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 V (DC); $Z_S = Z_L$ = 75 Ω; T_{mb} = 35 °C; unless otherwise specified.

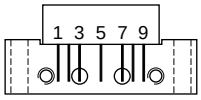
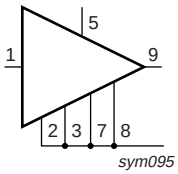
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	f = 50 MHz		-	21.5	-	dB
		f = 1003 MHz		22	22.7	23.5	dB
CTB	composite triple beat	V_o = 56.4 dBmV at 1003 MHz	[1]	-	–75	–65	dBc
CCN	carrier-to-composite noise	V_o = 56.4 dBmV at 1003 MHz	[1]	57	63	-	dBc
I_{tot}	total current		[2]	-	440	460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

[1] 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.

[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 Ω; T_{mb} = 35 °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.

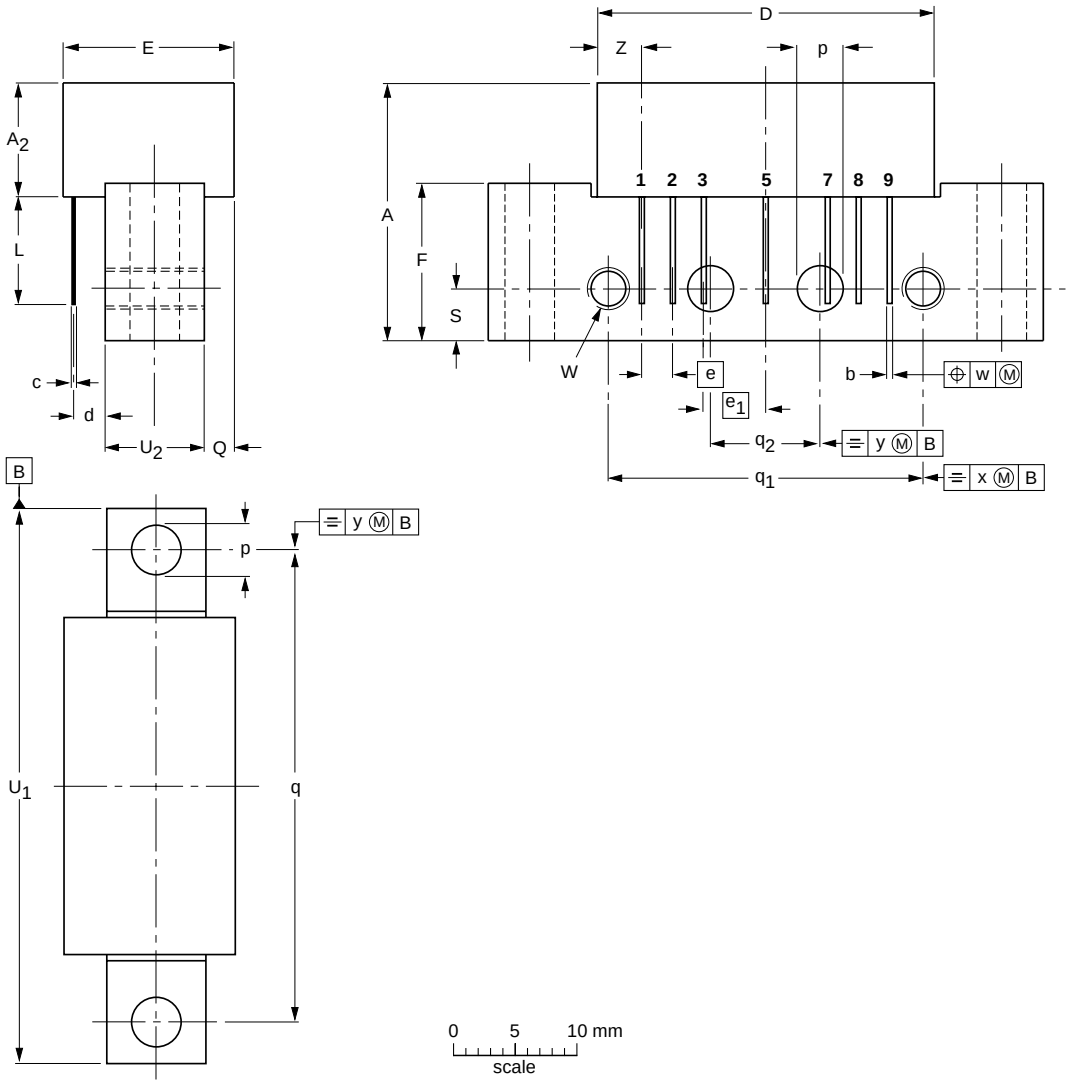
[3] Direct Current (DC).

[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".

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11. Contents

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