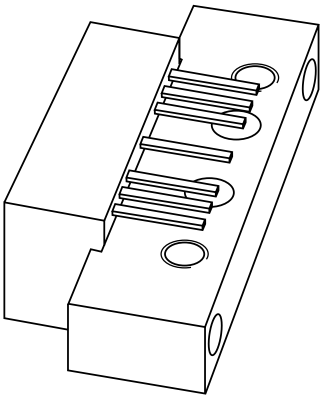
DATA SHEET



BGD812
860 MHz, 18.5 dB gain power doubler amplifier

Product specification
Supersedes data of 2001 Sep 07

2001 Oct 30

Philips Semiconductors

PHILIPS

860 MHz, 18.5 dB gain power doubler amplifier

BGD812

FEATURES

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

APPLICATIONS

- CATV systems operating in the 40 to 870 MHz frequency range.

DESCRIPTION

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

PINNING - SOT115J

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

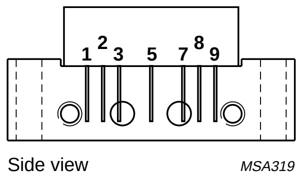


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 45 MHz	18.2	18.8	dB
		f = 870 MHz	19	20	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	380	410	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

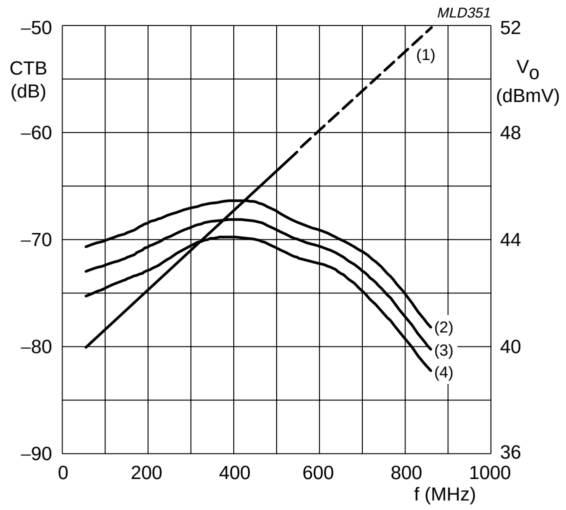
Bandwidth 40 to 870 MHz; V_B = 24 V; T_{mb} = 35 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 45 MHz	18.2	–	18.8	dB
		f = 870 MHz	19	–	20	dB
SL	slope straight line	f = 45 to 870 MHz; note 1	0.4	0.9	1.4	dB
FL	flatness straight line	f = 45 to 100 MHz	–	–	±0.25	dB
		f = 100 to 800 MHz	–	–	±0.5	dB
		f = 800 to 870 MHz	–0.3	–	+0.1	dB
s_{11}	input return losses	f = 45 to 80 MHz	25	–	–	dB
		f = 80 to 160 MHz	23	–	–	dB
		f = 160 to 320 MHz	20	–	–	dB
		f = 320 to 550 MHz	18	–	–	dB
		f = 550 to 650 MHz	18	–	–	dB
		f = 650 to 750 MHz	17	–	–	dB
		f = 750 to 870 MHz	17	–	–	dB
		f = 870 to 914 MHz	13	–	–	dB
s_{22}	output return losses	f = 45 to 80 MHz	23	–	–	dB
		f = 80 to 160 MHz	22	–	–	dB
		f = 160 to 320 MHz	18	–	–	dB
		f = 320 to 550 MHz	18	–	–	dB
		f = 550 to 650 MHz	16	–	–	dB
		f = 650 to 750 MHz	15	–	–	dB
		f = 750 to 870 MHz	15	–	–	dB
		f = 870 to 914 MHz	14	–	–	dB
s_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	79 chs flat; V_o = 44 dBmV; f_m = 547.25 MHz	–	–	–66.5	dB
		112 chs flat; V_o = 44 dBmV; f_m = 745.25 MHz	–	–	–61	dB
		132 chs flat; V_o = 44 dBmV; f_m = 859.25 MHz	–	–	–57	dB
		112 chs; f_m = 547.25 MHz; V_o = 50.2 dBmV at 745 MHz; note 2	–	–	–56	dB
		79 chs; f_m = 331.25 MHz; V_o = 47.3 dBmV at 547 MHz; note 3	–	–	–66	dB
X_{mod}	cross modulation	79 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–67	dB
		112 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–64	dB
		132 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–62	dB
		112 chs; f_m = 745.25 MHz; V_o = 50.2 dBmV at 745 MHz; note 2	–	–	–59	dB
		79 chs; f_m = 331.25 MHz; V_o = 47.3 dBmV at 547 MHz; note 3	–	–	–67	dB

