

## SiGe HBT MMIC Wideband Linear Amplifier

### Descriptions

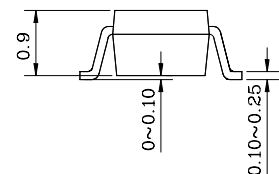
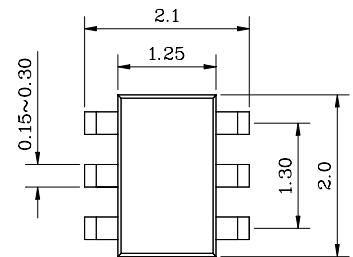
THM2004J is a high performance cascadeable 50-ohm amplifier. This RFIC uses the latest Silicon Germanium Hetero Junction Bipolar Transistor (TAHB09) process of Tachyonics Co., which has 30GHz  $f_T$ (Normal). THM2004J uses a multi feedback cascade amplifier topology with resistive feedback for broad band performance as well as stability over its entire temperature range. THM2004J also has internally matched 50 ohm impedance and wide bandwidth.

### Features

- Wide band operation :  $f_{3dB} = 2.2\text{GHz}$
- Single Voltage Supply
- Internally Matched to 50 Ohm Input & Output
- High Power Gain : 25dB at 1000MHz
- Saturated Output Power :  $P_{o(sat)} = +12\text{dBm}$  at 1000MHz

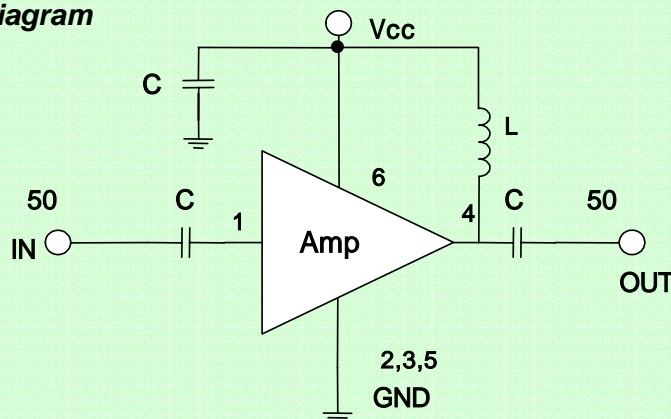
### Applications

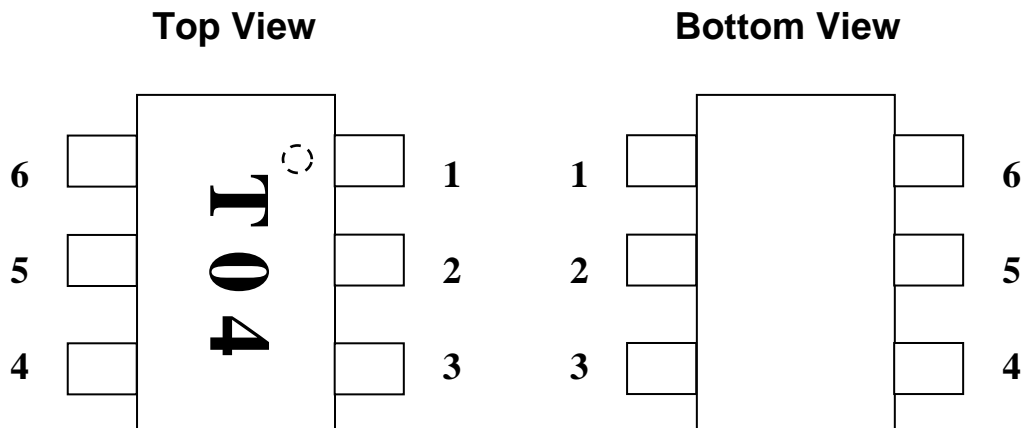
- DBS, LNB , Medium Output
- Transmission Stage Buffer (Mobile Communication)
- IF/RF Buffer Amplifier



SOT363

### Function Block Diagram



**Pin Configuration****Pin Description**

Pin No.	Name	Description
1	IN	RF SIGNAL INPUT
2	GND	GROUND
3	GND	GROUND
4	OUT	RF SIGNAL OUTPUT
5	GND	GROUND
6	VCC	POWER SUPPLY

