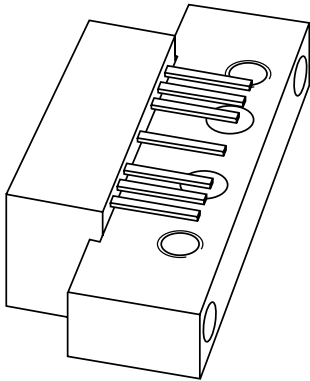


# DATA SHEET



## **BGD902; BGD902MI** 860 MHz, 18.5 dB gain power doubler amplifier

Product specification  
Supersedes data of 1999 Mar 29

2001 Nov 02

## 860 MHz, 18.5 dB gain power doubler amplifier

## BGD902; BGD902MI

### 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 900 MHz frequency range.

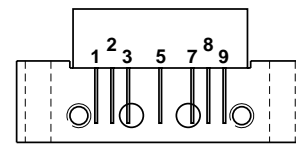
### DESCRIPTION

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

Both modules are electrically identical only the pinning is different.

### PINNING - SOT115J

PIN	DESCRIPTION	
	BGD902	BGD902MI
1	input	output
2, 3	common	common
5	+V <sub>B</sub>	+V <sub>B</sub>
7, 8	common	common
9	output	input



Side view

MSA319

Fig.1 Simplified outline.

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18.2	18.8	dB
		f = 900 MHz	19	20	dB
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = 24 V	405	435	mA

### LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V <sub>B</sub>	supply voltage	–	30	V
V <sub>i</sub>	RF input voltage	–	70	dBmV
T <sub>stg</sub>	storage temperature	–40	+100	°C
T <sub>mb</sub>	operating mounting base temperature	–20	+100	°C

# 860 MHz, 18.5 dB gain power doubler amplifier

BGD902; BGD902MI

**CHARACTERISTICS**Bandwidth 40 to 900 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18.2	18.5	18.8	dB
		f = 900 MHz	19	19.5	20	dB
SL	slope cable equivalent	f = 40 to 900 MHz	0.4	0.9	1.4	dB
FL	flatness of frequency response	f = 40 to 900 MHz	–	±0.15	±0.3	dB
S <sub>11</sub>	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 640 MHz	19	22	–	dB
		f = 640 to 900 MHz	18	21	–	dB
S <sub>22</sub>	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	25	–	dB
		f = 750 to 900 MHz	19	22	–	dB
S <sub>21</sub>	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 chs flat; V <sub>o</sub> = 47 dBmV; f <sub>m</sub> = 859.25 MHz	–	–68.5	–67	dB
		77 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 547.25 MHz	–	–70	–68	dB
		110 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 745.25 MHz	–	–63.5	–62	dB
		129 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 859.25 MHz	–	–60	–58	dB
		110 chs; f <sub>m</sub> = 400 MHz; V <sub>o</sub> = 49 dBmV at 550 MHz; note 1	–	–64	–62	dB
		129 chs; f <sub>m</sub> = 650 MHz; V <sub>o</sub> = 49.5 dBmV at 860 MHz; note 2	–	–58.5	–56.5	dB
X <sub>mod</sub>	cross modulation	49 chs flat; V <sub>o</sub> = 47 dBmV; f <sub>m</sub> = 55.25 MHz	–	–66.5	–64	dB
		77 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 55.25 MHz	–	–69.5	–67	dB
		110 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 55.25 MHz	–	–66	–63.5	dB
		129 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 55.25 MHz	–	–64.5	–62	dB
		110 chs; f <sub>m</sub> = 400 MHz; V <sub>o</sub> = 49 dBmV at 550 MHz; note 1	–	–63	–60	dB
		129 chs; f <sub>m</sub> = 860 MHz; V <sub>o</sub> = 49.5 dBmV at 860 MHz; note 2	–	–61	–58	dB
CSO	composite second order distortion	49 chs flat; V <sub>o</sub> = 47 dBmV; f <sub>m</sub> = 860.5 MHz	–	–65	–62	dB
		77 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 548.5 MHz	–	–72	–67	dB
		110 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 746.5 MHz	–	–65	–60	dB
		129 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 860.5 MHz	–	–61	–58	dB
		110 chs; f <sub>m</sub> = 250 MHz; V <sub>o</sub> = 49 dBmV at 550 MHz; note 1	–	–67	–63	dB
		129 chs; f <sub>m</sub> = 250 MHz; V <sub>o</sub> = 49.5 dBmV at 860 MHz; note 2	–	–62	–58	dB

