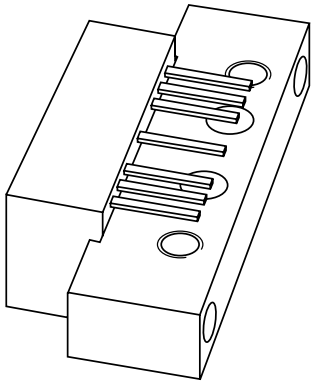
DATA SHEET



BGD702

750 MHz, 18.5 dB gain power doubler amplifier

Product specification
Supersedes data of 2001 Nov 02

2001 Nov 27

Philips Semiconductors

PHILIPS

750 MHz, 18.5 dB gain power doubler amplifier BGD702

FEATURES

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

APPLICATIONS

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

DESCRIPTION

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

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2, 3	common
5	$+V_B$
7, 8	common
9	output

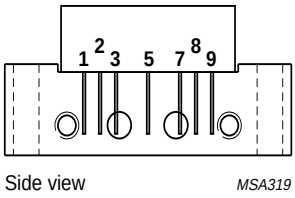


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 750 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 750 MHz; V_B = 24 V; T_{mb} = 35 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 750 MHz	18.5	19.7	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	1.3	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	±0.2	±0.5	dB
s_{11}	input return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	19	30	–	dB
		f = 160 to 320 MHz	18	29	–	dB
		f = 320 to 640 MHz	17	22	–	dB
		f = 640 to 750 MHz	16	21	–	dB
s_{22}	output return losses	f = 40 to 80 MHz	20	23	–	dB
		f = 80 to 160 MHz	19	24	–	dB
		f = 160 to 320 MHz	18	23	–	dB
		f = 320 to 640 MHz	17	21	–	dB
		f = 640 to 750 MHz	16	21	–	dB
s_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	110 channels flat; V_o = 44 dBmV; measured at 745.25 MHz	–	–59	–58	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–64	–62	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	–63	–58	dB
d_2	second order distortion	note 1	–	–78	–68	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61	64	–	dBmV
NF	noise figure	f = 50 MHz	–	4.5	5.5	dB
		f = 450 MHz	–	–	6.5	dB
		f = 550 MHz	–	–	6.5	dB
		f = 600 MHz	–	–	7	dB
		f = 750 MHz	–	6.5	8.5	dB
I_{tot}	total current consumption (DC)	note 3	–	425	435	mA

Notes

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. Measured 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 modules normally operate at V_B = 24 V, but are able to withstand supply transients up to V_B = 30 V.

Table 2 Bandwidth 40 to 600 MHz; V_B = 24 V; T_{mb} = 35 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 600 MHz	18.5	19.4	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 600 MHz	–	–	±0.3	dB
s_{11}	input return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	19	30	–	dB
		f = 160 to 320 MHz	18	29	–	dB
		f = 320 to 600 MHz	17	22	–	dB
s_{22}	output return losses	f = 40 to 80 MHz	20	23	–	dB
		f = 80 to 160 MHz	19	24	–	dB
		f = 160 to 320 MHz	18	23	–	dB
		f = 320 to 600 MHz	17	21	–	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	–	–66	–65	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–66	–65	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 MHz	–	–68	–60	dB
d_2	second order distortion	note 1	–	–80	–70	dB
V_o	output voltage	d_{im} = –60 dB; note 2	64	67	–	dBmV
NF	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	425	435	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 modules normally operate at V_B = 24 V, but are able to withstand supply transients up to V_B = 30 V.

Table 3 Bandwidth 40 to 550 MHz; V_B = 24 V; T_{mb} = 35 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 550 MHz	18.5	19.3	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	–	±0.3	dB
s_{11}	input return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	19	30	–	dB
		f = 160 to 320 MHz	18	29	–	dB
		f = 320 to 550 MHz	17	22	–	dB
s_{22}	output return losses	f = 40 to 80 MHz	20	23	–	dB
		f = 80 to 160 MHz	19	24	–	dB
		f = 160 to 320 MHz	18	23	–	dB
		f = 320 to 550 MHz	17	21	–	dB
s_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–68	–67	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–68	–67	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–68	–62	dB
d_2	second order distortion	note 1	–	–81	–72	dB
V_o	output voltage	d_{im} = –60 dB; note 2	64.5	68	–	dBmV
NF	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	425	435	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 modules normally operate at V_B = 24 V, but are able to withstand supply transients up to V_B = 30 V.

