

CGD1042HI

1 GHz, 22 dB gain GaAs high output power doubler

Rev. 01 — 21 September 2009

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.

1.2 Features

- Excellent linearity
- Superior levels of ESD protection
- Extremely low noise
- Excellent return loss properties
- Gain compensation over temperature
- Rugged construction
- Unconditionally stable
- Thermally optimized design
- Compliant to Directive 2002/95/EC, regarding Restriction of the use of certain Hazardous Substances (RoHS)
- Integrated ring wave surge protection

1.3 Applications

- CATV systems operating in the 40 MHz to 1003 MHz frequency range

1.4 Quick reference data

Table 1. Quick reference data

Bandwidth 40 MHz to 1003 MHz; $V_B = 24\text{ V (DC)}$; $Z_S = Z_L = 75\ \Omega$; $T_{mb} = 35\ ^\circ\text{C}$; unless otherwise specified.

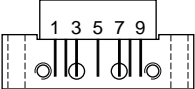
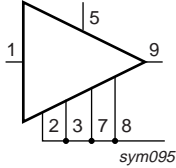
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G_p	power gain	$f = 50\text{ MHz}$	-	21.5	-	dB	
		$f = 1003\text{ MHz}$	22	22.7	23.5	dB	
CTB	composite triple beat	$V_o = 56.4\text{ dBmV}$ at 1003 MHz	[1]	-75	-65	dBc	
CCN	carrier-to-composite noise	$V_o = 56.4\text{ dBmV}$ at 1003 MHz	[1]	57	63	dBc	
I_{tot}	total current		[2]	-	440	460	mA

[1] 79 NTSC channels [$f = 54\text{ MHz}$ to 550 MHz] + 75 digital channels [$f = 550\text{ MHz}$ to 1003 MHz] (-6 dB offset); tilt extrapolated to 13.5 dB at 1003 MHz.

[2] Direct Current (DC).

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	input		
2, 3	common		
5	+V _B		
7, 8	common		
9	output		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
CGD1042HI	-	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 _B	supply voltage		-	30	V	
V _{i(RF)}	RF input voltage	single tone	-	75	dBmV	
V _{ESD}	electrostatic discharge voltage	Human Body Model (HBM); According JEDEC standard 22-A114E	[1]	-	2000	V
		Biased; According IEC61000-4-2		-	1500	V
T _{stg}	storage temperature		-40	+100	°C	
T _{mb}	mounting base temperature		-20	+100	°C	

[1] The ESD pulse of 2000 V corresponds to a class 2 sensitivity level.

5. Characteristics

Table 5. Characteristics

Bandwidth 40 MHz to 1003 MHz; $V_B = 24$ V (DC); $Z_S = Z_L = 75 \Omega$; $T_{mb} = 35^\circ\text{C}$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50$ MHz	-	21.5	-	dB
		$f = 1003$ MHz	22	22.7	23.5	dB
SL_{sl}	slope straight line	$f = 40$ MHz to 1003 MHz	[1] 0.5	-	2	dB
FL	flatness of frequency response	$f = 40$ MHz to 1003 MHz	[2] -	-	1	dB
RL_{in}	input return loss	$f = 40$ MHz to 160 MHz	20	-	-	dB
		$f = 160$ MHz to 320 MHz	20	-	-	dB
		$f = 320$ MHz to 640 MHz	19	-	-	dB
		$f = 640$ MHz to 870 MHz	17	-	-	dB
		$f = 870$ MHz to 1003 MHz	16	-	-	dB
RL_{out}	output return loss	$f = 40$ MHz to 160 MHz	20	-	-	dB
		$f = 160$ MHz to 320 MHz	20	-	-	dB
		$f = 320$ MHz to 640 MHz	19	-	-	dB
		$f = 640$ MHz to 870 MHz	18	-	-	dB
		$f = 870$ MHz to 1003 MHz	17	-	-	dB
NF	noise figure	$f = 50$ MHz	-	4.6	5.6	dB
		$f = 1003$ MHz	-	5.5	6.5	dB
I_{tot}	total current		[3] -	440	460	mA
79 NTSC channels + 75 digital channels						
CTB	composite triple beat	$V_o = 56.4$ dBmV at 1003 MHz	[4] -	-75	-65	dBc
CSO	composite second-order distortion	$V_o = 56.4$ dBmV at 1003 MHz	[4] -	-77	-65	dBc
Xmod	cross modulation	$V_o = 56.4$ dBmV at 1003 MHz	[4] -	-68	-	dB
CCN	carrier-to-composite noise	$V_o = 56.4$ dBmV at 1003 MHz	[4] 57	63	-	dBc
79 NTSC channels						
CTB	composite triple beat	$V_o = 58.4$ dBmV at 1003 MHz	[5] -	-70	-	dBc
CSO	composite second-order distortion	$V_o = 58.4$ dBmV at 1003 MHz	[5] -	-75	-	dBc
Xmod	cross modulation	$V_o = 58.4$ dBmV at 1003 MHz	[5] -	-65	-	dB

[1] G_p at 1003 MHz minus G_p at 40 MHz.

