

# DATA SHEET

**BGD602D**

CATV amplifier module

Product specification  
Supersedes data of February 1993  
File under Discrete Semiconductors, SC16

1995 Aug 28

# CATV amplifier module

# BGD602D

### FEATURES

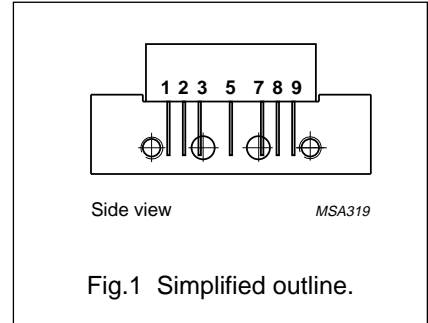
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

### DESCRIPTION

Hybrid high dynamic range cascode amplifier module with darlington configuration for CATV systems operating over a frequency range of 40 to 600 MHz at a supply voltage of +24 V (DC).

### PINNING - SOT115J2

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	17.5	18.5	dB
		f = 600 MHz	18.5	–	dB
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = 24 V	–	440	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 600 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$G_p$	power gain	$f = 50$ MHz	17.5	18.5	dB
		$f = 600$ MHz	18.5	–	dB
SL	slope cable equivalent	$f = 40$ to 600 MHz	0.2	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	19	–	dB
		$f = 160$ to 600 MHz	18	–	dB
$S_{22}$	output return losses	$f = 40$ to 80 MHz	20	–	dB
		$f = 80$ to 160 MHz	19	–	dB
		$f = 160$ to 600 MHz	18	–	dB
$S_{21}$	phase response	$f = 50$ MHz	–45	+45	deg
CTB	composite triple beat	85 channels flat; $V_o = 44$ dBmV; measured at 595.25 MHz	–	–68	dB
$X_{\text{mod}}$	cross modulation	85 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–61	dB
CSO	composite second order distortion	85 channels flat; $V_o = 44$ dBmV; measured at 596.5 MHz	–	–64	dB
$d_2$	second order distortion	note 1	–	–76	dB
$V_o$	output voltage	$d_{\text{im}} = -60$ dB; note 2	66	–	dBmV
F	noise figure	$f = 50$ MHz	–	5.5	dB
		$f = 600$ MHz	–	7	dB
$I_{\text{tot}}$	total current consumption (DC)	note 3	–	440	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.
- $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  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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**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	17.5	18.5	dB
		f = 550 MHz	18.3	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	2.2	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	–	dB
		f = 80 to 160 MHz	19	–	dB
		f = 160 to 550 MHz	18	–	dB
S <sub>22</sub>	output return losses	f = 40 to 80 MHz	20	–	dB
		f = 80 to 160 MHz	19	–	dB
		f = 160 to 550 MHz	18	–	dB
S <sub>21</sub>	phase response	f = 50 MHz	–45	+45	deg
CTB	composite triple beat	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 547.25 MHz	–	–69	dB
X <sub>mod</sub>	cross modulation	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	–	–62	dB
CSO	composite second order distortion	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 548.5 MHz	–	–66	dB
d <sub>2</sub>	second order distortion	note 1	–	–78	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = –60 dB; note 2	67	–	dBmV
F	noise figure	f = 50 MHz	–	5.5	dB
		f = 550 MHz	–	7	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	440	mA

**Notes**

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 493.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 548.5 MHz.
- f<sub>p</sub> = 540.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 547.25 MHz; V<sub>q</sub> = V<sub>o</sub> –6 dB;  
f<sub>r</sub> = 549.25 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> = 538.25 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 450 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	17.5	18.5	dB
		f = 450 MHz	18.1	–	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0.2	1.8	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	19	–	dB
		f = 160 to 450 MHz	18	–	dB
S <sub>22</sub>	output return losses	f = 40 to 80 MHz	20	–	dB
		f = 80 to 160 MHz	19	–	dB
		f = 160 to 450 MHz	18	–	dB
S <sub>21</sub>	phase response	f = 50 MHz	–45	+45	deg
CTB	composite triple beat	60 channels flat; V <sub>o</sub> = 46 dBmV; measured at 445.25 MHz	–	–68	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	–	–66	dB
d <sub>2</sub>	second order distortion	note 1	–	–80	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = –60 dB; note 2	67	–	dBmV
F	noise figure	f = 50 MHz	–	5.5	dB
		f = 450 MHz	–	6.5	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	440	mA

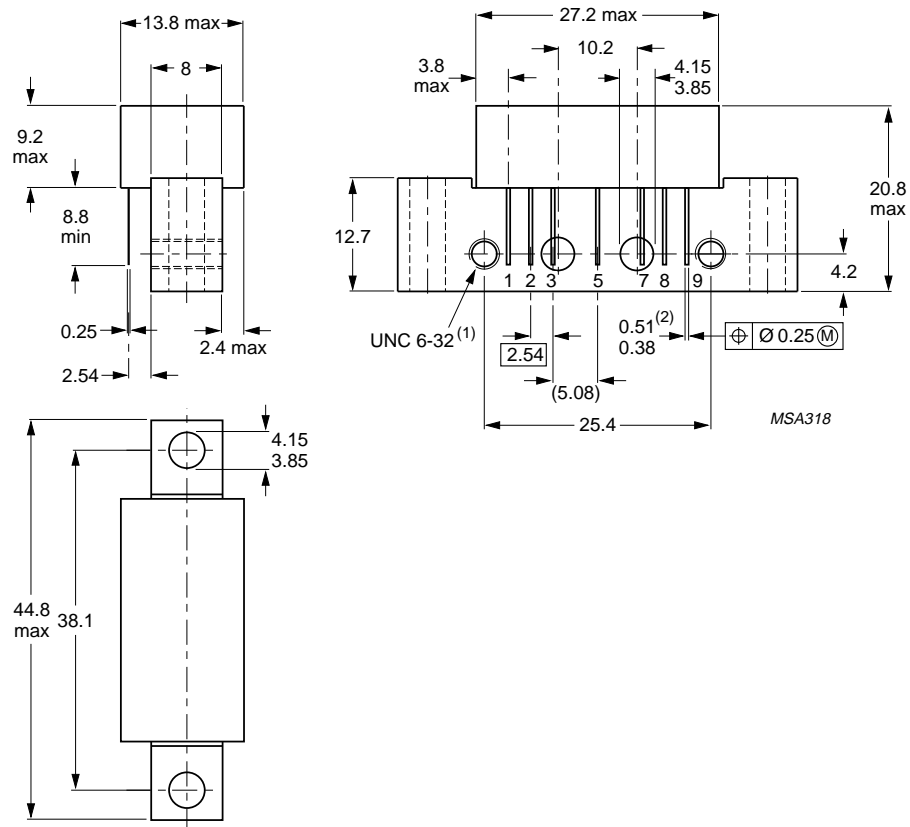
**Notes**

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 391.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 446.5 MHz.
- 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.

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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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