

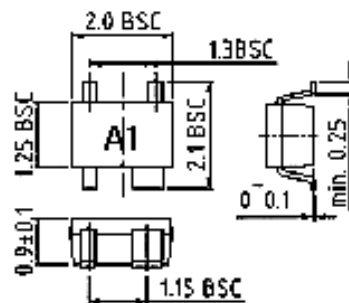
**SiGe HBT MMIC
Wideband Linear Amplifier**

Descriptions

TARF 2201 is a high performance cascadeable 50-ohm amplifier. This RFIC uses the latest Silicon Germanium Hetero Junction Bipolar Transistor (TAHB09) process of Tachyonics Co., which has 30GHz f_T (Normal). TARF2201 uses a Darlington pair topology with resistive feedback for broad band performance as well as stability over its entire temperature range. TARF2201 also has internally matched 50 ohm impedance and wide bandwidth.

Features

- DC to 3000 MHz Operation
- Internally matched to 50 Ohm Input & Output
- Single Voltage Supply
- Output 1dB compression point : 12dBm at 900MHz

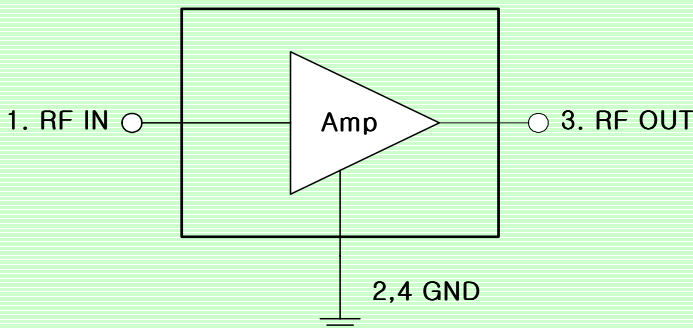


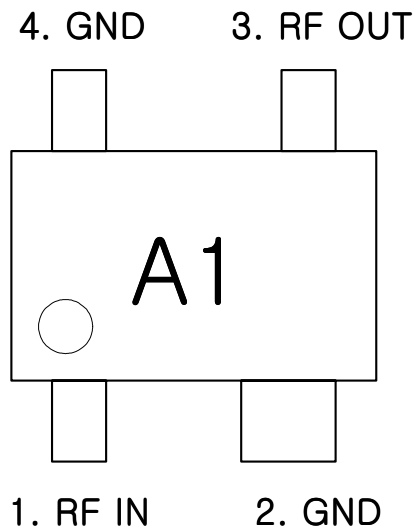
SOT343

Applications

- Oscillator Amplifier
- Final Power Amplifier for Low Power Application
- IF/RF Buffer Amplifier
- Driver for CATV Amplifier

General Function Block Diagram



Pin Configuration**Pin Description**

Pin No.	Name	Description
1	RF IN	RF signal input pin
2	GND	GROUND
3	RF OUT	RF signal output pin
4	GND	GROUND

Absolute Maximum Ratings

Parameter	Rating	unit
Supply Voltage	6	V
Supply Current	50	mA
Operating Temperature	-40 to +85	°C
Storage Temperature	-55 to +150	°C
Maximum Input power	+10	dBm
Maximum Junction Temperature	+150	°C

Electrical Characteristics(T_A=25°C, V_{CC}=3V, Z_L=Z_S=50Ω)

Symbol	Description	Condition	Specification			Unit
			Min	Typ.	Max	
S ₂₁	Small Signal gain	f = 900 MHz f = 1900 MHz	13.5 12.5	14.5 13.5	- -	dB
P _{1dB}	Output 1dB Compression Point	f = 900 MHz f = 1900 MHz	10 10	11.5 11.5	- -	dBm
RL _{IN}	Input Return Loss	f = 900 MHz f = 1900 MHz	15 13	20 18	- -	dB
RL _{OUT}	Output Return Loss	f = 900 MHz f = 1900 MHz	15 13	20 18	- -	dB
OIP ₃	Output 3'rd Order Intercept Point	f ₁ = 899 MHz, f ₂ =901MHz	20	24	-	dBm
		f ₁ = 1900 MHz, f ₂ =1901MHz	20	24	-	dBm
NF	Noise Figure	f = 900 MHz f = 1900 MHz	- -	4.4 4.4	5.5 5.5	dB
ISL	Isolation	f = 900 MHz f = 1900 MHz	17 17	18.0 18.0	- -	dB
I _{cc}	Bias Current	V _{cc} =3V	-	35	45	mA

