ANADIGICS

ACU2109S3

CATV/TV/Cable Modem Upconverter MMIC

Advanced Product Information - Rev 1

FEATURES

- Integrated Monolithic GaAs Upconverter
- Designed for Digital and Analog TV
- Very Low Oscillator Phase Noise
- Low Noise Figure & Low Distortion
- Low Power Consumption
- Small size
- Can be Shut Down Remotely
- Operates from 5 Volt Power Supply
- High Reliability

APPLICATIONS

- CATV/TV Tuners
- Cable Modem Tuners

S3
16 Pin SOIC Package

Description:

The ACU2109 is a Monolithic GaAs IC incorporating all upconverter functions of a double conversion CATV, Cable Modem and TV tuner: gain block, oscillator and a double balanced mixer. The oscillator is optimized to meet the stability and phase noise requirements of 256QAM Digital TV, while the amplifier and mixer retain the low distortion necessary for Analog signals.

The part is supplied in a low profile 16-lead modified SOIC package and it requires only a single polarity 5 Volt power supply.

This upconverter IC is well suited for double conversion tuner designs where small size, low cost, low auxiliary parts count and a no-compromise performance when handling both Digital and Analog TV signals is important.

It lets tuner manufacturers reduce costs by lowering component count and dispensing with labor-intensive production alignment steps, while improving performance and reliability.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	ABSOLUTE	MAXIMUM
$V_{DD}/V_{IF}/V_{OSC}$ (Pins 1,10,14,& 16)	9	V_{DC}
V_{RF}/V_{TUNE} (Pins 6 & 11)	0	V_{DC}
RF Input Voltage	+60	dBmV
Storage Temperature	- 55 to +200	°C
Soldering Temperature	260	°C
Soldering Time	5	Sec.
Operating Case Temperature	- 40 to + 85	°C

ELECTRICAL SPECIFICATIONS

PARAMETER	MIN.	TYP.	MAX.	UNIT
Conversion Gain [1]	5.0	8.0	-	dB
Gain Flatness [1]	-	0.8	-	dB
SSB Noise Figure [1]	-	6.5	8.0	dB
CSO [2]	-	-60	-57	dBc
CTB [2]	-	-60	-57	dBc
Cross Modulation [3]	-	-62	-60	dBc
2-Tone 2nd Order Input IP [4]	-	95	-	dBmV
2-Tone 3rd Order Input IP [4]	-	70	-	dBmV
LO Phase Noise [5]	-	-89	-84	dBc/Hz
LO Power to Prescaler	-7	-0	-	dBm
LO to RF Leakage	-	20	-	dBmV
LO to IF Leakage	-	34	-	dBmV
RF to IF Isolation	30	35	-	dB
Tuning Voltage[1]	1.0	-	27	V
Shutdown Voltage(Pin 3)	-	-2	-	V
V_{DDIF}	4.75	5.0	5.25	V
V_{DDLO}	4.75	5.0	5.25	V
I_{DDIF}		65	85	mA
I_{DDLO}		80	95	mA
Power Consumption		770	900	mW

Notes:

1. As measured in ANADIGICS test fixture
2. 128 Channels @ + 7 dBmV
3. 128 Channels, 99% Modulation @ 15 KHz
4. Two tones @ -15 dBm (33.75 dBmV) each
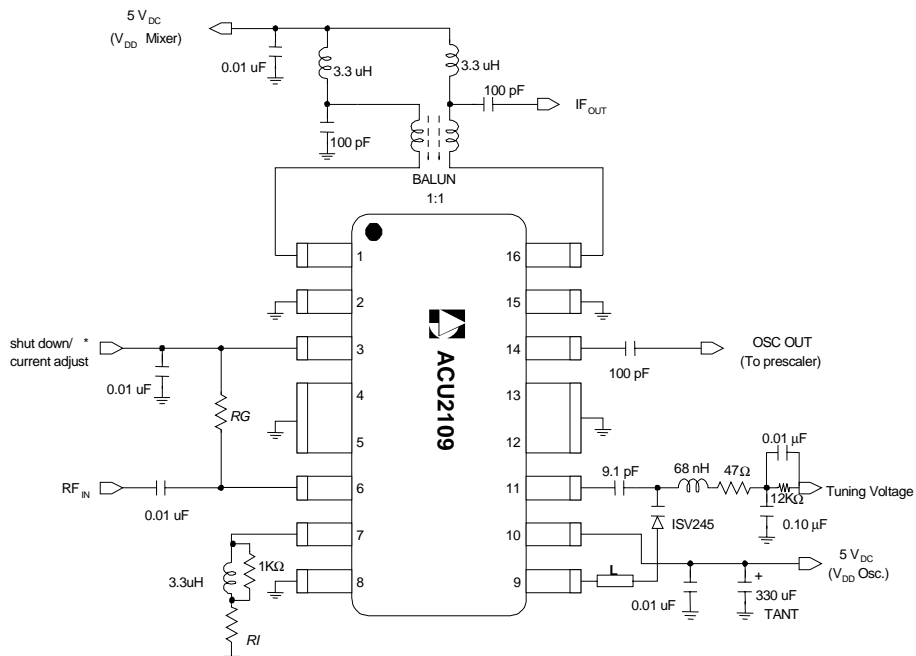5. At 10 KHz offset

