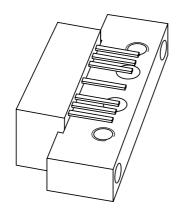
### **DISCRETE SEMICONDUCTORS**

# DATA SHEET



## **BGD702N** 750 MHz, 18.5 dB gain power doubler amplifier

Product specification Supersedes data of 2001 Oct 25 2001 Nov 02





### 750 MHz, 18.5 dB gain power doubler amplifier

### BGD702N

#### **FEATURES**

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

### **APPLICATIONS**

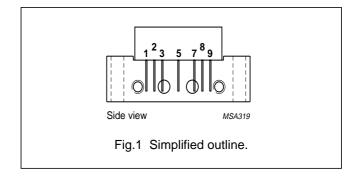
 CATV systems operating in the 40 to 750 MHz frequency range.

### **DESCRIPTION**

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

#### **PINNING - SOT115J**

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



### **QUICK REFERENCE DATA**

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Gp	power gain	f = 50 MHz	18	19	dB
		f = 750 MHz	18.5	_	dB
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = 24 V	_	435	mA

### **LIMITING VALUES**

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

SYMBOL	PARAMETER		MAX.	UNIT
Vi	RF input voltage	_	65	dBmV
T <sub>stg</sub>	storage temperature	-40	+100	°C
T <sub>mb</sub>	operating mounting base temperature	-20	+100	°C

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#### **CHARACTERISTICS**

**Table 1** Bandwidth 40 to 750 MHz;  $V_B = 24 \text{ V}$ ;  $T_{mb} = 35 \,^{\circ}\text{C}$ ;  $Z_S = Z_L = 75 \,\Omega$ 

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Gp	power gain	f = 50 MHz	18	19	dB
		f = 750 MHz	18.5	_	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	_	±0.25	dB
S <sub>11</sub>	input return losses	f = 40 to 80 MHz	20	_	dB
		f = 80 to 160 MHz	19	_	dB
		f = 160 to 320 MHz	18	_	dB
		f = 320 to 640 MHz	17	_	dB
		f = 640 to 750 MHz	16	_	dB
S <sub>22</sub>	output return losses	f = 40 to 80 MHz	20	_	dB
		f = 80 to 160 MHz	19	_	dB
		f = 160 to 320 MHz	18	_	dB
		f = 320 to 640 MHz	17	_	dB
		f = 640 to 750 MHz	16	_	dB
S <sub>21</sub>	phase response	f = 50 MHz	-45	+45	deg
СТВ	composite triple beat	110 channels flat; V <sub>o</sub> = 44 dBmV; measured at 745.25 MHz	_	-58	dB
X <sub>mod</sub>	cross modulation	110 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	_	-62	dB
CSO	composite second order distortion	110 channels flat; V <sub>o</sub> = 44 dBmV; measured at 746.5 MHz	-	-58	dB
$d_2$	second order distortion	note 1	_	-68	dB
Vo	output voltage	$d_{im} = -60 \text{ dB}$ ; note 2	61	_	dBmV
F	noise figure	f = 50 MHz	_	5.5	dB
		f = 450 MHz	_	6.5	dB
		f = 550 MHz	_	6.5	dB
		f = 600 MHz	_	7	dB
		f = 750 MHz	_	8.5	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	_	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:

$$\begin{split} f_p &= 740.25 \text{ MHz; } V_p = V_o; \\ f_q &= 747.25 \text{ MHz; } V_q = V_o - 6 \text{ dB;} \\ f_r &= 749.25 \text{ MHz; } V_r = V_o - 6 \text{ dB;} \\ \text{measured at } f_p + f_q - f_r = 738.25 \text{ MHz.} \end{split}$$

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18	19	dB
		f = 600 MHz	18.5	_	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 600 MHz	-	±0.2	dB
S <sub>11</sub>	input return losses	f = 40 to 80 MHz	20	_	dB
		f = 80 to 160 MHz	19	_	dB
		f = 160 to 320 MHz	18	_	dB
		f = 320 to 600 MHz	17	_	dB
S <sub>22</sub>	output return losses	f = 40 to 80 MHz	20	_	dB
		f = 80 to 160 MHz	19	_	dB
		f = 160 to 320 MHz	18	_	dB
		f = 320 to 600 MHz	17	_	dB
S <sub>21</sub>	phase response	f = 50 MHz	-45	+45	deg
СТВ	composite triple beat	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 595.25 MHz	-	-65	dB
X <sub>mod</sub>	cross modulation	85 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	-	-65	dB
CSO	composite second order distortion	85 channels flat; $V_0 = 44 \text{ dBmV}$ ; measured at 596.5 MHz	_	-60	dB
d <sub>2</sub>	second order distortion	note 1	_	-70	dB
Vo	output voltage	d <sub>im</sub> = -60 dB; note 2	64	_	dBmV
F	noise figure	see Table 1	_	_	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	_	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:

```
\begin{split} f_p &= 590.25 \text{ MHz; } V_p = V_o; \\ f_q &= 597.25 \text{ MHz; } V_q = V_o - 6 \text{ dB;} \\ f_r &= 599.25 \text{ MHz; } V_r = V_o - 6 \text{ dB;} \\ \text{measured at } f_p + f_q - f_r = 588.25 \text{ MHz.} \end{split}
```

