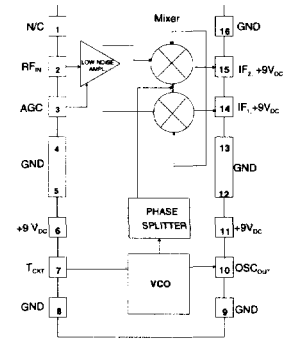
ACU50550

50-550 MHz CATV/TV UPCONVERTER MMIC
REV 10

FEATURES	FUNCTIONAL BLOCK DIAGRAM
Integrated Monolithic Upconverter 7.0 dB Noise Figure 4 dB Conversion Gain High Linearity Small Size Automatic Gain Control (AGC) Low Cost High Reliability Single Supply Voltage	

The ANADIGICS upconverter MMIC is a low-cost, high performance upconverter fabricated entirely in GaAs. It is designed for use in double conversion CATV set-top converters and TV receiver tuners. The upconverter offers a high degree of functionality in a very small and user friendly configuration. The MMIC provides tuner manufacturers the opportunity to reduce cost by lowering the component count and decreasing the amount of production alignment steps, while significantly improving performance and reliability.

ABSOLUTE MAXIMUM RATINGS:

The upconverter is supplied in a heat sink 16 pin dual in-line package (DIP)

PARAMETER	MAX	UNIT
VDD/VIF	13	Volts
V_{AGC}	8	Volts
V_{RF}/V_{TCKT}*	.5	Volts
Case Temperature	85	^{o}C
Storage Temperature	- 65 to +150	^{o}C
Soldering Temperature	260	^{o}C
Soldering Time	5.0	Sec.
RF Input Power	+ 10	dBm
Lo Input Power	+ 17	dBm

*V_{TCKT}: Maximum voltage that may be applied to pin 7 of the device without damaging the IC. DC blocking capacitor (1500 pF) between pin 7 and external tuning circuit is mandatory.

OPERATING RANGES

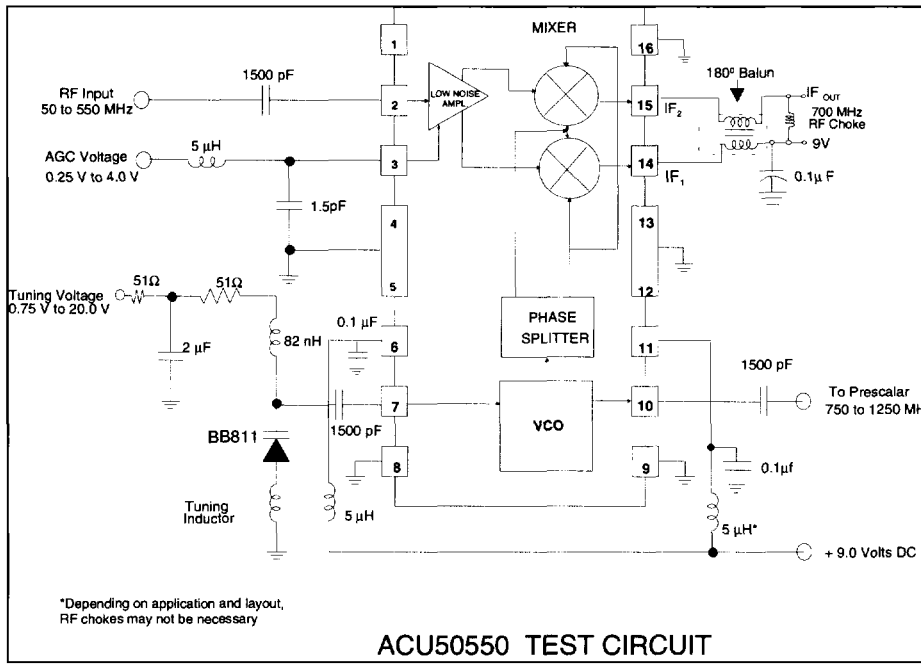
PARAMETER	MIN.	TYPICAL	MAX.	UNITS
Frequency				
RF	50		550	MHz
IF	600		750	MHz
LO	650		1300	MHz
V_{AGC}[2]	0		4.0	Volts
AGC[1]	0		8	dB
V_{TUNE}	1		20	Volts
V_{DD}	8.5	9.0	9.5	Volts
I_{DD}	65	85	107	mA
Case Temperature	- 40		85	^{o}C

ELECTRICAL SPECIFICATIONS :

(Packaged Unit, $T_A = 25^{o}$ C, V_{DD} = + 9V, IF =700 MHz)

