

CGD987HCI

1 GHz, 27 dB gain GaAs high output power doubler

Rev. 1 — 29 June 2011

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 and benefits

- Excellent linearity
- Optimized for flat PAL D and flat NTSC loading
- 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 Hazardous Substances (RoHS)
- Integrated ring wave surge protection

1.3 Applications

- CATV systems operating in the 40 MHz to 862 MHz / 1003 MHz frequency range using PAL D or NTSC channel conditions.

1.4 Quick reference data

Table 1. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50\text{ MHz}$	-	25.5	-	dB
		$f = 1003\text{ MHz}$	26	27	28	dB
CTB	composite triple beat	$V_o = 48\text{ dBmV at } 862\text{ MHz}$	[1]	-	-66	-62 dBc
CSO	composite second-order distortion	$V_o = 48\text{ dBmV at } 862\text{ MHz}$	[1]	-	-66	-60 dBc
I_{tot}	total current		[2]	-	440	460 mA

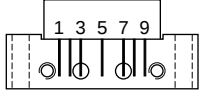
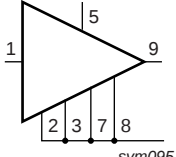
[1] 98 PAL D channels with 8 MHz bandwidth per channel; $[f = 47\text{ MHz to } 862\text{ MHz}]$; flat V_o till 862 MHz.

[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
CGD987HCl	-	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	-	25.5	-	dB
		$f = 870$ MHz	-	26.5	-	dB
		$f = 1003$ MHz	26	27	28	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]	-	-	1 dB
RL_{in}	input return loss	$f = 40$ MHz to 160 MHz	20	-	-	dB
		$f = 160$ MHz to 320 MHz	19	-	-	dB
		$f = 320$ MHz to 640 MHz	18	-	-	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	18	-	-	dB
		$f = 320$ MHz to 640 MHz	17	-	-	dB
		$f = 640$ MHz to 870 MHz	16	-	-	dB
		$f = 870$ MHz to 1003 MHz	16	-	-	dB
NF	noise figure	$f = 50$ MHz	-	4.5	5.5	dB
		$f = 1003$ MHz	-	5	6	dB
I_{tot}	total current		[3]	-	440	460 mA

[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).

Table 6. Distortion 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
98 PAL D channels						
CTB	composite triple beat	$V_o = 48$ dBmV at 862 MHz	[1]	-	-66	-62 dBc
		$V_o = 50$ dBmV at 862 MHz	[1]	-	-62	- dBc
CSO	composite second-order distortion	$V_o = 48$ dBmV at 862 MHz	[1]	-	-66	-60 dBc
		$V_o = 50$ dBmV at 862 MHz	[1]	-	-63	- dBc
Xmod	cross modulation	$V_o = 48$ dBmV at 862 MHz	[1]	-	-68	- dB
		$V_o = 50$ dBmV at 862 MHz	[1]	-	-60	- dB
112 NTSC channels						
CTB	composite triple beat	$V_o = 48$ dBmV at 750 MHz	[2]	-	-63	- dBc
CSO	composite second-order distortion	$V_o = 48$ dBmV at 750 MHz	[2]	-	-64	- dBc
Xmod	cross modulation	$V_o = 48$ dBmV at 750 MHz	[2]	-	-66	- dB
79 NTSC channels + 75 digital channels						
CTB	composite triple beat	$V_o = 56.4$ dBmV at 1003 MHz	[3]	-	-75	- dBc
CSO	composite second-order distortion	$V_o = 56.4$ dBmV at 1003 MHz	[3]	-	-70	- dBc
Xmod	cross modulation	$V_o = 56.4$ dBmV at 1003 MHz	[3]	-	-68	- dB
CCN	carrier-to-composite noise	$V_o = 56.4$ dBmV at 1003 MHz	[3]	-	57	- dBc

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

[2] 112 NTSC channels; $[f = 45$ MHz to 750 MHz]; flat V_o till 750 MHz.

[3] 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.

