



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	°C
Storage Temperature	- 65 to +150	°C
Soldering Temperature	260	°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

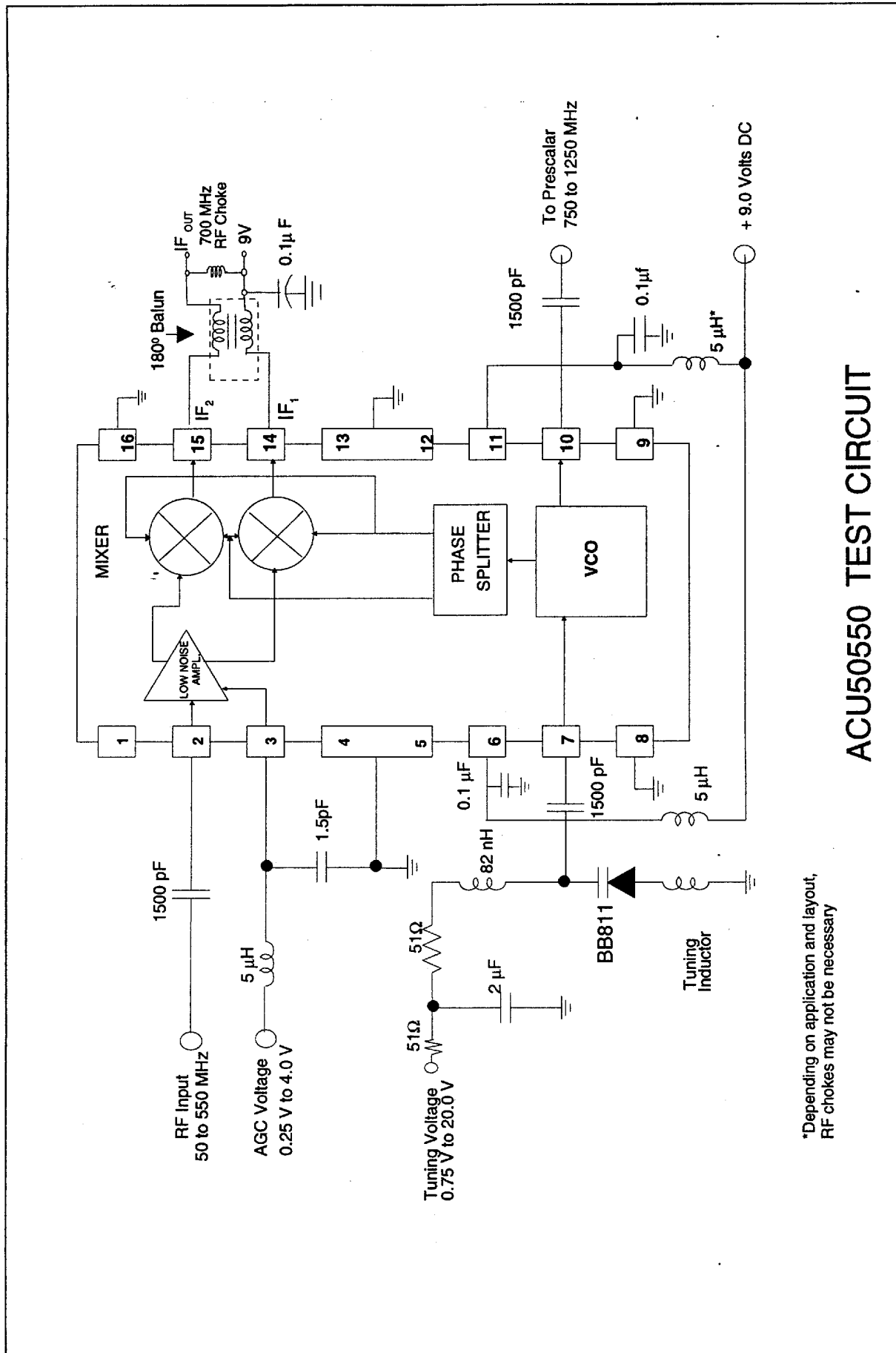
PARAMETER	MIN.	TYPICAL	MAX.	UNITS
Frequency				
RF	50		550	MHz
IF	600		750	MHz
LO	650		1300	MHz
V_{AGC}^2	0		4.0	Volts
AGC ¹	0		8	dB
V_{TUNE}	1		20	Volts
V_{DD}	8.5	9.0	9.5	Volts
I_{DD}	65	85	107	mA
Case Temperature	- 40		85	°C

