CGD985LC

1 GHz, 25 dB gain GaAs low current power doubler

Rev. 1 — 10 March 2014 Product data sheet

1. Product profile

1.1 General description

Hybrid amplifier module in a SOT115AE package, operating at a supply voltage of 24 V Direct Current (DC), employing Heterojunction Field Effect Transistor (HFET) GaAs dies.

1.2 Features and benefits

- Low power consumption
- Excellent linearity
- Optimized for PAL D loading
- Extremely low noise
- Excellent return loss properties
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)
- Gain compensation over temperature
- Rugged construction
- Unconditionally stable
- Thermally optimized design
- Adjustable supply current

1.3 Applications

- CATV systems operating in the 40 MHz to 1 GHz frequency range using PAL D channel conditions.

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	22.5	23.5	24.5	dB
		f = 1003 MHz	24	25	26	dB
CTB	composite triple beat	V_o = 48 dBmV at 862 MHz [1][2]	-	−65	−59	dBc
CSO	composite second-order distortion	V_o = 48 dBmV at 862 MHz [1][2]	-	−70	−60	dBc
I_{tot}	total current	pin 4 not connected [3]	345	365	385	mA
		pin 4 connected to ground [3]	-	315	-	mA

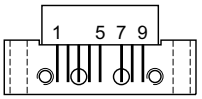
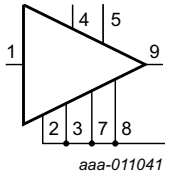
[1] 98 PAL D channels with 8 MHz bandwidth per channel; [f = 47 MHz to 862 MHz]; flat V_o till 862 MHz.

[2] pin 4 not connected.

[3] Direct Current (DC).

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	input		
2, 3	common		
4	I_{CC} adjust [1]		
5	$+V_B$		
7, 8	common		
9	output		

[1] The total supply current can be adjusted by pin 4. Grounding of pin 4 gives the lowest supply current while floating of pin 4 gives the maximum supply current.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
CGD985LC	-	rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; 8 gold-plated in-line leads	SOT115AE

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
I_I	input current	on I_{CC} adjust (pin 4)	−10	0	mA
T_{stg}	storage temperature		−40	+100	°C
T_{mb}	mounting base temperature		−20	+100	°C

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	22.5	23.5	24.5	dB
		f = 1003 MHz	24	25	26	dB
SL_{sl}	slope straight line	f = 40 MHz to 1003 MHz [1]	0.7	-	2.2	dB
FL	flatness of frequency response	f = 40 MHz to 1003 MHz [2]	-	-	0.8	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	15	-	-	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	17	-	-	dB
		f = 870 MHz to 1003 MHz	16	-	-	dB
NF	noise figure	f = 50 MHz	-	5.0	6.0	dB
		f = 1003 MHz	-	5.5	6.5	dB
Pin 4 not connected						
I_{tot}	total current	[3]	345	365	385	mA
98 PAL D channels						
CTB	composite triple beat	V_o = 48 dBmV at 862 MHz [4]	-	–65	–59	dBc
CSO	composite second-order distortion	V_o = 48 dBmV at 862 MHz [4]	-	–70	–60	dBc
Xmod	cross modulation	V_o = 48 dBmV at 862 MHz [4][5]	-	–60	-	dB
59 PAL D channels + 75 digital channels						
CTB	composite triple beat	V_o = 58.5 dBmV at 1003 MHz [6]	-	–72	-	dBc
CSO	composite second-order distortion	V_o = 58.5 dBmV at 1003 MHz [6]	-	–75	-	dBc
Xmod	cross modulation	V_o = 58.5 dBmV at 1003 MHz [5][6]	-	–67	-	dB
CCN	carrier-to-composite noise	V_o = 58.5 dBmV at 1003 MHz [6]	-	62	-	dBc

Table 5. Characteristics *…continued*

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
Pin 4 connected to ground						
I_{tot}	total current	[3]	-	315	-	mA
98 PAL D channels						
CTB	composite triple beat	V_o = 48 dBmV at 862 MHz [4]	-	–58	-	dBc
CSO	composite second-order distortion	V_o = 48 dBmV at 862 MHz [4]	-	–69	-	dBc
59 PAL D channels + 75 digital channels						
CTB	composite triple beat	V_o = 58.5 dBmV at 1003 MHz [6]	-	–64	-	dBc
CSO	composite second-order distortion	V_o = 58.5 dBmV at 1003 MHz [6]	-	–64	-	dBc
CCN	carrier-to-composite noise	V_o = 58.5 dBmV at 1003 MHz [6]	-	55	-	dBc

[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).

