

**Product Features**

Operating frequency: 30MHz ~ 4GHz

Gain: 19.7dB@1.8GHz

Noise Figure: 4.0dB@1.8GHz

Output Third-Order Interception:

32.9dBm@0.9GHz

30.9 dbm@1.8GHz

Output Power for 1dB Compression:

21.7 dBm@0.9GHz

21.1 dBm@1.8GHz

Additive Phase Noise:

-162dBc/Hz@1KHz

-165dBc/Hz@10KHz

Supply Current: 72mA @ Vdd=+5V

Package: SOT89

**Application**

Cellular

PCS

GSM

Satellite Navigation

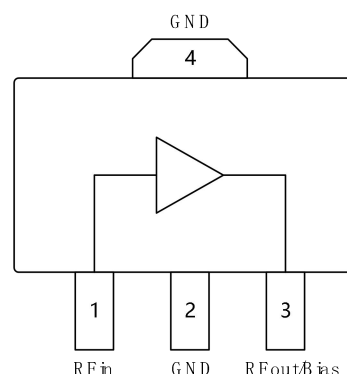
IF Amplifier

**Ordering Information**

Part Number	Package	Description
BR9108TA	SOT89	30MHz~4GHz Gain Block/Amplifier

**General Description**

The BR9108TA is a MMIC monolithic amplifier using GaAs process. The amplifier is internally matched to 50 ohms with frequency range of 30MHz ~ 4GHz, and only require an external RF choke and blocking/bypass capacitors. The amplifier contains on-chip active bias network to ensure that the quiescent current is not affected by the process and temperature. The product, with +5V single power supply, provides high reliability, high linearity, low phase noise, small package, etc., which makes the product to be applied in systems with high dynamic range application and in circuits that require high signal integrity for crystal oscillator amplification and local oscillator signal amplification.

**Functional Block Diagram**


**Electrical Specifications**

Parameter	Conditions	Min.	Typ.	Max.	Units
Gain	0.03 GHz	-	21.6	-	dB
	2GHz	-	19.4	-	dB
	4GHz	-	17.0	-	dB
Output Power for 1dB Compression	0.03 GHz	-	20.9	-	dBm
	2GHz	-	18.3	-	dBm
	4GHz	-	16.5	-	dBm
Output Third-Order Interception	0.03 GHz	-	33.6	-	dBm
	2GHz	-	30.5	-	dBm
	4GHz	-	25.9	-	dBm
Noise Figure	0.03 GHz	-	3.5	-	dB
	2GHz	-	3.9	-	dB
	4GHz	-	4.6	-	dB
Input Return Loss	2GHz	-	-15.7	-	dB
	4GHz	-	-14.3	-	dB
Output Return Loss	2GHz	-	-13.3	-	dB
	4GHz	-	-10.6	-	dB
Supply Voltage	-	-	5	-	V
Supply Current	-	-	72	-	mA

Test Condition: Vdd=+5V, I=72mA, OIP3 spacing=1MHz, Pout=0dBm/tone, TA=+25°C

**Absolute Maximum Ratings**

Maximum Supply voltage (Vdd): +5.5V

Maximum RF Input Power: 20dBm( $\leq$ 3GHz)  
18dBm( $>$  3GHz)**Recommended Operating Conditions**

Supply Voltage: +5V

Supply Current: 72mA

Operating Temperature: -55°C ~ +125°C

Storage Temperature: -65°C ~ +150°C

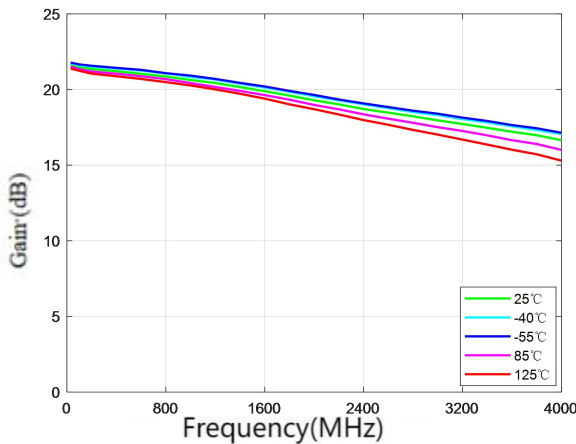
Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and. exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

