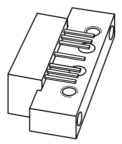


BGY787

750 MHz, 21.5 dB gain push-pull

Rev. 08 — 1 April 2005 **Product data sheet**

1. Product profile

1.1 General description

Hybrid amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC).

CAUTION

This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features

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

1.3 Applications

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

1.4 Quick reference data

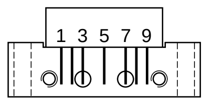
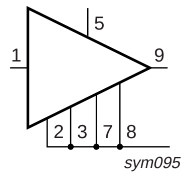
Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	f = 50 MHz	21	21.5	22	dB
		f = 750 MHz	21.5	22.5	-	dB
I_{tot}	total current consumption (DC)	V_B = 24 V [1]	-	220	240	mA

[1] The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

2. Pinning information

Table 2: Pinning

Pin	Description	Simplified outline	Symbol
1	input		
2	common		
3	common		
5	$+V_B$		
7	common		
8	common		
9	output		

3. Ordering information

Table 3: Ordering information

Type number	Package		
	Name	Description	Version
BGY787	-	rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads	SOT115J

4. Limiting values

Table 4: Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_i	RF input voltage		-	60	dBmV
T_{stg}	storage temperature		–40	+100	°C
T_{mb}	mounting base temperature		–20	+100	°C

5. Characteristics

Table 5: Characteristics at bandwidth 40 MHz to 750 MHz

V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	f = 50 MHz		21	21.5	22	dB
		f = 750 MHz		21.5	22.5	-	dB
SL	slope cable equivalent	f = 40 MHz to 750 MHz		0	1	1.5	dB
FL	flatness of frequency response	f = 40 MHz to 750 MHz		-	±0.2	±0.5	dB
s_{11}	input return losses	f = 40 MHz to 80 MHz		20	33	-	dB
		f = 80 MHz to 160 MHz		18.5	30	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 640 MHz		15.5	22	-	dB
		f = 640 MHz to 750 MHz		14	20.5	-	dB
s_{22}	output return losses	f = 40 MHz to 80 MHz		20	28.5	-	dB
		f = 80 MHz to 160 MHz		18.5	27.5	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 640 MHz		15.5	22	-	dB
		f = 640 MHz to 750 MHz		14	20	-	dB
φ_{S21}	phase response	f = 50 MHz		–45	-	+45	deg
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		-	–54	–52	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz		-	–57.5	–53	dB
d_2	second order distortion		[1]	-	–75	–63	dB
V_o	output voltage	d_{im} = –60 dB	[2]	61	63	-	dBmV
F	noise figure	f = 50 MHz		-	4	5	dB
		f = 450 MHz		-	-	5.5	dB
		f = 550 MHz		-	-	5.5	dB
		f = 600 MHz		-	-	6	dB
		f = 750 MHz		-	5	6.5	dB
I_{tot}	total current consumption (DC)		[3]	-	220	240	mA

[1] 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.

[2] Measure 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.

[3] The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 6: Characteristics at bandwidth 40 MHz to 770 MHz
V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	f = 50 MHz		21	21.5	22	dB
		f = 770 MHz		21.5	22.5	-	dB
SL	slope cable equivalent	f = 40 MHz to 770 MHz		0	1	1.5	dB
FL	flatness of frequency response	f = 40 MHz to 770 MHz		-	±0.2	±0.5	dB
s_{11}	input return losses	f = 40 MHz to 80 MHz		20	33	-	dB
		f = 80 MHz to 160 MHz		18.5	30	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 640 MHz		15.5	22.5	-	dB
		f = 640 MHz to 770 MHz		14	20.5	-	dB
s_{22}	output return losses	f = 40 MHz to 80 MHz		20	28.5	-	dB
		f = 80 MHz to 160 MHz		18.5	27.5	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 640 MHz		15.5	22	-	dB
		f = 640 MHz to 770 MHz		14	20	-	dB
φ_{S21}	phase response	f = 50 MHz		–45	-	+45	deg
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		-	–54	–52	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz		-	–57.5	–53	dB
d_2	second order distortion		[1]	-	–75	–63	dB
V_o	output voltage	d_{im} = –60 dB	[2]	61	63	-	dBmV
F	noise figure	f = 50 MHz		-	4	5	dB
		f = 450 MHz		-	-	5.5	dB
		f = 550 MHz		-	-	5.5	dB
		f = 600 MHz		-	-	6	dB
		f = 770 MHz		-	5	6.5	dB
I_{tot}	total current consumption (DC)		[3]	-	220	240	mA

[1] 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.