ELECTRICAL SPECIFICATIONS :

(Packaged Unit, $T_A = 25^\circ C$, $V_{DD} = +9V$, 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		

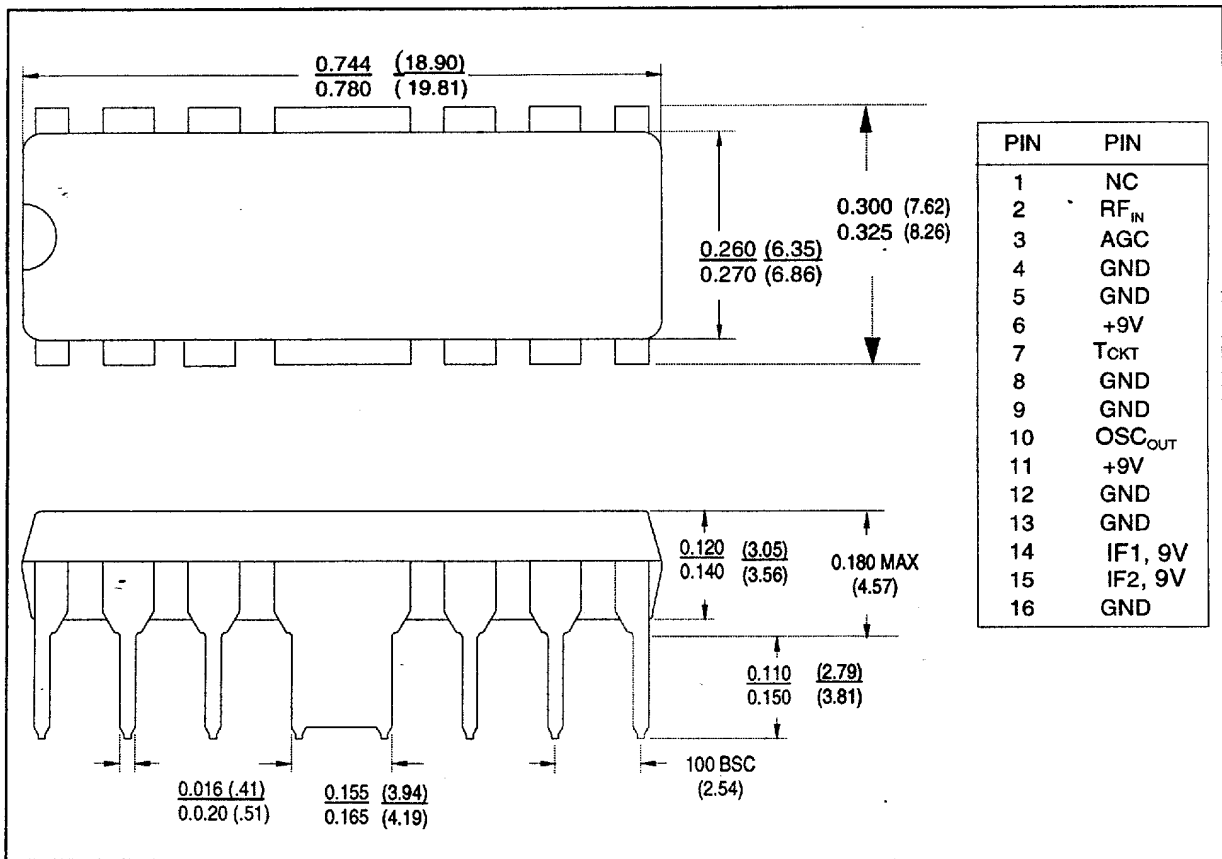
- 12 dB of AGC available; Distortion specs maintained up to 8 dB of AGC.
- AGC Level Increases with Decreasing Voltage ($V_{AGC} = 4.0V_{DC}$, AGC = 0 dB).
- As measured in ANADIGICS test fixture.
- 85 Channel @ +15 dBmV, 8 dB of AGC
- Two Tones @ - 15 dBm each