Typical Characteristics

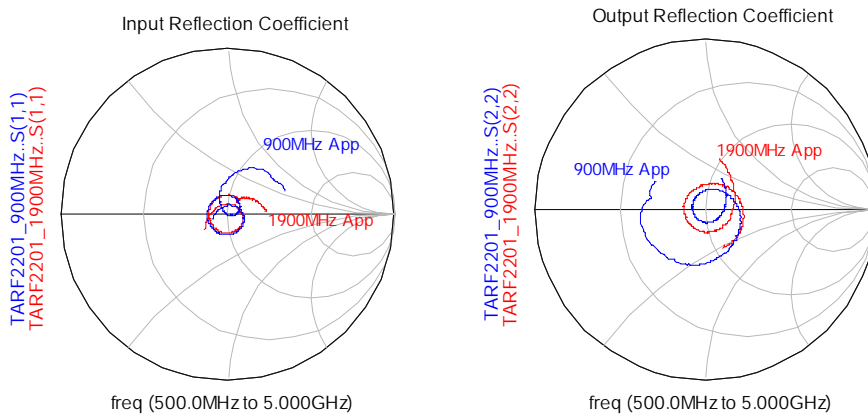


Fig1. Input/Output Impedance

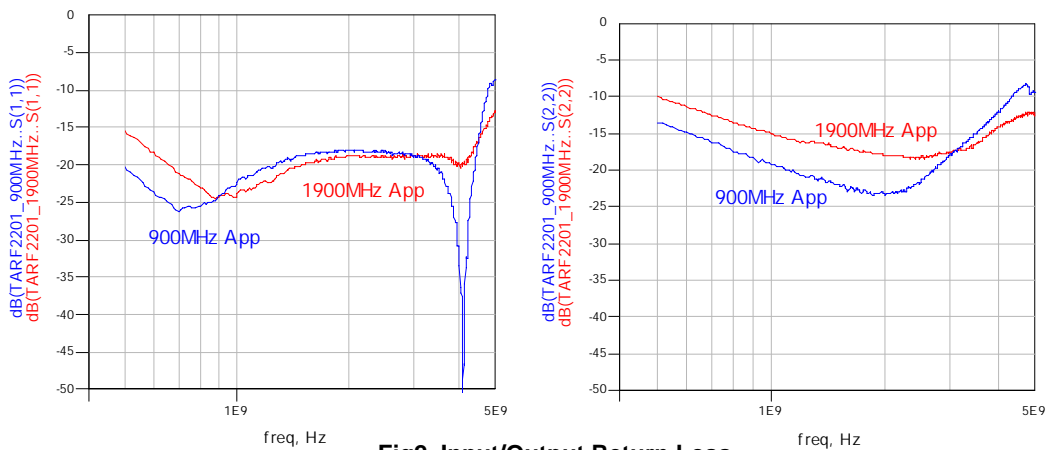


Fig2. Input/Output Return Loss

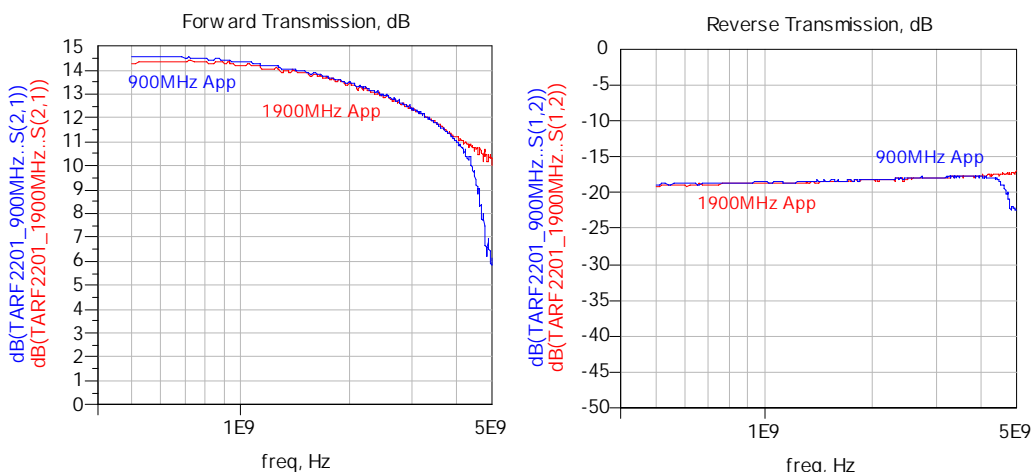


