CATV Line Amplifier

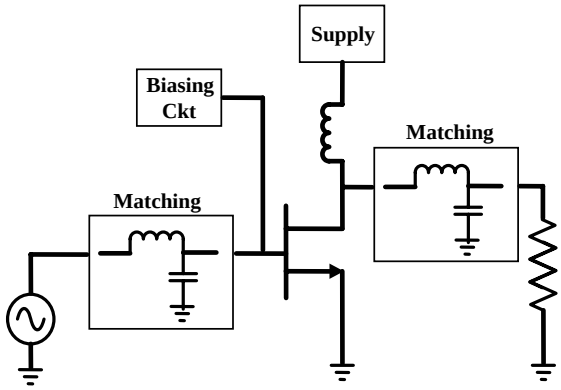
RTV01

Description

The **RTV01** is a CATV Line Amplifier IP block. CATV Line Amplifier designed using GaAs Enhancement mode psuedomorphic high electron mobility transistor (pHEMT). The amplifier provides low distortion and noise figure along with flat gain. The part is biased at 8V. This covers the range for 40 to 870 MHz band.

The optimized on-chip impedance matching circuitry provides 50 ohm nominal RF input impedance and is provided in a low-cost industry-standard 14 Pin SOIC Package.

Functional Diagram



Applications

- CABLE TV

Key Features

- Gain flatness of 2.5 dB
- Small Size, Low Cost
- High Performance

Electrical Specification

Conditions: Vdd = 8 V & T_A=25 ^{0}C

Parameter	Min	Typical	Max	Units
Frequency Range	40		870	MHz
Gain	11.8		13.8	dB
Noise Figure	2		5	dB
Voltage Output		44		dBmV
CTB				
77 Channels		-70		dBc
110 Channels		-68	-64	dBc
128 Channels		-67		dBc
CSO				
77 Channels		-72		dBc
110 Channels		-72	-68	dBc
128 Channels		-70		dBc
XMOD				
77 Channels		-71		dBc
110 Channels		-68	-61	dBc

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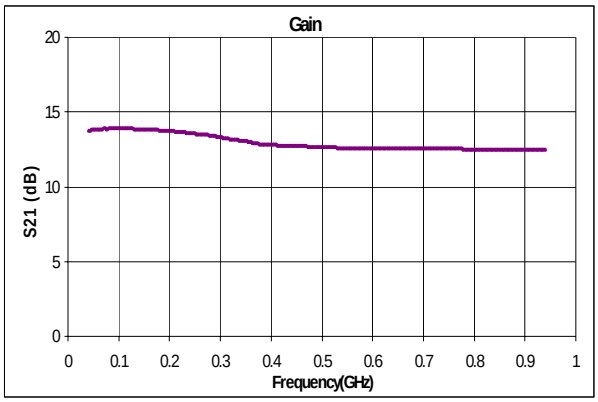
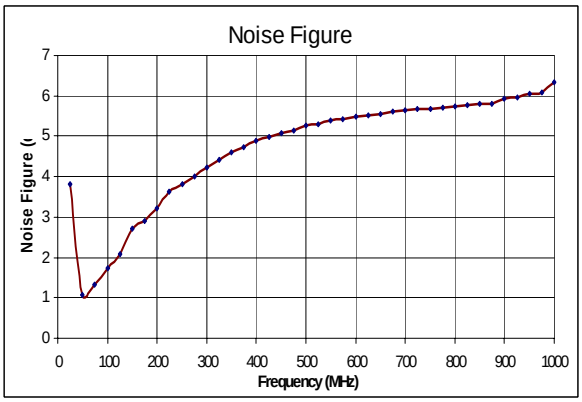
128 Channels		-66		dBc
Supply Current		199		mA
Cable Equivalent Slope				dB
DC Voltage		8		V
Return Loss				
Input		12		dB
Output		15		dB

