

# DATA SHEET

## **BGY681** CATV amplifier module

Product specification  
File under Discrete Semiconductors, SC16

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**Philips Semiconductors**



**PHILIPS**

# CATV amplifier module

# BGY681

## FEATURES

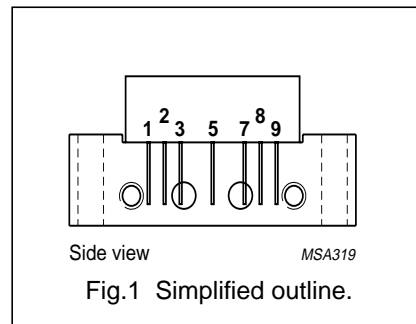
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module designed for CATV systems operating over a frequency range of 40 to 600 MHz 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	12	13	dB
		f = 600 MHz	12.7	–	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 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

## BGY681

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	12	–	13	dB
		f = 600 MHz	12.7	–	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0.7	–	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	19	–	–	dB
		f = 160 to 600 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 600 MHz	18	–	–	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	–	–	–52	dB
X <sub>mod</sub>	cross modulation	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	–	–	–58	dB
CSO	composite second order distortion	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 596.5 MHz	–	–	–57	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	59.5	–	–	dBmV
F	noise figure	f = 600 MHz	–	–	9.5	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	220	240	mA

**Notes**

1.  $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
2. Measured according to DIN45004B:  
 $f_p = 590.25$  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.
3. The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY681

**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	12	–	13	dB
		f = 550 MHz	12.5	–	14.5	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.5	–	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	–	±0.2	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	–	–	–56	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	–	–	–59	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	61.5	–	–	dBmV
F	noise figure	f = 550 MHz	–	–	9	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	220	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.

## CATV amplifier module

## BGY681

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	12	–	13	dB
		f = 450 MHz	12.5	–	14	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0.5	–	1.5	dB
FL	flatness of frequency response	f = 40 to 450 MHz	–	–	±0.2	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	–	–	–58	dB
X <sub>mod</sub>	cross modulation	60 channels flat; V <sub>o</sub> = 46 dBmV; measured at 55.25 MHz	–	–	–62	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	–	–	–74	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = –60 dB; note 2	64	–	–	dBmV
F	noise figure	f = 450 MHz	–	–	8	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	–	220	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.