

# DATA SHEET

## **BGY887** CATV amplifier module

Product specification  
File under Discrete Semiconductors, SC16

1996 May 21

## CATV amplifier module

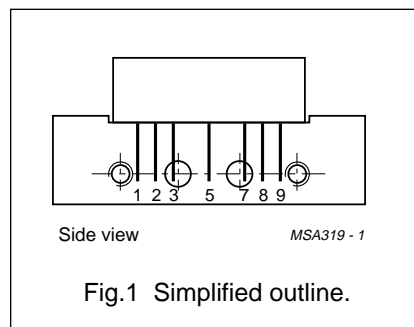
BGY887

## FEATURES

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

## PINNING - SOT115J2

PIN	DESCRIPTION
1	input
2	common
3	common
5	+V <sub>B</sub>
7	common
8	common
9	output



## APPLICATIONS

- CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid dynamic range amplifier module in a SOT115J2 package operating with a voltage supply of 24 V (DC).

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	21	22	dB
		f = 860 MHz	21.5	–	dB
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = 24 V	–	235	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>	operating mounting base temperature	–20	+100	°C

## CATV amplifier module

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**CHARACTERISTICS**Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$  Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$G_p$	power gain	$f = 50$ MHz	21	22	dB
		$f = 860$ MHz	21.5	–	dB
SL	slope cable equivalent	$f = 40$ to 860 MHz	0.2	2	dB
FL	flatness of frequency response	$f = 40$ to 860 MHz	–	±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 640 MHz	15.5	–	dB
		$f = 640$ to 860 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 860 MHz	14	–	dB
$S_{21}$	phase response	$f = 50$ MHz	–45	+45	deg
CTB	composite triple beat	49 channels flat; $V_o = 44$ dBmV; measured at 859.25 MHz	–	–62	dB
$X_{\text{mod}}$	cross modulation	49 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–61	dB
CSO	composite second order distortion	49 channels flat; $V_o = 44$ dBmV; measured at 860.5 MHz	–	–61	dB
$d_2$	second order distortion	note 1	–	–70	dB
$V_o$	output voltage	$d_{\text{im}} = -60$ dB; note 2	59	–	dBmV
F	noise figure	$f = 50$ MHz	–	4.5	dB
		$f = 860$ MHz	–	6.5	dB
$I_{\text{tot}}$	total current consumption (DC)	note 3	–	235	mA

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

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**CHARACTERISTICS**Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$G_p$	power gain	f = 50 MHz	21	22	dB
		f = 860 MHz	21.5	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 860 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 640 MHz	15.5	–	dB
		f = 640 to 860 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 860 MHz	14	–	dB
$S_{21}$	phase response	f = 50 MHz	–45	+45	deg
CTB	composite triple beat	129 channels flat; $V_o = 42$ dBmV; measured at 859.25 MHz	–	–51	dB
$X_{\text{mod}}$	cross modulation	129 channels flat; $V_o = 42$ dBmV; measured at 55.25 MHz	–	–57	dB
CSO	composite second order distortion	129 channels flat; $V_o = 42$ dBmV; measured at 860.5 MHz	–	–55	dB
$d_2$	second order distortion	note 1	–	–70	dB
$V_o$	output voltage	$d_{\text{im}} = -60$ dB; note 2	59	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	dB
		f = 860 MHz	–	6.5	dB
$I_{\text{tot}}$	total current consumption (DC)	note 3	–	235	mA

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	21	22	dB
		f = 750 MHz	21.5	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	±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 640 MHz	15.5	–	dB
		f = 640 to 750 MHz	14	–	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 640 MHz	15.5	–	dB
		f = 640 to 750 MHz	14	–	dB
S <sub>21</sub>	phase response	f = 50 MHz	–45	+45	deg
CTB	composite triple beat	110 channels flat; V <sub>o</sub> = 44 dBmV; measured at 745.25 MHz	–	–51	dB
X <sub>mod</sub>	cross modulation	110 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	–	–54	dB
CSO	composite second order distortion	110 channels flat; V <sub>o</sub> = 44 dBmV; measured at 746.5 MHz	–	–56	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	60	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	dB
		f = 750 MHz	–	6	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	235	mA

**Notes**

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 691.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 746.5 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 740.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 747.25 MHz; V<sub>q</sub> = V<sub>o</sub> –6 dB;  
f<sub>r</sub> = 749.25 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> = 738.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	21	22	dB
		f = 600 MHz	21.5	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 600 MHz	–	±0.2	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 600 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 600 MHz	16	–	dB
S <sub>21</sub>	phase response	f = 50 MHz	–45	+45	deg
CTB	composite triple beat	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 595.25 MHz	–	–56	dB
X <sub>mod</sub>	cross modulation	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	–	–57	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	f = 50 MHz	–	4.5	dB
		f = 600 MHz	–	5.5	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	235	mA

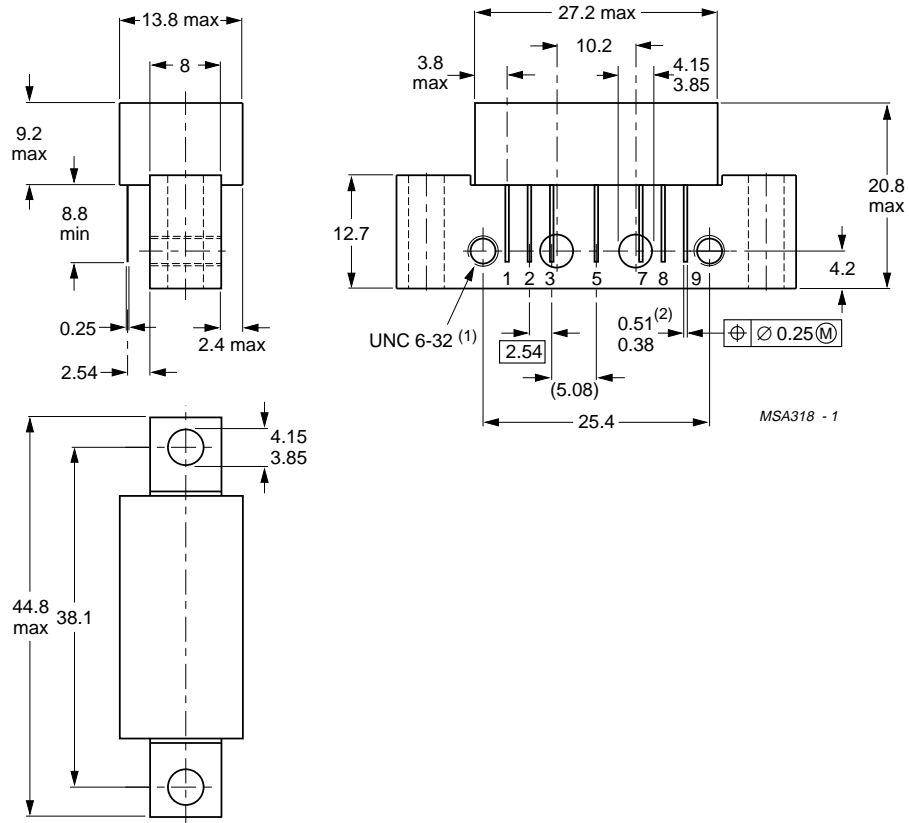
**Notes**

- 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.

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PACKAGE OUTLINE



Dimensions in mm.

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

(2) Leads gold plated.

Fig.2 SOT115J2.

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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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**NOTES**

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