Measured results

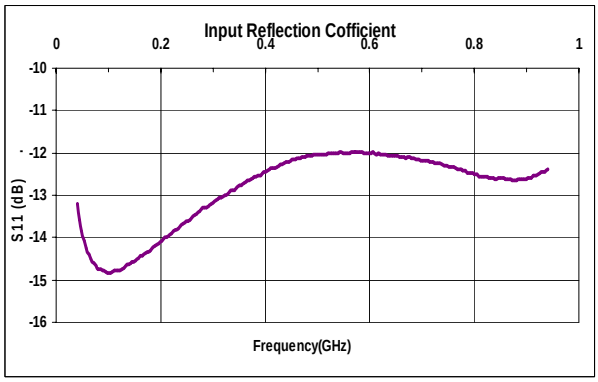
Gain Vs Frequency



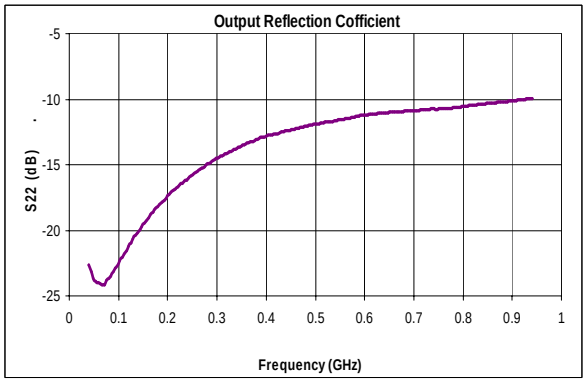
Noise Fig Vs Frequency



Input Return Loss Vs Frequency



Output Return Loss Vs Frequency



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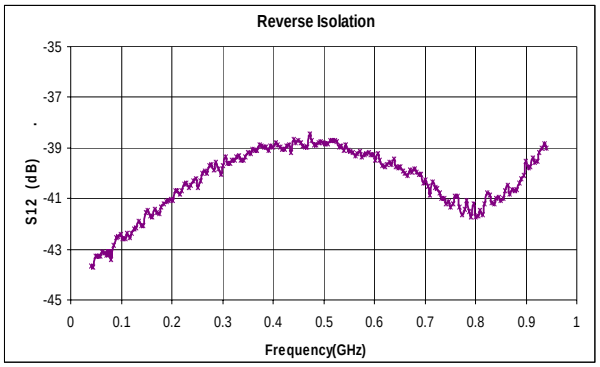
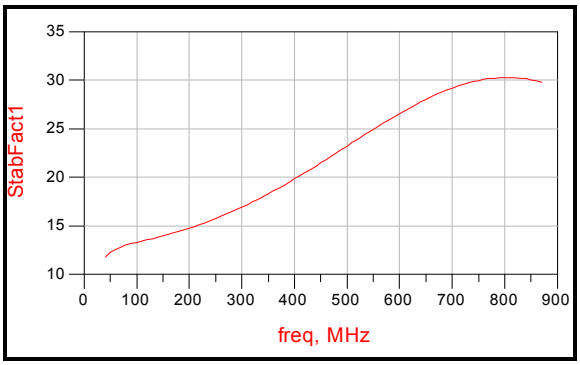
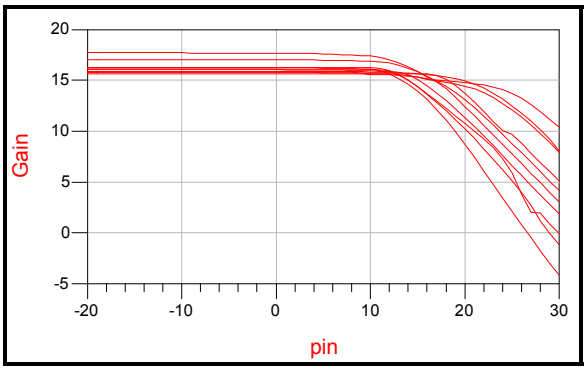
Reverse Isolation Vs Frequency



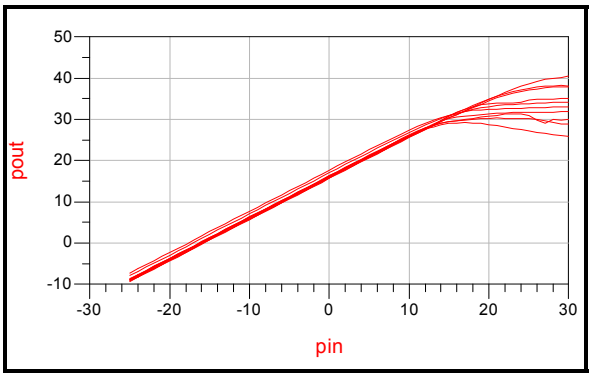
Stability Factor over Frequency (Simulated)



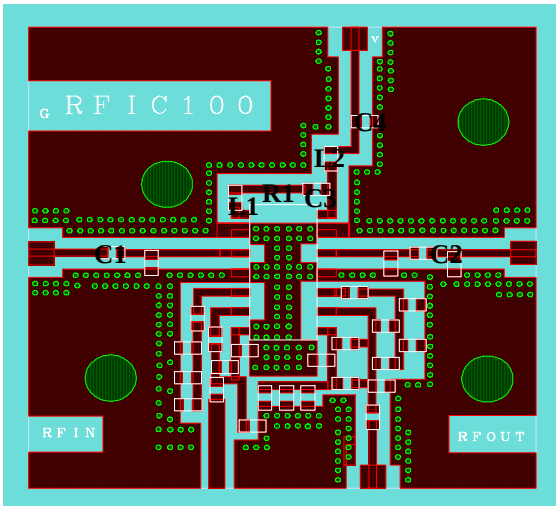
Gain Vs Pin (Simulated)



