

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

_ <.T._:_ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	MILE				
power gain	f = 50 MHz	21	21.5	22	dB
	f = 750 MHz	21.5	22.5	W-100	dB
total current consumption (DC)	V _B = 24 V	[1] -	220	240	mA
	power gain total current consumption (DC)	f = 750 MHz	f = 750 MHz 21.5	f = 750 MHz 21.5 22.5	f = 750 MHz 21.5 22.5 -

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

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2. Pinning information V.100Y.COM.TW

Table 2: **Pinning**

Pin	Description	Simplified outline Symbol
1	input	WW.100 COM.
2	common	1 3 5 7 9
3	common	
5	+V _B	12 3 7 8
7	common	2 3 1 6 sym095
8	common	WWW.to
9	output	TWW.100 COM. T.

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Table 3: **Ordering information**

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

W.100Y.CO **Limiting values**

Table 4: Limiting values

Symbol	Parameter	Conditions	Min	Max	Unit
Vi	RF input voltage		11	60	dBm'
T _{stg}	storage temperature		-40	+100	°C
T _{mb}	mounting base temperature	I.CU.TY	-20	+100	°C
O.V.C	ONE THE WWW.	N.COM		1	no V.C
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5. Characteristics

Table 5: Characteristics at bandwidth 40 MHz to 750 MHz

 $V_B = 24 \ V; \ T_{case} = 30 \ ^{\circ}C; \ Z_S = Z_L = 75 \ \Omega.$

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Gp	power gain	f = 50 MHz		21	21.5	22	dB
		f = 750 MHz	OON.Co.	21.5	22.5	-	dB
SL	slope cable equivalent	f = 40 MHz to 750 MHz	. OOY.CC	0	1	1.5	dB
FL CO	flatness of frequency response	f = 40 MHz to 750 MHz	Jun C	G_{Mr}	±0.2	±0.5	dB
s ₁₁	input return losses	f = 40 MHz to 80 MHz	1.100	20	33	-	dB
		f = 80 MHz to 160 MHz	W.100X.	18.5	30	-	dB
		f = 160 MHz to 320 MHz	1007	17	25	-	dB
		f = 320 MHz to 640 MHz	100	15.5	22	N	dB
		f = 640 MHz to 750 MHz	MM	14	20.5	W	dB
S ₂₂	output return losses	f = 40 MHz to 80 MHz	MW.I	20	28.5	-W	dB
		f = 80 MHz to 160 MHz	WW.	18.5	27.5	. I	dB
		f = 160 MHz to 320 MHz	W STAN	17	25	T. J.	dB
		f = 320 MHz to 640 MHz	N W	15.5	22	MIT	dB
		f = 640 MHz to 750 MHz	MM	14	20	-11.	dB
Ψ S21	phase response	f = 50 MHz	WW	-45	nay.C	+45	deg
СТВ	composite triple beat	110 channels flat; $V_0 = 44 \text{ dBmV}$; measured at 745.25 MHz	W	N-M-y	-54.5	-53	dB
X _{mod}	cross modulation	110 channels flat; V _o = 44 dBmV; measured at 55.25 MHz		NWV	-54	-52	dB
cso	composite second order distortion	110 channels flat; V _o = 44 dBmV; measured at 746.5 MHz	N	WW	-57.5	-53	dB
d ₂	second order distortion	WWW. 100Y.CO.	[1]	-1111	-75	-63	dB
V _o	output voltage	$d_{im} = -60 \text{ dB}$	[2]	61	63	1001	dBmV
F	noise figure	f = 50 MHz	TW	-	4	5	dB
		f = 450 MHz	1.1	-		5.5	dB
		f = 550 MHz	William	-	- 111	5.5	dB
		f = 600 MHz	MT.M	-	3/1/1	6	dB
		f = 750 MHz	WIM	-	5	6.5	dB
I _{tot}	total current consumption (DC)	TI TINN.	[3]	N_	220	240	mA

^[1] $f_p = 55.25 \text{ MHz}$; $V_p = 44 \text{ dBmV}$; $f_q = 691.25 \text{ MHz}$; $V_q = 44 \text{ dBmV}$; measured at $f_p + f_q = 746.5 \text{ MHz}$.

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^[2] Measure according to DIN45004B; $f_p = 740.25 \text{ MHz}; \ V_p = V_o; f_q = 747.25 \text{ MHz}; \ V_q = V_o - 6 \text{ dB}; f_r = 749.25 \text{ MHz}; \ V_r = V_o - 6 \text{ dB}; \text{ measured at } f_p + f_q - f_r = 738.25 \text{ MHz}.$

^[3] The module normally operates at $V_B = 24 \text{ V}$, but is able to withstand supply transients up to 30 V.