## 860 MHz, 18.5 dB gain power doubler amplifier

BGD902; BGD902MI

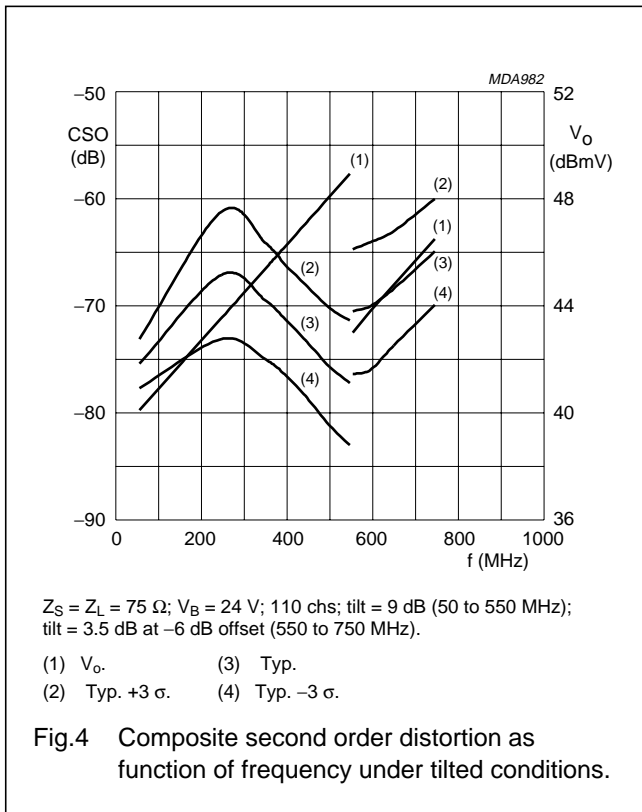
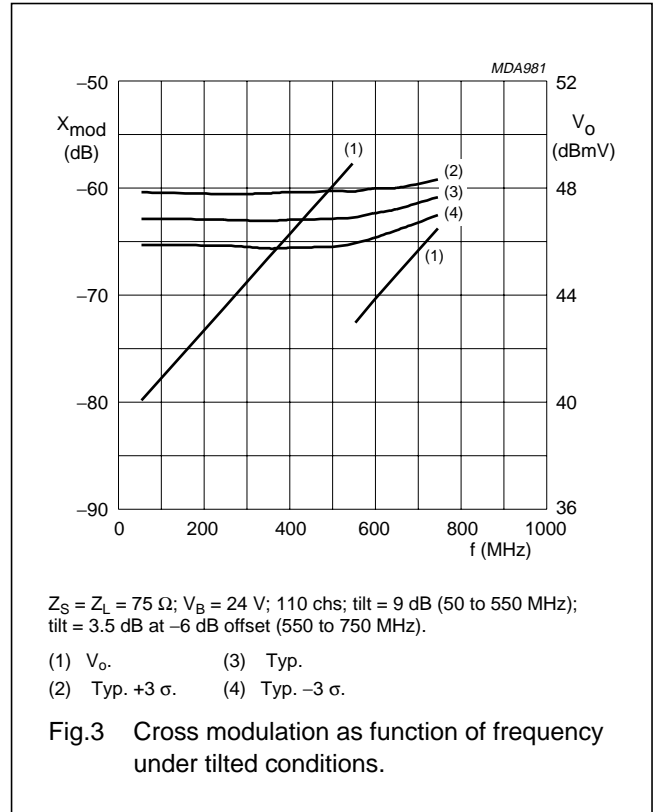
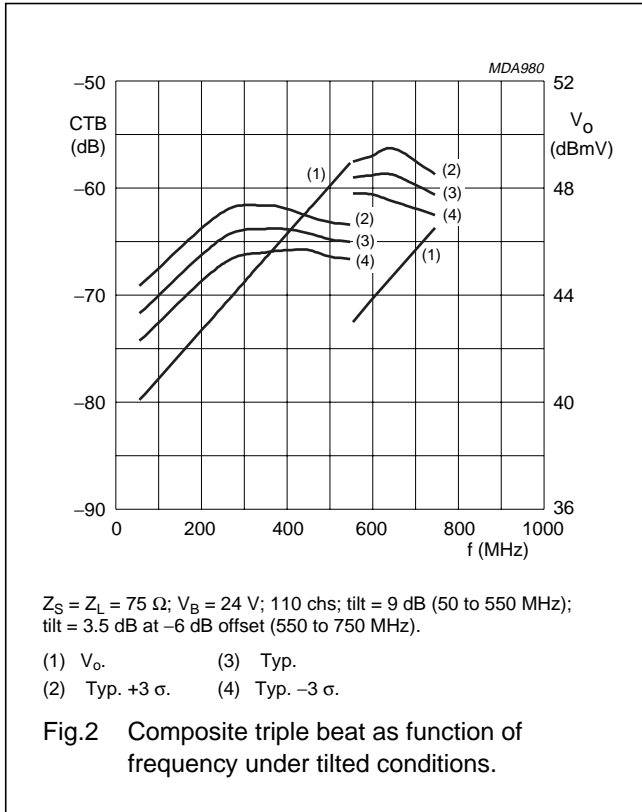
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
d <sub>2</sub>	second order distortion	note 3	–	–80	–74	dB
		note 4	–	–83	–77	dB
		note 5	–	–84	–78	dB
V <sub>o</sub>	output voltage	d <sub>im</sub> = –60 dB; note 6	64.5	66	–	dBmV
		d <sub>im</sub> = –60 dB; note 7	65.5	67	–	dBmV
		d <sub>im</sub> = –60 dB; note 8	67.5	69	–	dBmV
		CTB compression = 1 dB; 129 chs flat; f = 859.25 MHz	48.5	49.5	–	dBmV
		CSO compression = 1 dB; 129 chs flat; f = 860.5 MHz	50	53	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5	dB
		f = 550 MHz	–	5	5.5	dB
		f = 750 MHz	–	5.5	6.5	dB
		f = 900 MHz	–	6.5	8	dB
I <sub>tot</sub>	total current consumption (DC)	note 9	405	420	435	mA