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

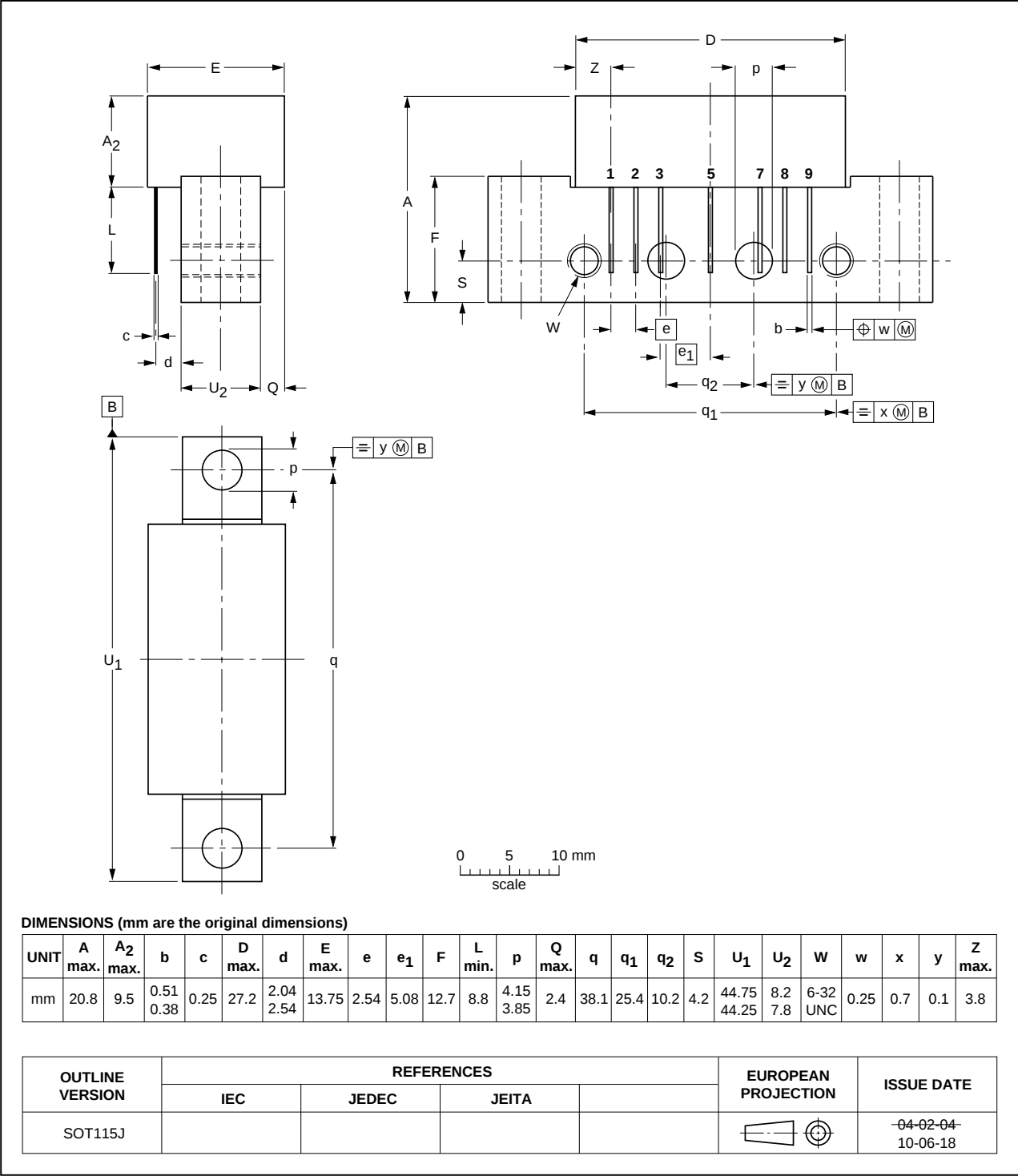


Fig 1. Package outline SOT115J

7. Abbreviations

Table 7. Abbreviations

Acronym	Description
CATV	Community Antenna TeleVision
ESD	ElectroStatic Discharge
GaAs	Gallium-Arsenide
NTSC	National Television Standard Committee
PAL	Phase Alternate Line
RF	Radio Frequency
UNC	UNified Coarse

8. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
CGD987HCI v.1	20110629	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.
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[2] The term 'short data sheet' is explained in section "Definitions".

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