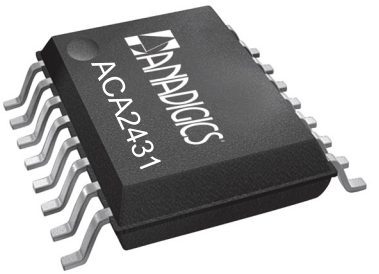
ACA2431

1.218 GHz High Output GaN
CATV Power Doubler Amplifier

PRELIMINARY DATA SHEET - Rev 1.1

FEATURES

- 50 to 1218 MHz Frequency Range
- +59 dBmV output power
- 28 dB Gain @ 1.218 GHz
- Single +24 V Supply
- Operating Current = 460 mA
- GaN Amplifier Technology
- Halogen Free/RoHS Compliant
- External current control for lower power applications



16 Pin Wide Body SOIC with Heat Slug

APPLICATIONS

- Advanced high power, high frequency HFC transmission systems
- Output power doubler for Deep Fiber Node in CATV distribution
- CATV digital edge QAM output driver

PRODUCT DESCRIPTION

The ACA2431 is a highly linear, high output power integrated RF amplifier designed for CATV heads ends and HFC distribution systems. The IC consists of two parallel amplifiers that are optimized for exceptionally low distortion, high output power, and high crash point in a thermally enhanced surface mount package. A GaN output stage is incorporated to minimize the operating (bias) current, thus making this an excellent choice for environmentally friendly “green” initiatives.

The ACA2431 provides high gain over the 50 to 1218 MHz CATV downstream band, and is cascaded between two transmission line baluns.

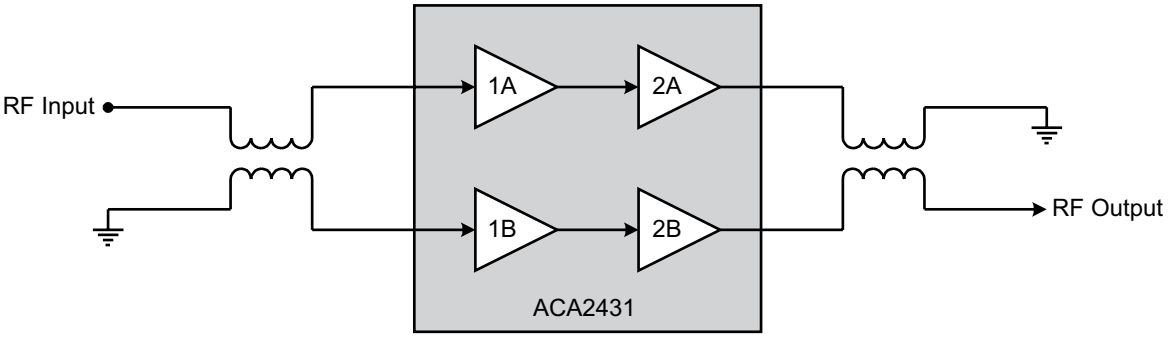


Figure 1: Block Diagram

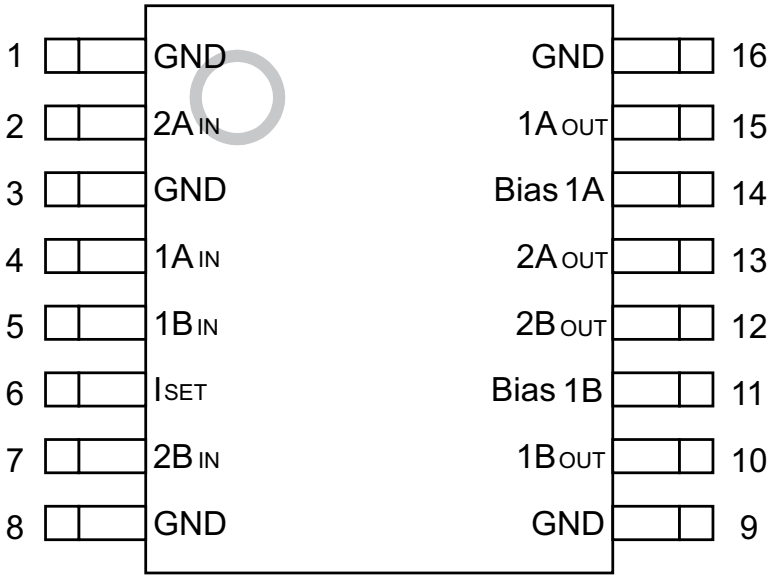


Figure 2: Pinout

Table 1: Pin Description

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
1	GND	Ground	9	GND	Ground
2	$2A_{IN}$	Amplifier 2A Input	10	$1B_{OUT}$	Amplifier 1B Output
3	GND	Ground	11	Bias 1B	Bias for 1B Amplifier
4	$1A_{IN}$	Amplifier 1A Input	12	$2B_{OUT}$	Amplifier 2B Output and Supply
5	$1B_{IN}$	Amplifier 1B Input	13	$2A_{OUT}$	Amplifier 2A Output and Supply
6	I_{SET}	Current Adjust	14	Bias 1A	Bias for 1A Amplifier
7	$2B_{IN}$	Amplifier 2B Input	15	$1A_{OUT}$	Amplifier 1A Output
8	GND	Ground	16	GND	Ground