dBc = dB below carrier
dBmV = dBm + 48.75

FUNCTIONAL BLOCK DIAGRAM

* Very temperature. Do not connect to common ground.
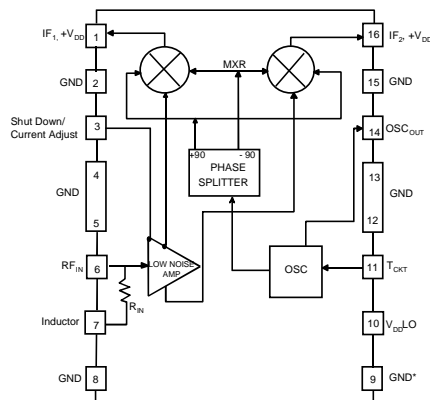
OPERATING RANGES

PARAMETER	MIN.	TYPICAL	MAX.	UNITS
Frequency RF IF LO	 50 900 950		 860 1200 2060	 MHz
V_{TUNE}	1.5		27	Volts
V_{DDIF}	4.75	5	5.25	Volts
V_{DDLO}	4.75	5	5.25	Volts
I_{DDIF}		65	85	mA
I_{DDLO}		80	95	mA

NOTES:

L = Printed inductor
RG = Gain control/impedance match resistor (240 Ω for 8 dB gain)
RI = Current adjust resistor 2.7 W for 60 mA mixer current)
* = Apply -2V DC for shutdown. 0< VDC < 0.3 for 60 mA mixer current

Package Outline
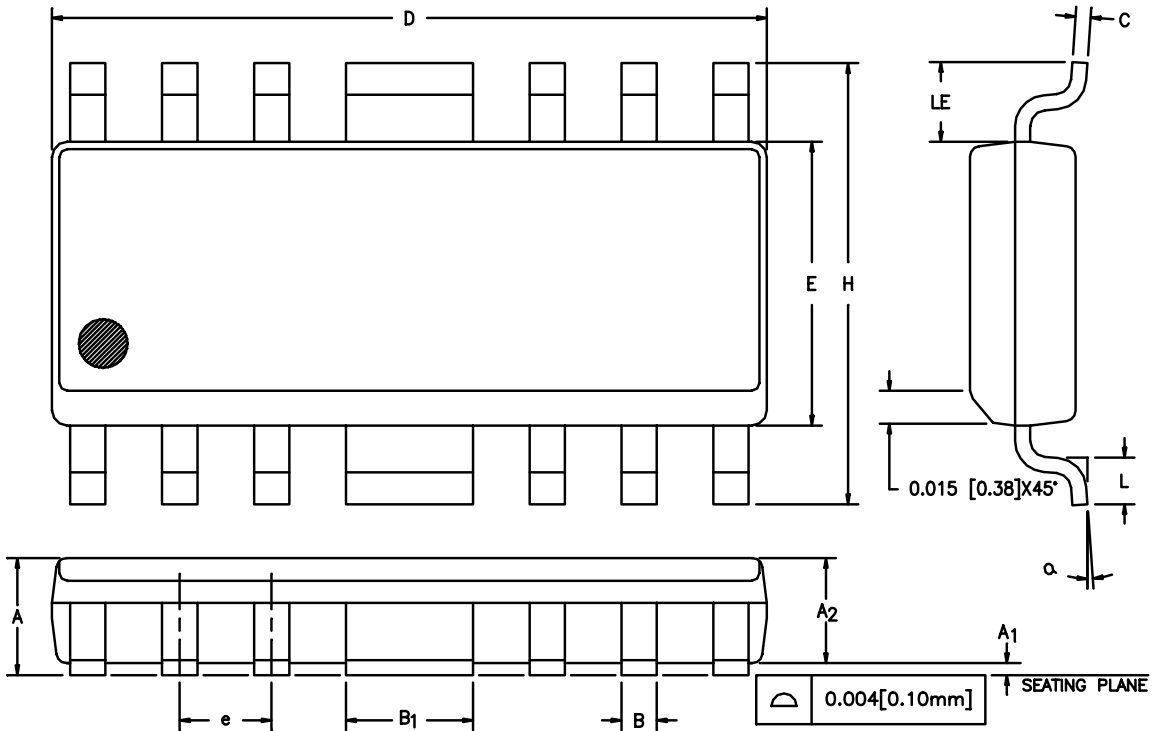
S Y M B O L	INCHES		MILLIMETERS		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	0.058	0.068	1.47	1.73	
A_1	0.004	0.010	0.10	0.25	
A_2	0.055	0.065	1.40	1.65	
B	0.013	0.020	0.33	0.50	
B_1	0.062	0.070	1.58	1.78	
C	0.008	0.010	0.20	0.25	4
D	0.380	0.400	9.66	10.16	2
E	0.150	0.160	3.81	4.06	3
e	0.050 BSC		1.27 BSC		
H	0.226	0.244	5.74	6.20	
L	0.016	0.040	0.41	1.02	
LE	0.030	—	0.76	—	
α	0°	8°	0°	8°	

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. LEAD THICKNESS AFTER PLATING TO BE 0.013 [0.33mm] MAXIMUM.

0–006

Notes

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