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	79 chs flat; V_o = 44 dBmV; f_m = 548.5 MHz	–	–	–67	dB
		112 chs flat; V_o = 44 dBmV; f_m = 746.5 MHz	–	–	–60	dB
		132 chs flat; V_o = 44 dBmV; f_m = 860.5 MHz	–	–	–58	dB
		112 chs; f_m = 210 MHz; V_o = 50.2 dBmV at 745 MHz; note 2	–	–	–57	dB
		79 chs; f_m = 210 MHz; V_o = 47.3 dBmV at 547 MHz; note 3	–	–	–64	dB
d_2	second order distortion	note 4	–	–	–71	dB
V_o	output voltage	d_{im} = –60 dB; note 5	64	–	–	dBmV
		CTB compression = 1 dB; 132 chs flat; f = 859.25 MHz	48	–	–	dBmV
		CSO compression = 1 dB; 132 chs flat; f = 860.5 MHz	51	–	–	dBmV
NF	noise figure	f = 50 MHz	–	–	5.5	dB
		f = 550 MHz	–	–	5.5	dB
		f = 750 MHz	–	–	6.5	dB
		f = 870 MHz	–	–	7.5	dB
I_{tot}	total current consumption (DC)	note 6	380	395	410	mA

Notes

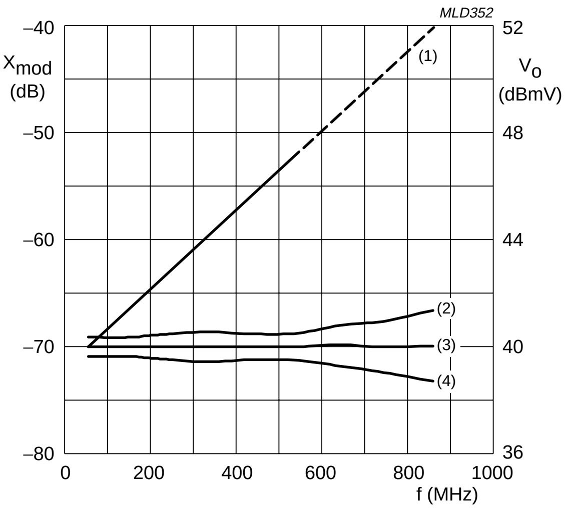
1. Slope straight line is defined as gain at 870 MHz against gain at 45 MHz.
2. Tilt = 10.2 dB (55 to 745 MHz).
3. Tilt = 7.3 dB (55 to 547 MHz).
4. f_p = 55.25 MHz; V_p = 44 dBmV; f_q = 805.25 MHz; V_q = 44 dBmV; measured at $f_p + f_q$ = 860.5 MHz.
5. Measured according to DIN45004B: f_p = 851.25 MHz; $V_p = V_o$; 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.
6. 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; 79 chs; tilt = 7.3 dB (50 to 550 MHz).