Fig3. Small Signal Gain

Fig4. Isolation

Typical Characteristics

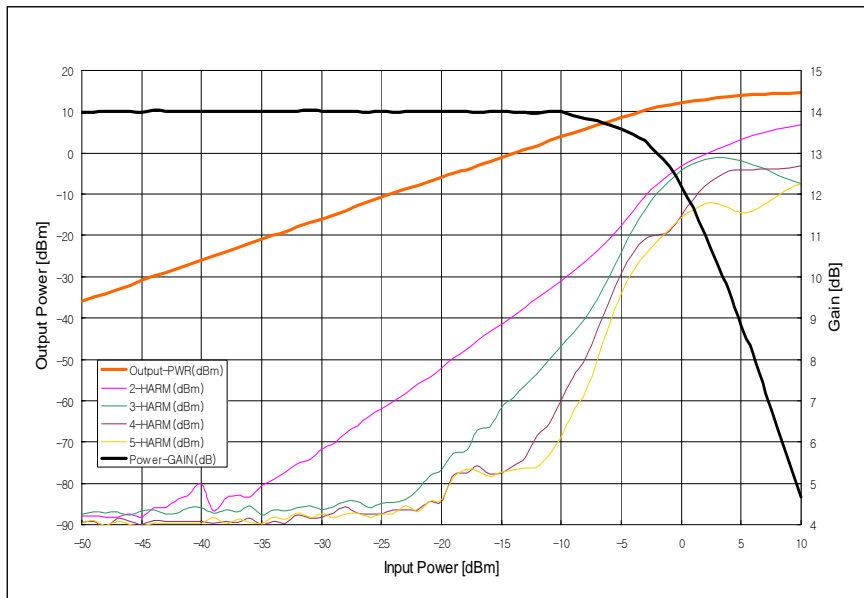


Fig5. 900MHz One Tone Power Sweep

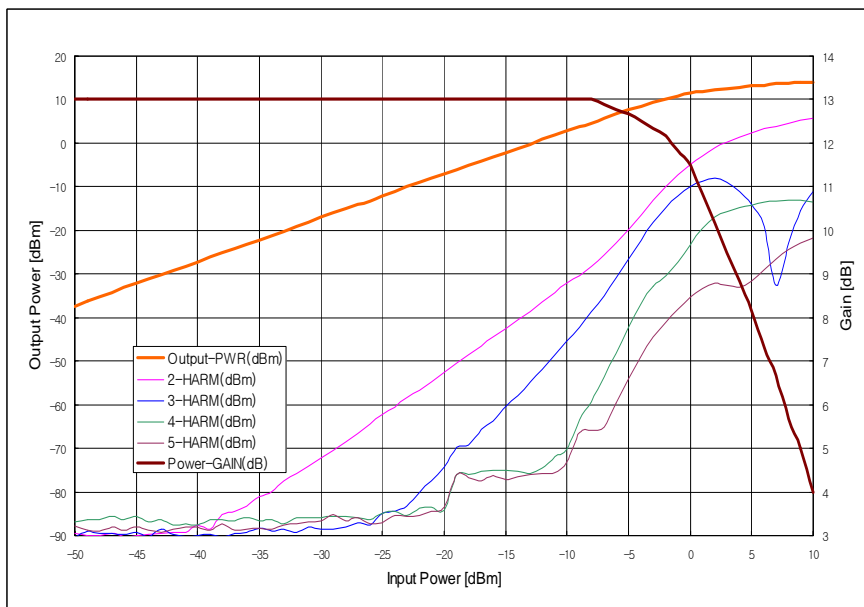