**Absolute Maximum Ratings**

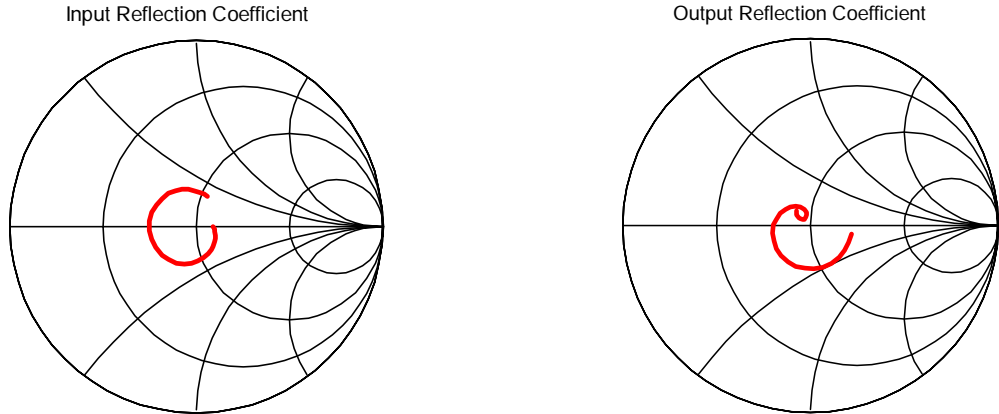
Parameter	Rating	Unit
Supply Voltage	6	V
Supply Current	60	mA
RF Input Power	+10	dBm
Operation Temperature Range	-40 to +85	
Maximum Junction Temperature	+150	
Storage Temperature Range	-55 to +150	

**Electrical Characteristics**

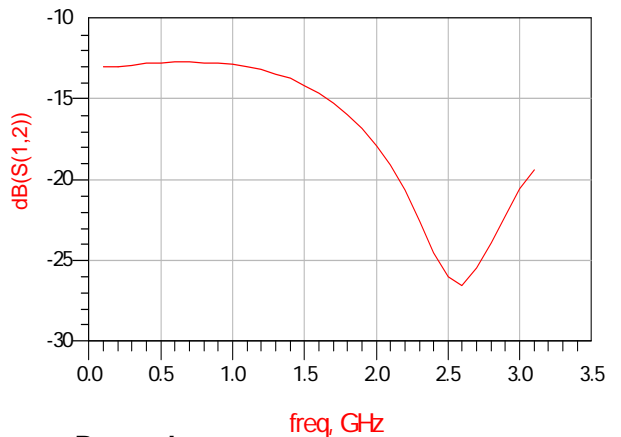
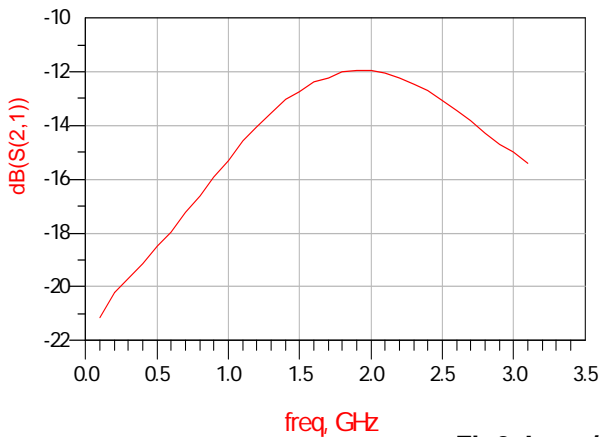
( $T_A = 25$  ,  $V_{CC} = 5V$  ,  $L1 = 220nH$  ,  $Z_S = Z_L = 50\Omega$ )

Symbol	Parameter	Condition	Specification			Unit
			Min.	Typ.	Max.	
$f_{3dB}$	Upper 3dB cut off frequency		2000	2200	-	MHz
$G_p$	Power Gain	$f = 1000MHz$	22	25	27	dB
$P_{O(sat)}$	Saturated output power	$f = 1000MHz$	+9	+12	-	dBm
$RL_{IN}$	Input Return Loss	$f = 1000MHz$	9	16	-	dB
$RL_{OUT}$	Output Return Loss	$f = 1000MHz$	7	13	-	dB
NF	Noise Figure	$f = 1000MHz$	-	4.0	6.0	dB
ISL	Isolation	$f = 1000MHz$	26	32	-	dB
$I_{CC}$	Bias Current	No Input Signal	19	25	32	mA