**ESD WARNING****ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

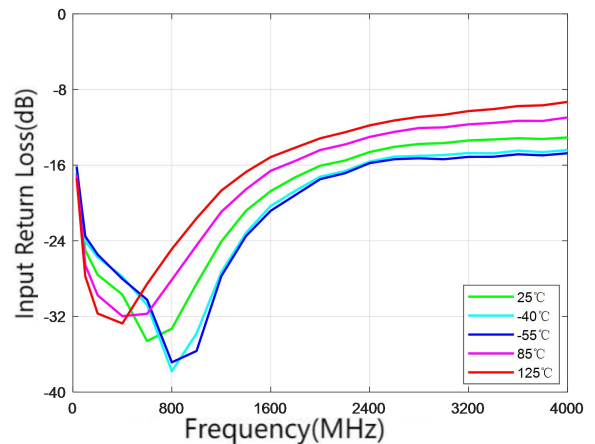
Typical Performance (EVB test results)

Parameters	Typ.												Units
	30	100	200	400	600	800	1000	1200	1400	1600	1800	2000	
Frequency	30	100	200	400	600	800	1000	1200	1400	1600	1800	2000	MHz
Gain	21.6	21.5	21.4	21.2	21.1	20.9	20.7	20.5	20.3	20.0	19.7	19.4	dB
Input Return Loss	-16.8	-23.6	-25.2	-28.0	-31.9	-33.7	-28.5	-23.7	-20.3	-18.3	-16.8	-15.7	dB
Output Return Loss	-23.3	-22.7	-23.1	-23.3	-22.5	-20.7	-19.1	-17.5	-16.1	-14.9	-14.0	-13.3	dB
Reverse Isolation	-23.0	-23.1	-23.0	-22.9	-23.0	-23.1	-23.2	-23.1	-23.2	-23.2	-23.2	-23.3	dB
Output Power for 1dB Compression	20.9	21.5	21.7	21.6	21.6	21.7	21.8	21.8	21.6	21.0	21.1	18.3	dBm
Output Third-Order Interception	33.6	34.0	34.4	35.0	34.0	33.2	32.7	33.0	32.1	30.9	30.9	30.5	dBm
Noise Figure	3.5	3.5	3.4	3.5	3.6	3.6	3.7	3.8	3.9	3.9	4.0	3.9	dB
Frequency	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	2000	MHz
Gain	19.4	19.1	18.9	18.6	18.4	18.2	18.0	17.7	17.5	17.2	17.0	19.4	dB
Input Return Loss	-15.7	-15.1	-14.4	-14.1	-14.0	-14.1	-14.1	-14.2	-14.2	-14.4	-14.4	-15.7	dB
Output Return Loss	-13.3	-12.9	-12.6	-12.3	-12.0	-12.0	-11.7	-11.6	-11.4	-11.0	-10.6	-13.3	dB
Reverse Isolation	-23.3	-23.2	-23.3	-23.3	-23.2	-23.1	-23.4	-23.3	-23.3	-23.6	-23.2	-23.3	dB
Output Power for 1dB Compression	18.3	19.3	19.9	19.0	18.4	17.6	17.4	17.5	17.1	16.1	16.5	18.3	dBm
Output Third-Order Interception	30.5	30.0	29.2	28.8	28.7	28.3	27.1	27.1	26.9	25.9	25.9	30.5	dBm
Noise Figure	3.9	3.9	4.2	4.2	4.3	4.4	4.4	4.4	4.4	4.4	4.6	3.9	dB