Fig6. 1900MHz One Tone Power Sweep

Typical Characteristics

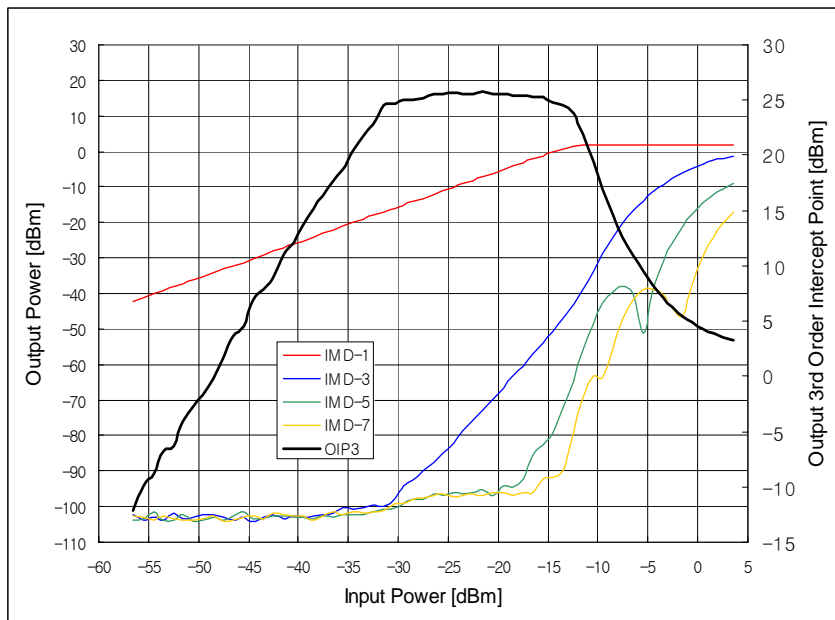


Fig7. 900MHz Two Tone Power Sweep

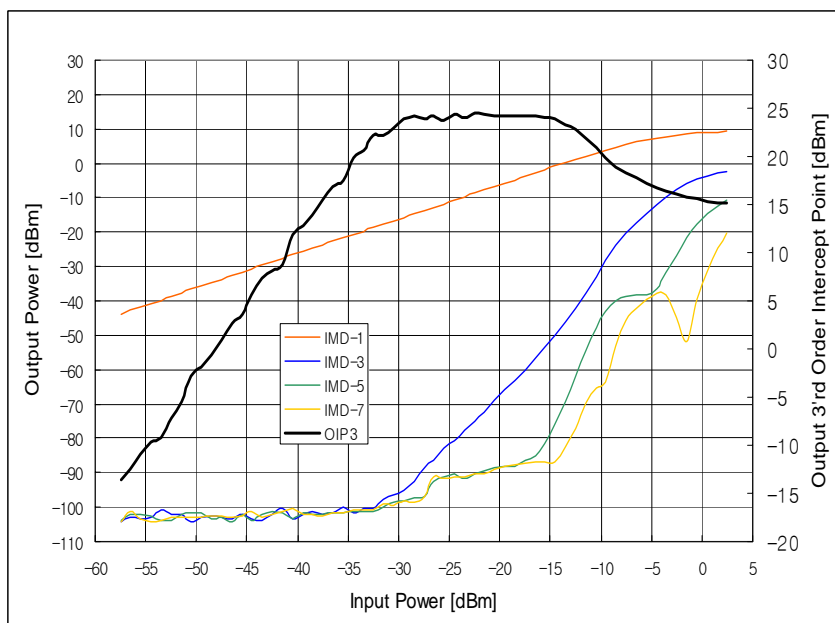
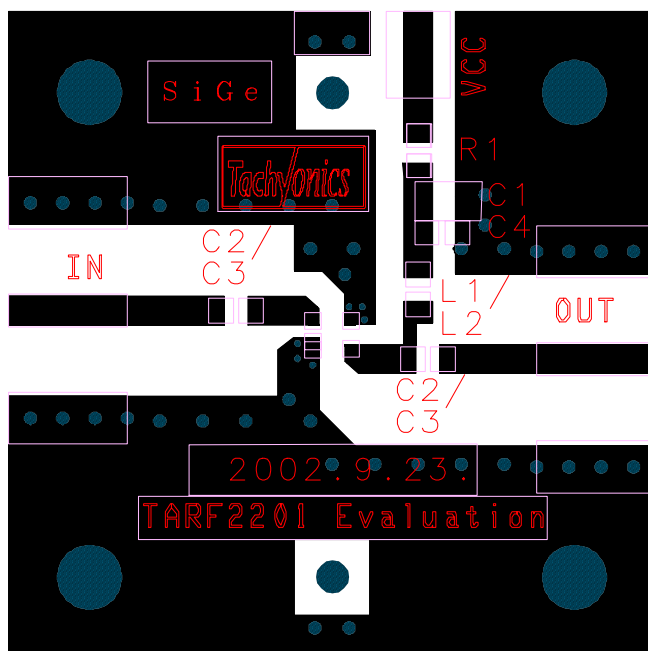