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Characteristics at bandwidth 40 MHz to 770 MHz

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
G_p	power gain	f = 50 MHz		21	21.5	22	dB
		f = 770 MHz	M	21.5	22.5	-	dB
SL	slope cable equivalent	f = 40 MHz to 770 MHz	Mo.	0	1	1.5	dB
FCON'	flatness of frequency response	f = 40 MHz to 770 MHz		TTV	±0.2	±0.5	dB
s ₁₁	input return losses	f = 40 MHz to 80 MHz	$C_{\Omega_{i}}$	20	33	-	dB
		f = 80 MHz to 160 MHz	1.CC	18.5	30	-	dB
		f = 160 MHz to 320 MHz	*7 C	17	25	-	dB
		f = 320 MHz to 640 MHz	7 7.	15.5	22.5	-	dB
		f = 640 MHz to 770 MHz	101.	14	20.5	-	dB
S ₂₂	output return losses	f = 40 MHz to 80 MHz	1007	20	28.5	_	dB
		f = 80 MHz to 160 MHz	. 100	18.5	27.5	A	dB
		f = 160 MHz to 320 MHz	.10	17	25	rW.	dB
		f = 320 MHz to 640 MHz	N.In	15.5	22	TIN	dB
		f = 640 MHz to 770 MHz		14	20		dB
Ψ S21	phase response	f = 50 MHz	-TXN	-45		+45	deg
СТВ	composite triple beat	110 channels flat; $V_0 = 44$ dBmV; measured at 745.25 MHz		V.100	-54.5	-53	dB
X _{mod}	cross modulation	110 channels flat; $V_0 = 44$ dBmV; measured at 55.25 MHz		- XV 1	-54	-52	dB
CSO	composite second order distortion	110 channels flat; $V_0 = 44$ dBmV; measured at 746.5 MHz	W	MM	-57.5	-53	dB
d_2	second order distortion	M. 100 COM. 1	[1]	TVV	-75	-63	dB
Vo	output voltage	$d_{im} = -60 \text{ dB}$	[2]	61	63) } .	dBmV
F	noise figure	f = 50 MHz		7/1/1/	4	5	dB
		f = 450 MHz		-11	- 1	5.5	dB
		f = 550 MHz		- 1	VIII.	5.5	dB
		f = 600 MHz		-	N-WW	6	dB
		f = 770 MHz	S	-	5	6.5	dB
I _{tot}	total current consumption (DC)	TW WW. TI 100 TO MIT	[3]	-	220	240	mA

^[1] $f_p = 55.25 \text{ MHz}$; $V_p = 44 \text{ dBmV}$; $f_q = 691.25 \text{ MHz}$; $V_q = 44 \text{ dBmV}$; measured at $f_p + f_q = 746.5 \text{ MHz}$.

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^[2] Measure according to DIN45004B; $f_p = 740.25 \text{ MHz}; V_p = V_o; f_q = 747.25 \text{ MHz}; V_q = V_o - 6 \text{ dB}; f_r = 749.25 \text{ MHz}; V_r = V_o - 6 \text{ dB}; measured at <math>f_p + f_q - f_r = 738.25 \text{ MHz}.$

^[3] The module normally operates at $V_B = 24 \text{ V}$, but is able to withstand supply transients up to 30 V.

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Characteristics at bandwidth 40 MHz to 600 MHz Table 7:

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Gp	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
FLOW	flatness of frequency response	f = 40 MHz to 600 MHz		TIV	_	±0.3	dB
s ₁₁	input return losses	f = 40 MHz to 80 MHz	207	20	33	-	dB
		f = 80 MHz to 160 MHz	C_C	18.5	30	-	dB
		f = 160 MHz to 320 MHz	of C	17	25	-	dB
		f = 320 MHz to 600 MHz	3.1	16	22.5	-	dB
S ₂₂	output return losses	f = 40 MHz to 80 MHz;	0.7.	20	28.5	-	dB
		f = 80 MHz to 160 MHz	001	18.5	27.5	-	dB
		f = 160 MHz to 320 MHz	100	17	25	14	dB
		f = 320 MHz to 600 MHz	170	16	22	rW.	dB
Ψ S21	phase response	f = 50 MHz	1.In	-45	$00 M_{I}$	+45	deg
СТВ	composite triple beat	85 channels flat; $V_o = 44$ dBmV; measured at 595.25 MHz		100 X	-59.5	-58	dB
X _{mod}	cross modulation	85 channels flat; $V_0 = 44 \text{ dBmV}$; measured at 55.25 MHz		N.100	-55.5	-53	dB
cso	composite second order distortion	85 channels flat; $V_o = 44 \text{ dBmV}$; measured at 596.5 MHz	NN	W.10	-64	-56	dB
d ₂	second order distortion	MWW.100V.COM.	<u>[1]</u>	$\Lambda_{M^{*}}$	ooy.	-68	dB
Vo	output voltage	$d_{im} = -60 \text{ dB}$	[2]	62.5	700	CO	dBm
F	noise figure	see Table 5		-TWV	1700	₹ C	dB
I _{tot}	total current consumption (DC)	MAY 1001 ON IN	[3]	N. A.	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.

