![ANADIGICS logo]

ACU50752
CATV/TV/Cable Modem Upconverter
## MMIC
Data Sheet - Rev 2.0

FEATURES

- Integrated Monolithic Upconverter
- Compatible with all digital and analog modulation types
- 5 Volt Operation
- Low Power Consumption
- Low Noise Figure
- High Conversion Gain
- Low Distortion
- Excellent Oscillator Purity and Phase Noise
- Remote Shutdown Feature
- Small Size
- Low Cost
- High Reliability

S3 Package
Modified 16 Pin SOIC

PRODUCT DESCRIPTION

The ACU50752 is a Monolithic GaAs IC designed to perform the upconverter functions in a double conversion tuner: gain block, local oscillator and balanced mixer. The specifications meet the requirements of CATV, TV and Cable Modem applications. Offered in a modified 16-lead SOIC package and requiring only a single polarity 5 V supply (or 3.5 V, with slightly reduced performance), the IC is well suited for applications where small size, low cost, low auxiliary parts count and a no-compromise performance is important. It provides tuner manufacturers the opportunity to reduce cost by lowering the component count and decreasing the amount of labor-intensive production alignment steps, while significantly improving performance and reliability.
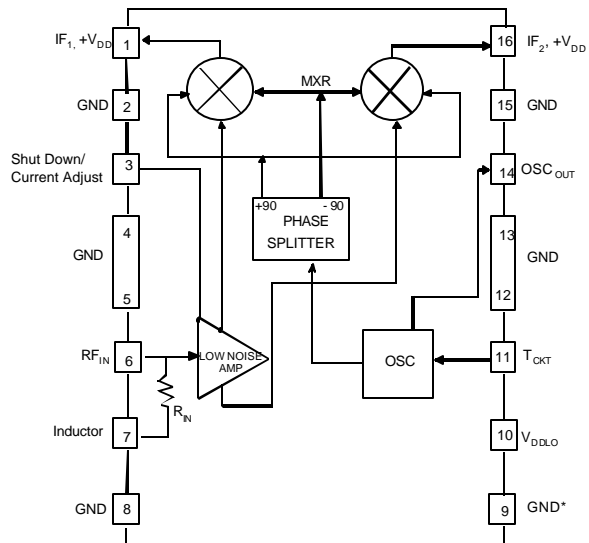
* Varactor return. Do not connect to common ground

Figure 1: Functional Block Diagram

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Table 1: Pin Description

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
1	IF_1, V_{DDIF}	Balanced IFoutput and supply	9	VC_{RTN}	Varactor return
2	GND	Ground	10	V_{DDLO}	Oscillator supply
3	V_{BIAS}	Shut down/current adjust	11	Tank	Oscillator tank circuit
4	GND	Ground	12	GND	Ground
5	GND	Ground	13	GND	Ground
6	RF_{IN}	RFInput	14	OSC_{OUT}	Oscillator output to Prescalar
7	I_{BIAS}	Current Bias	15	GND	Ground
8	GND	Ground	16	IF_2, V_{DDIF}	Balanced IF output and supply

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
$V_{DDIF}, V_{DDLO}, V_{OSC}$ (Pins 1,10,14 & 16)	0	9	VDC
V_{RF}/V_{TUNE} (Pins 6 & 11)	-	0	VDC
RF Input Voltage	-	+60	dBmV
Storage Temperature	- 55	+200	°C
Soldering Temperature	-	260	°C
Soldering Time	-	5	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.

Table 3: Operating Ranges

PARAMETER		MIN	TYP	MAX	UNIT
Frequency	RF IF LO	50 900 950	- - -	860 1200 2060	MHz
V_{DDIF}		4.75	5	5.25	VDC
V_{DDLO}		4.75	5	5.25	VDC
Shutdown Voltage (Pin 3)		-	-2	-	V
Tuning Voltage		1.5	-	27	V
Operating Case Temperature		-40	-	+85	°C

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

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Table 4: Electrical Specifications
(T_A = 25 °C; V_{DDIF}, V_{DDLO} =+ 5V; RF = 50 to 860 MHz; IF = 1170 MHz)

PARAMETER	MIN	TYP	MAX	UNIT
Conversion Gain[1]	5.0	8.0	-	dB
Gain Flatness[1]	-	1.0	-	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]	-	40	-	dBm
2-Tone 3rd Order Input IP[4]	-	18	-	dBm
LO Phase Noise[5]	-	-84	-81	dBc/Hz
LO Power to Prescaler	-10	-5	-	dBm
LO to RF Leakage	-	-22	-	dBm
LO to IF Leakage	-	-24	-	dBm
RF to IF Isolation	40	50	-	dB
Tuning Voltage[1]	1.0	-	22	V
I_{DDIF}	-	58	80	mA
I_{DDLO}	-	60	80	mA
Power Consumption	-	600	800	mW

