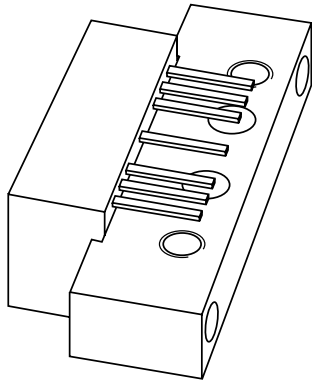


# DATA SHEET



## **BGY785A**

**750 MHz, 18.5 dB gain push-pull  
amplifier**

Product specification  
Supersedes data of 1999 Mar 30

2001 Nov 15

# 750 MHz, 18.5 dB gain push-pull amplifier

# BGY785A

## FEATURES

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

## APPLICATIONS

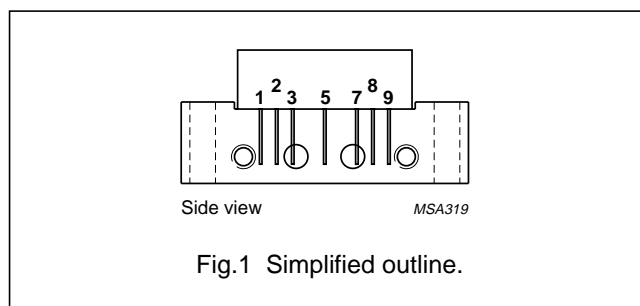
- CATV systems operating in the 40 to 750 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range cascode amplifier module in a SOT115J package 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



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18	19	dB
		f = 750 MHz	18.5	–	dB
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = 24 V	–	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

## 750 MHz, 18.5 dB gain push-pull amplifier

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## CHARACTERISTICS

**Table 1** Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$G_p$	power gain	f = 50 MHz	18	18.5	19	dB
		f = 750 MHz	18.5	19.5	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0	0.9	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	$\pm 0.1$	$\pm 0.3$	dB
$S_{11}$	input return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	29.5	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 640 MHz	15.5	26	–	dB
		f = 640 to 750 MHz	14	21	–	dB
$S_{22}$	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	26	–	dB
		f = 160 to 320 MHz	17	23.5	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 750 MHz	14	24	–	dB
CTB	composite triple beat	110 channels flat; $V_o = 44$ dBmV; measured at 745.25 MHz	–	–54.5	–53	dB
$X_{mod}$	cross modulation	110 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–57.5	–56	dB
CSO	composite second order distortion	110 channels flat; $V_o = 44$ dBmV; measured at 746.5 MHz	–	–62	–53	dB
$d_2$	second order distortion	note 1	–	–77	–65	dB
$V_o$	output voltage	$d_{im} = -60$ dB; note 2	59	62	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5.5	dB
		f = 450 MHz	–	–	5.5	dB
		f = 550 MHz	–	–	5.5	dB
		f = 600 MHz	–	–	6	dB
		f = 750 MHz	–	6	7	dB
$I_{tot}$	total current consumption (DC)	note 3	–	225	240	mA

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- 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.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## 750 MHz, 18.5 dB gain push-pull amplifier

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**Table 2** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75 \Omega$ 

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18	18.5	19	dB
		f = 600 MHz	18.5	–	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0	–	1.5	dB
FL	flatness of frequency response	f = 40 to 600 MHz	–	–	±0.3	dB
S <sub>11</sub>	input return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	29.5	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 600 MHz	16	26	–	dB
S <sub>22</sub>	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	26	–	dB
		f = 160 to 320 MHz	17	23.5	–	dB
		f = 320 to 600 MHz	16	22	–	dB
CTB	composite triple beat	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 595.25 MHz	–	–	–57	dB
X <sub>mod</sub>	cross modulation	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	–	–	–59	dB
CSO	composite second order distortion	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 596.5 MHz	–	–	–58	dB
d <sub>2</sub>	second order distortion	note 1	–	–	–70	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = –60 dB; note 2	61	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	225	240	mA

**Notes**

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 541.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 596.5 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 590.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 597.25 MHz; V<sub>q</sub> = V<sub>o</sub> –6 dB;  
f<sub>r</sub> = 599.25 MHz; V<sub>r</sub> = V<sub>o</sub> –6 dB;  
measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 588.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

## 750 MHz, 18.5 dB gain push-pull amplifier

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**Table 3** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75 \Omega$ 

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18	18.5	19	dB
		f = 550 MHz	18.5	–	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0	–	1.5	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	–	±0.3	dB
S <sub>11</sub>	input return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	29.5	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 550 MHz	16	26	–	dB
S <sub>22</sub>	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	26	–	dB
		f = 160 to 320 MHz	17	23.5	–	dB
		f = 320 to 550 MHz	16	22	–	dB
CTB	composite triple beat	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 547.25 MHz	–	–61	–60	dB
X <sub>mod</sub>	cross modulation	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	–	–61	–60	dB
CSO	composite second order distortion	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 548.5 MHz	–	–67.5	–60	dB
d <sub>2</sub>	second order distortion	note 1	–	–	–72	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = –60 dB; note 2	62	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	225	240	mA

**Notes**

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

## 750 MHz, 18.5 dB gain push-pull amplifier

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**Table 4** Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75 \Omega$ 

