CGD1042HI

1 GHz, 22 dB gain GaAs high output power doubler

Rev. 2 — 29 September 2010 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 (DC), employing Hetero junction Field Effect Transistor (HFET) GaAs dies.

1.2 Features and benefits

- 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 with 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.

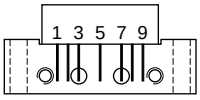
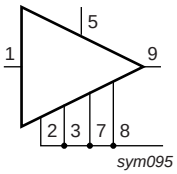
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	f = 50 MHz		-	21.5	-	dB
		f = 1003 MHz		22	22.7	23.5	dB
CTB	composite triple beat	V_o = 56.4 dBmV at 1003 MHz	[1]	-	–75	–65	dBc
CCN	carrier-to-composite noise	V_o = 56.4 dBmV at 1003 MHz	[1]	57	63	-	dBc
I_{tot}	total current		[2]	-	440	460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

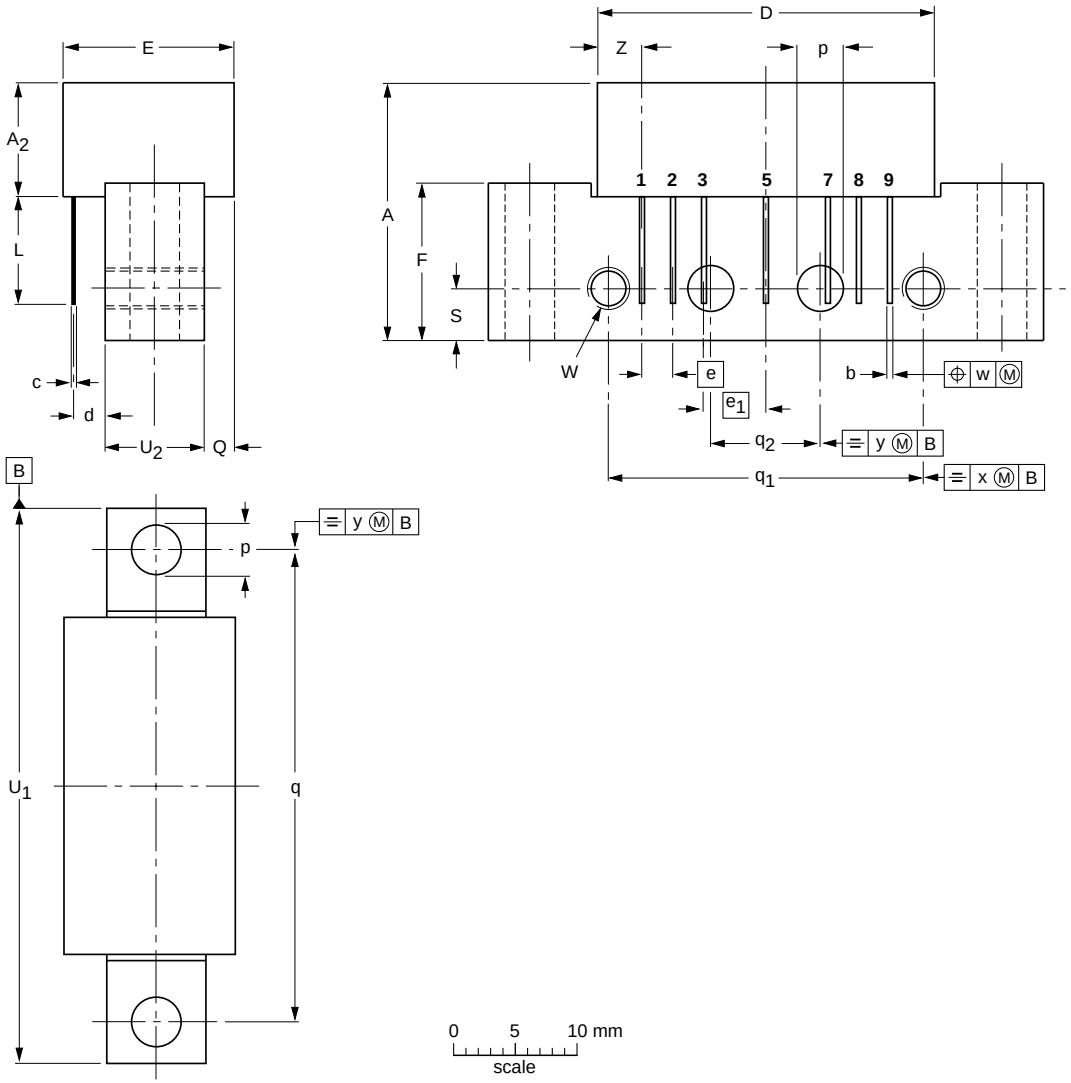
[3] Direct Current (DC).

[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	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	9.5	0.51 0.38	0.25	27.2	2.04 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						~~04-02-04~~ 10-06-18

Fig 1. Package outline SOT115J

7. Abbreviations

Table 6. Abbreviations

Acronym	Description
CATV	Community Antenna TeleVision
DC	Direct Current
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 v.2	20100929	Product data sheet	-	CGD1042HI v.1
Modifications:	• Package outline drawings have been updated to the latest version. • Legal texts have been updated.			
CGD1042HI v.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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