

DATA SHEET



BGY685A

600 MHz, 18.2 dB gain push-pull
amplifier

Product specification
Supersedes data of 1998 Mar 16

2001 Oct 22

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FEATURES

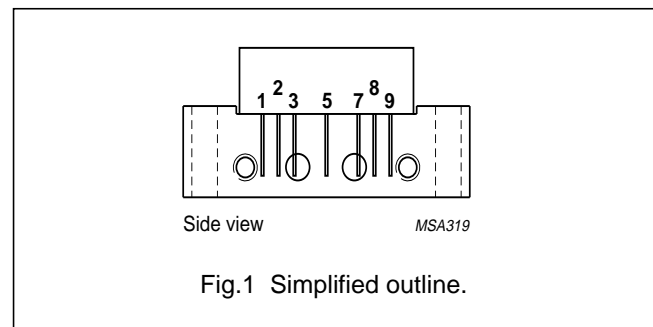
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

DESCRIPTION

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

PINNING - SOT115J

| PIN | DESCRIPTION |
|-----|-----------------|
| 1 | input |
| 2 | common |
| 3 | common |
| 5 | +V _B |
| 7 | common |
| 8 | common |
| 9 | output |



QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|------|
| G _p | power gain | f = 50 MHz | 17.7 | – | 18.7 | dB |
| | | f = 600 MHz | 19 | – | – | dB |
| I _{tot} | total current consumption (DC) | V _B = 24 V | – | 220 | 240 | mA |

LIMITING VALUES

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

| SYMBOL | PARAMETER | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V _i | RF input voltage | – | 65 | dBmV |
| T _{stg} | storage temperature | –40 | +100 | °C |
| T _{mb} | operating mounting base temperature | –20 | +100 | °C |

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CHARACTERISTICS

Table 1 Bandwidth 40 to 600 MHz; $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$; $Z_S = Z_L = 75\ \Omega$

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| G_p | power gain | $f = 50\text{ MHz}$ | 17.7 | 18.7 | dB |
| | | $f = 600\text{ MHz}$ | 19 | – | dB |
| SL | slope cable equivalent | $f = 40\text{ to }600\text{ MHz}$ | 0.5 | 2.2 | dB |
| FL | flatness of frequency response | $f = 40\text{ to }600\text{ MHz}$ | – | ± 0.2 | dB |
| S_{11} | input return losses | $f = 40\text{ to }80\text{ MHz}$ | 20 | – | dB |
| | | $f = 80\text{ to }160\text{ MHz}$ | 19 | – | dB |
| | | $f = 160\text{ to }600\text{ MHz}$ | 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 |
| | | $f = 160\text{ to }600\text{ MHz}$ | 18 | – | dB |
| S_{21} | phase response | $f = 50\text{ MHz}$ | –45 | +45 | deg |
| CTB | composite triple beat | 85 channels flat; $V_o = 44\text{ dBmV}$; measured at 595.25 MHz | – | –55 | dB |
| X_{mod} | cross modulation | 85 channels flat; $V_o = 44\text{ dBmV}$; measured at 55.25 MHz | – | –60 | dB |
| CSO | composite second order distortion | 85 channels flat; $V_o = 44\text{ dBmV}$; measured at 596.5 MHz | – | –56 | dB |
| d_2 | second order distortion | note 1 | – | –70 | dB |
| V_o | output voltage | $d_{\text{im}} = -60\text{ dB}$; note 2 | 60 | – | dBmV |
| F | noise figure | $f = 600\text{ MHz}$ | – | 8.5 | dB |
| I_{tot} | total current consumption (DC) | note 3 | – | 240 | mA |

Notes

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

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Table 2 Bandwidth 40 to 550 MHz; $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$; $Z_S = Z_L = 75\text{ }\Omega$