### Notes

- Tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).
- Tilt = 12.5 dB (50 to 860 MHz).
- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 805.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 860.5 MHz.
- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 691.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 746.5 MHz.
- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 493.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 548.5 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 851.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 858.25 MHz; V<sub>q</sub> = V<sub>o</sub> –6 dB;  
f<sub>r</sub> = 860.25 MHz; V<sub>r</sub> = V<sub>o</sub> –6 dB;  
measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 849.25 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 740.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 747.25 MHz; V<sub>q</sub> = V<sub>o</sub> –6 dB;  
f<sub>r</sub> = 749.25 MHz; V<sub>r</sub> = V<sub>o</sub> –6 dB;  
measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 738.25 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 540.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 547.25 MHz; V<sub>q</sub> = V<sub>o</sub> –6 dB;  
f<sub>r</sub> = 549.25 MHz; V<sub>r</sub> = V<sub>o</sub> –6 dB;  
measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 538.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 35 V.

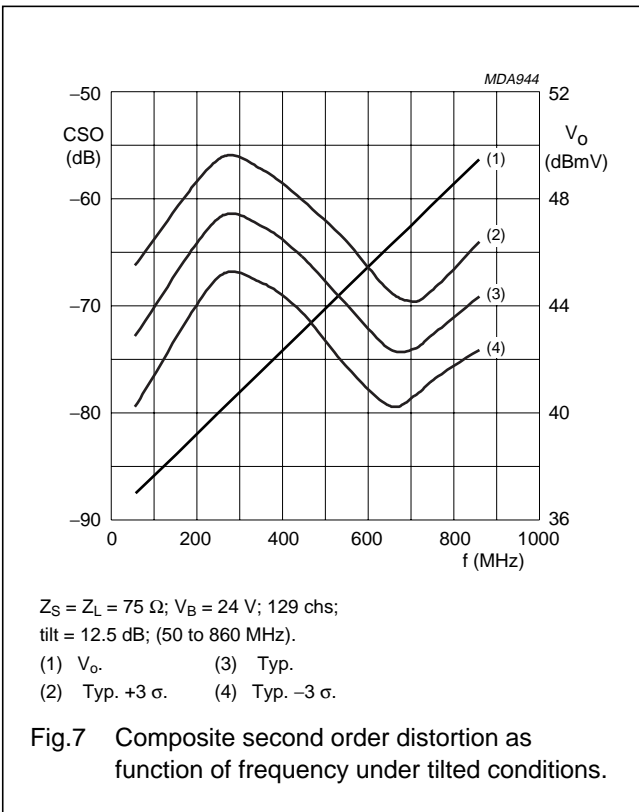
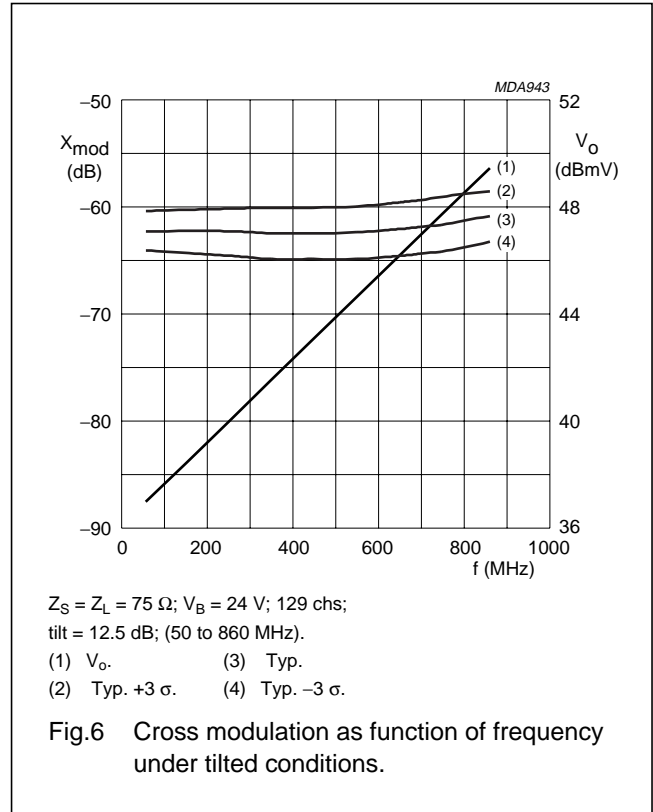
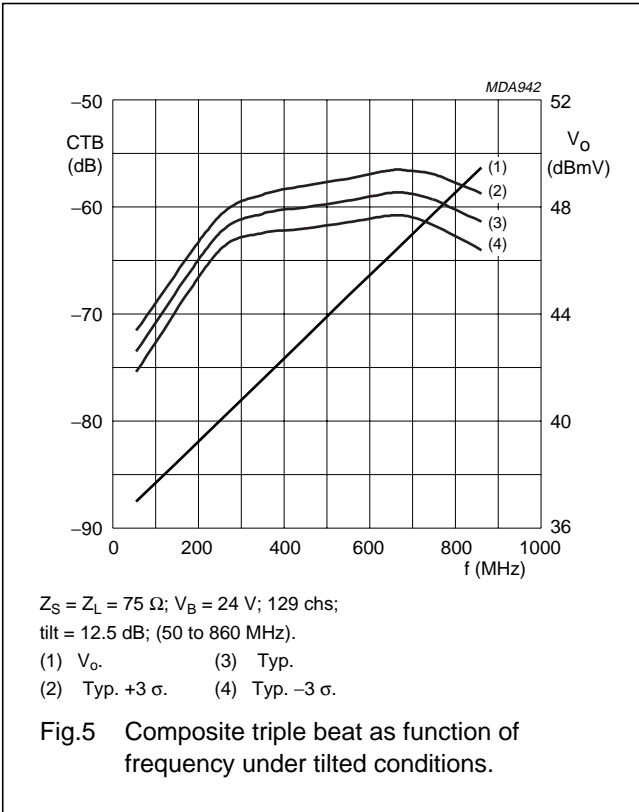
860 MHz, 18.5 dB gain  
power doubler amplifier

