CGY1043

1 GHz, 23 dB gain GaAs push-pull amplifier

Rev. 1 — 10 February 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 Heterojunction Field Effect Transistor (HFET) GaAs dies.

1.2 Features and benefits

- Excellent linearity, stability and reliability
- Extremely low noise
- Excellent return loss properties
- Rugged construction
- Unconditionally stable
- Thermally optimized design
- Superior levels of ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)
- Integrated ring wave surge protection
- Power gain is specified for both 870 MHz and 1003 MHz bandwidth

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.

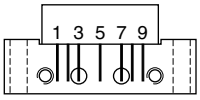
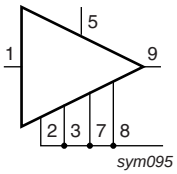
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
G_p	power gain	f = 45 MHz		21.0	22.0	23.0	dB
		f = 870 MHz		22.3	23.3	24.3	dB
		f = 1003 MHz		23.0	23.75	24.5	dB
CTB	composite triple beat	V_o = 44 dBmV	[1]	-	–62	-	dBc
CCN	carrier-to-composite noise	V_o = 44 dBmV	[1]	-	63	-	dBc
I_{tot}	total current		[2]	-	265	280	mA

[1] 79 NTSC channels [f = 55.25 MHz to 547.25 MHz] + 75 digital channels [f = 547.25 MHz to 1003 MHz] (–6 dB offset); flat output level.

[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
CGY1043	-	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		-	2000	V
T_{stg}	storage temperature			−40	+100	°C
T_{mb}	mounting base temperature			−20	+100	°C

[1] The value of 2000 V corresponds to a class 2 classification.

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 = 45 MHz		21.0	22.0	23.0	dB
		f = 870 MHz		22.3	23.3	24.3	dB
		f = 1003 MHz		23.0	23.75	24.5	dB
SL_{sl}	slope straight line	f = 45 MHz to 1003 MHz	[1]	1.2	1.95	2.7	dB
FL	flatness of frequency response	f = 45 MHz to 1003 MHz	[2]	-	-	0.9	dB
RL_{in}	input return loss	f = 45 MHz to 200 MHz		20	-	-	dB
		f = 200 MHz to 550 MHz		19	-	-	dB
		f = 550 MHz to 870 MHz		19	-	-	dB
		f = 870 MHz to 914 MHz		19	-	-	dB
		f = 914 MHz to 1003 MHz		16	-	-	dB
RL_{out}	output return loss	f = 45 MHz to 200 MHz		18	-	-	dB
		f = 200 MHz to 550 MHz		18	-	-	dB
		f = 550 MHz to 870 MHz		18	-	-	dB
		f = 870 MHz to 914 MHz		18	-	-	dB
		f = 914 MHz to 1003 MHz		16	-	-	dB
NF	noise figure	f = 50 MHz		-	3.5	4.0	dB
		f = 1003 MHz		-	4.2	4.9	dB
I_{tot}	total current		[3]	-	265	280	mA
79 NTSC channels + 75 digital channels							
CTB	composite triple beat	V_o = 44 dBmV	[4]	-	–62	-	dBc
CSO	composite second-order distortion	V_o = 44 dBmV	[4]	-	–64	-	dBc
Xmod	cross modulation	V_o = 44 dBmV	[4]	-	–58	-	dB
CCN	carrier-to-composite noise	V_o = 44 dBmV	[4]	-	63	-	dBc
79 NTSC channels							
CTB	composite triple beat	V_o = 44 dBmV	[5]	-	-	–62	dBc
CSO	composite second-order distortion	V_o = 44 dBmV	[5]	-	-	–62	dBc
Xmod	cross modulation	V_o = 44 dBmV	[5]	-	–58	-	dB
98 PAL channels							
CTB	composite triple beat	V_o = 44 dBmV	[6]	-	–68	-	dBc
CSO	composite second-order distortion	V_o = 44 dBmV	[6]	-	–66	-	dBc
Xmod	cross modulation	V_o = 44 dBmV	[6]	-	–58	-	dB

[1] G_p at 1003 MHz minus G_p at 45 MHz.

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

[3] Direct Current (DC).