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18	18.5	19	dB
		f = 450 MHz	18.5	–	–	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0	–	1.5	dB
FL	flatness of frequency response	f = 40 to 450 MHz	–	–	±0.3	dB
S <sub>11</sub>	input return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	29.5	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 450 MHz	16	26	–	dB
S <sub>22</sub>	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	26	–	dB
		f = 160 to 320 MHz	17	23.5	–	dB
		f = 320 to 450 MHz	16	22	–	dB
CTB	composite triple beat	60 channels flat; V <sub>o</sub> = 46 dBmV; measured at 445.25 MHz	–	–	–61	dB
X <sub>mod</sub>	cross modulation	60 channels flat; V <sub>o</sub> = 46 dBmV; measured at 55.25 MHz	–	–	–60	dB
CSO	composite second order distortion	60 channels flat; V <sub>o</sub> = 46 dBmV; measured at 446.5 MHz	–	–	–61	dB
d <sub>2</sub>	second order distortion	note 1	–	–	–75	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = –60 dB; note 2	64	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	225	240	mA

**Notes**

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 46 dBmV;  
f<sub>q</sub> = 391.25 MHz; V<sub>q</sub> = 46 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 446.5 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 440.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 447.25 MHz; V<sub>q</sub> = V<sub>o</sub> –6 dB;  
f<sub>r</sub> = 449.25 MHz; V<sub>r</sub> = V<sub>o</sub> –6 dB;  
measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 438.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

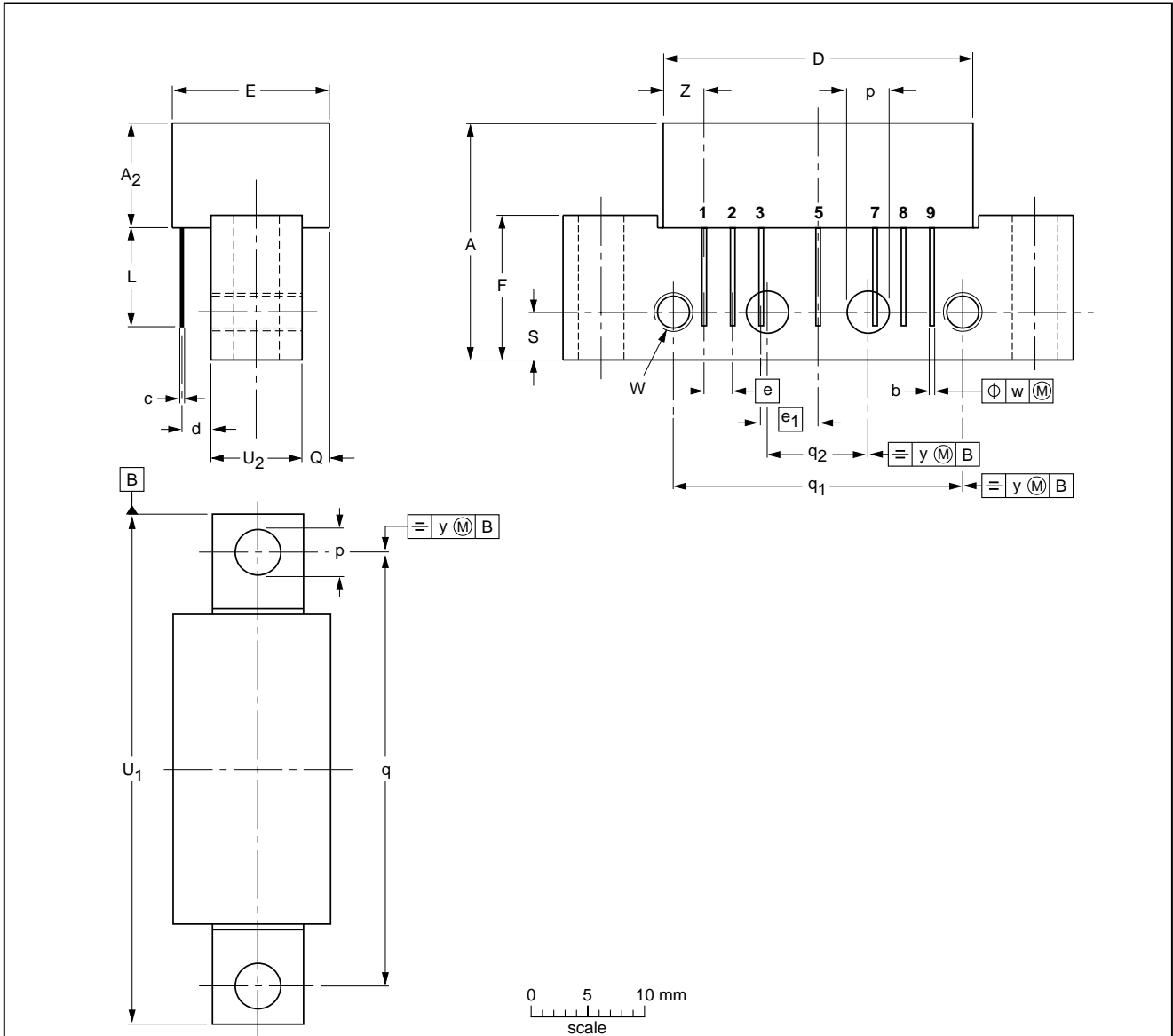
750 MHz, 18.5 dB gain push-pull amplifier

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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

SOT115J



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

## 750 MHz, 18.5 dB gain push-pull amplifier

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## DATA SHEET STATUS

DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITIONS
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**NOTES**

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**NOTES**

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