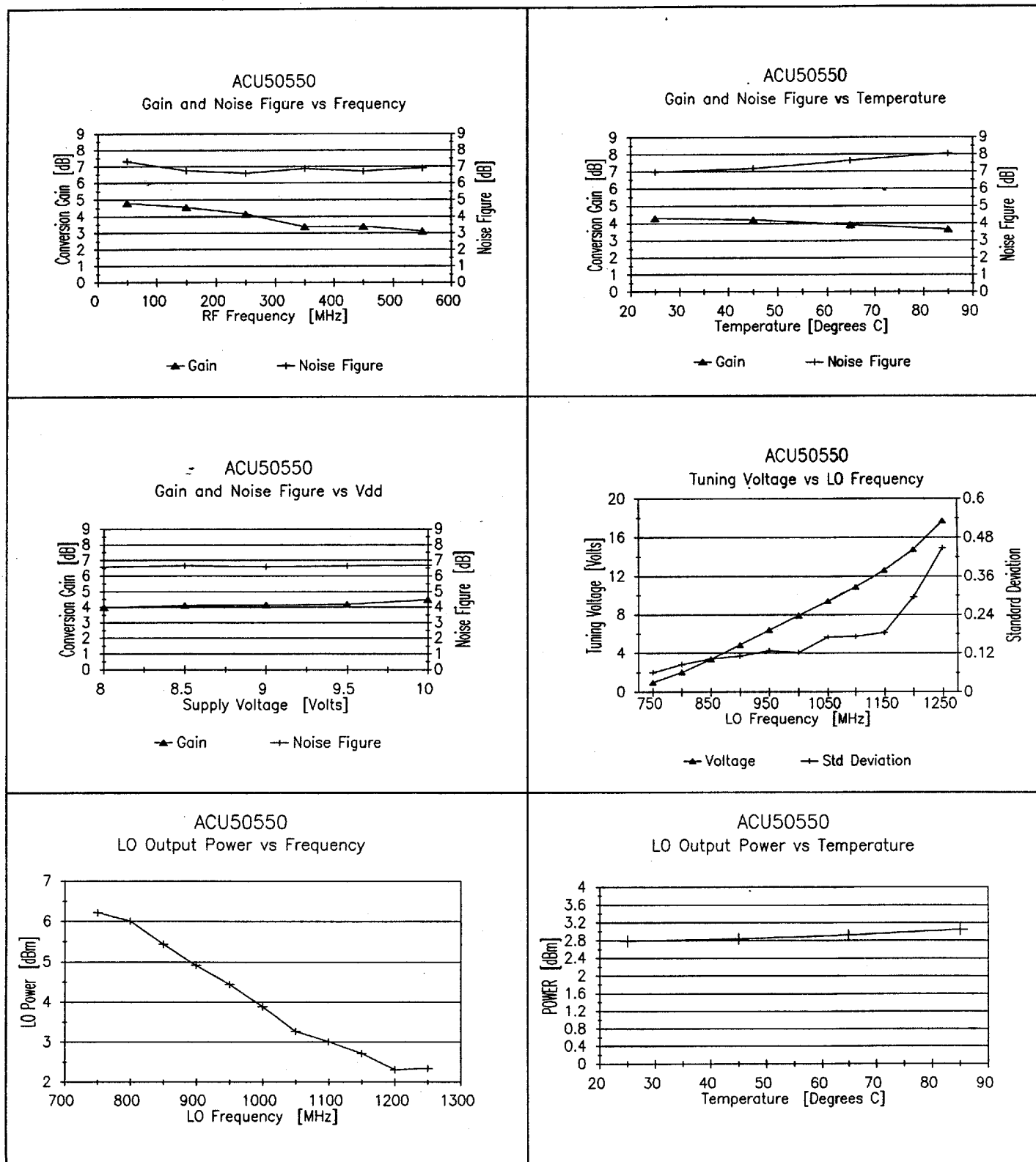
*Depending on application and layout,
RF chokes may not be necessary

