$ = 30 °C; $Z_S = Z_L$ = 75 Ω

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $G_p$ | power gain | f = 50 MHz | 28.5 | 29.5 | dB |
| | | f = 750 MHz | 29 | – | dB |
| SL | slope cable equivalent | f = 40 to 750 MHz | 0.2 | 2.2 | dB |
| FL | flatness of frequency response | f = 40 to 750 MHz | – | ±0.45 | dB |
| $S_{11}$ | input return losses | f = 40 to 80 MHz | 20 | – | dB |
| | | f = 80 to 160 MHz | 18.5 | – | dB |
| | | f = 160 to 320 MHz | 17 | – | dB |
| | | f = 320 to 640 MHz | 15.5 | – | dB |
| | | f = 640 to 750 MHz | 14 | – | dB |
| $S_{22}$ | output return losses | f = 40 to 80 MHz | 20 | – | dB |
| | | f = 80 to 160 MHz | 18.5 | – | dB |
| | | f = 160 to 320 MHz | 17 | – | dB |
| | | f = 320 to 640 MHz | 15.5 | – | dB |
| | | f = 640 to 750 MHz | 14 | – | dB |
| CTB | composite triple beat | 110 channels flat; $V_o$ = 44 dBmV; measured at 745.25 MHz | – | –50 | dB |
| $X_{mod}$ | cross modulation | 110 channels flat; $V_o$ = 44 dBmV; measured at 55.25 MHz | – | –54 | dB |
| CSO | composite second order distortion | 110 channels flat; $V_o$ = 44 dBmV; measured at 746.5 MHz | – | –56 | dB |
| $d_2$ | second order distortion | note 1 | – | –70 | dB |
| $V_o$ | output voltage | $d_{im}$ = –60 dB; note 2 | 59 | – | dBmV |
| F | noise figure | see Table 1 | – | – | dB |
| $I_{tot}$ | total current consumption (DC) | note 3 | – | 340 | mA |

**Notes**

1. $f_p$ = 55.25 MHz; $V_p$ = 44 dBmV;
   $f_q$ = 691.25 MHz; $V_q$ = 44 dBmV;
   measured at $f_p + f_q$ = 746.5 MHz.
2. Measured according to DIN45004B:
   $f_p$ = 740.25 MHz; $V_p = V_o$;
   $f_q$ = 747.25 MHz; $V_q = V_o$ –6 dB;
   $f_r$ = 749.25 MHz; $V_r = V_o$ –6 dB;
   measured at $f_p + f_q - f_r$ = 738.25 MHz.
3. The module normally operates at $V_B$ = 24 V, but is able to withstand supply transients up to 30 V.