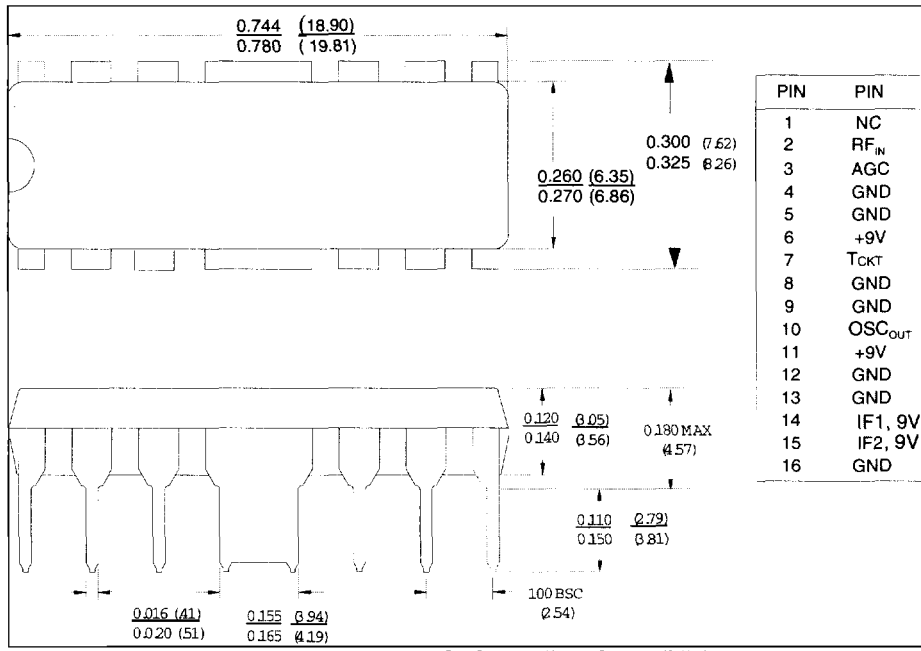
PARAMETER	MIN	TYP	MAX	UNIT
Conversion Gain [3]	1.7	4		dB
SSB Noise Figure[3]		7.0	8.5	dB
Gain Flatness [3]		1.2	2.0	dB
LO-RF Leakage		- 20	- 10	dBm
LO-IF Leakage		- 13	- 5	dBm
LO Phase Noise @ 10 KHz Offset		- 83	- 75	dBc/Hz
CSO [4]		- 60	- 57	dBc
CTB [4]		- 60	- 57	dBc
2-Tone 2nd Order Input I.P.[5]				
@ Full Gain	33.0	40.0		dBm
@ 8 dB AGC	34.5	41.5		dBm
2- Tone 3rd Order Input I.P. [5]				
@ Full Gain	8.5	14.0		dBm
@ 8 dB AGC	11.5	17.0		dBm
Input Impedance Normalized to 50 Ω		See Smith Chart		
Output Impedance		See Smith Chart		

1. 12 dB of AGC available; Distortion specs maintained up to 8 dB of AGC.
2. AGC Level Increases with Decreasing Voltage (V_{AGC} = 4.0V_{DC}, AGC = 0 dB).
3. As measured in ANADIGICS test fixture.
4. 85 Channel @ +15 dBmV, 8 dB of AGC
5. Two Tones @ - 15 dBm e



ACU50550 TEST CIRCUIT

PATENT PENDING



PIN	PIN
1	NC
2	RF_{IN}
3	AGC
4	GND
5	GND
6	+9V
7	T_{CKT}
8	GND
9	GND
10	OSC_{OUT}
11	+9V
12	GND
13	GND
14	IF1, 9V
15	IF2, 9V
16	GND

ALL DIMENSIONS ARE IN INCHES (MM)

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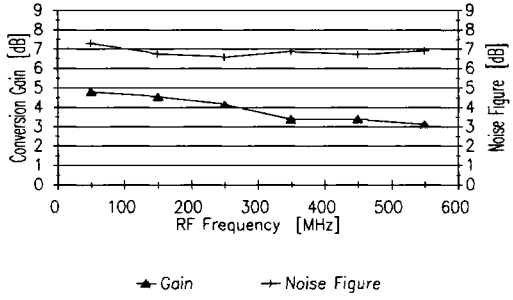
Gain and Noise Figure vs Frequency



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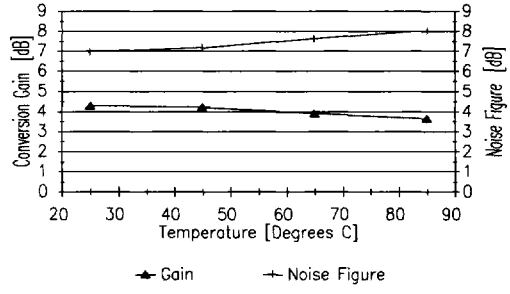
Gain and Noise Figure vs Temperature



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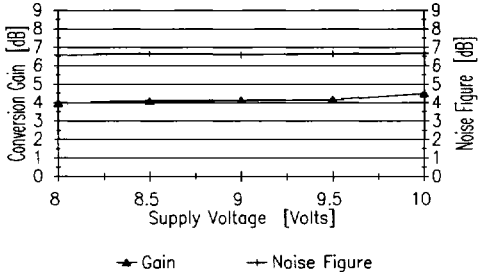
Gain and Noise Figure vs Vdd