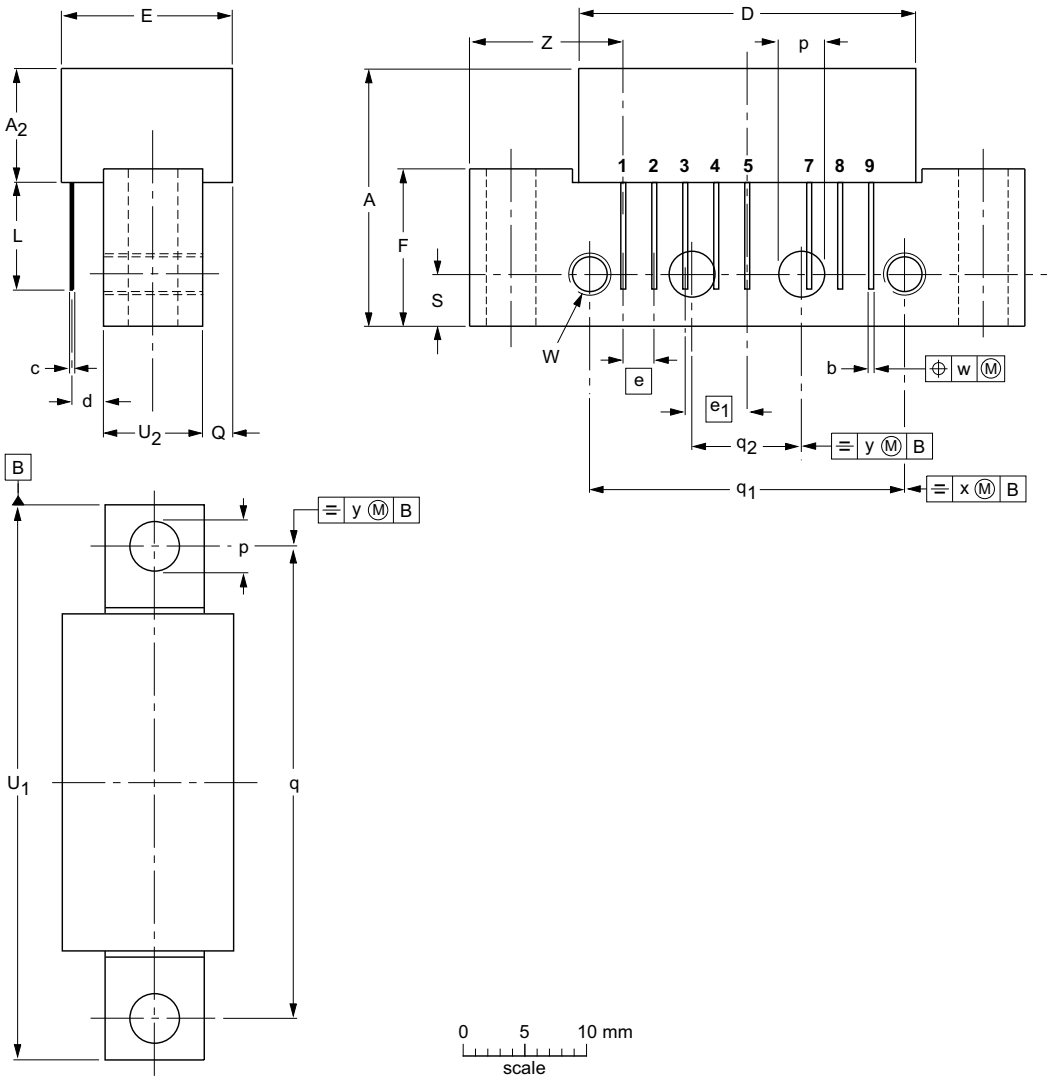
[4] 98 PAL D channels with 8 MHz bandwidth per channel; [f = 47 MHz to 862 MHz]; flat V_o till 862 MHz.

[5] Measured at 55.25 MHz.

[6] 59 PAL D channels [f = 49.75 MHz to 543.25 MHz] + 75 digital channels [f = 555.25 MHz to 1003 MHz] (–10 dB offset); 13.5 dB tilt extrapolated to 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; 8 gold-plated in-line leads **SOT115AE**



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	9.5	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	12

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT115AE						~~04-02-04~~ 10-06-18

Fig 1. Package outline SOT115AE

7. Abbreviations

Table 6. Abbreviations

Acronym	Description
CATV	Community Antenna TeleVision
ESD	ElectroStatic Discharge
GaAs	Gallium-Arsenide
PAL D	Phase Alternate Line standard D
UNC	UNified Coarse

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
CGD985LC v.1	20140310	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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