**Table 4** Bandwidth 40 to 600 MHz; $V_B$ = 24 V; $T_{mb}$ = 30 °C; $Z_S = Z_L$ = 75 Ω

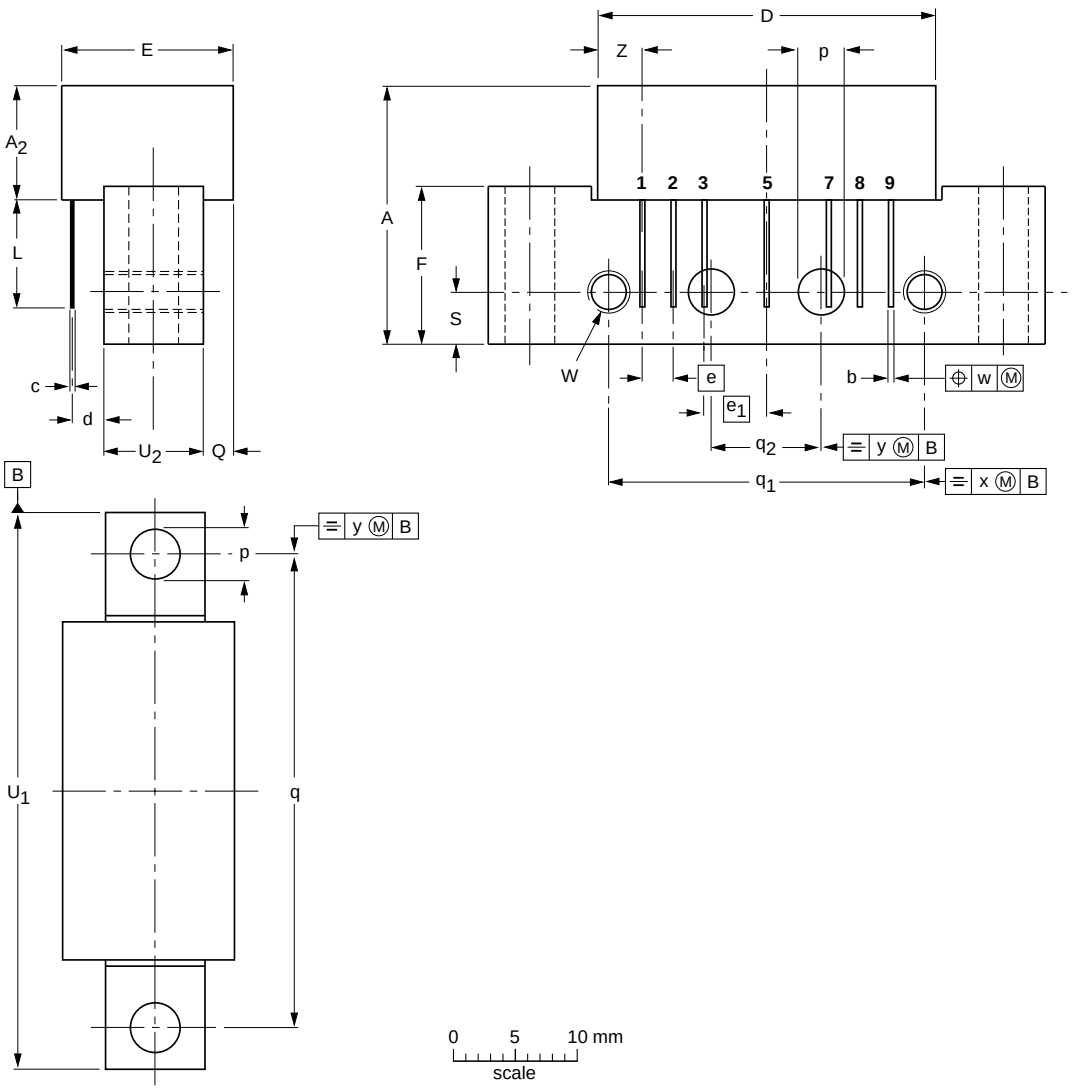
| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $G_p$ | power gain | f = 50 MHz | 28.5 | 29.5 | dB |
| | | f = 600 MHz | 29 | – | dB |
| SL | slope cable equivalent | f = 40 to 600 MHz | – | 2 | dB |
| FL | flatness of frequency response | f = 40 to 600 MHz | – | ±0.35 | dB |
| $S_{11}$ | input return losses | f = 40 to 80 MHz | 20 | – | dB |
| | | f = 80 to 160 MHz | 18.5 | – | dB |
| | | f = 160 to 320 MHz | 17 | – | dB |
| | | f = 320 to 600 MHz | 16 | – | dB |
| $S_{22}$ | output return losses | f = 40 to 80 MHz | 20 | – | dB |
| | | f = 80 to 160 MHz | 18.5 | – | dB |
| | | f = 160 to 320 MHz | 17 | – | dB |
| | | f = 320 to 600 MHz | 16 | – | dB |
| CTB | composite triple beat | 85 channels flat; $V_o$ = 44 dBmV; measured at 595.25 MHz | – | −55 | dB |
| $X_{mod}$ | cross modulation | 85 channels flat; $V_o$ = 44 dBmV; measured at 55.25 MHz | – | −56 | dB |
| CSO | composite second order distortion | 85 channels flat; $V_o$ = 44 dBmV; measured at 596.5 MHz | – | −60 | dB |
| $d_2$ | second order distortion | note 1 | – | −72 | dB |
| $V_o$ | output voltage | $d_{im}$ = −60 dB; note 2 | 61 | – | dBmV |
| F | noise figure | see Table 1 | – | – | dB |
| $I_{tot}$ | total current consumption (DC) | note 3 | – | 340 | 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.

## 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 | E max. | e | $e_1$ | F | L min. | p | Q max. | q | $q_1$ | $q_2$ | S | $U_1$ | $U_2$ | W | w | x | y | Z 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 VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT115J | | | | | | ~~04-02-04~~<br>10-06-18 |

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| DOCUMENT STATUS[1] | PRODUCT STATUS[2] | DEFINITION |
|---|---|---|
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