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^[2] Measure according to DIN45004B; WWW.100Y.COM.TW $f_p = 590.25 \text{ MHz}; V_p = V_0; f_q = 597.25 \text{ MHz}; V_q = V_0 - 6 \text{ dB}; f_r = 599.25 \text{ MHz}; V_r = V_0 - 6 \text{ dB}; measured at <math>f_p + f_q - f_r = 588.25 \text{ MHz}.$

^[3] The module normally operates at $V_B = 24 \text{ V}$, but is able to withstand supply transients up to 30 V.

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Characteristics at bandwidth 40 MHz to 550 MHz

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Gp	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	Var-	0	-	1.5	dB
FLOW	flatness of frequency response	f = 40 MHz to 550 MHz		TT	N_	±0.3	dB
s ₁₁	input return losses	f = 40 MHz to 80 MHz	Co	20	33	-	dB
		f = 80 MHz to 160 MHz	J.C	18.5	30	-	dB
		f = 160 MHz to 320 MHz	~ 7 (17	25	-	dB
		f = 320 MHz to 550 MHz	03.	16	22.5	-	dB
s ₂₂	output return losses	f = 40 MHz to 80 MHz	001	20	28.5	-	dB
		f = 80 MHz to 160 MHz	100	18.5	27.5	N_	dB
		f = 160 MHz to 320 MHz	- 100	17	25		dB
		f = 320 MHz to 550 MHz	1.1	16	22	TV	dB
Ψ S21	phase response	f = 50 MHz	M_{T_i}	-45	c_{OM}	+45	deg
СТВ	composite triple beat	77 channels flat; $V_o = 44 \text{ dBmV}$; measured at 547.25 MHz		1002	-61	-60	dB
X _{mod}	cross modulation	77 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz		N.100	-56.5	-55	dB
CSO	composite second order distortion	77 channels flat; $V_o = 44 \text{ dBmV}$; measured at 548.5 MHz	WV	W.1	-65.5	-58	dB
d ₂	second order distortion	MMN. Ia ON COM	[1]		-ooy	-70	dB
Vo	output voltage	$d_{im} = -60 \text{ dB}$	[2]	63	·Inn	1-CO	dBm
F	noise figure	see Table 5		TINY	V-100	₹ C(dB
I _{tot}	total current consumption (DC)	M. 21 100 X O. W. J. M.	[3]	Ā,	220	240	mA

^[1] $f_p = 55.25 \text{ MHz}$; $V_p = 44 \text{ dBmV}$; $f_q = 493.25 \text{ MHz}$; $V_q = 44 \text{ dBmV}$; measured at $f_p + f_q = 548.5 \text{ MHz}$.

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^[2] Measure according to DIN45004B; WWW.100Y.COM.TW $f_p = 540.25 \; \text{MHz}; \; V_p = V_o; \; f_q = 547.25 \; \text{MHz}; \; V_q = V_o - 6 \; \text{dB}; \; f_r = 549.25 \; \text{MHz}; \; V_r = V_o - 6 \; \text{dB}; \; \text{measured at} \; f_p + f_q - f_r = 538.25 \; \text{MHz}.$ WWW.100Y.COM.TW

^[3] The module normally operates at $V_B = 24 \text{ V}$, but is able to withstand supply transients up to 30 V.

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Characteristics at bandwidth 40 MHz to 450 MHz

