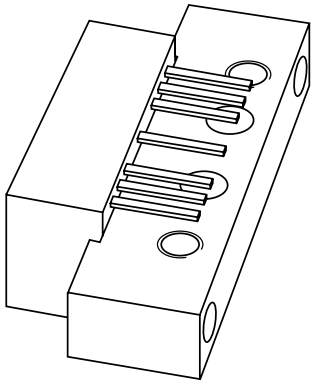
DATA SHEET



BGD902L

860 MHz, 18.5 dB gain power doubler amplifier

Product specification

2001 Oct 30

Supersedes data of 1999 Aug 17

Philips
Semiconductors

PHILIPS

860 MHz, 18.5 dB gain power doubler amplifier BGD902L

FEATURES

- Excellent linearity
- Extremely low noise
- Excellent return loss properties
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability
- Low DC current consumption.

APPLICATIONS

- CATV systems operating in the 40 to 900 MHz frequency range.

DESCRIPTION

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

PINNING - SOT115J

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

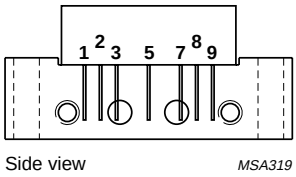


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18.2	18.8	dB
		f = 900 MHz	19	20	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	350	380	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	30	V
V_i	RF input voltage	–	70	dBmV
T_{stg}	storage temperature	−40	+100	°C
T_{mb}	operating mounting base temperature	−20	+100	°C

CHARACTERISTICS

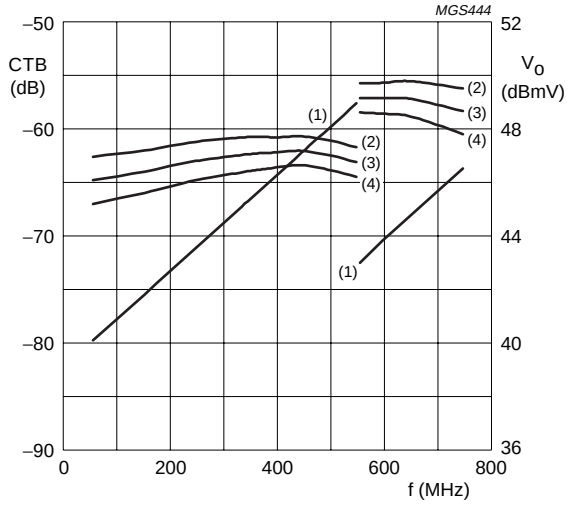
Bandwidth 40 to 900 MHz; V_B = 24 V; T_{mb} = 35 °C; $Z_S = Z_L$ = 75 Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18.2	18.5	18.8	dB
		f = 900 MHz	19	19.5	20	dB
SL	slope straight line	f = 40 to 900 MHz	0.4	0.9	1.4	dB
FL	flatness straight line	f = 40 to 900 MHz	–	±0.15	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	21	24	–	dB
		f = 80 to 160 MHz	22	26	–	dB
		f = 160 to 320 MHz	22	28	–	dB
		f = 320 to 650 MHz	19	22	–	dB
		f = 650 to 900 MHz	18	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	25	32	–	dB
		f = 80 to 160 MHz	25	33	–	dB
		f = 160 to 320 MHz	21	29	–	dB
		f = 320 to 750 MHz	20	22	–	dB
		f = 750 to 900 MHz	19	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 channels flat; V_o = 47 dBmV; f_m = 859.25 MHz	–	–66.5	–65	dB
		77 channels flat; V_o = 44 dBmV; f_m = 547.25 MHz	–	–68	–66	dB
		110 channels flat; V_o = 44 dBmV; f_m = 745.25 MHz	–	–61.5	–60	dB
		129 channels flat; V_o = 44 dBmV; f_m = 859.25 MHz	–	–58	–56	dB
		110 channels; f_m = 445.25 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–62	–60	dB
		129 channels; f_m = 697.25 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–56	–53.5	dB
X_{mod}	cross modulation	49 channels flat; V_o = 47 dBmV; f_m = 55.25 MHz	–	–64.5	–62	dB
		77 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–67.5	–65	dB
		110 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–64	–61.5	dB
		129 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–62.5	–60	dB
		110 channels; f_m = 55.25 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–60.5	–58	dB
		129 channels; f_m = 859.25 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–58	–55	dB

