

# CGD1042H

1 GHz, 23 dB gain high output power doubler

Rev. 01 — 9 October 2007

Product data sheet

## 1. Product profile

### 1.1 General description

Hybrid amplifier module in a SOT115J package, operating at a supply voltage of 24 V Direct Current (DC), employing Hetero junction Field Effect Transistor (HFET) GaAs dies.

#### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features

- High output power capability
- Excellent linearity
- Extremely low noise
- Excellent return loss properties
- Rugged construction
- Unconditionally stable
- Thermal optimized design

### 1.3 Applications

- CATV systems operating in the 40 MHz to 1000 MHz frequency range

### 1.4 Quick reference data

**Table 1. Quick reference data**

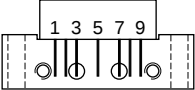
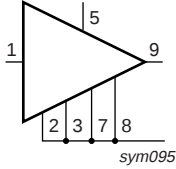
Bandwidth to 1000 MHz;  $V_B = 24$  V (DC);  $T_{mb} = 35$  °C; unless otherwise specified.

| Symbol    | Parameter     | Conditions     | Min  | Typ  | Max  | Unit |
|-----------|---------------|----------------|------|------|------|------|
| $G_p$     | power gain    | $f = 45$ MHz   | -    | 21.5 | -    | dB   |
|           |               | $f = 1000$ MHz | 22.0 | 23.0 | 24.0 | dB   |
| $I_{tot}$ | total current | [1]            | 430  | 450  | 470  | mA   |

[1] Direct Current (DC).

2. Pinning information

Table 2. Pinning

| Pin  | Description     | Simplified outline                                                                  | Symbol                                                                              |
|------|-----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1    | input           |  |  |
| 2, 3 | common          |                                                                                     |                                                                                     |
| 5    | +V <sub>B</sub> |                                                                                     |                                                                                     |
| 7, 8 | common          |                                                                                     |                                                                                     |
| 9    | output          |                                                                                     |                                                                                     |

3. Ordering information

Table 3. Ordering information

| Type number | Package |                                                                                                                                                                |         |
|-------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
|             | Name    | Description                                                                                                                                                    | Version |
| CGD1042H    | -       | rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads | SOT115J |

4. Limiting values

Table 4. Limiting values

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

| Symbol             | Parameter                 | Conditions  | Min | Max  | Unit |
|--------------------|---------------------------|-------------|-----|------|------|
| V <sub>B</sub>     | supply voltage            |             | -   | 30   | V    |
| V <sub>i(RF)</sub> | RF input voltage          | single tone | -   | 75   | dBmV |
| T <sub>stg</sub>   | storage temperature       |             | -40 | +100 | °C   |
| T <sub>mb</sub>    | mounting base temperature |             | -20 | +100 | °C   |

## 5. Characteristics

**Table 5. Characteristics**

Bandwidth to 1000 MHz;  $V_B = 24\text{ V (DC)}$ ;  $T_{mb} = 35\text{ }^{\circ}\text{C}$ ; unless otherwise specified.

