PS401

InGaP HBT CATV Amplifer

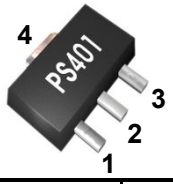
Features

- 45 - 1000MHz
- 19.0dB Gain at 45MHz
- CSO 65dBc @+15dBmV
- CTB 76dBc @+15dBmV
- NF 2.4dB
- Lead-free / Green / RoHS-compliant SOT-89 Package

Applications

- Headend Driver Amplifier
- Predriver Amplifier
- Line Driver Amplifier
- Optic Transceiver Application
- MOCA
- FTTH Application

Functional Diagram



Function	Pin No.
RF IN	1
RF OUT / Bias	3
Ground	2,4

Description

The PS401 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers that is internally matched to 75Ω input/output. The amplifier features high gain, high linear performance, wideband operation, high reliability, low noise as an CATV amplifier. The PS401 operates from a single voltage supply and requires only two DC-blocking capacitors, a bias resistor and an inductor for operation. The device is a general purpose CATV amplifier that offers high dynamic range in a low cost surface-mountable plastic SOT-89 packages. All devices are 100% RF and DC tested.

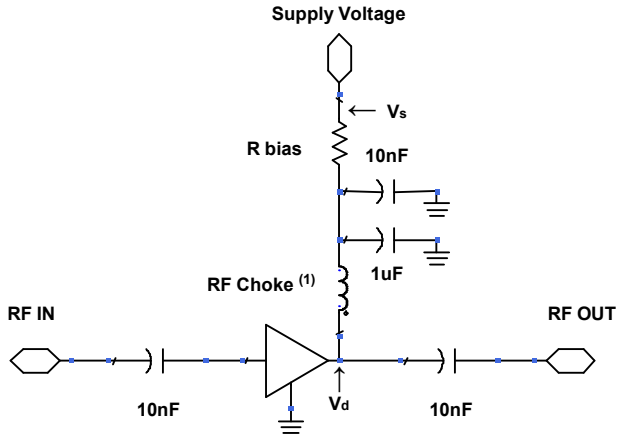
Specifications

* Test Conditions : T=25°C, Supply Voltage=+5V, 75ohm System

Symbol	Parameters	Units	Min.	Typ.	Max.	Condition
Forward (45MHz ~ 1000MHz)						
S21	Gain	dB	18.0	19.0	20.0	45 ~ 1000MHz
S11	Input Return Loss	dB	-15	-17		45 ~ 1000MHz
S22	Output Return Loss	dB	-10	-12		45 ~ 1000MHz
CSO	Composite Second Order	dBc		65		+15dBmV/132ch Flat
CTB	Composite Triple Beat	dBc		76		+15dBmV/132ch Flat
OIP3	Output Third Order Intercept Point	dBm		32.0		Note 1
P1dB	Output Power at 1dB Compression	dBm		15.0		
NF	Noise Figure	dB		2.4		
I	Current	mA	50	60	70	
Reverse (5MHz ~ 100MHz)						
S21	Gain	dB	18.5	19.5	20.5	5 ~ 100MHz
S11&S22	Return Loss	dB	-12	-14		5 ~ 100MHz
OIP3	Output Third Order Intercept Point	dBm		33.1		Note 1
P1dB	Output Power at 1dB Compression	dBm		14.5		
NF	Noise Figure	dB		2.2		
I	Current	mA	40	50	60	
Rth	Thermal Resistance	°C/W		85		