ACU50550 TEST CIRCUIT

PATENT PENDING



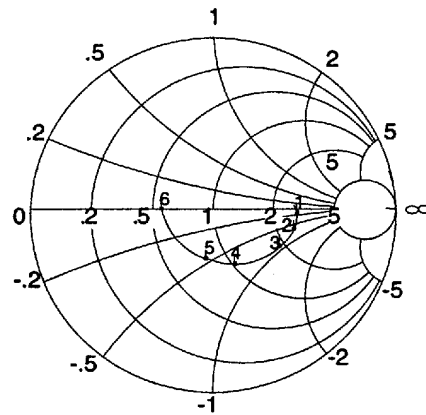
ALL DIMENSIONS ARE IN INCHES (MM)



RF INPUT IMPEDANCE

START: 0.050 GHz
STOP: 1.00 GHz

CH 1 - S11
REF. PLANE
3.988cm



Normalized to 50 Ω

1: 0.050 GHz
125.539 Ω
- 16.883j Ω

Marker to Max.
Marker to Min.

2: 0.148 GHz
111.418 Ω
- 36.162j Ω

3: 0.298 GHz
82.160 Ω
- 47.213j Ω

4: 0.550 GHz
49.329 Ω
- 35.341 j Ω

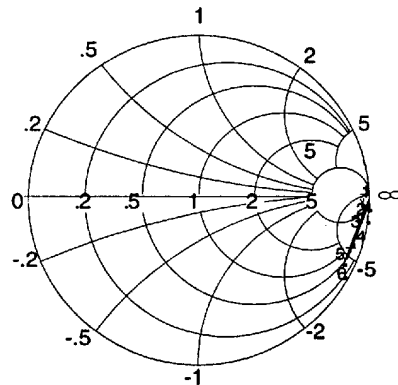
5: 0.700 GHz
39.097 Ω
- 25.403 j Ω

6: 1.000 GHz
28.207 Ω
- 2.673 j Ω

IF OUTPUT IMPEDANCE

START: 0.050 GHz
STOP: 1.00 GHz

CH 1 - S22
REF. PLANE
4.237 cm



Normalized to 50 Ω

1: 0.050 GHz
1.124 K Ω
- 1.628j Ω

Marker to Max.
Marker to Min.

2: 0.148 GHz
269.437 Ω
- 921.299 j Ω

3: 0.298 GHz
111.619 Ω
- 504.043 j Ω

4: 0.550 GHz
52.962 Ω
- 303.873 j Ω

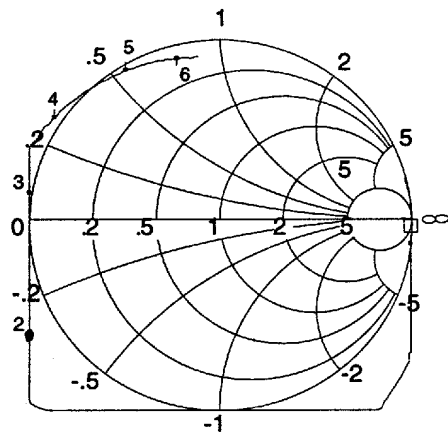
5: 0.700 GHz
39.139 Ω
- 261.920 j Ω

6: 1.000 GHz
32.016 Ω
- 208.275 j Ω

IMPEDANCE @ LO PORT

START: 0.750 GHz
STOP: 1.800 GHz

CH 1 - S11
REF. PLANE
2.6765 cm



NORMALIZED TO 50 Ω

1: 0.0734 GHz
- 39.264 Ω
- 620.128j Ω

Marker to Max.
Marker to Min.

2: 0.750 GHz
- 6.733 Ω
- 11.359j Ω

3: 0.9977 GHz
- 3.008 Ω
2.914 j Ω

4: 1.2551 GHz
-1.025 Ω
14.243 j Ω

5: 1.5944 GHz
978.397 Ω
27.481j Ω

6: 1.800 GHz
2.425 Ω
35.871j Ω