| Symbol     | Parameter                         | Conditions                                | Min     | Typ  | Max  | Unit |
|------------|-----------------------------------|-------------------------------------------|---------|------|------|------|
| $G_p$      | power gain                        | $f = 45\text{ MHz}$                       | -       | 21.5 | -    | dB   |
|            |                                   | $f = 1000\text{ MHz}$                     | 22.0    | 23.0 | 24.0 | dB   |
| $SL_{sl}$  | slope straight line               | $f = 45\text{ MHz to }1000\text{ MHz}$    | [1] -   | 1.5  | -    | dB   |
| FL         | flatness of frequency response    | $f = 45\text{ MHz to }1000\text{ MHz}$    | [2] -   | 0.5  | -    | dB   |
| CTB        | composite triple beat             | $V_o = 55\text{ dBmV at }1000\text{ MHz}$ | [3] -   | -83  | -    | dBc  |
|            |                                   | $V_o = 59\text{ dBmV at }1000\text{ MHz}$ | [3] -   | -75  | -70  | dBc  |
| CSO        | composite second-order distortion | $V_o = 55\text{ dBmV at }1000\text{ MHz}$ | [3] -   | -80  | -    | dBc  |
|            |                                   | $V_o = 59\text{ dBmV at }1000\text{ MHz}$ | [3] -   | -76  | -68  | dBc  |
| Xmod       | cross modulation                  | $V_o = 55\text{ dBmV at }1000\text{ MHz}$ | [3] -   | -75  | -    | dBc  |
|            |                                   | $V_o = 59\text{ dBmV at }1000\text{ MHz}$ | [3] -   | -67  | -    | dBc  |
| CCN        | carrier-to-composite noise        | $V_o = 55\text{ dBmV at }1000\text{ MHz}$ | [3] -   | 65   | -    | dBc  |
|            |                                   | $V_o = 59\text{ dBmV at }1000\text{ MHz}$ | [3] 55  | 58   | -    | dBc  |
| $RL_{in}$  | input return loss                 | $f = 45\text{ MHz to }200\text{ MHz}$     | 20.0    | -    | -    | dB   |
|            |                                   | $f = 200\text{ MHz to }550\text{ MHz}$    | 17.5    | -    | -    | dB   |
|            |                                   | $f = 550\text{ MHz to }870\text{ MHz}$    | 15.0    | -    | -    | dB   |
|            |                                   | $f = 870\text{ MHz to }914\text{ MHz}$    | 14.5    | -    | -    | dB   |
|            |                                   | $f = 914\text{ MHz to }1000\text{ MHz}$   | 14.0    | -    | -    | dB   |
| $RL_{out}$ | output return loss                | $f = 45\text{ MHz to }200\text{ MHz}$     | 21.0    | -    | -    | dB   |
|            |                                   | $f = 200\text{ MHz to }550\text{ MHz}$    | 20.0    | -    | -    | dB   |
|            |                                   | $f = 550\text{ MHz to }870\text{ MHz}$    | 18.0    | -    | -    | dB   |
|            |                                   | $f = 870\text{ MHz to }914\text{ MHz}$    | 17.5    | -    | -    | dB   |
|            |                                   | $f = 914\text{ MHz to }1000\text{ MHz}$   | 17.0    | -    | -    | dB   |
| NF         | noise figure                      | $f = 50\text{ MHz to }1000\text{ MHz}$    | -       | 5.0  | 5.5  | dB   |
| $I_{tot}$  | total current                     |                                           | [4] 430 | 450  | 470  | mA   |

[1]  $G_p$  at 1000 MHz minus  $G_p$  at 45 MHz.

[2] flatness straight line (peak to valley).

[3] 79 NTSC channels + 75 digital channels (-6 dB offset); tilt extrapolated to 18 dB at 1000 MHz.

[4] Direct Current (DC).