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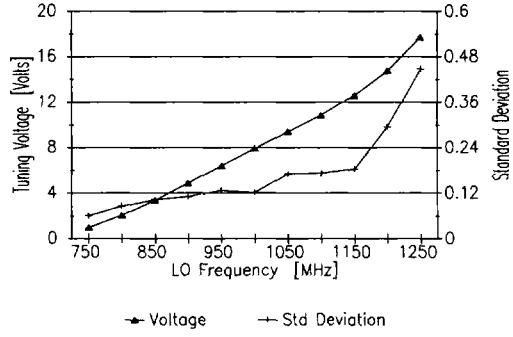
Tuning Voltage vs LO Frequency



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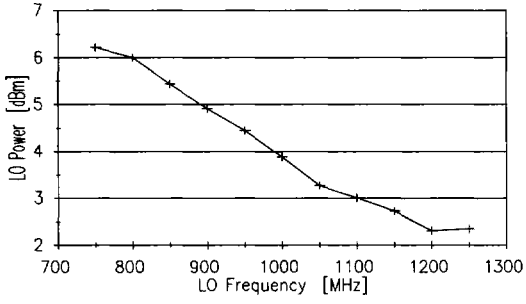
LO Output Power vs Frequency



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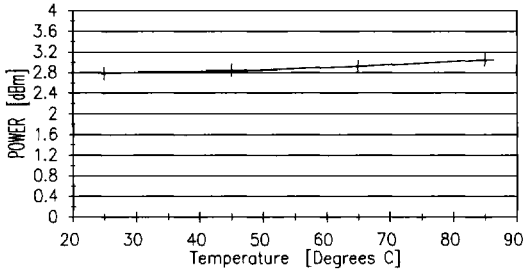
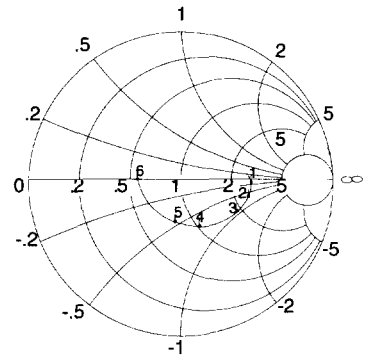
LO Output Power vs Temperature



RF INPUT IMPEDANCE

START: 0.050 GHz
STOP: 1.00 GHz



Normalized to 50 Ω

CH 1 - S11
REF. PLANE
3.988cm

1: 0.050 GHz
125.539 Ω
- 16.883jΩ
Marker to Max.
Marker to Min.
2: 0.148 GHz
111.418Ω
- 36.162jΩ

3: 0.298 GHz
82.160 Ω
- 47.213jΩ

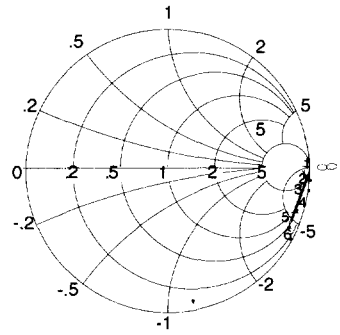
4: 0.550 GHz
49.329 Ω
-35.341 jΩ

5 : 0.700 GHz
39.097 Ω
-25.403 jΩ

6: 1.000 GHz
28.207 Ω
-2.673 jΩ

IF OUTPUT IMPEDANCE

START: 0.050 GHz
STOP: 1.00 GHz



Normalized to 50 Ω

CH 1 - S22
REF. PLANE
4.237 cm

1: 0.050 GHz
1.124 KΩ
- 1.628jΩ
Marker to Max.
Marker to Min.
2: 0.148 GHz
269.437Ω
- 921.299 jΩ

3: 0.298 GHz
111.619 Ω
- 504.043 jΩ

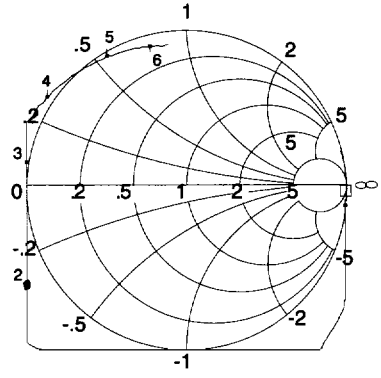
4: 0.550 GHz
52.962 Ω
-303.873 jΩ

5 : 0.700 GHz
39.139 Ω
-261.920 jΩ

6: 1.000 GHz
32.016 Ω
-208.275 jΩ

IMPEDANCE @ LO PORT

START: 0.750 GHz
STOP: 1.800 GHz



NORMALIZED TO 50 Ω

CH 1 - S11
REF. PLANE
2.6765 cm

1: 0.0734 GHz
- 39.264 Ω
- 620.128jΩ

Marker to Max.
Marker to Min.

2: 0.750 GHz
- 6.733Ω
- 11.359jΩ

3: 0.9977 GHz
- 3.008 Ω
2.914 jΩ

4: 1.2551 GHz
-1.025Ω
14.243 jΩ

5 : 1.5944 GHz
978.397Ω
27.481jΩ

6: 1.800 GHz
2.425Ω
35.871jΩ