Table 4 Bandwidth 40 to 450 MHz; V_B = 24 V; T_{mb} = 35 °C; $Z_S = Z_L$ = 75 Ω

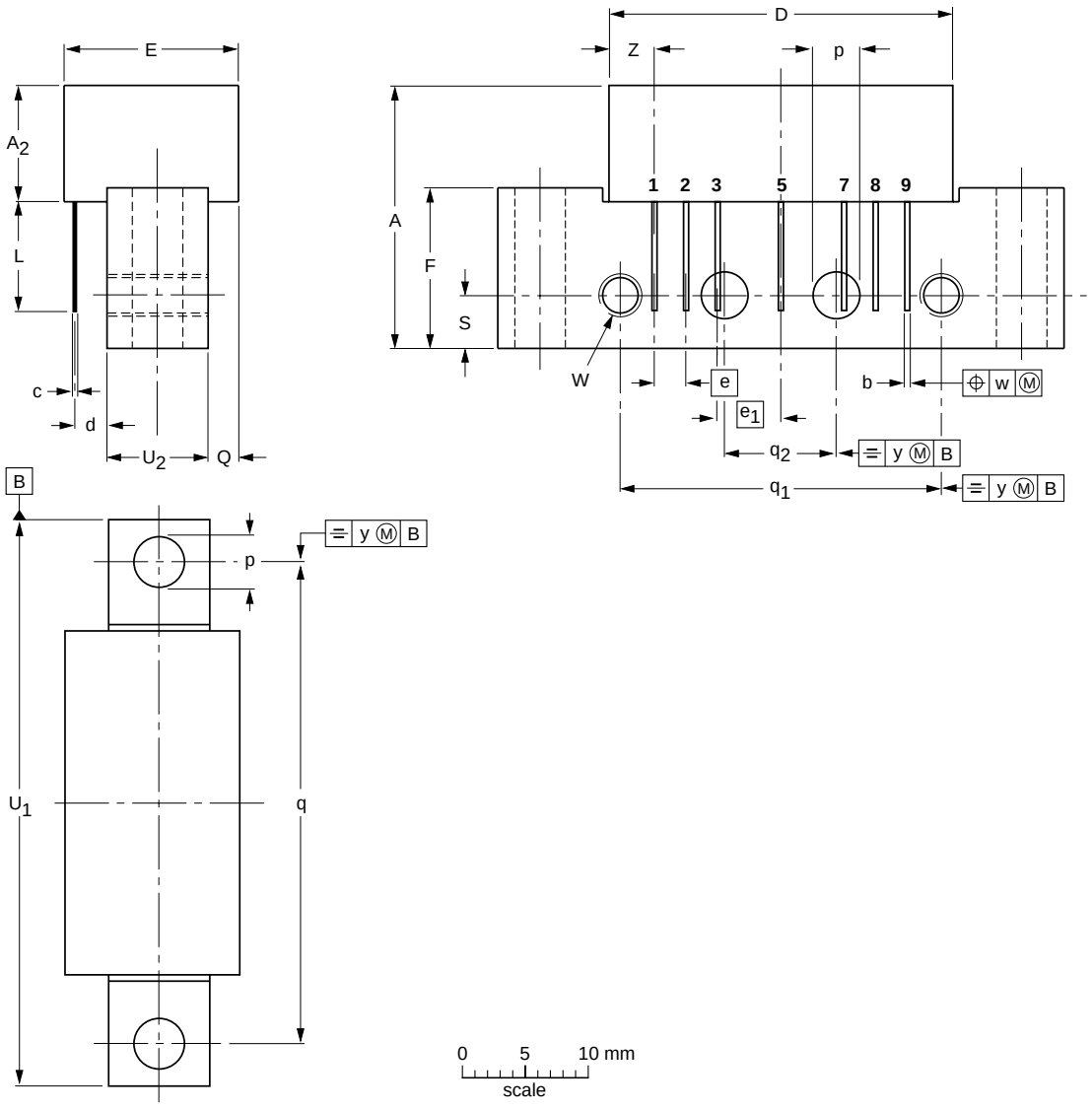
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 450 MHz	18.5	19.2	–	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 450 MHz	–	–	±0.3	dB
s_{11}	input return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	19	30	–	dB
		f = 160 to 320 MHz	18	29	–	dB
		f = 320 to 450 MHz	17	22	–	dB
s_{22}	output return losses	f = 40 to 80 MHz	20	23	–	dB
		f = 80 to 160 MHz	19	24	–	dB
		f = 160 to 320 MHz	18	23	–	dB
		f = 320 to 450 MHz	17	21	–	dB
s_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	–68	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	–65	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV measured at 446.5 MHz	–	–	–65	dB
d_2	second order distortion	note 1	–	–	–75	dB
V_o	output voltage	d_{im} = –60 dB; note 2	67	–	–	dBmV
NF	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	425	435	mA

Notes

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. Measured 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 modules normally operate at V_B = 24 V, but are able to withstand supply transients up to V_B = 30 V.

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 max.	U_2	W	w	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	8	6-32 UNC	0.25	0.1	3.8

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115J						99-02-06

DATA SHEET STATUS

DATA SHEET STATUS(1)	PRODUCT STATUS(2)	DEFINITIONS
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.
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CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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