BGD902; BGD902MI



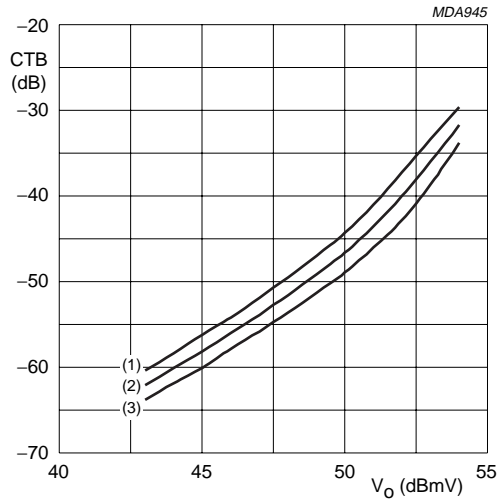
860 MHz, 18.5 dB gain  
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860 MHz, 18.5 dB gain  
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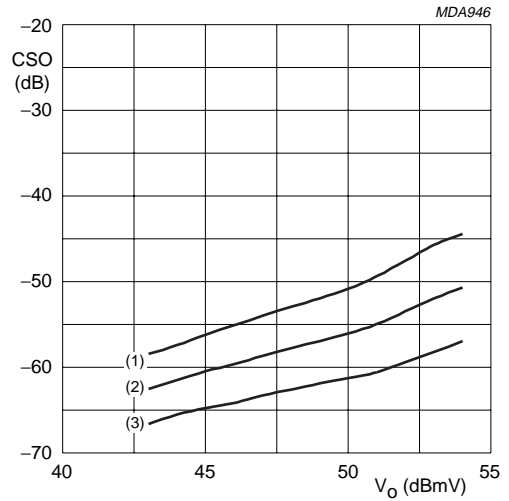
BGD902; BGD902MI



$Z_S = Z_L = 75 \Omega$ ;  $V_B = 24 \text{ V}$ ; 129 chs;  $f_m = 859.25 \text{ MHz}$ .

- (1) Typ. +3  $\sigma$ .
- (2) Typ.
- (3) Typ. -3  $\sigma$ .

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



$Z_S = Z_L = 75 \Omega$ ;  $V_B = 24 \text{ V}$ ; 129 chs;  $f_m = 860.5 \text{ MHz}$ .

- (1) Typ. +3  $\sigma$ .
- (2) Typ.
- (3) Typ. -3  $\sigma$ .