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------------|-----------------------------------|--|------|------|-----------|------|
| G_p | power gain | $f = 50\text{ MHz}$ | 17.7 | – | 18.7 | dB |
| | | $f = 550\text{ MHz}$ | 18.8 | – | 20 | dB |
| SL | slope cable equivalent | $f = 40\text{ to }550\text{ MHz}$ | 0.5 | – | 2 | dB |
| FL | flatness of frequency response | $f = 40\text{ to }550\text{ MHz}$ | – | – | ± 0.2 | 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 | $f = 50\text{ MHz}$ | –45 | – | +45 | deg |
| CTB | composite triple beat | 77 channels flat; $V_o = 44\text{ dBmV}$; measured at 547.25 MHz | – | – | –59 | dB |
| X_{mod} | cross modulation | 77 channels flat; $V_o = 44\text{ dBmV}$; measured at 55.25 MHz | – | – | –62 | dB |
| CSO | composite second order distortion | 77 channels flat; $V_o = 44\text{ dBmV}$; measured at 548.5 MHz | – | – | –59 | dB |
| d_2 | second order distortion | note 1 | – | – | –72 | dB |
| V_o | output voltage | $d_{\text{im}} = -60\text{ dB}$; note 2 | 61.5 | – | – | dBmV |
| F | noise figure | $f = 550\text{ MHz}$ | – | – | 8 | dB |
| I_{tot} | total current consumption (DC) | note 3 | – | 220 | 240 | 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 $f_p + f_q = 548.5\text{ MHz}$.
- $f_p = 540.25\text{ MHz}$; $V_p = V_o$;
 $f_q = 547.25\text{ MHz}$; $V_q = V_o - 6\text{ dB}$;
 $f_r = 549.25\text{ MHz}$; $V_r = V_o - 6\text{ dB}$;
measured at $f_p + f_q - f_r = 538.25\text{ MHz}$.
- The module normally operates at $V_B = 24\text{ V}$, but is able to withstand supply transients up to 30 V.

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Table 3 Bandwidth 40 to 450 MHz; $T_{\text{case}} = 30\text{ °C}$; $Z_S = Z_L = 75\ \Omega$

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------------|-----------------------------------|--|------|------|-----------|------|
| G_p | power gain | $f = 50\text{ MHz}$ | 17.7 | – | 18.7 | dB |
| | | $f = 450\text{ MHz}$ | 18.6 | – | 19.8 | dB |
| SL | slope cable equivalent | $f = 40\text{ to }450\text{ MHz}$ | 0.5 | – | 1.8 | dB |
| FL | flatness of frequency response | $f = 40\text{ to }450\text{ MHz}$ | – | – | ± 0.2 | 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 | $f = 50\text{ MHz}$ | –45 | – | +45 | deg |
| CTB | composite triple beat | 60 channels flat; $V_o = 46\text{ dBmV}$; measured at 445.25 MHz | – | – | –61 | dB |
| X_{mod} | cross modulation | 60 channels flat; $V_o = 46\text{ dBmV}$; measured at 55.25 MHz | – | – | –61 | dB |
| CSO | composite second order distortion | 60 channels flat; $V_o = 46\text{ dBmV}$; measured at 446.5 MHz | – | – | –61 | dB |
| d_2 | second order distortion | note 1 | – | – | –75 | dB |
| V_o | output voltage | $d_{\text{im}} = -60\text{ dB}$; note 2 | 64 | – | – | dBmV |
| F | noise figure | $f = 450\text{ MHz}$ | – | – | 7 | dB |
| I_{tot} | total current consumption (DC) | note 3 | – | 220 | 240 | 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 $f_p + f_q = 446.5\text{ MHz}$.
- $f_p = 440.25\text{ MHz}$; $V_p = V_o$;
 $f_q = 447.25\text{ MHz}$; $V_q = V_o - 6\text{ dB}$;
 $f_r = 449.25\text{ MHz}$; $V_r = V_o - 6\text{ dB}$;
measured at $f_p + f_q - f_r = 438.25\text{ MHz}$.
- The module normally operates at $V_B = 24\text{ V}$, but is able to withstand supply transients up to 30 V.