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

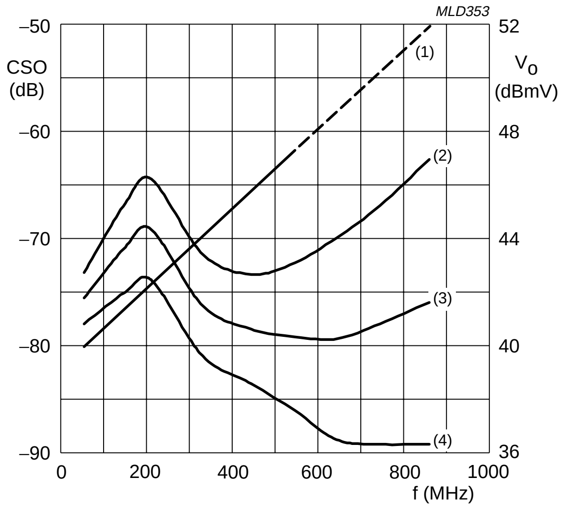
Fig.2 Composite triple beat as a function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 79 chs; tilt = 7.3 dB (50 to 550 MHz).

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

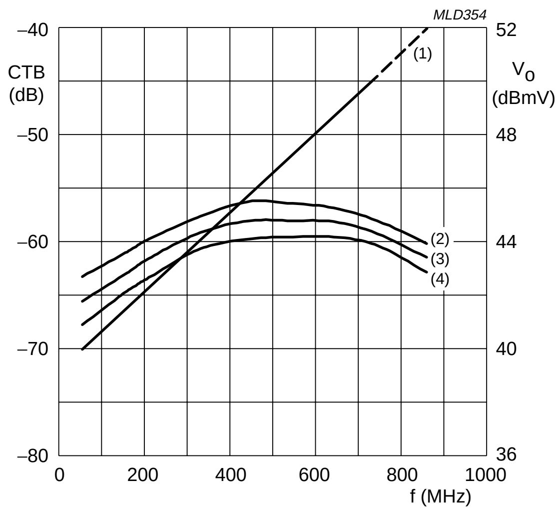
Fig.3 Cross modulation as a function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 79 chs; tilt = 7.3 dB (50 to 550 MHz).

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

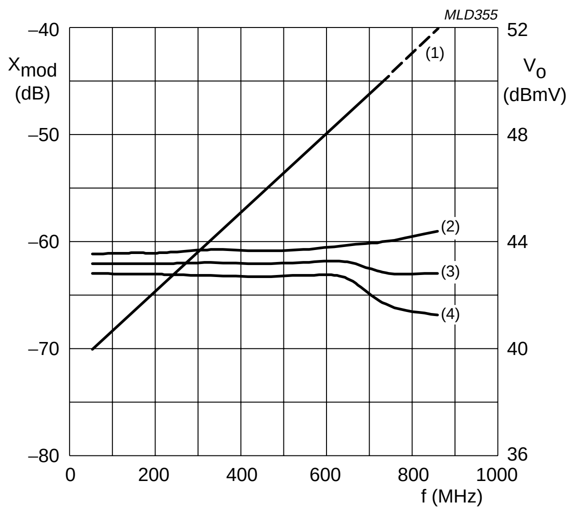
Fig.4 Composite second order distortion as a function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 112 chs; tilt = 10.3 dB (50 to 750 MHz).

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

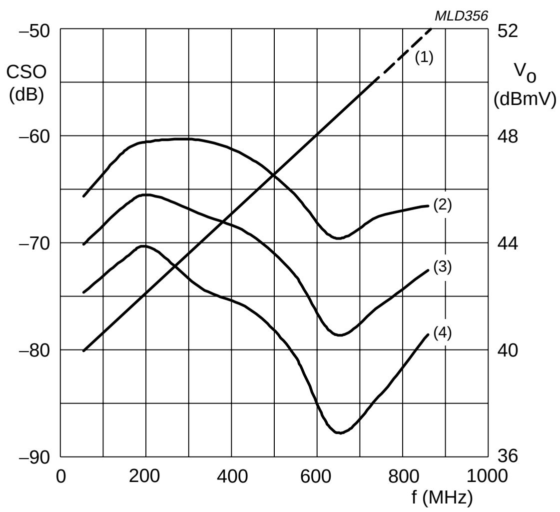
Fig.5 Composite triple beat as a function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 112 chs; tilt = 10.3 dB (50 to 750 MHz).