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	49 channels flat; V_o = 47 dBmV; f_m = 860.5 MHz	–	–66	–63	dB
		77 channels flat; V_o = 44 dBmV; f_m = 548.5 MHz	–	–71	–66	dB
		110 channels flat; V_o = 44 dBmV; f_m = 746.5 MHz	–	–65	–60	dB
		129 channels flat; V_o = 44 dBmV; f_m = 860.5 MHz	–	–62	–59	dB
		110 channels; f_m = 246 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–69	–64	dB
		129 channels; f_m = 246 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–64	–59	dB
d_2	second order distortion	note 3	–	–80	–74	dB
		note 4	–	–83	–77	dB
		note 5	–	–84	–78	dB
V_o	output voltage	d_{im} = –60 dB; note 6	63	64.5	–	dBmV
		d_{im} = –60 dB; note 7	64	65.5	–	dBmV
		d_{im} = –60 dB; note 8	66	67.5	–	dBmV
		CTB compression = 1 dB; 129 channels flat; f = 859.25 MHz	47	48	–	dBmV
		CSO compression = 1 dB; 129 channels flat; f = 860.5 MHz	49.5	51.5	–	dBmV
NF	noise figure	f = 50 MHz	–	4	5	dB
		f = 550 MHz	–	4.3	5.5	dB
		f = 750 MHz	–	5	6.5	dB
		f = 900 MHz	–	6	7.5	dB
I_{tot}	total current consumption (DC)	note 9	350	365	380	mA

Notes

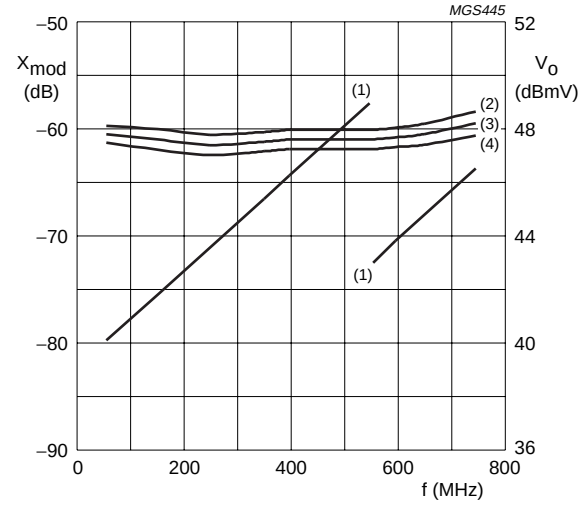
1. Tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).
2. Tilt = 12.5 dB (50 to 860 MHz).
3. f_p = 55.25 MHz; V_p = 44 dBmV; f_q = 805.25 MHz; V_q = 44 dBmV; measured at $f_p + f_q$ = 860.5 MHz.
4. f_p = 55.25 MHz; V_p = 44 dBmV; f_q = 691.25 MHz; V_q = 44 dBmV; measured at $f_p + f_q$ = 746.5 MHz.
5. 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.
6. Measured according to DIN45004B:
   f_p = 851.25 MHz; $V_p = V_o$; f_q = 858.25 MHz; $V_q = V_o$ –6 dB; f_r = 860.25 MHz; $V_r = V_o$ –6 dB;
   measured at $f_p + f_q - f_r$ = 849.25 MHz.
7. 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.
8. 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.
9. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 35 V.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).

(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. –3 σ.

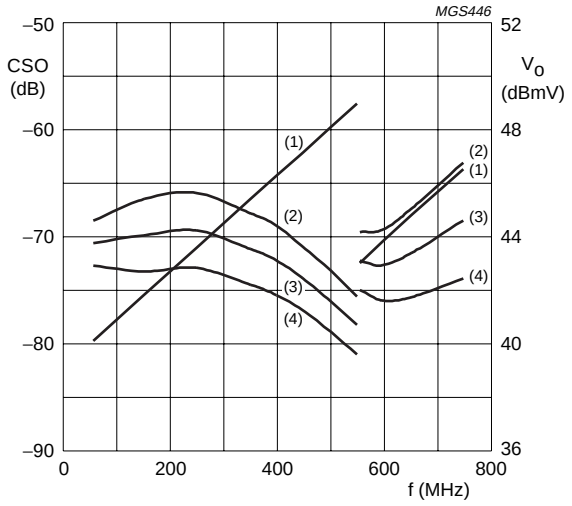
Fig.2 Composite triple beat as a function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).

(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. –3 σ.