Note 1. Two Tones, 1MHz Spacing, +5dBm per Tone at Output

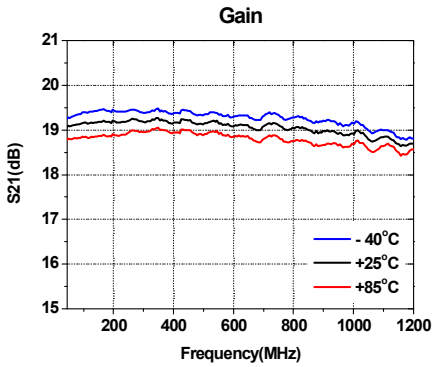
45 -1000MHz CATV Application Circuit

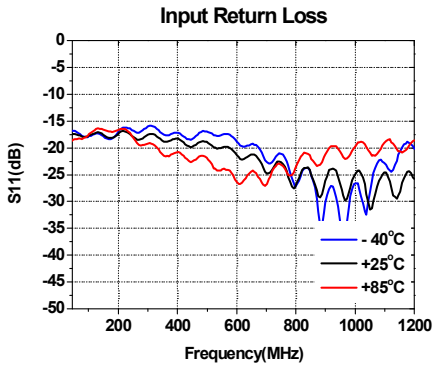


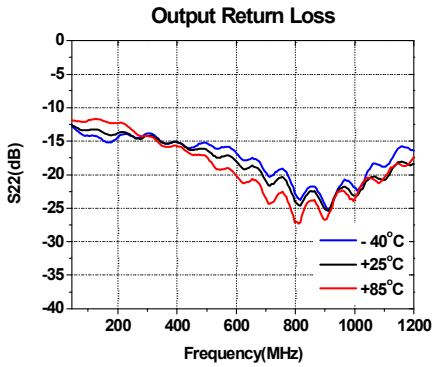
Recommended Bias Values

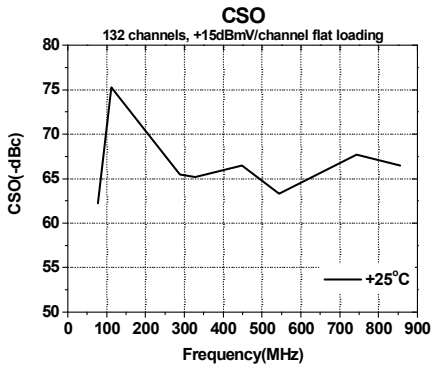
Supply Voltage	R bias Value	Size
5 V	22.0 Ω	1210
6 V	38.0 Ω	1210
8 V	68.0 Ω	2010
10 V	100.0 Ω	2010
12 V	130.0 Ω	2512
Rbias = (Vs – Vd) / Id		

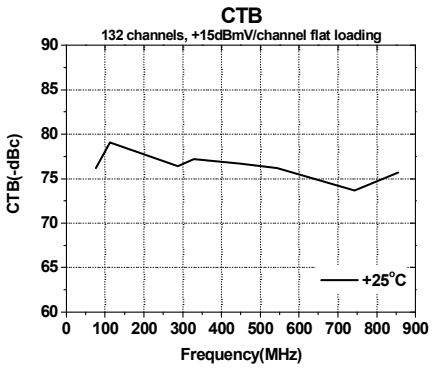
1. RF Choke is about 5uH. We recommend that wire of 0.2 phi radius wind 5 turns on toroidal core(size:4.0x1.5x2.0)
2. Measurement for our datasheet was made on 1.6mm thick FR-4 Board. And 75 ohm microstrip line