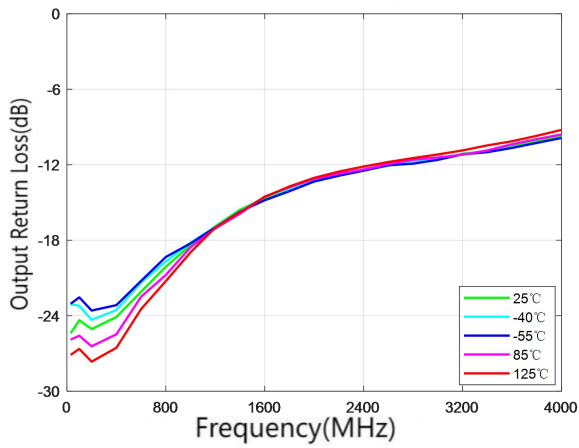
Test Condition: Vdd=+5V, I=72mA, OIP3 spacing=1MHz, Pout=0dBm/tone, TA=+25°C



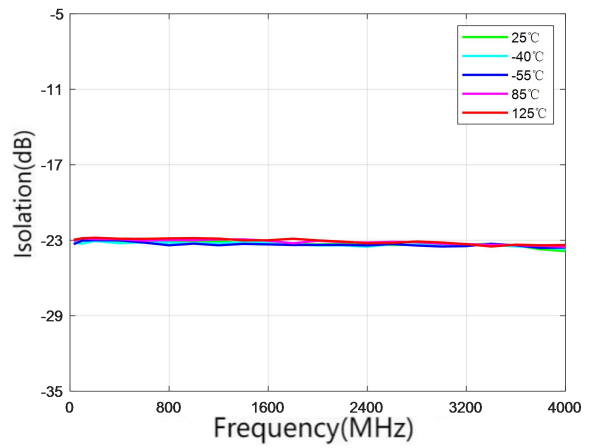
Gain



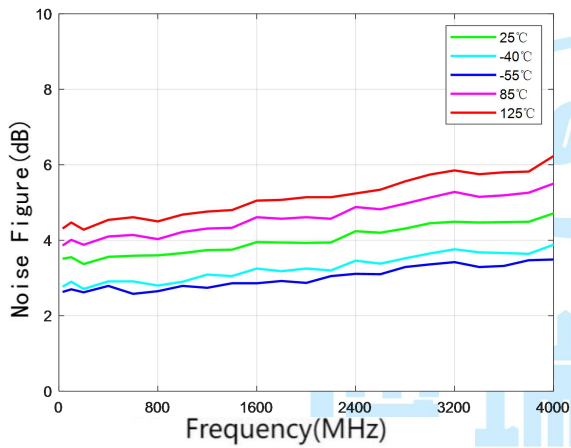
Input Return Loss



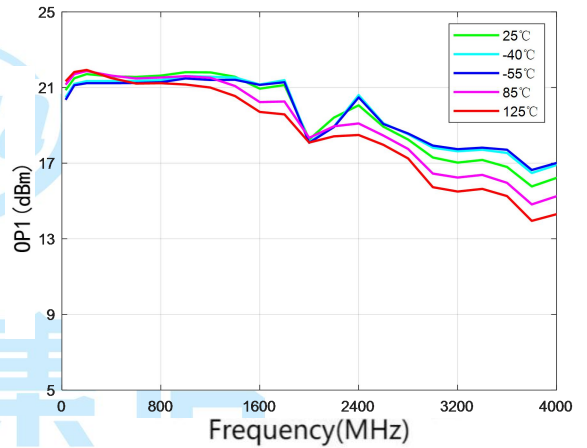
Output Return Loss



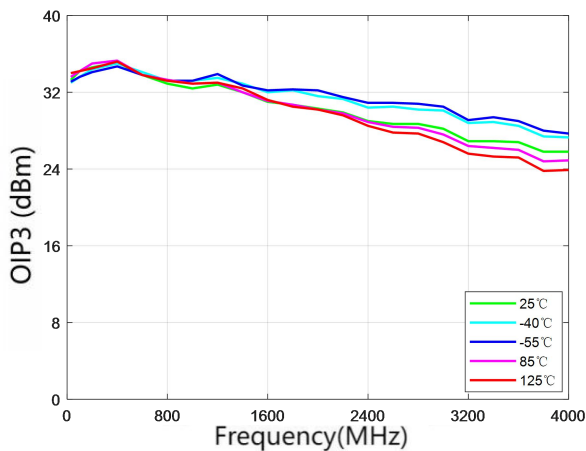
Reverse Isolation



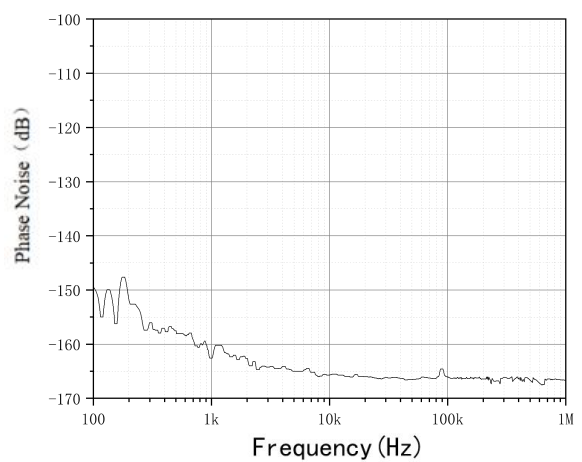
Noise Figure



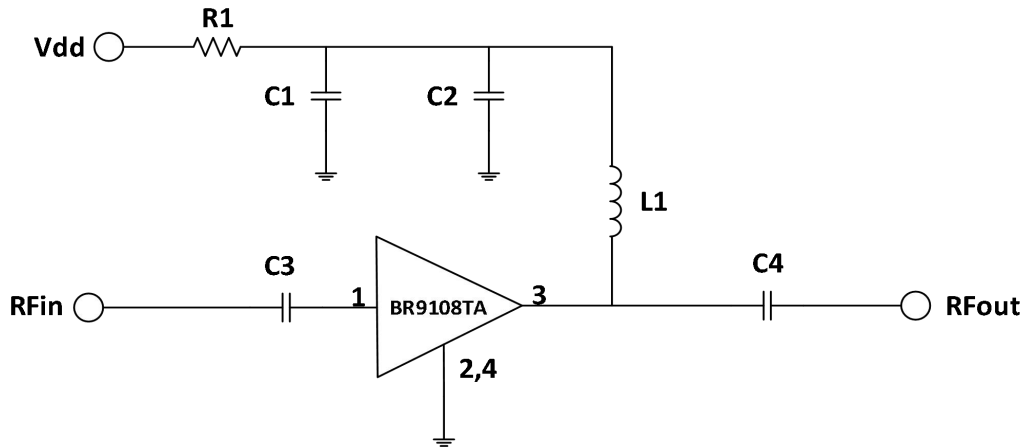
Output Power for 1dB Compression



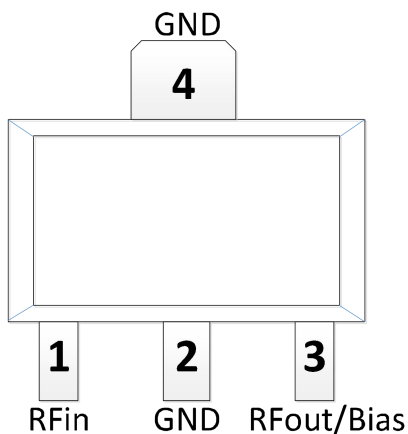
Output Third-Order Intercept



Additive phase noise VS frequency offset,  
f=10MHz, Pin=-2dBm

**Typical Application Schematic**

**Bill of Material**

Reference Designator	Package Size	Value	P/N
L1	1008	1.1uH	1008AF-112XJEB
C1	0402	100nF	GRM155R61A104KA01D
R1	0402	0 Ω	RC0402JR-070RL
C2~C4	0402	2.2nF	GRM155R71H222JA01D

**Pin Configuration and Description**


Pin Number	Pin name	Description
1	RFin	RF Input pin. A DC Block is required.
2,4	GND	RF/DC Ground pin. Use recommended via pattern to minimize inductance and thermal resistance; See PCB Mounting Pattern for suggested footprint.
3	RFout/Bias	RF Output pin. DC bias will also need to be injected through a RF bias choke/inductor for operation.

