

DATA SHEET



BGD804

**860 MHz, 20 dB gain power
doubler amplifier**

Product specification
Supersedes data of 1999 Mar 26

2001 Nov 01

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FEATURES

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

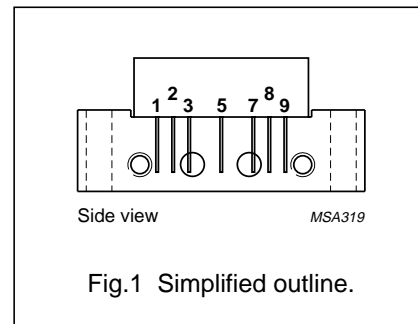
APPLICATIONS

CATV systems in the 40 to 860 MHz frequency range.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	+V _B
7	common
8	common
9	output

PIN CONFIGURATION



DESCRIPTION

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

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20.5	dB
		f = 860 MHz	20	–	dB
I _{tot}	total current consumption (DC)	V _B = 24 V	–	410	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
V _B	supply voltage	–	25	V

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CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz; $V_B = 24$ V; $T_{case} = 35$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 860 MHz	20	21	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	1.1	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.5	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 640 MHz	15.5	20	–	dB
		f = 640 to 860 MHz	14	20	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 860 MHz	14	19	–	dB
S ₂₁	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 channels flat; V _o = 47 dBmV; measured at 859.25 MHz	–	–64	–61	dB
X _{mod}	cross modulation	49 channels flat; V _o = 47 dBmV; measured at 55.25 MHz	–	–65.5	–62	dB
CSO	composite second order distortion	49 channels flat; V _o = 47 dBmV; measured at 860.5 MHz	–	–63	–58	dB
d ₂	second order distortion	note 1	–	–73	–67	dB
V _o	output voltage	d _{im} = –60 dB; note 2	+60	–61.5	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5	dB
		f = 550 MHz	–	–	6	dB
		f = 650 MHz	–	–	6	dB
		f = 750 MHz	–	–	6.5	dB
		f = 860 MHz	–	6.5	7.5	dB
I _{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

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

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Table 2 Bandwidth 40 to 860 MHz; $V_B = 24$ V; $T_{\text{case}} = 35$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 860 MHz	20	21	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	1.1	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.5	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 640 MHz	15.5	20	–	dB
		f = 640 to 860 MHz	14	20	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 860 MHz	14	19	–	dB
S ₂₁	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	129 channels flat; V _o = 44 dBmV; measured at 859.25 MHz	–	–54	–53	dB
X _{mod}	cross modulation	129 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	–	–62	–61	dB
CSO	composite second order distortion	129 channels flat; V _o = 44 dBmV; measured at 860.5 MHz	–	–60.5	–54	dB
d ₂	second order distortion	note 1	–	–73	–67	dB
V _o	output voltage	d _{im} = –60 dB; note 2	+60	–61.5	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I _{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
 $f_q = 805.25$ MHz; $V_q = 44$ dBmV;
measured at $f_p + f_q = 860.5$ MHz.
2. 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.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

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Table 3 Bandwidth 40 to 750 MHz; $V_B = 24$ V; $T_{case} = 35$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 750 MHz	20	20.8	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	–	±0.45	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 640 MHz	15.5	20	–	dB
		f = 640 to 750 MHz	14	20	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 750 MHz	14	19	–	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	–57	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	–	–62	–56	dB
d ₂	second order distortion	note 1	–	–	–68	dB
V _o	output voltage	d _{im} = –60 dB; note 2	63	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I _{tot}	total current consumption (DC)	note 3	–	395	410	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 module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

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Table 4 Bandwidth 40 to 650 MHz; $V_B = 24$ V; $T_{case} = 35$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 650 MHz	20	20.7	–	dB
SL	slope cable equivalent	f = 40 to 650 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 650 MHz	–	–	±0.35	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 650 MHz	15	20	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 650 MHz	15	19	–	dB
S ₂₁	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	94 channels flat; V _o = 44 dBmV; measured at 649.25 MHz	–	–	–60	dB
X _{mod}	cross modulation	94 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	–	–	–62	dB
CSO	composite second order distortion	94 channels flat; V _o = 44 dBmV; measured at 650.5 MHz	–	–	–58	dB
d ₂	second order distortion	note 1	–	–	–69	dB
V _o	output voltage	d _{im} = –60 dB; note 2	65	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I _{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
 $f_q = 595.25$ MHz; $V_q = 44$ dBmV;
measured at $f_p + f_q = 650.5$ MHz.
2. Measured according to DIN45004B;
 $f_p = 640.25$ MHz; $V_p = V_o$;
 $f_q = 647.25$ MHz; $V_q = V_o - 6$ dB;
 $f_r = 649.25$ MHz; $V_r = V_o - 6$ dB;
measured at $f_p + f_q - f_r = 638.25$ MHz.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