3. The module normally operates at  $V_B = 24 \text{ V}$ , but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	18	19	dB
		f = 550 MHz	18.5	_	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	-	±0.2	dB
S <sub>11</sub>	input return losses	f = 40 to 80 MHz	20	_	dB
		f = 80 to 160 MHz	19	_	dB
		f = 160 to 320 MHz	18	_	dB
		f = 320 to 550 MHz	17	_	dB
S <sub>22</sub>	output return losses	f = 40 to 80 MHz	20	_	dB
		f = 80 to 160 MHz	19	_	dB
		f = 160 to 320 MHz	18	_	dB
		f = 320 to 550 MHz	17	_	dB
S <sub>21</sub>	phase response	f = 50 MHz	-45	+45	deg
СТВ	composite triple beat	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 547.25 MHz	-	-67	dB
X <sub>mod</sub>	cross modulation	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz	-	-67	dB
CSO	composite second order distortion	77 channels flat; V <sub>o</sub> = 44 dBmV; measured at 548.5 MHz	-	-62	dB
d <sub>2</sub>	second order distortion	note 1	_	-72	dB
Vo	output voltage	$d_{im} = -60 \text{ dB}$ ; note 2	64.5	_	dBmV
F	noise figure	see Table 1	-	_	dB
I <sub>tot</sub>	total current consumption (DC)	note 3	_	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:

```
\begin{split} f_p &= 540.25 \text{ MHz; } V_p = V_o; \\ f_q &= 547.25 \text{ MHz; } V_q = V_o - 6 \text{ dB;} \\ f_r &= 549.25 \text{ MHz; } V_r = V_o - 6 \text{ dB;} \\ \text{measured at } f_p + f_q - f_r = 538.25 \text{ MHz.} \end{split}
```

3. The module normally operates at  $V_B = 24 \text{ V}$ , but is able to withstand supply transients up to 30 V.

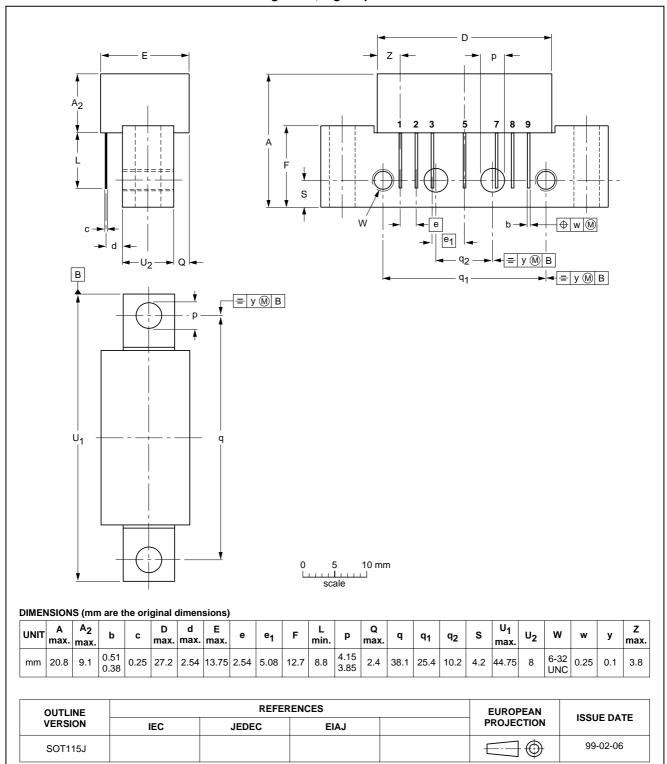
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#### **PACKAGE OUTLINE**

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



### 750 MHz, 18.5 dB gain power doubler amplifier

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DATA SHEET STATUS(1)	PRODUCT STATUS <sup>(2)</sup>	DEFINITIONS
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