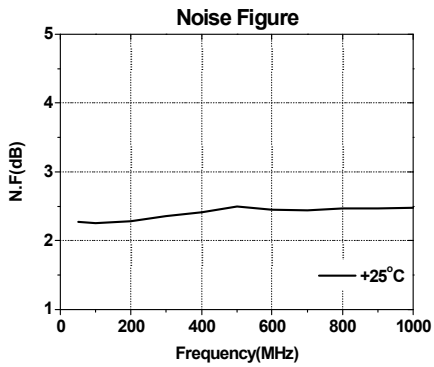


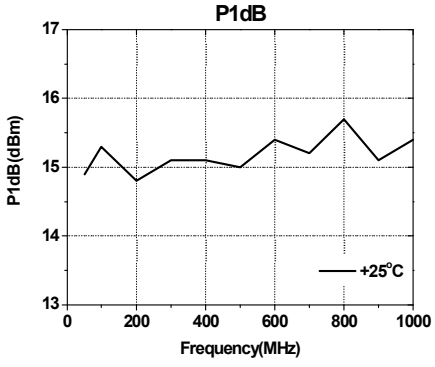


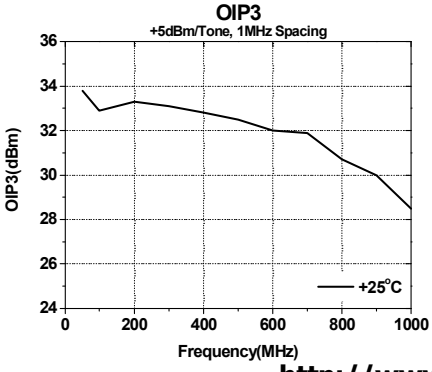




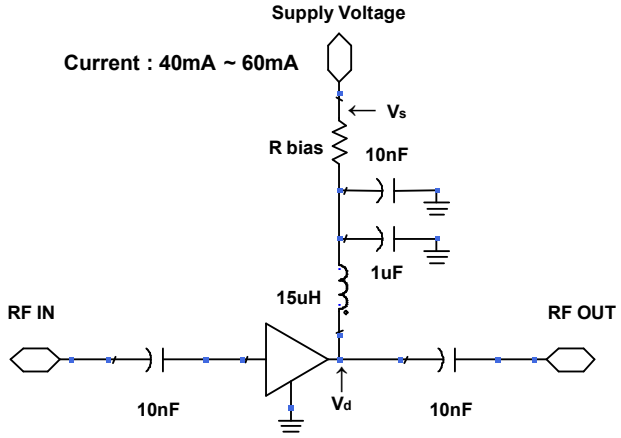








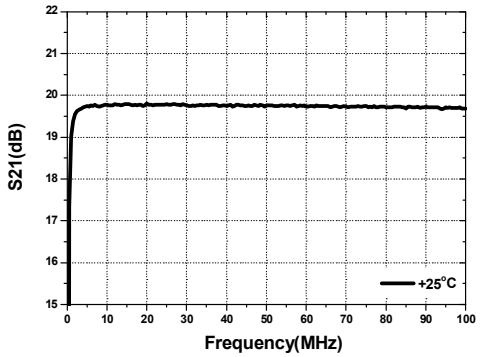
5 -100MHz CATV Application Circuit



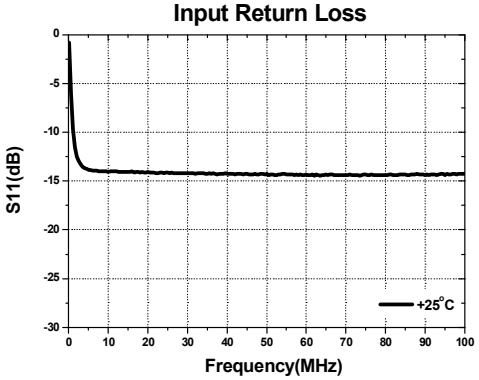
Recommended Bias Values

Supply Voltage	R bias Value	Size
5 V	22.0 Ω	1210
6 V	38.0 Ω	1210
8 V	68.0 Ω	2010
10 V	100.0 Ω	2010
12 V	130.0 Ω	2512
Rbias = (Vs – Vd) / Id		