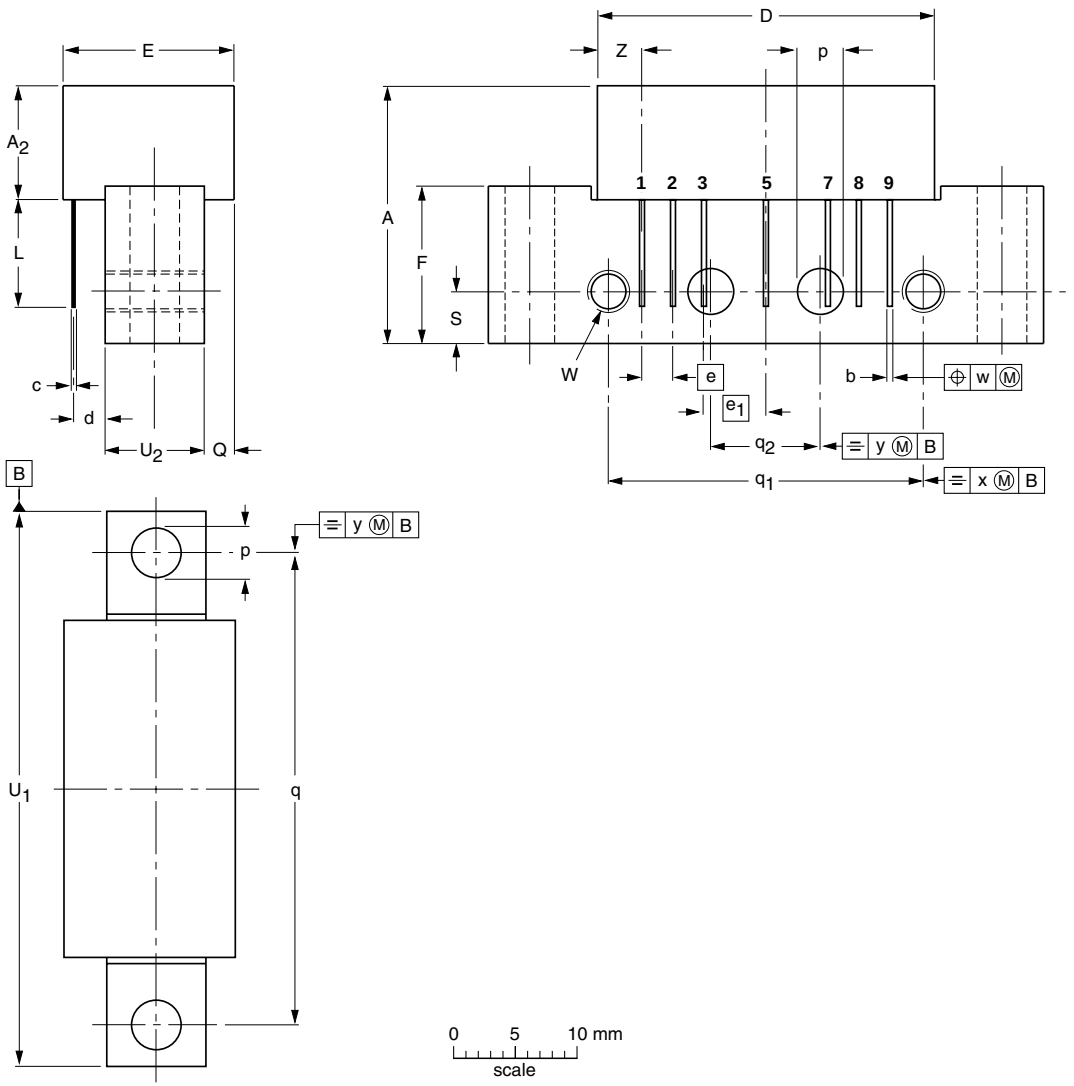
[4] 79 NTSC channels [f = 55.25 MHz to 547.25 MHz] + 75 digital channels [f = 547.25 MHz to 1003 MHz] (–6 dB offset); flat output level.

[5] 79 NTSC channels [f = 55.25 MHz to 550 MHz]; flat output level.

[6] 98 PAL channels [f = 49.75 MHz to 847.25 MHz]; flat output level.

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
ESD	ElectroStatic Discharge
GaAs	Gallium Arsenide
NTSC	National Television Standard Committee
PAL	Phase Alternating Line
RF	Radio Frequency
UNC	UNified Coarse

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
CGY1043 v.1	20110210	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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