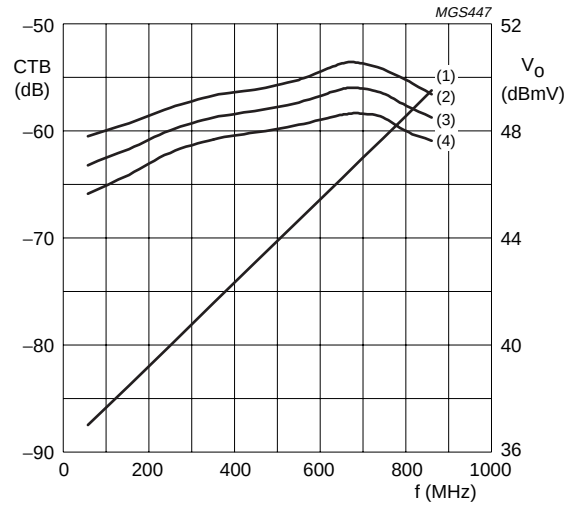
Fig.3 Cross modulation as a function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).

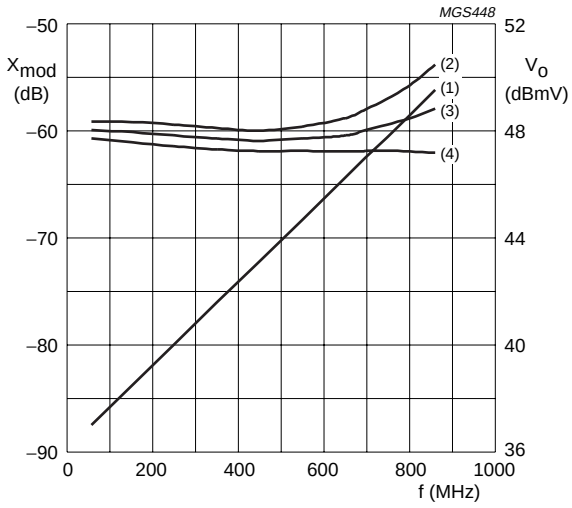
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. –3 σ.

Fig.4 Composite second order distortion as a function of frequency under tilted conditions.



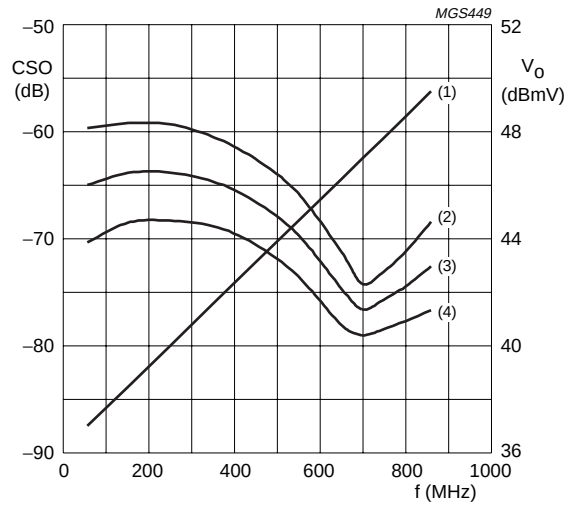
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. –3 σ.

Fig.5 Composite triple beat as a function of frequency under tilted conditions.



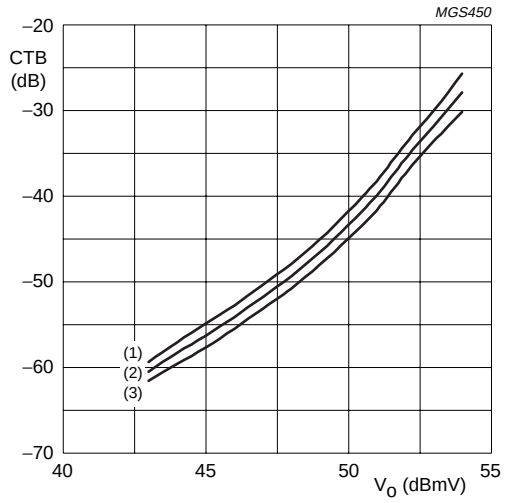
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. –3 σ.

Fig.6 Cross modulation as a function of frequency under tilted conditions.



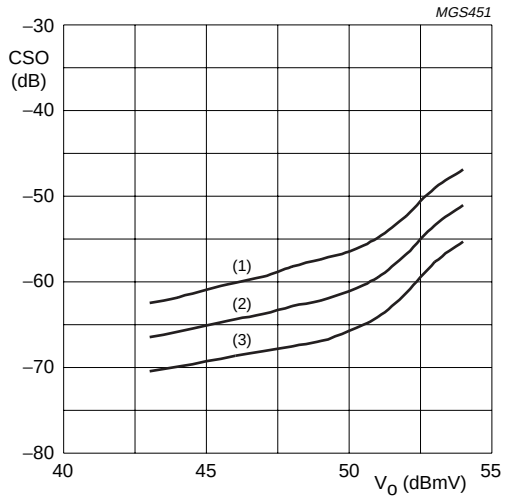
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. –3 σ.