[2] Flatness is defined as peak deviation to straight line.

[3] Direct Current (DC).

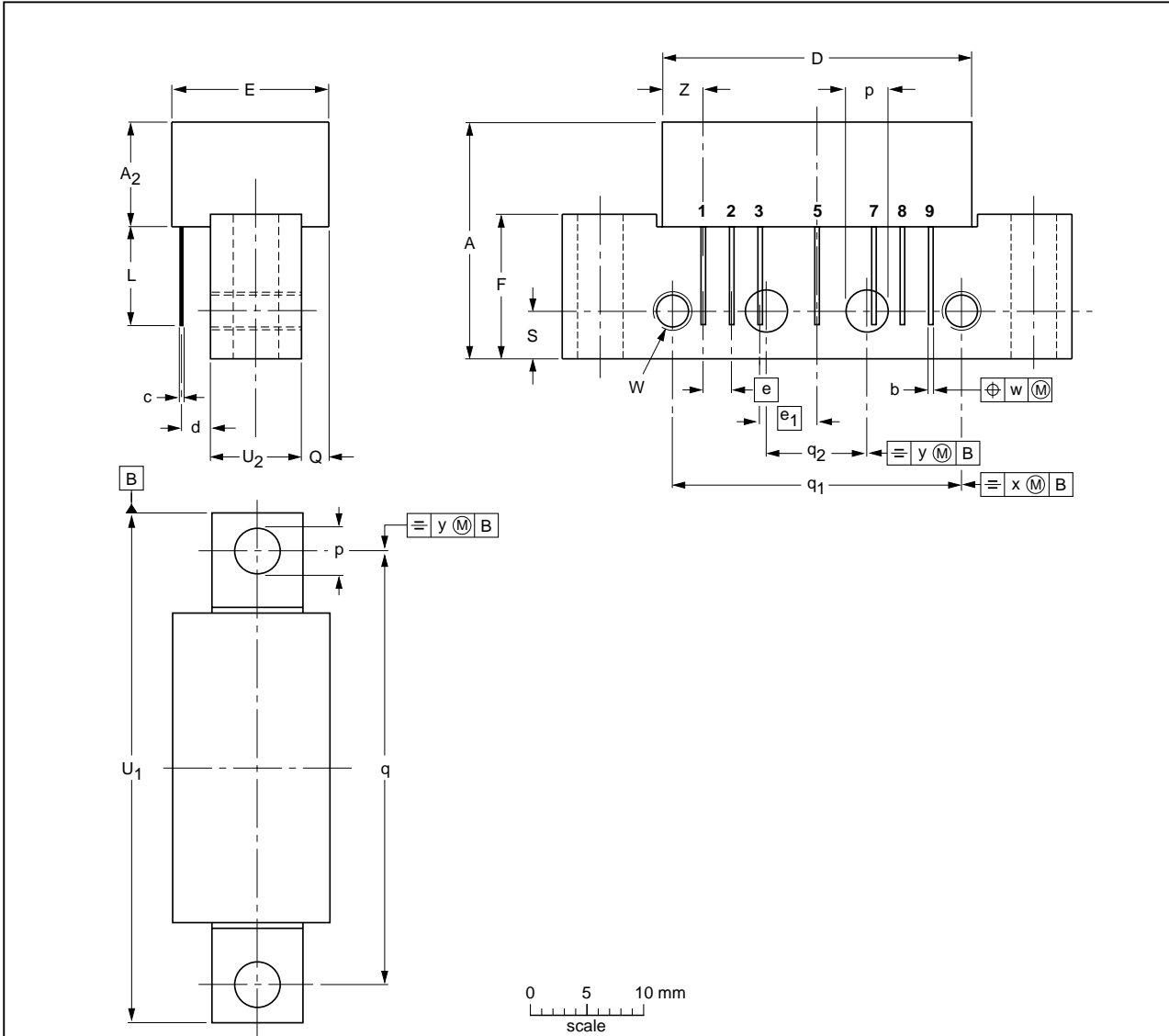
[4] 79 NTSC channels [$f = 54$ MHz to 550 MHz] + 75 digital channels [$f = 550$ MHz to 1003 MHz] (-6 dB offset); tilt extrapolated to 13.5 dB at 1003 MHz.

[5] 79 NTSC channels [$f = 54$ MHz to 550 MHz]; tilt extrapolated to 13.5 dB at 1003 MHz.

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



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	U ₂	W	w	x	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 44.25	8.2 7.8	6-32 UNC	0.25	0.7	0.1	3.8

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT115J						99-02-06 04-02-04

Fig 1. Package outline SOT115J

7. Abbreviations

Table 6. Abbreviations

Acronym	Description
CATV	Community Antenna TeleVision
ESD	ElectroStatic Discharge
GaAs	Gallium-Arsenide
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
CGD1042HI_1	20090921	Product data sheet	-	-

9. Legal information

9.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

9.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

9.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental

damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

9.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

10. Contact information

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

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

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.



© NXP B.V. 2009.

All rights reserved.

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 21 September 2009

Document identifier: CGD1042HI_1