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Supply (pins 12, 13)	0	+28	V_{DC}
Current Adjust (pin 6)	-	+4	V_{DC}
RF Power at Inputs (pins 4, 5)	-	+75	dBmV
Case Operating Temperature Range (T_C)	-40	+110	°C
Storage Temperature	-65	+150	°C
Soldering Temperature	-	+260	°C
Soldering Time	-	5.0	Sec

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

Notes:

(1) Pins 2, 4, 5 and 7 should be AC-coupled. No external DC bias should be applied.

(2) Pin 6 should be AC-grounded and/or pulled to ground through a resistor for current control.

(3) Pins 10, 11, 14 and 15 should have no other external bias applied.

Table 3: Operating Ranges

PARAMETER	MIN	TYP	MAX	UNIT
RF Input/Output Frequency (f)	50	-	1218	MHz
Supply Voltage (V_{DD})	-	+24	-	V_{DC}
Current Adjust (pin 15)	-	+1.5	-	V_{DC}
Case Temperature (T_C)	-40	-	+100	°C

The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the electrical specifications.

Table 4: Electrical Specifications (See Notes 1, 3, & 4)
(T_A = +25 °C, V_{DD} = +24 VDC, f = 50 to 1218 MHz, 75 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain (1218 MHz)	27.25	28	28.75	dB	f = 1218 MHz, See note 3
Cable Equivalent Slope	-	0	-	dB	See note 3
Gain Flatness to 1218 MHz	-	± 0.2	-	dB	See notes 2 & 3
Noise Figure	-	5	-	dB	
CTB	-	-78	-74	dBc	See note 1
CSO	-	-66	-64	dBc	See note 1
XMOD	-	-65	-60	dBc	See note 1
CIN	-	-60	-56	dBc	See note 1
Input Return Loss	-	-20	-18	dB	See note 3
Output Return Loss	-	-20	-18	dB	See note 3
Thermal resistance (θ_{JC})	-	2.7	3.3	°C/W	Junction to case slug
Supply Current	440	460	480	mA	

Notes:
(1) Parts measured with 79 NTSC analog channels plus digital QAM channels to 1000 MHz, +58 dBmV output power and 15.5 dB tilt referenced to 1 GHz.
(2) Peak deviation from a straight line between gain value at 50 MHz and 1218 MHz.
(3) Measured in application circuit in Figure 3.
(4) All specifications as measured on ANADIGICS evaluation board.