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Table 5 Bandwidth 40 to 550 MHz; $V_B = 24$ V; $T_{case} = 35$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 550 MHz	20	20.6	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	–	±0.35	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 550 MHz	16	20	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 550 MHz	16	19	–	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	–	–66	–64	dB
X _{mod}	cross modulation	77 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	–	–67	–64	dB
CSO	composite second order distortion	77 channels flat; V _o = 44 dBmV; measured at 548.5 MHz	–	–67	–62	dB
d ₂	second order distortion	note 1	–	–	–72	dB
V _o	output voltage	d _{im} = –60 dB; note 2	66	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I _{tot}	total current consumption (DC)	note 3	–	395	410	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 module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

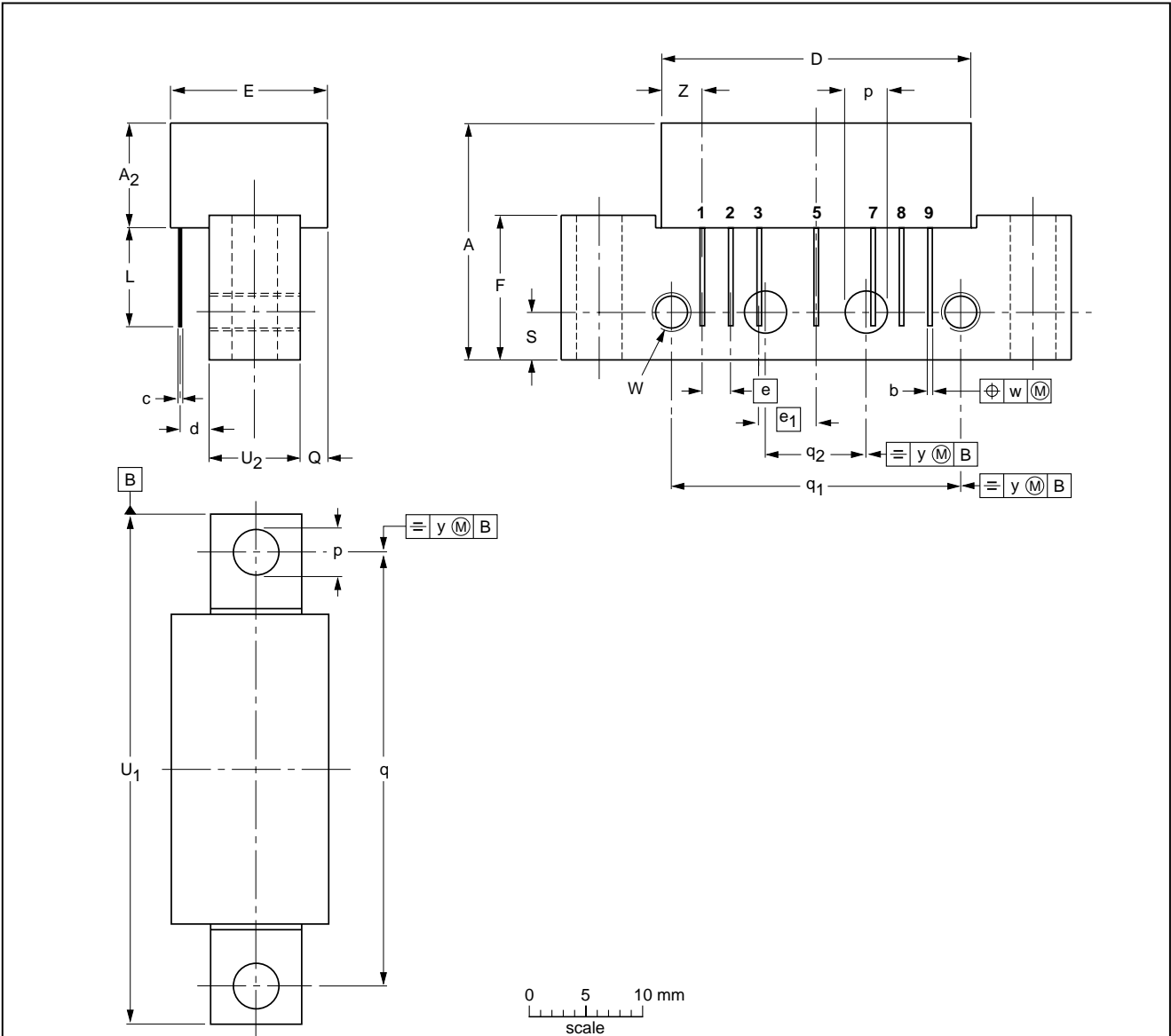
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PACKAGE OUTLINE

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

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NOTES

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Contact information

For additional information please visit <http://www.semiconductors.philips.com>. Fax: +31 40 27 24825

For sales offices addresses send e-mail to: sales.addresses@www.semiconductors.philips.com.

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