Fig.7 Composite second order distortion as a function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs; $f_m = 859.25$ MHz.
(1) Typ. +3 σ.
(2) Typ.
(3) Typ. –3 σ.

Fig.8 Composite triple beat as a function of output voltage.

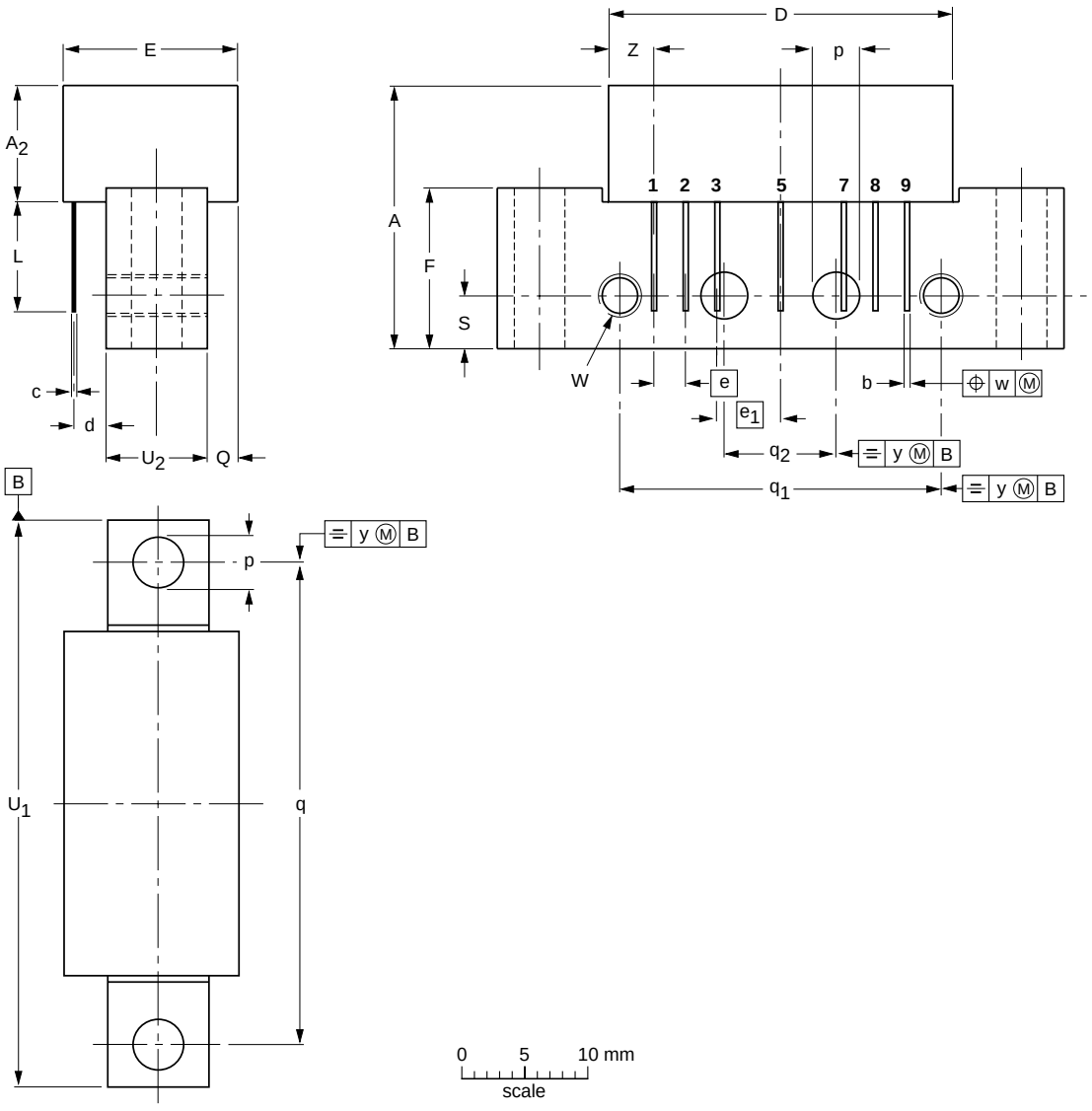


$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs; $f_m = 860.5$ MHz.
(1) Typ. +3 σ.
(2) Typ.
(3) Typ. –3 σ.

Fig.9 Composite second order distortion as a function of output voltage.

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
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NOTES

NOTES

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