[2] Measure 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.

[3] The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 7: Characteristics at bandwidth 40 MHz to 600 MHz
V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	f = 50 MHz		21	21.5	22	dB
		f = 600 MHz		21.5	-	-	dB
SL	slope cable equivalent	f = 40 MHz to 600 MHz		0	-	1.5	dB
FL	flatness of frequency response	f = 40 MHz to 600 MHz		-	-	±0.3	dB
s_{11}	input return losses	f = 40 MHz to 80 MHz		20	33	-	dB
		f = 80 MHz to 160 MHz		18.5	30	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 600 MHz		16	22.5	-	dB
s_{22}	output return losses	f = 40 MHz to 80 MHz;		20	28.5	-	dB
		f = 80 MHz to 160 MHz		18.5	27.5	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 600 MHz		16	22	-	dB
φ_{S21}	phase response	f = 50 MHz		–45	-	+45	deg
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz		-	–59.5	–58	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz		-	–55.5	–53	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 MHz		-	–64	–56	dB
d_2	second order distortion		[1]	-	-	–68	dB
V_o	output voltage	d_{im} = –60 dB	[2]	62.5	-	-	dBmV
F	noise figure	see Table 5		-	-	-	dB
I_{tot}	total current consumption (DC)		[3]	-	220	240	mA

[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] Measure 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.

Table 8: Characteristics at bandwidth 40 MHz to 550 MHz

V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	f = 50 MHz		21	21.5	22	dB
		f = 550 MHz		21.5	-	-	dB
SL	slope cable equivalent	f = 40 MHz to 550 MHz		0	-	1.5	dB
FL	flatness of frequency response	f = 40 MHz to 550 MHz		-	-	±0.3	dB
s_{11}	input return losses	f = 40 MHz to 80 MHz		20	33	-	dB
		f = 80 MHz to 160 MHz		18.5	30	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 550 MHz		16	22.5	-	dB
s_{22}	output return losses	f = 40 MHz to 80 MHz		20	28.5	-	dB
		f = 80 MHz to 160 MHz		18.5	27.5	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 550 MHz		16	22	-	dB
φ_{S21}	phase response	f = 50 MHz		–45	-	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz		-	–61	–60	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz		-	–56.5	–55	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz		-	–65.5	–58	dB
d_2	second order distortion		[1]	-	-	–70	dB
V_o	output voltage	d_{im} = –60 dB	[2]	63	-	-	dBmV
F	noise figure	see Table 5		-	-	-	dB
I_{tot}	total current consumption (DC)		[3]	-	220	240	mA

[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] Measure 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.

Table 9: Characteristics at bandwidth 40 MHz to 450 MHz
V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	f = 50 MHz		21	21.5	22	dB
		f = 450 MHz		21.5	-	-	dB
SL	slope cable equivalent	f = 40 MHz to 450 MHz		0	-	1.5	dB
FL	flatness of frequency response	f = 40 MHz to 450 MHz		-	-	±0.3	dB
s_{11}	input return losses	f = 40 MHz to 80 MHz		20	33	-	dB
		f = 80 MHz to 160 MHz		18.5	30	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 450 MHz		16	22.5	-	dB
s_{22}	output return losses	f = 40 MHz to 80 MHz		20	28.5	-	dB
		f = 80 MHz to 160 MHz		18.5	27.5	-	dB
		f = 160 MHz to 320 MHz		17	25	-	dB
		f = 320 MHz to 450 MHz		16	22	-	dB
φ_{S21}	phase response	f = 50 MHz		–45	-	+45	deg
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz		-	-	–59	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz		-	-	–54	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; measured at 446.5 MHz		-	-	–60	dB
d_2	second order distortion		[1]	-	-	–73	dB
V_o	output voltage	d_{im} = –60 dB	[2]	64	-	-	dBmV
F	noise figure	see Table 5		-	-	-	dB
I_{tot}	total current consumption (DC)		[3]	-	220	240	mA