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

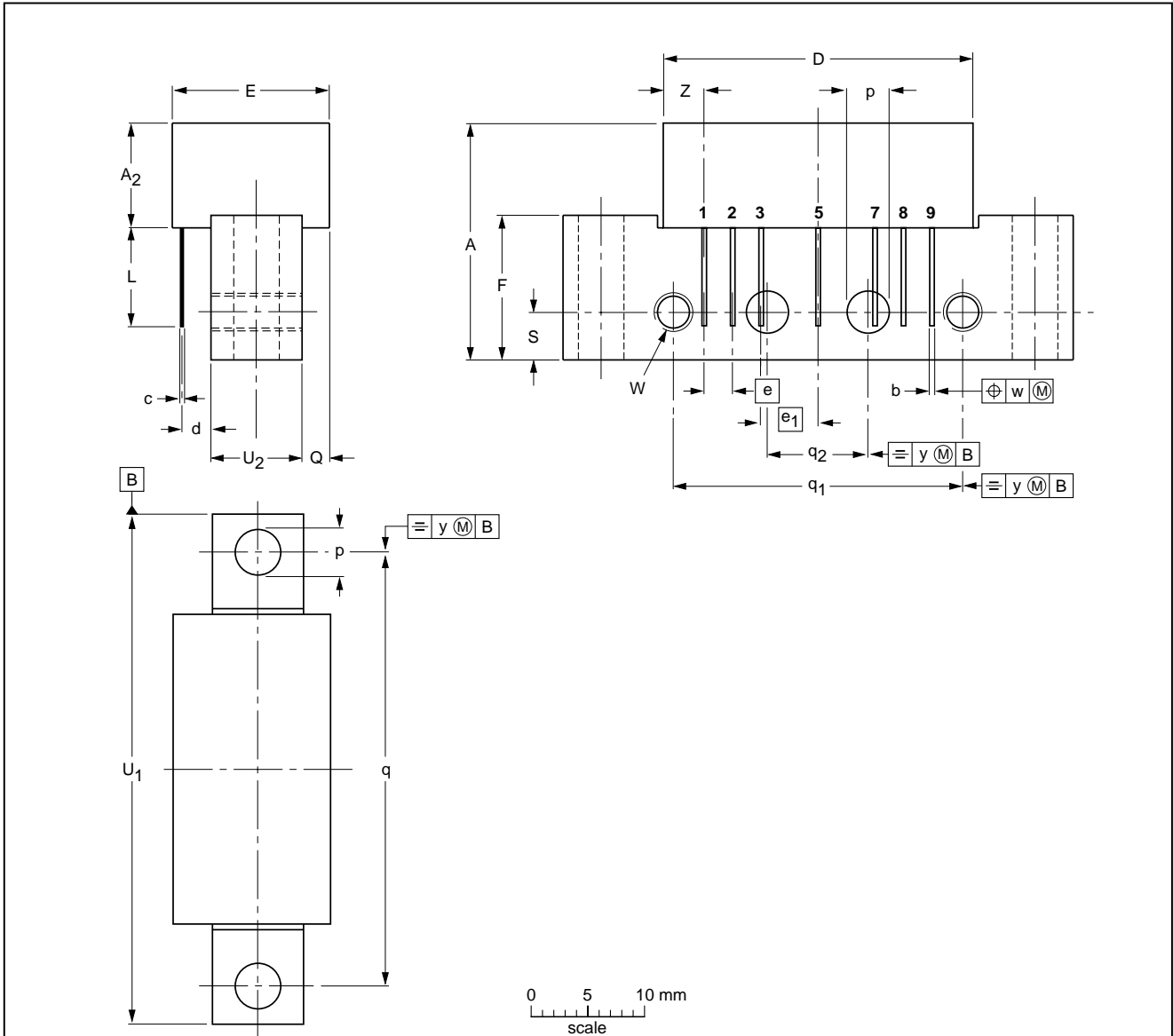
860 MHz, 18.5 dB gain  
power doubler amplifier

BGD902; BGD902MI

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 <sub>2</sub> max.	b	c	D max.	d max.	E max.	e	e <sub>1</sub>	F	L min.	p	Q max.	q	q <sub>1</sub>	q <sub>2</sub>	S	U <sub>1</sub> max.	U <sub>2</sub>	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

## 860 MHz, 18.5 dB gain power doubler amplifier

## BGD902; BGD902MI

### DATA SHEET STATUS

DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITIONS
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860 MHz, 18.5 dB gain  
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BGD902; BGD902MI

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**NOTES**

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860 MHz, 18.5 dB gain  
power doubler amplifier

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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](mailto:sales.addresses@www.semiconductors.philips.com).

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