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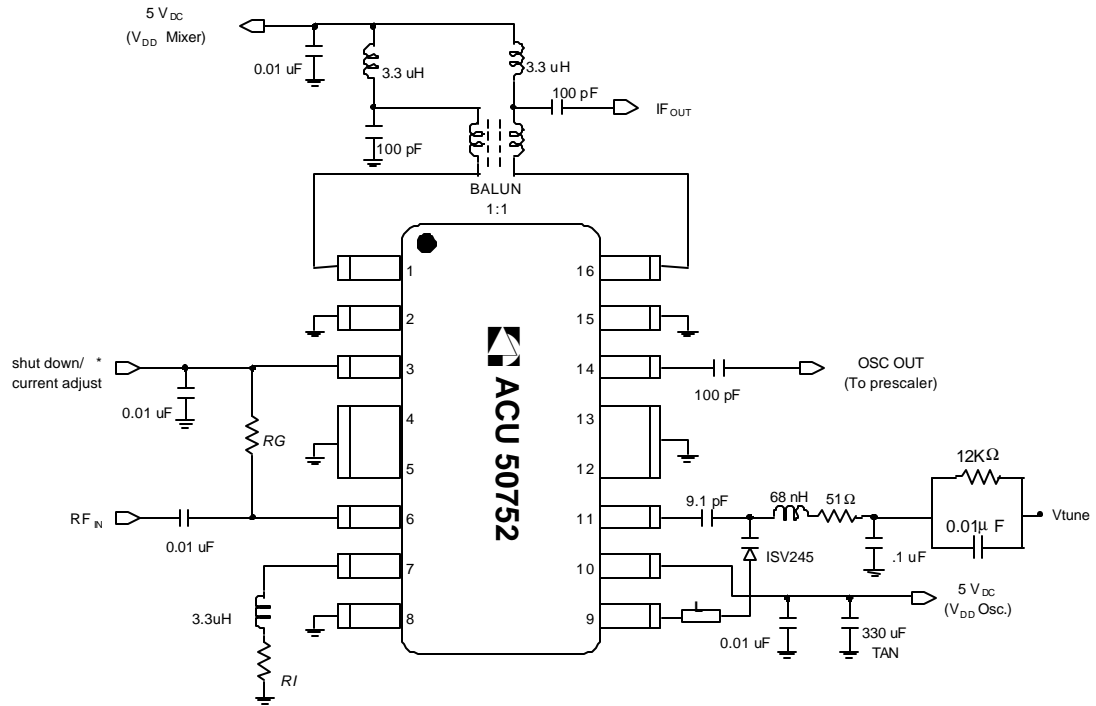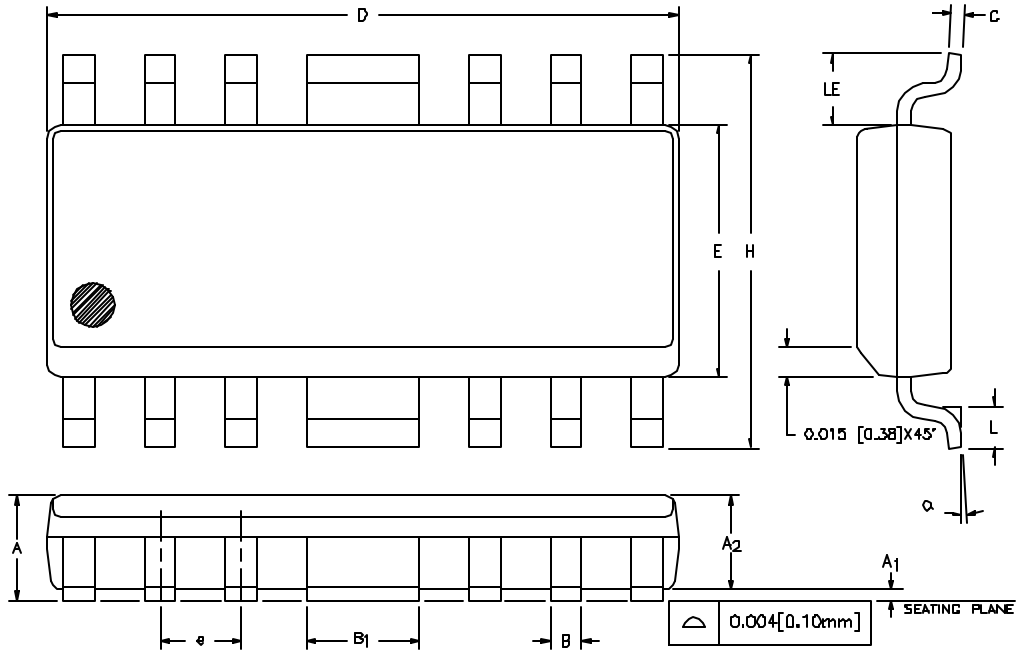*(4) Two tones @ -15 dBm each*
(5) At 10 KHz offset

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Figure 2: Test Circuit Schematic

Notes:

L	*=*	*Printed inductor (2~3 nH)*
RG	*=*	*Gain control/impedance match resistor (240W for 8 dB gain)*
RI	*=*	*Current adjust resistor (2.7 W for 60 mA mixer current)*
*	*=*	*Apply -2 V DC for shutdown, 0< VDC < 0.3 for 60 mA mixer current*

PACKAGE OUTLINE

SYMBOL	INCHES		MILLIMETERS		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	0.058	0.068	1.47	1.73	
A₁	0.004	0.010	0.10	0.25	
A₂	0.055	0.065	1.40	1.65	
B	0.013	0.020	0.33	0.50	
B₁	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.

Figure 3: S3 Package Outline - Modified 16 Pin SOIC

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NOTES

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ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
ACU50752S3CTR	-40°C to +85°C	Modified 16 Pin SOIC	Tape & Reel, 3500 pieces per reel
ACU50752S3C	-40°C to +85°C	Modified16 Pin SOIC	Tube, 50 pieces per tube