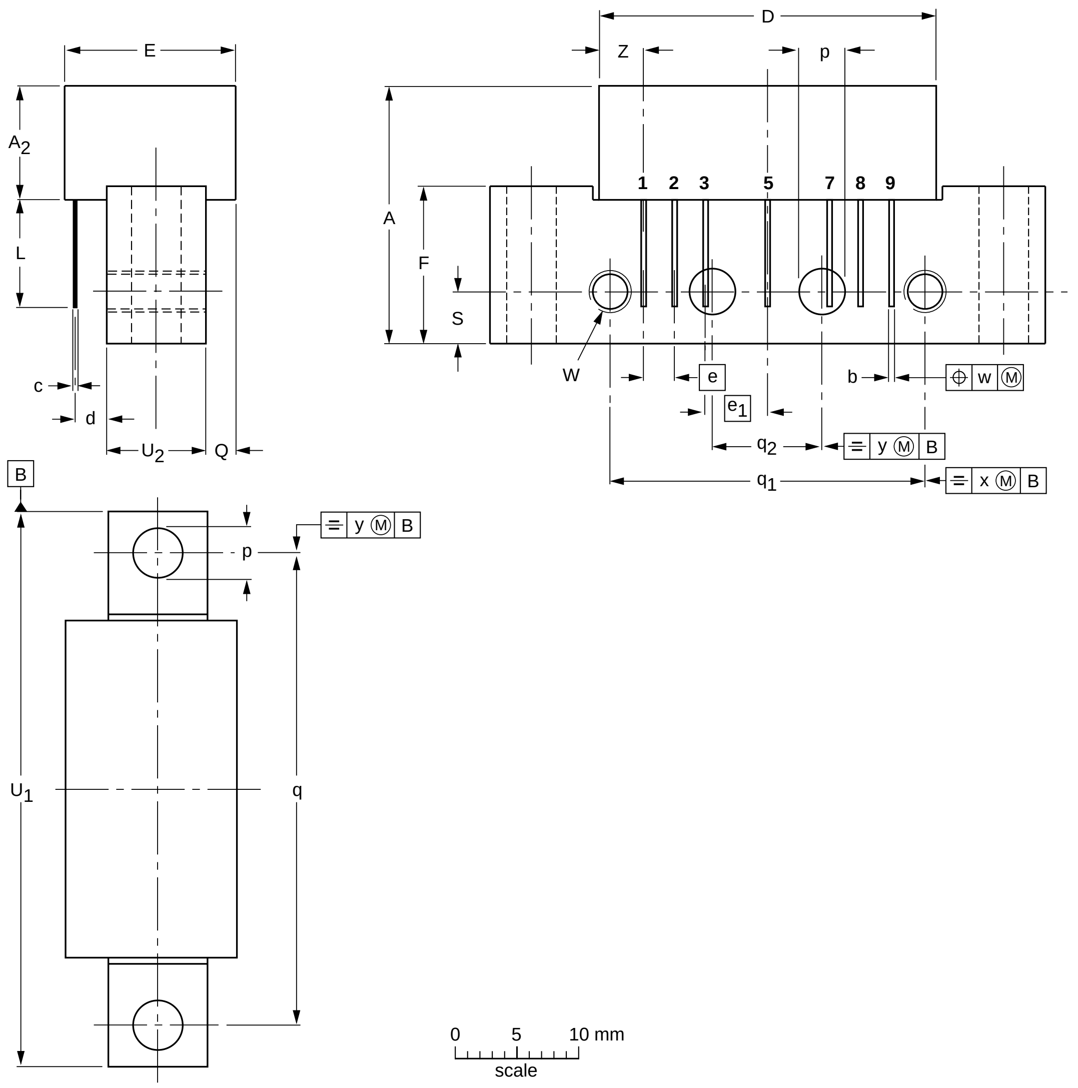
[1] f_p = 55.25 MHz; V_p = 46 dBmV; f_q = 391.25 MHz; V_q = 46 dBmV; measured at $f_p + f_q$ = 446.5 MHz.

[2] Measure 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.

6. 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_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	p	Q max.	q	q_1	q_2	S	U_1	U_2	W	w	x	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 44.25	8.2 7.8	6-32 UNC	0.25	0.7	0.1	3.8

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT115J						~~99-02-06~~ 04-02-04

Fig 1. Package outline SOT115J

7. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BGY787_8	20050401	Product data sheet	-	9397 750 14773	BGY787_7
Modifications:	• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.				
BGY787_7	20030516	Product specification	-	9397 750 11198	BGY787_6
BGY787_6	20011031	Product specification	-	9397 750 08811	BGY787_5
BGY787_5	19990330	Product specification	-	9397 750 05455	BGY787_4
BGY787_4	19971124	Product specification	-	9397 750 02951	BGY787_3
BGY787_3	19970414	Product specification	-	9397 750 02155	-

8. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

9. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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12. Contents

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