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Gp	power gain	f = 50 MHz		21	21.5	22	dB
		f = 450 MHz	M.	21.5	-	-	dB
SL	slope cable equivalent	f = 40 MHz to 450 MHz		0	-	1.5	dB
FLON	flatness of frequency response	f = 40 MHz to 450 MHz		TT	N_	±0.3	dB
S ₁₁	input return losses	f = 40 MHz to 80 MHz		20	33	-	dB
		f = 80 MHz to 160 MHz	CC	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	01.	20	28.5	-	dB
		f = 80 MHz to 160 MHz	007	18.5	27.5	W.	dB
		f = 160 MHz to 320 MHz		17	25	W	dB
		f = 320 MHz to 450 MHz	7.0	16	22	TW	dB
Ψ S21	phase response	f = 50 MHz	1.70	-45	$G_{O_{M_{i}}}$	+45	deg
СТВ	composite triple beat	60 channels flat; $V_0 = 46 \text{ dBmV}$; measured at 445.25 MHz		100 ₂	Y.CO	-59	dB
X _{mod}	cross modulation	60 channels flat; $V_o = 46 \text{ dBmV}$; measured at 55.25 MHz		V.100	J.C.	-54	dB
CSO	composite second order distortion	60 channels flat; $V_0 = 46 \text{ dBmV}$; measured at 446.5 MHz	W	W.1	' 00 X ;	-60	dB
d ₂	second order distortion		<u>[1]</u>	1111.	1005	-73	dB
Vo	output voltage	$d_{im} = -60 \text{ dB}$	[2]	64	1.700	V.CO	dBm
F	noise figure	see Table 5		- NY	N.100	ST C	dB
I _{tot}	total current consumption (DC)	M. 1001.	[3]	N. T.	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.

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^[2] Measure according to DIN45004B; WWW.100Y.COM.TW $f_p = 440.25 \text{ MHz}; V_p = V_o; f_q = 447.25 \text{ MHz}; V_q = V_o - 6 \text{ dB}; f_r = 449.25 \text{ MHz}; V_r = V_o - 6 \text{ dB}; measured at <math>f_p + f_q - f_r = 438.25 \text{ MHz}$.

^[3] The module normally operates at $V_B = 24 \text{ V}$, 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

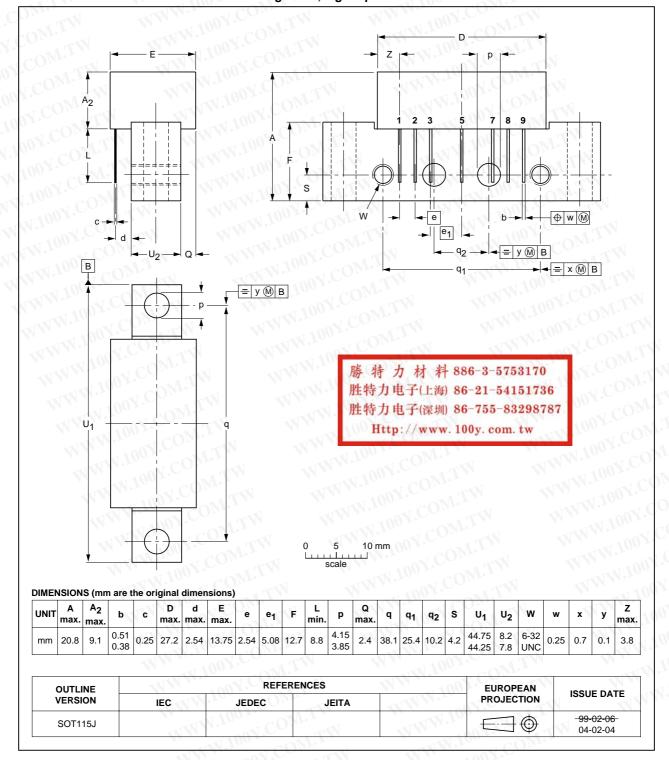


Fig 1. Package outline SOT115J

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7. Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersede
BGY787_8	20050401	Product data sheet	-	9397 750 14773	BGY787_7
Modifications:		of this data sheet has bee standard of Philips Semic		y with the new prese	ntation and
BGY787_7	20030516	Product specification	- WWW.	9397 750 11198	BGY787_6
BGY787_6	20011031	Product specification	- WWW.I	9397 750 08811	BGY787_5
BGY787_5	19990330	Product specification	WW.	9397 750 05455	BGY787_4
BGY787_4	19971124	Product specification	- 1	9397 750 02951	BGY787_3
BGY787_3	19970414	Product specification	47	9397 750 02155	<u></u>

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Level	Data sheet status [1]	Product status [2] [3]	Definition
OM	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.
	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 C	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

8. Data sheet status

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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11. Contact information

For additional information, please visit: http://www.semiconductors.philips.com
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12. Contents

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1	Product profile
1.1	General description
1.2	Features
1.3	Applications
1.4	Quick reference data
200	Pinning information 2
3	Ordering information 2
4	Limiting values 2
5	Characteristics 3
6	Package outline 8
7,700	Revision history9
8,00	Data sheet status
9	Definitions
10	Disclaimers 10
11	Contact information 10
	1100

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> Date of release: 1 April 2005 Document number: 9397 750 14773