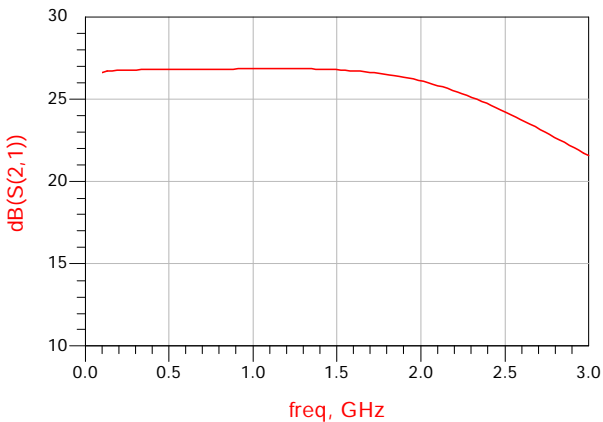
**Typical Characteristics**



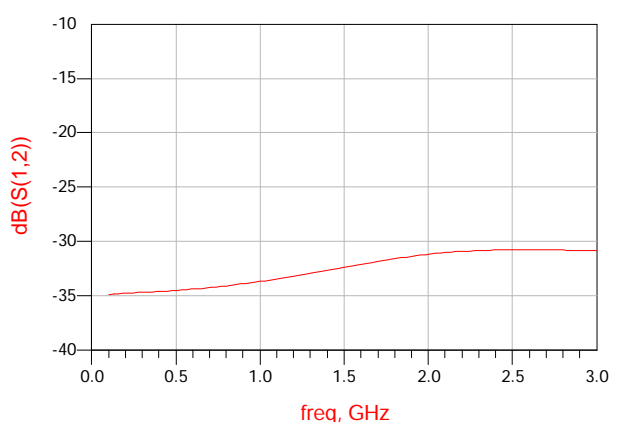
**Fig1. Input/Output Impedance**



**Fig2. Input/Output Return Loss**



**Fig3. Small Signal Gain**



**Fig4. Isolation**

Typical Characteristics

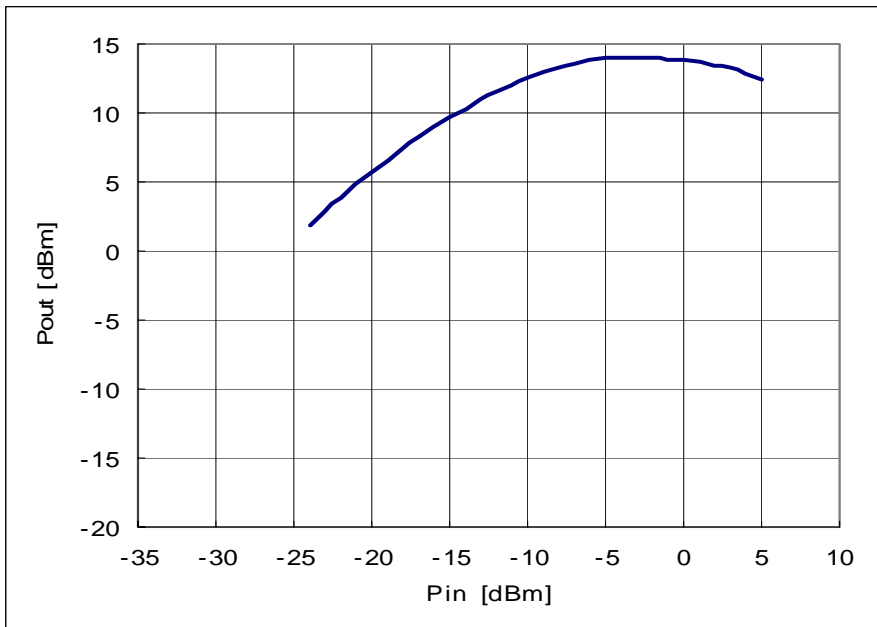


Fig5. 1000MHz Power Sweep

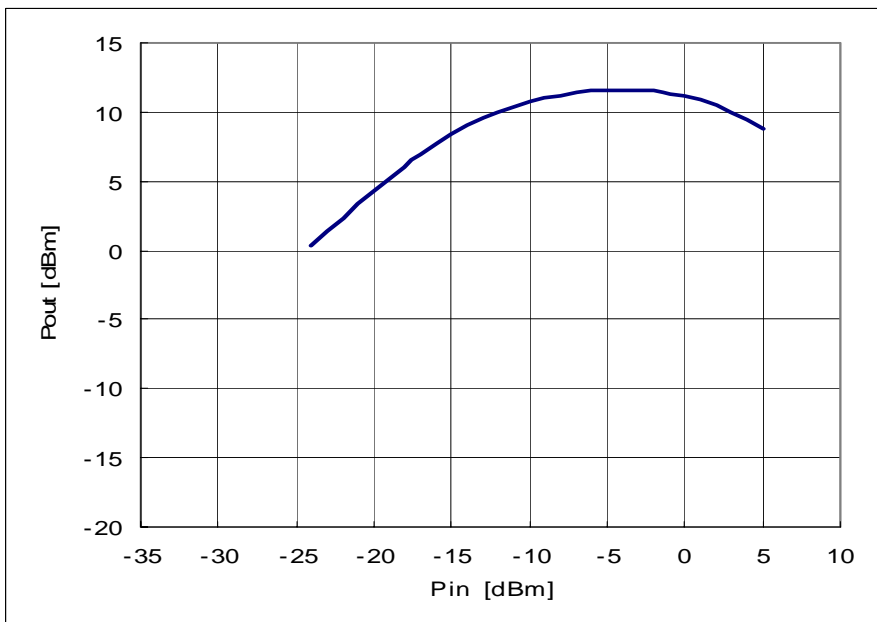
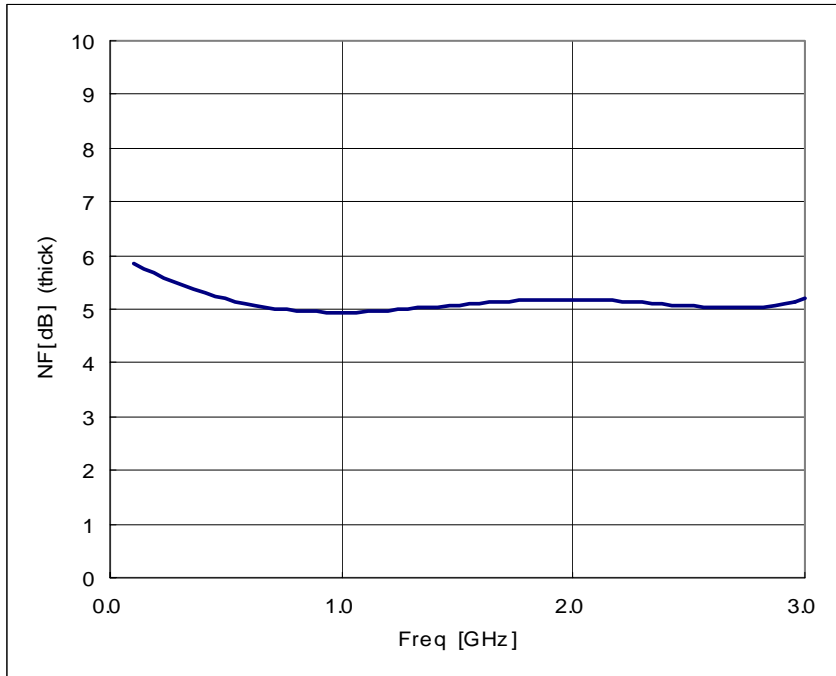