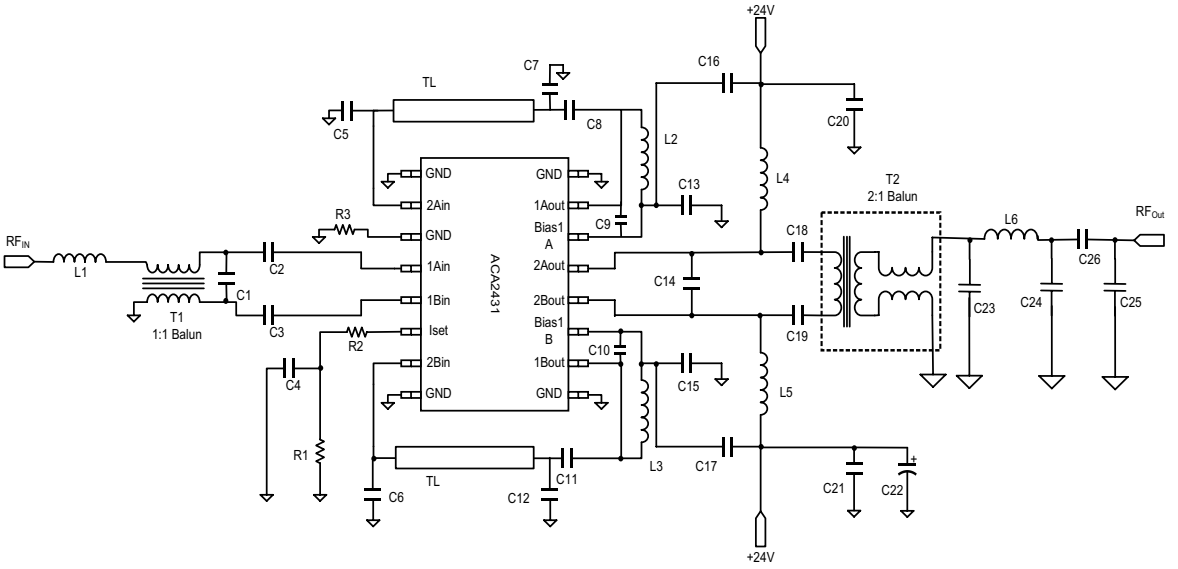
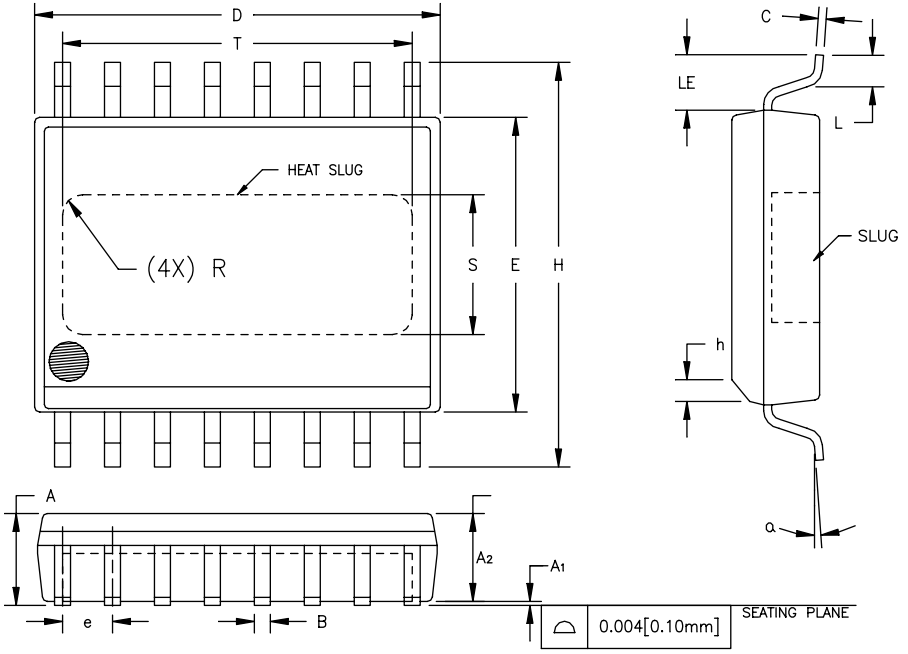


Figure 3: Application Circuit Diagram

Table 5: Component Descriptions

COMPONENT	VALUE
C24, C25 “NC”	TBD
C2, C3, C4, C20, C21	0.01 uF
C5, C6, C9, C10	TBD
C7, C12	TBD
C8, C11	270 pF
C14	TBD
C18, C19	150 pF
C13, C15, C16, C17	4700 pF
C22	47 uF
C23	TBD
L1	TBD
L2, L3	470 nH
L4, L5	780 nH
L6	TBD
R1	TBD
R2	510 Ohms

PACKAGE OUTLINE



SYMBOL	INCHES		MILLIMETERS		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	0.087	0.098	2.21	2.49	
A_1	0.000	0.004	0.00	0.10	6
A_2	0.087	0.094	2.21	2.39	
B	0.013	0.019	0.33	0.48	
C	0.007	0.009	0.18	0.23	
D	0.398	0.412	10.11	10.46	2
E	0.290	0.300	7.37	7.62	3
e	0.050 BSC		1.27 BSC		4
H	0.394	0.418	10.01	10.62	
h	0.010	0.028	0.25	0.71	
L	0.024	0.040	0.61	1.02	
LE	0.052	—	1.32	—	
α	0°	8°	0°	8°	
S	0.120	0.140	3.05	3.56	5
T	0.330	0.350	8.38	8.89	5
R	REF. 0.015		REF. 0.38		5

NOTES:

1. CONTROLLING DIMENSION: INCHES
2. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED 0.006 [0.15mm] PER SIDE.
3. DIMENSION "E" DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSIONS SHALL NOT EXCEED 0.010 [0.25mm] PER SIDE.
4. MAXIMUM LEAD TWIST/SKEW TO BE ±0.005 [0.13mm].
5. DIMENSIONS "S", "T" AND "R" INDICATE EXPOSED SLUG AREA.
6. STANDOFF HEIGHT (A_1) MEASURED FROM BOTTOM OF SLUG.

Figure 4: Wide Body SOIC-16 Package

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
ACA2431P2	-40 °C to +100 °C	16 Pin Wide Body SOIC with Heat Slug	Tape and Reel, 1500 pieces per Reel

ANADIGICS, Inc.
141 Mount Bethel Road
Warren, New Jersey 07059, U.S.A.
Tel: +1 (908) 668-5000
Fax: +1 (908) 668-5132

URL: http://www.anadigics.com
E-mail: Mktg@anadigics.com