Pout Vs Pin (Simulated)



PCB board for CATV



Values for Offchip Components

Components	Size	Value
C1	0603	560 pF
C2	0603	560 pF
C3	0603	200 pF
C4	0805	1000 pF
L1	0805	80 nH
L2	0805	150nH
R1	0603	100 Ohm

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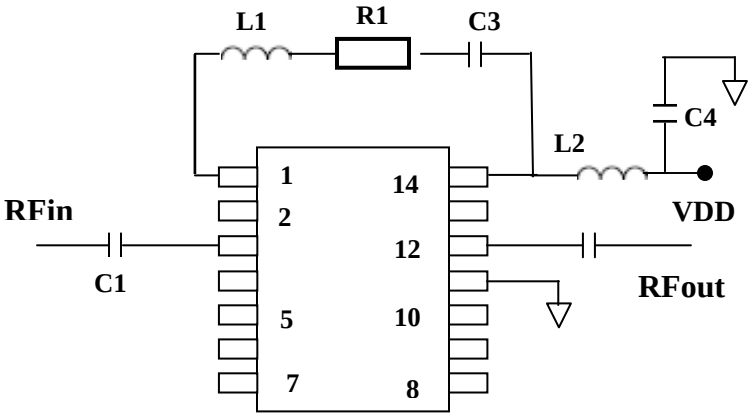
PIN Diagram



Note: Pin description with 14 pin SOIC package as follows:

Pin 1, 14 are connected through the feedback that uses off chip inductor L1 of 80nH, R1 of 100 ohm and a capacitor of C3 of 200pF.
Pin 14 is connected to VDD through Off chip inductor L2 off 150nH.
Pin 3, 12 are connected to RFin and RFout through the off chip capacitors C1 of 560pF & C2 of 560pF respectively.
A bypass capacitor C4 of value 1000pF has been added for better performance.
Pin 2, 11 are the ground pins.
Pin 4, 5, 6, 7, 8, 9, 10& 13 are the not connected (NC Pins)

The above amplifier will operate on VDD = 8V.

CATV Module

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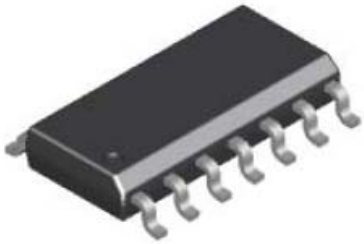
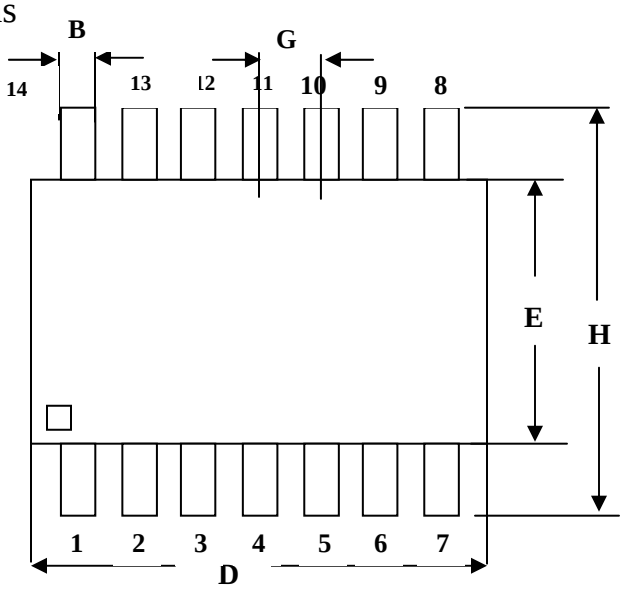
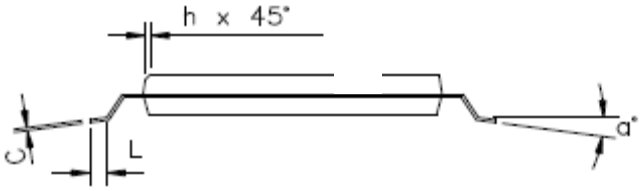
Outline Drawing for Package with Dimensions
All dimensions are in Inches





Seating plane



Symbol	Min	Max
A	0.060	0.068
A1	0.004	0.008
B	0.014	0.019
C	0.007	0.010
D	0.337	0.346
E	0.150	0.157
G	0.050	0.050
H	0.230	0.244
h	0.010	0.016
L	0.016	0.035
a’	0’	8’

NOTE

1) Lead width and lead thickness exclusive of solder plate
2) Package outline exclusive of mold flashes and burr dimension
3) Allowable mold flash is 5 mil per side
4) Dimensions are given in inches
5) Lead coplanarity is 0.003 inch max