Fig8. 1900MHz Two Tone Power Sweep

Evaluation Board Layout

Board Size 30 x 30 mm²**NOTE**

Board Thickness 0.8mm
 Board Material FR4
 Multi-Layer or Double Layer

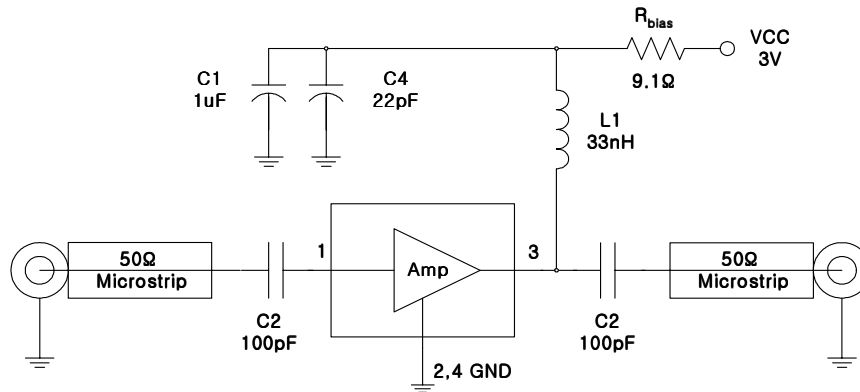
Component List

Name	Value	Remark
C1	1uF	Need to be well matched for bias
C2	100pF	Need to be well matched for 900MHz
C3	68pF	Need to be well matched for 1900MHz
C4	22pF	Need to be well matched for bias
L1	33nH	Need to be well matched for 900MHz
L2	22nH	Need to be well matched for 1900MHz
R1	9.1Ω	Need to be well matched for bias

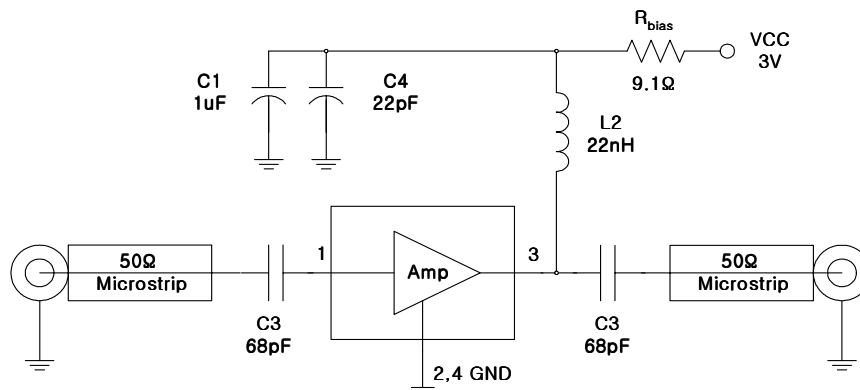
NOTE Application Schematic Ref.

Application Schematic

Application Schematic for Operation at 900MHz



Application Schematic for Operation at 1900MHz



Recommended Bias Resistor Values

V _{CC} [V]	I _{CC} [A]	R _{bias} [Ω]
3	0.035	9.1
4	0.035	39.0
5	0.035	68.0
6	0.035	100.0

R_{bias} Calculation

$$R_{\text{bias}} = (V_{\text{CC}} - 2.7) / I_{\text{CC}}$$