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

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



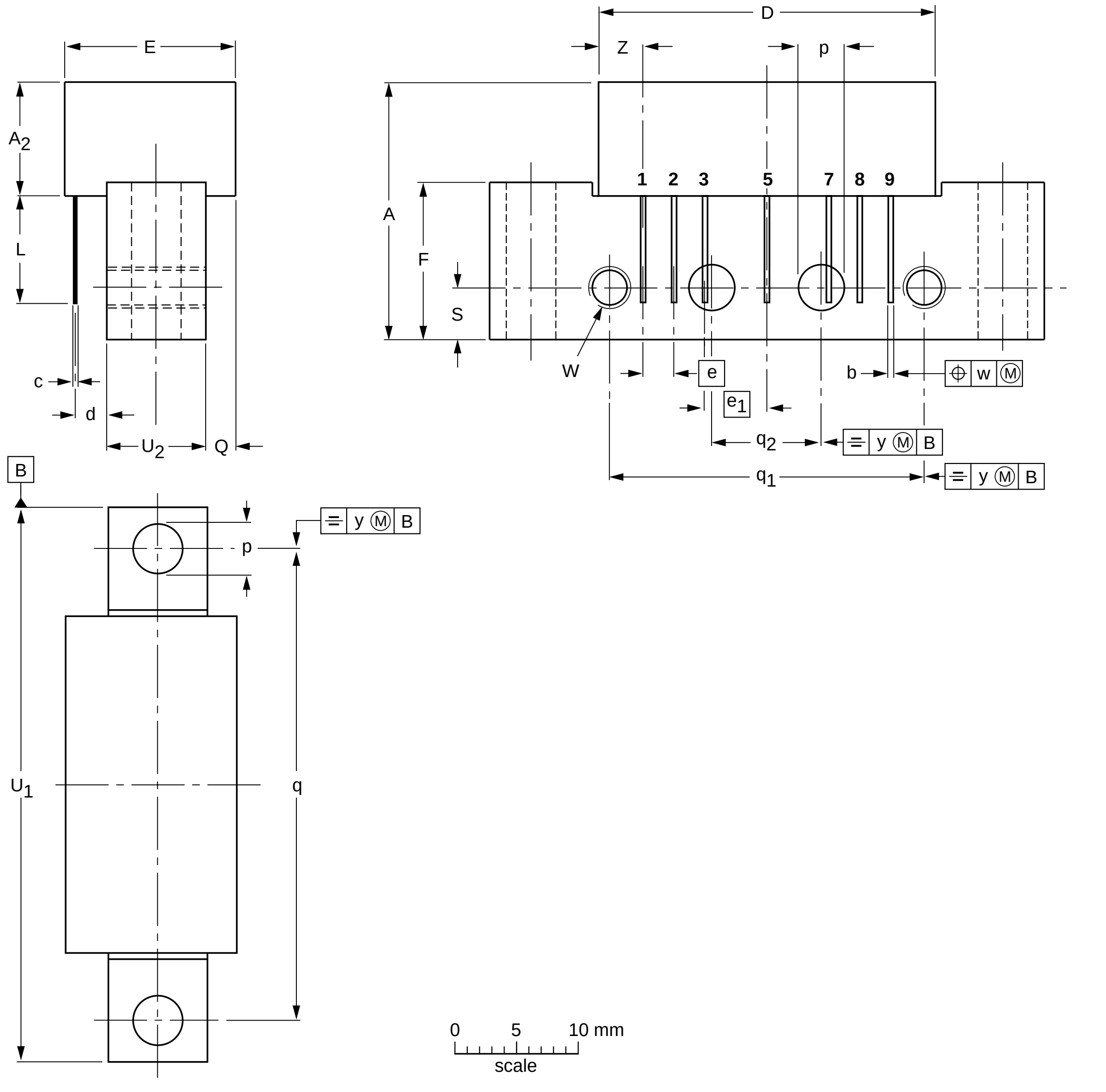
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 112 chs; tilt = 10.3 dB (50 to 750 MHz).

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

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

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.
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SCA73

Printed in The Netherlands 613518/04/pp12 Date of release: 2001 Oct 30 Document order number: 9397 750 08852

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