

# CGY1041

## 1 GHz, 21 dB gain GaAs push-pull amplifier

Rev. 1 — 10 February 2011

Product data sheet

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## 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);  $Z_S = Z_L = 75 \Omega$ ;  $T_{mb} = 35$  °C; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$f = 45$ MHz	19.0	20.0	21.0	dB
		$f = 870$ MHz	20.4	21.4	22.4	dB
		$f = 1003$ MHz	21.0	21.75	22.5	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

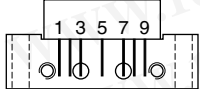
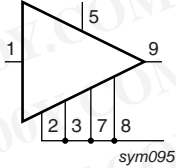
[1] 79 NTSC channels [ $f = 55.25$  MHz to 547.25 MHz] + 75 digital channels [ $f = 547.25$  MHz to 1003 MHz] (-6 dB offset); flat output level.

[2] Direct Current (DC).



## 2. Pinning information

**Table 2. Pinning**

Pin	Description	Simplified outline	Graphic symbol
1	input		 sym095
2, 3	common		
5	+V <sub>B</sub>		
7, 8	common		
9	output		

## 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
CGY1041	-	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 <sub>B</sub>	supply voltage		-	30	V
V <sub>i(RF)</sub>	RF input voltage	single tone	-	75	dBmV
V <sub>ESD</sub>	electrostatic discharge voltage	Human Body Model (HBM); According JEDEC standard 22-A114E	[1]	2000	V
		Biased; According IEC61000-4-2	-	2000	V
T <sub>stg</sub>	storage temperature		-40	+100	°C
T <sub>mb</sub>	mounting base temperature		-20	+100	°C

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

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## 5. Characteristics

**Table 5. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$G_p$	power gain	$f = 45$ MHz	19.0	20.0	21.0	dB	
		$f = 870$ MHz	20.4	21.4	22.4	dB	
		$f = 1003$ MHz	21.0	21.75	22.5	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 to 870 MHz	-	3.6	4.0	dB	
		$f = 870$ MHz to 1003 MHz	-	4.3	4.9	dB	
$I_{tot}$	total current		[3]	-	265	280	mA
<b>79 NTSC channels + 75 digital channels</b>							
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
<b>79 NTSC channels</b>							
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
<b>98 PAL channels</b>							
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.

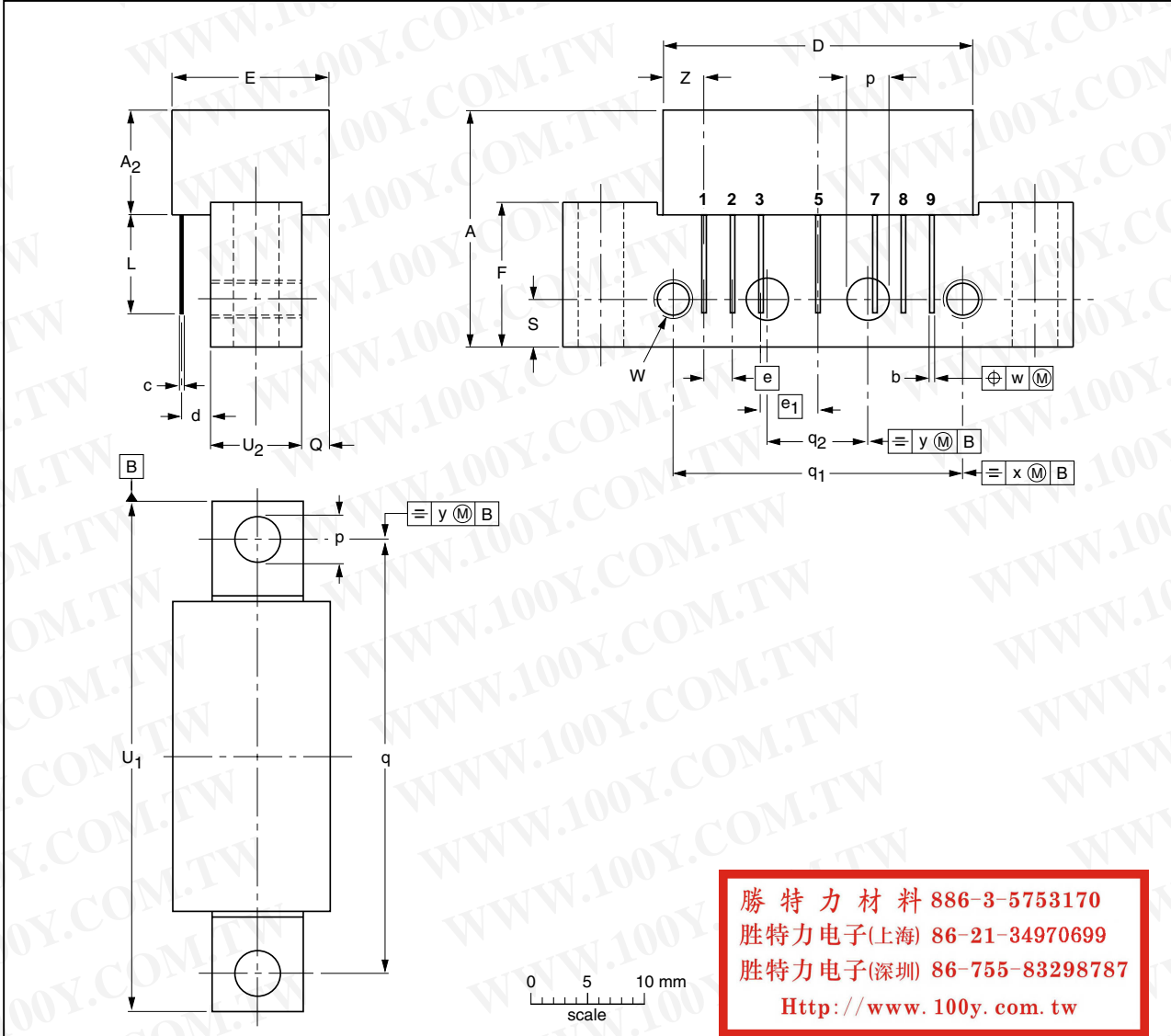
[5] 79 NTSC channels [ $f = 55.25$  MHz to 550 MHz]; flat output level.

[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



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DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>2</sub> max.	b	c	D max.	d	E max.	e	e <sub>1</sub>	F	L min.	p	Q max.	q	q <sub>1</sub>	q <sub>2</sub>	S	U <sub>1</sub>	U <sub>2</sub>	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
CGY1041 v.1	20110210	Product data sheet	-	-

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## 9. Legal information

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Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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.

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