

# DATA SHEET



## **BGY685A**

**600 MHz, 18.2 dB gain push-pull  
amplifier**

Product specification  
Supersedes data of 1998 Mar 16

2001 Oct 22

# 600 MHz, 18.2 dB gain push-pull amplifier

# BGY685A

### FEATURES

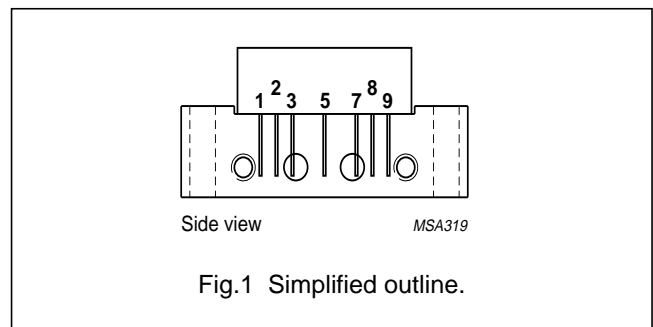
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

### 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 <sub>B</sub>
7	common
8	common
9	output



### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	17.7	–	18.7	dB
		f = 600 MHz	19	–	–	dB
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = 24 V	–	220	240	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

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## CHARACTERISTICS

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

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	$f = 40\text{ to }600\text{ MHz}$	–	$\pm 0.2$	dB
$S_{11}$	input return losses	$f = 40\text{ to }80\text{ MHz}$	20	–	dB
		$f = 80\text{ to }160\text{ MHz}$	19	–	dB
		$f = 160\text{ to }600\text{ MHz}$	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
$X_{\text{mod}}$	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
$I_{\text{tot}}$	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;  $T_{\text{case}} = 30\text{ °C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$G_p$	power gain	$f = 50\text{ MHz}$	17.7	–	18.7	dB
		$f = 550\text{ MHz}$	18.8	–	20	dB
SL	slope cable equivalent	$f = 40\text{ to }550\text{ MHz}$	0.5	–	2	dB
FL	flatness of frequency response	$f = 40\text{ to }550\text{ MHz}$	–	–	$\pm 0.2$	dB
$S_{11}$	input return losses	$f = 40\text{ to }80\text{ MHz}$	20	–	–	dB
		$f = 80\text{ to }160\text{ MHz}$	19	–	–	dB
		$f = 160\text{ to }550\text{ MHz}$	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
$X_{\text{mod}}$	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
$I_{\text{tot}}$	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	$f = 40\text{ to }450\text{ MHz}$	–	–	$\pm 0.2$	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
$S_{21}$	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
$X_{\text{mod}}$	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
$I_{\text{tot}}$	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.

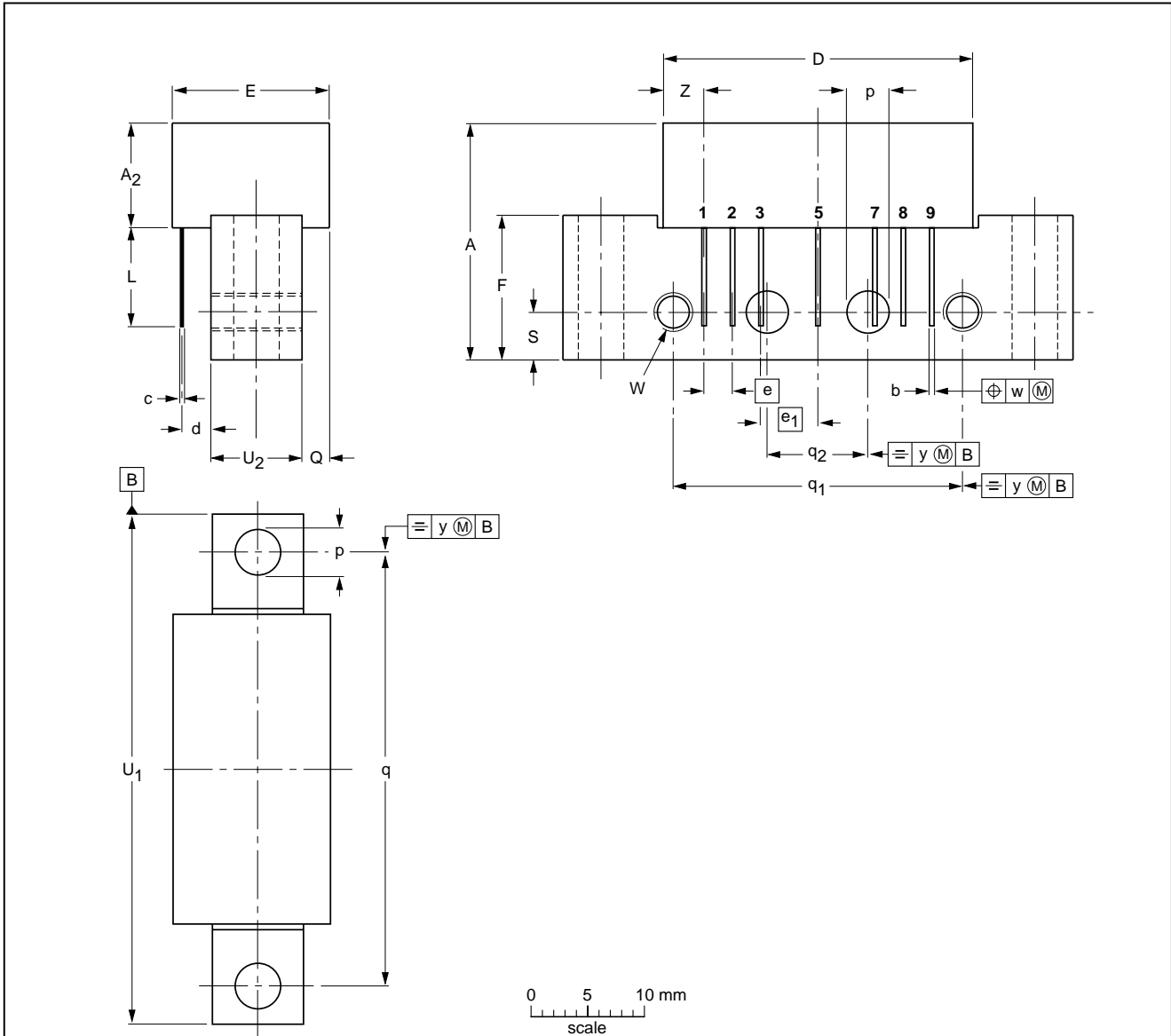
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PACKAGE OUTLINE

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 <sub>2</sub> max.	b	c	D max.	d max.	E max.	e	e <sub>1</sub>	F	L min.	p	Q max.	q	q <sub>1</sub>	q <sub>2</sub>	S	U <sub>1</sub> max.	U <sub>2</sub>	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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