

# DATA SHEET

## **BGY685AL** CATV amplifier module

Product specification  
Supersedes data of February 1995  
File under Discrete Semiconductors, SC16

1997 Apr 10

# CATV amplifier module

# BGY685AL

### FEATURES

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

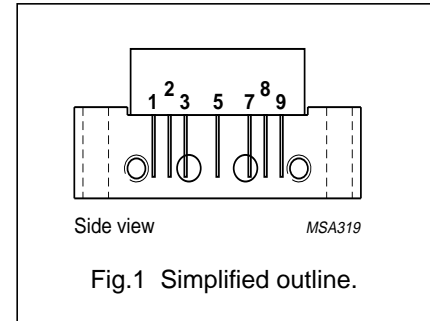
### DESCRIPTION

Hybrid high dynamic range amplifier module designed for applications in CATV systems operating over a frequency range of 40 MHz 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

### PIN CONFIGURATION



### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18	19	dB
		f = 600 MHz	18.5	–	dB
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = +24 V	–	250	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>	mounting base operating 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	$f = 50\text{ MHz}$	18	19	dB
		$f = 600\text{ MHz}$	18.5	–	dB
SL	slope cable equivalent	$f = 40\text{ to }600\text{ MHz}$	0.5	2.0	dB
FL	flatness of frequency response	$f = 40\text{ to }600\text{ MHz}$	–	$\pm 0.3$	dB
$S_{11}$	input return losses	$f = 40\text{ to }80\text{ MHz}$	20	–	dB
		$f = 80\text{ to }160\text{ MHz}$	19	–	dB
		$f = 160\text{ to }600\text{ MHz}$	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
CTB	composite triple beat	85 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 595.25 MHz	–	–56	dB
$X_{\text{mod}}$	cross modulation	85 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 55.25 MHz	–	–55	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	$f = 600\text{ MHz}$	–	5	dB
$I_{\text{tot}}$	total current consumption	DC value; $V_B = +24\text{ V}$ ; note 3	–	250	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  $+30\text{ V}$ .

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$G_p$	power gain	$f = 50\text{ MHz}$	18	19	dB
		$f = 550\text{ MHz}$	18.5	–	dB
SL	slope cable equivalent	$f = 40\text{ to }550\text{ MHz}$	0.5	2	dB
FL	flatness of frequency response	$f = 40\text{ to }550\text{ MHz}$	–	$\pm 0.3$	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
CTB	composite triple beat	77 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 547.25 MHz	–	–58	dB
$X_{\text{mod}}$	cross modulation	77 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 55.25 MHz	–	–56	dB
CSO	composite second order distortion	77 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 548.5 MHz	–	–58	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	$f = 550\text{ MHz}$	–	4.5	dB
$I_{\text{tot}}$	total current consumption	DC value; $V_B = +24\text{ V}$ ; note 3	–	250	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  $+30\text{ V}$ .

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**Table 3** Bandwidth 40 to 450 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	$f = 50\text{ MHz}$	18	19	dB
		$f = 450\text{ MHz}$	18.3	–	dB
SL	slope cable equivalent	$f = 40\text{ to }450\text{ MHz}$	0.3	1.5	dB
FL	flatness of frequency response	$f = 40\text{ to }450\text{ MHz}$	–	$\pm 0.2$	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
CTB	composite triple beat	60 channels flat; $V_o = 46\text{ dBmV}$ ; measured at 445.25 MHz	–	–58	dB
$X_{\text{mod}}$	cross modulation	60 channels flat; $V_o = 46\text{ dBmV}$ ; measured at 55.25 MHz	–	–54	dB
CSO	composite second order distortion	60 channels flat; $V_o = 46\text{ dBmV}$ ; measured at 446.5 MHz	–	–58	dB
$d_2$	second order distortion	note 1	–	–70	dB
$V_o$	output voltage	$d_{\text{im}} = -60\text{ dB}$ ; note 2	62.5	–	dBmV
F	noise figure	$f = 450\text{ MHz}$	–	4.5	dB
$I_{\text{tot}}$	total current consumption	DC value; $V_B = +24\text{ V}$ ; note 3	–	250	mA

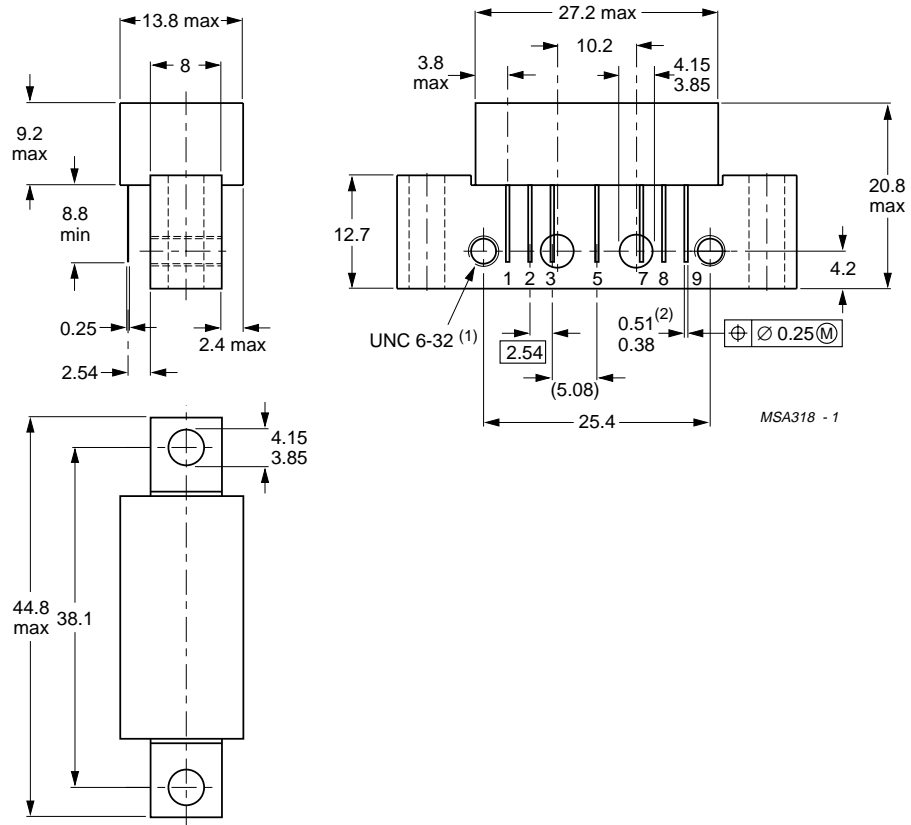
**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
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  $+30\text{ V}$ .

CATV amplifier module

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PACKAGE OUTLINE



Dimensions in mm.

(1) Screw 6-32 UNC-2A available on request.

(2) Leads gold plated.

Fig.2 SOT115J.

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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>	
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