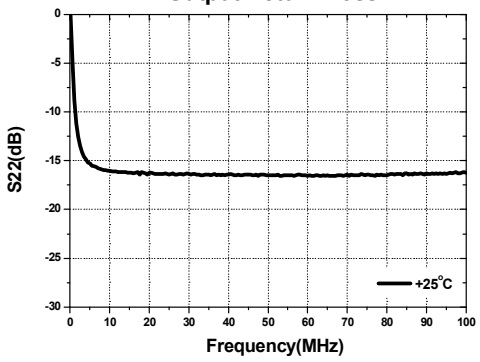
Gain



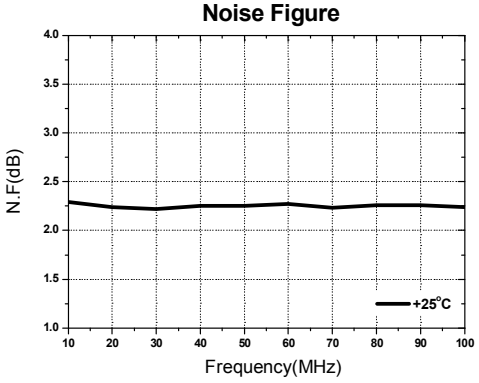
Input Return Loss



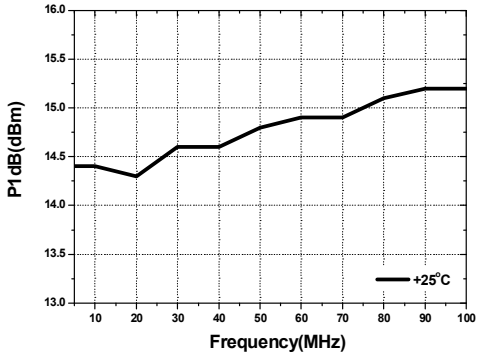
Output Return Loss



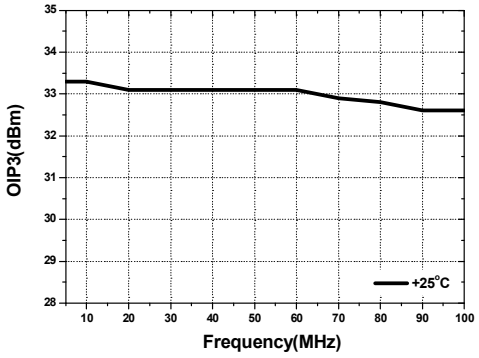
Noise Figure



P1dB



OIP3

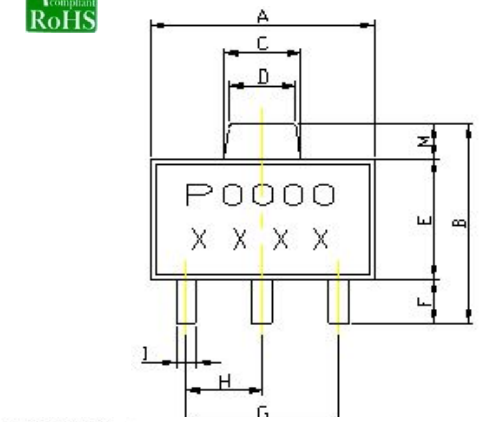


Absolute Maximum Ratings

Parameter	Rating	Unit
Device Voltage	+4	V
Device Current	150	mA
RF Power Input	8	dBm
Storage Temperature	-55 to +125	°C
Ambient Operating Temperature	-40 to +85	°C
Junction Temperature	160	°C

Operation of this device above any of these parameters may cause permanent damage.

Lead-free /RoHS Compliant / Green SOT-89 Package Outline

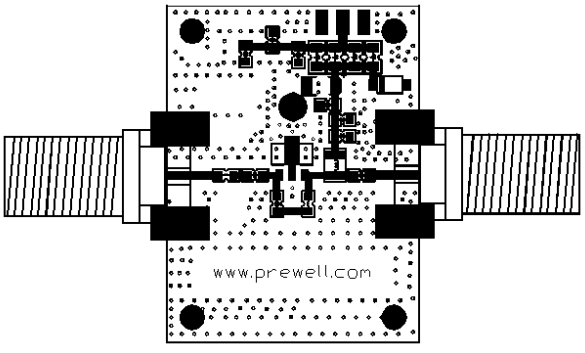


REF	DIMENSIONS Millimeters	
	Min.	Max.
A	4.40	4.60
B	4.05	4.25
C	1.50	1.70
D	1.30	1.50
E	2.40	2.60
F	0.89	1.20
G	3.00 REF.	
H	1.50 REF.	
I	0.40	0.52
J	1.40	1.60
K	0.35	0.41
L	5° TYP.	
M	0.70 REF.	

ESD / MSL Ratings

1. ESD sensitive device.
   Observe Handling Precautions.
2. ESD Rating : Class 2(Passes at 2000V min.)
   Human Body Model (HBM), JESD22-A114
3. ESD Rating : Class IV (Passes at 1000V min.)
   Charged Device Model (CDM), JESD22-C101
4. MSL (Moisture Sensitive Level) Rating : Level 3
   at +260°C Convection reflow, J-STD-020

Evaluation Board Layout (30x40)



Mounting Instructions

1. Use a large ground pad area with many plated through-holes as shown.
2. We recommend 1 oz copper minimum.
3. Measurement for our data sheet was made on 1.6mm thick FR-4 Board.
4. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
5. RF trace width depends on the board material and construction.
6. Add mounting screws near the part to fasten the board to a heatsink.