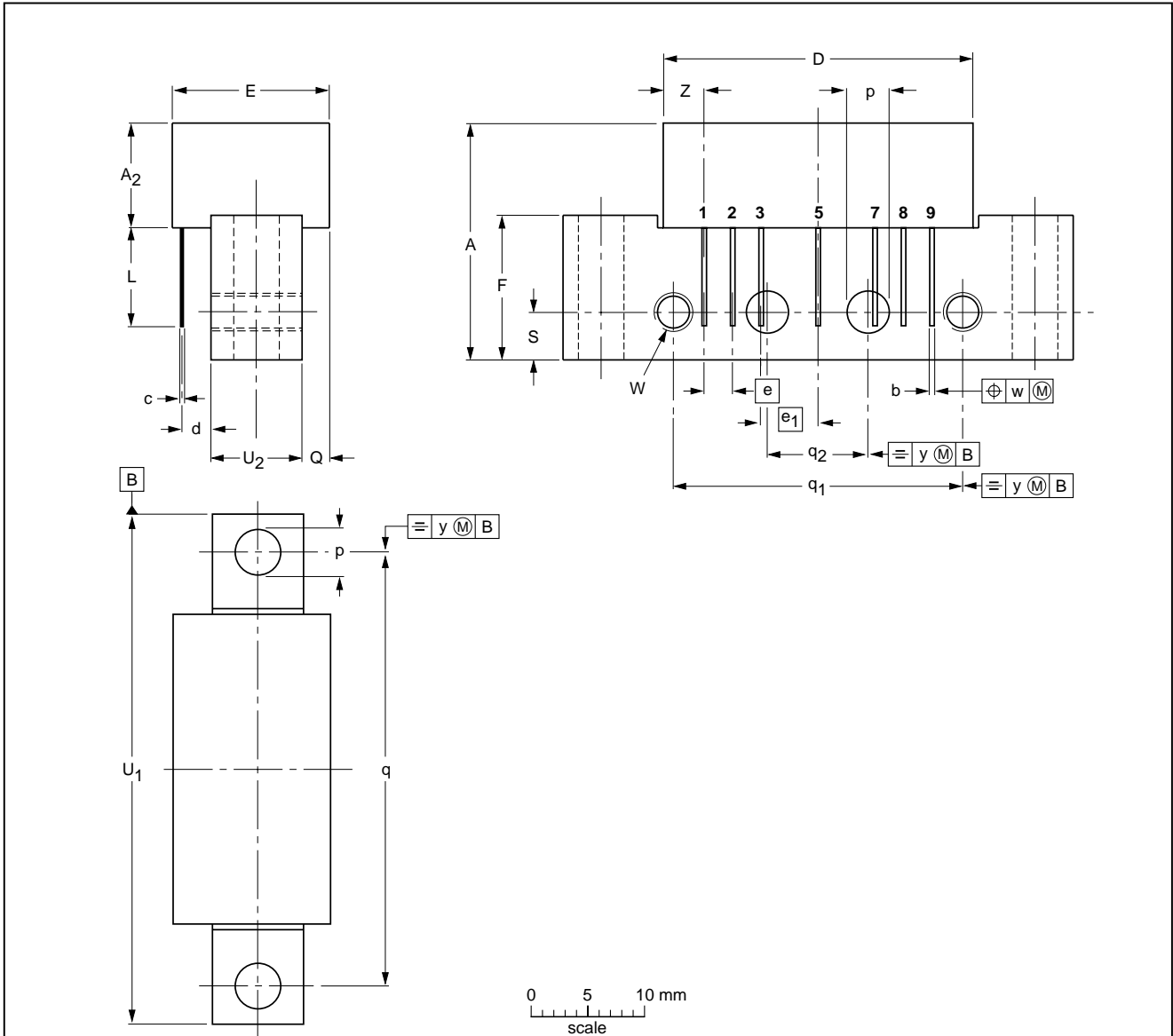
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PACKAGE OUTLINE

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

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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 0.38 | 0.25 | 27.2 | 2.54 | 13.75 | 2.54 | 5.08 | 12.7 | 8.8 | 4.15 3.85 | 2.4 | 38.1 | 25.4 | 10.2 | 4.2 | 44.75 | 8 | 6-32 UNC | 0.25 | 0.1 | 3.8 |

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

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|----------------------------------|-------------------------------|--|
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