6. 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

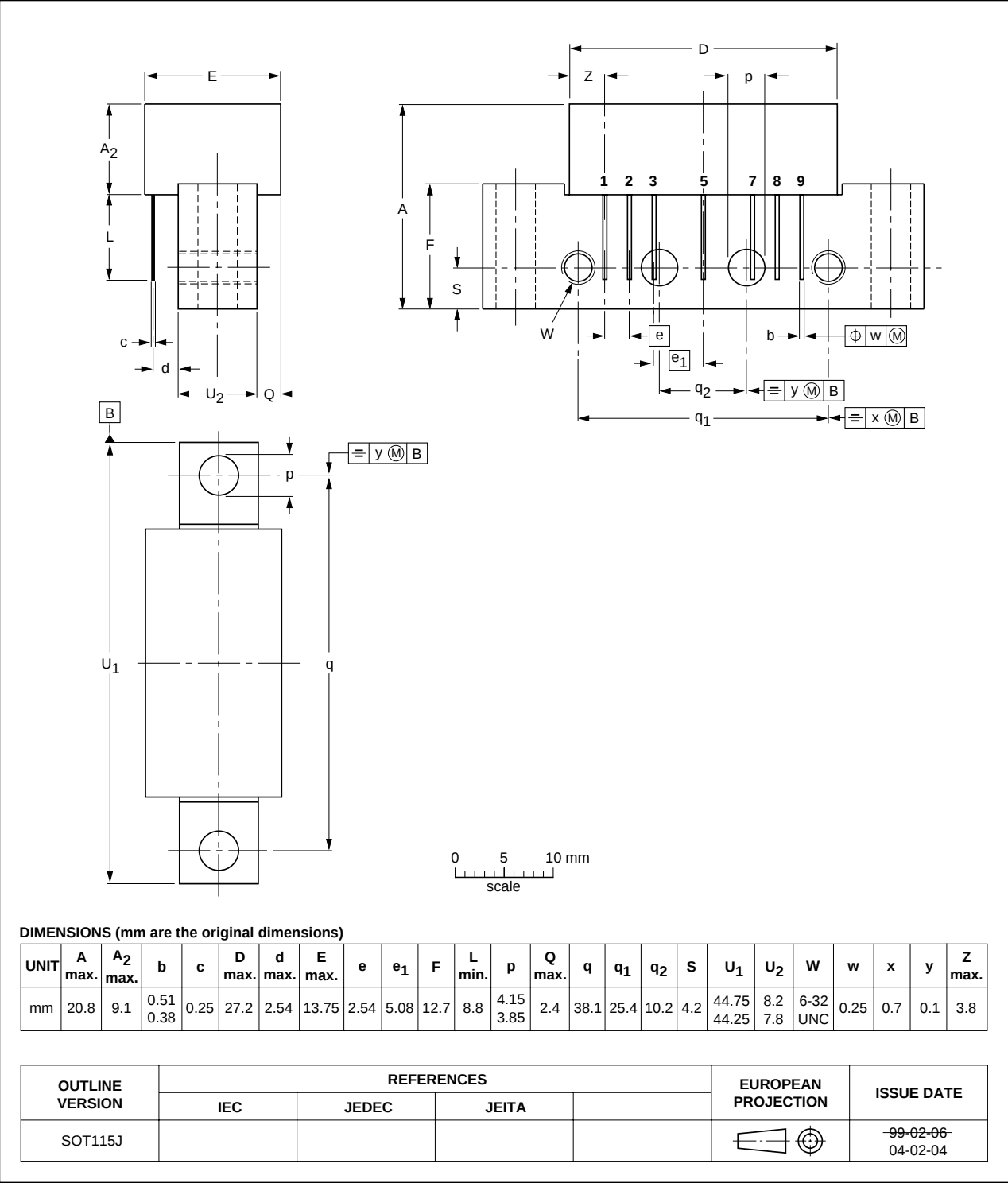


Fig 1. Package outline SOT115J

## 7. Abbreviations

Table 6. Abbreviations

| Acronym | Description                            |
|---------|----------------------------------------|
| CATV    | Community Antenna TeleVision           |
| NTSC    | National Television Standard Committee |
| RF      | Radio Frequency                        |
| UNC     | UNified Coarse                         |

## 8. Revision history

Table 7. Revision history

| Document ID | Release date | Data sheet status  | Change notice | Supersedes |
|-------------|--------------|--------------------|---------------|------------|
| CGD1042H_1  | 20071009     | Product data sheet | -             | -          |

## 9. Legal information

### 9.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | Definition                                                                            |
|-----------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet      | Development                   | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet    | Qualification                 | This document contains data from the preliminary specification.                       |
| Product [short] data sheet        | Production                    | This document contains the product specification.                                     |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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11. Contents

1 Product profile ..... 1

1.1 General description..... 1

1.2 Features ..... 1

1.3 Applications ..... 1

1.4 Quick reference data..... 1

2 Pinning information..... 2

3 Ordering information..... 2

4 Limiting values..... 2

5 Characteristics..... 3

6 Package outline ..... 4

7 Abbreviations..... 5

8 Revision history..... 5

9 Legal information..... 6

9.1 Data sheet status ..... 6

9.2 Definitions..... 6

9.3 Disclaimers..... 6

9.4 Trademarks..... 6

10 Contact information..... 6

11 Contents ..... 7



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