

# DATA SHEET

## **BGY785AD** CATV amplifier module

Product specification  
Supersedes data of 1995 Sep 14  
File under Discrete Semiconductors, SC16

1997 Apr 14

# CATV amplifier module

# BGY785AD

## FEATURES

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

## APPLICATIONS

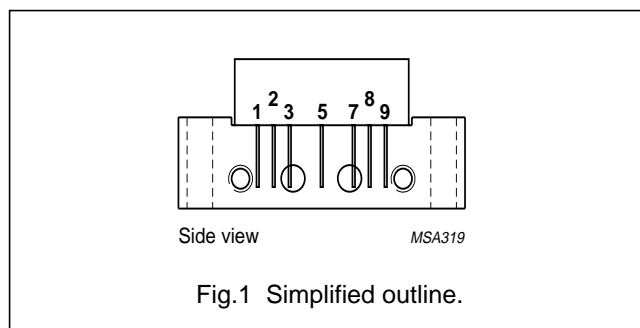
CATV systems operating in the 40 to 750 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range cascode amplifier module with darlington pre-stage dies in a SOT115J package 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.	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	–	265	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	–	60	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 750 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$G_p$	power gain	$f = 50$ MHz	18	19	dB
		$f = 750$ MHz	18.5	–	dB
SL	slope cable equivalent	$f = 40$ to 750 MHz	0.2	2	dB
FL	flatness of frequency response	$f = 40$ to 750 MHz	–	$\pm 0.5$	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 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
$S_{21}$	phase response	$f = 50$ MHz	135	225	deg
CTB	composite triple beat	110 channels flat; $V_o = 44$ dBmV; measured at 745.25 MHz	–	–58	dB
$X_{mod}$	cross modulation	110 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–56	dB
CSO	composite second order distortion	110 channels flat; $V_o = 44$ dBmV; measured at 746.5 MHz	–	–58	dB
$d_2$	second order distortion	note 1	–	–68	dB
$V_o$	output voltage	$d_{im} = -60$ dB; note 2	61	–	dBmV
F	noise figure	$f = 50$ MHz	–	5.5	dB
		$f = 450$ MHz	–	5	dB
		$f = 550$ MHz	–	5.5	dB
		$f = 600$ MHz	–	5.5	dB
		$f = 750$ MHz	–	6	dB
$I_{tot}$	total current consumption (DC)	note 3	–	265	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.

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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.	MAX.	UNIT
$G_p$	power gain	f = 50 MHz	18	19	dB
		f = 600 MHz	18.5	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 600 MHz	–	$\pm 0.3$	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
$S_{21}$	phase response	f = 50 MHz	135	225	deg
CTB	composite triple beat	85 channels flat; $V_o = 44$ dBmV; measured at 595.25 MHz	–	–64	dB
$X_{mod}$	cross modulation	85 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–59	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	–	–70	dB
$V_o$	output voltage	$d_{im} = -60$ dB; note 2	64	–	dBmV
F	noise figure	see Table 1	–	–	dB
$I_{tot}$	total current consumption (DC)	note 3	–	265	mA

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$ ;  $V_p = V_o$ ;  
 $f_q = 597.25$ ;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$ ;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

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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.	MAX.	UNIT
$G_p$	power gain	f = 50 MHz	18	19	dB
		f = 550 MHz	18.5	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	$\pm 0.3$	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 550 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 550 MHz	16	–	dB
$S_{21}$	phase response	f = 50 MHz	135	225	deg
CTB	composite triple beat	77 channels flat; $V_o = 44$ dBmV; measured at 547.25 MHz	–	–66	dB
$X_{mod}$	cross modulation	77 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–61	dB
CSO	composite second order distortion	77 channels flat; $V_o = 44$ dBmV; measured at 548.5 MHz	–	–62	dB
$d_2$	second order distortion	note 1	–	–72	dB
$V_o$	output voltage	$d_{im} = -60$ dB; note 2	64.5	–	dBmV
F	noise figure	see Table 1	–	–	dB
$I_{tot}$	total current consumption (DC)	note 3	–	265	mA

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- 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.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

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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.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18	19	dB
		f = 450 MHz	18.5	–	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0.2	2	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	–	dB
		f = 80 to 160 MHz	18.5	–	dB
		f = 160 to 320 MHz	17	–	dB
		f = 320 to 450 MHz	16	–	dB
S <sub>22</sub>	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 450 MHz	16	–	dB
S <sub>21</sub>	phase response	f = 50 MHz	135	225	deg
CTB	composite triple beat	60 channels flat; V <sub>o</sub> = 46 dBmV; measured at 445.25 MHz	–	–66	dB
X <sub>mod</sub>	cross modulation	60 channels flat; V <sub>o</sub> = 46 dBmV; measured at 55.25 MHz	–	–59	dB
CSO	composite second order distortion	60 channels flat; V <sub>o</sub> = 46 dBmV; measured at 446.5 MHz	–	–65	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	66	–	dBmV
F	noise figure	see Table 1	–	–	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	265	mA

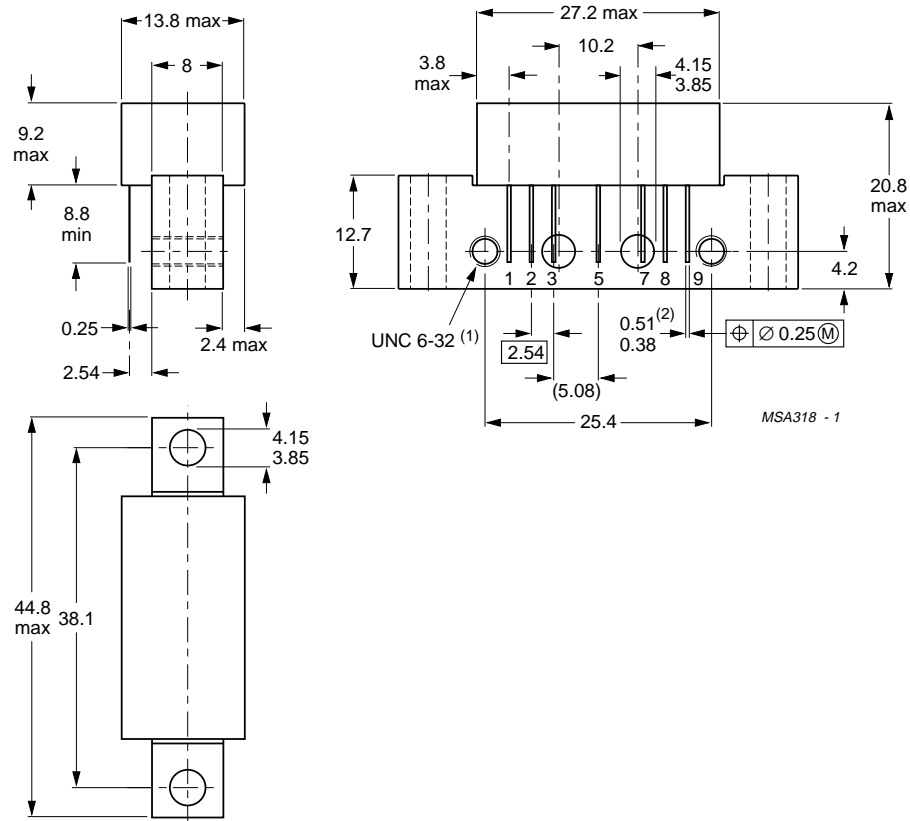
**Notes**

1.  $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
2. Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
3. The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

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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>	
Where application information is given, it is advisory and does not form part of the specification.	

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**NOTES**

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