Fig6. 2000MHz Power Sweep

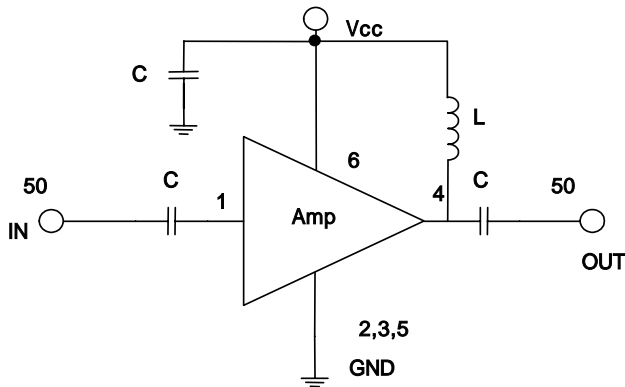
**Typical Characteristics**



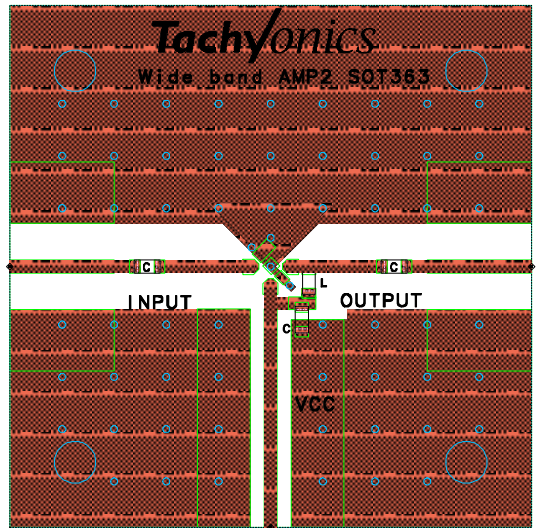
**Fig7. Noise Figure**

**Test Circuit**

**Evaluation Board**



Board Size 30 x 30 mm<sup>2</sup>



**NOTE**  
 Board Thickness 0.3mm  
 Board Material FR4  
 Double Layer

**Component List**

Name	Value	Remark
C	1000 pF	100MHz or higher frequency
L	220 nH	100MHz or higher frequency