

Product Features

Operating Frequency: 30MHz ~ 4GHz

Gain : 18.9dB@900MHz@5V

Output Power for 1dB Compression:

22.1dBm@900MHz @5V

Noise Figure: 0.65dB@900MHz@5V

Output Third-Order Intercept:

32.4dBm@900MHz@5V

Vdd=5V, static current 46mA

Vdd=3V, static current 23mA

Package: SOT89 (plastic seal)

Application

Communication Base Stations

Test and Measurement Equipment

Point-to-point Communication

Navigation Equipment

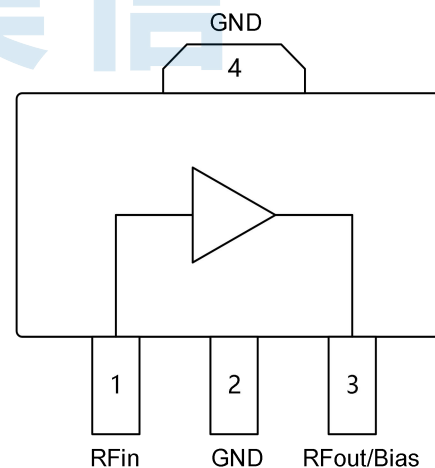
Ordering Information

Part Number	Package	Description
BR9123TA	SOT89	30MHz ~ 4GHz Low Noise Amplifier

General Description

BR9123TA is a high performance MMIC low noise amplifier chip designed based on GaAs process. The product can cover the frequency range of 30MHz ~ 4GHz, and has been matched to 50 ohms. The RF input and output ports only need to be isolated by the capacitor, and the on-chip active bias network ensures that the static current is not affected by the threshold voltage and temperature. Using +3V to +5V single power supply Supply Voltage, has the characteristics of high stability, high linearity, low Noise Figure, high output power 1dB compression point and third-order cross modulation, making the product can be applied in the system with high dynamic range.

Functional Block Diagram



Electrical Specifications

Parameters	Min.	Typ.	Max.	Units	Test Conditions
Gain	-	22.4	-	dB	50MHz
	-	20.1	-	dB	700MHz
	-	12.8	-	dB	2500MHz
Output Power for 1dB Compression	-	21.8	-	dBm	50MHz
	-	21.9	-	dBm	700MHz
Output Third-Order Interception	-	30.1	-	dBm	50MHz
	-	32.3	-	dBm	700MHz
Noise Figure	-	1.83	-	dB	50MHz
	-	0.53	-	dB	700MHz
Input Return Loss	-	-13.9	-	dB	700MHz
Output Return Loss	-	-20.5	-	dB	700MHz
Reverse Isolation	-	-25.9	-	dB	700MHz
Operating Voltage	-	5	-	V	-
Static Current	-	46	-	mA	-
Test Conditions: Vdd=+5V, I=46mA, OIP3 spacing=1MHz, Pout=+0dBm/tone, Temp=+25°C					

Absolute Maximum Ratings

Maximum Operating Voltage (Vdd) : +6V

Maximum RF input Power: +15dBm

Recommended Operating Conditions

Power Supply Voltage: +3V ~ +5V

Storage Temperature: -65°C ~ +150°C

Operating Temperature: -55°C ~ +125°C

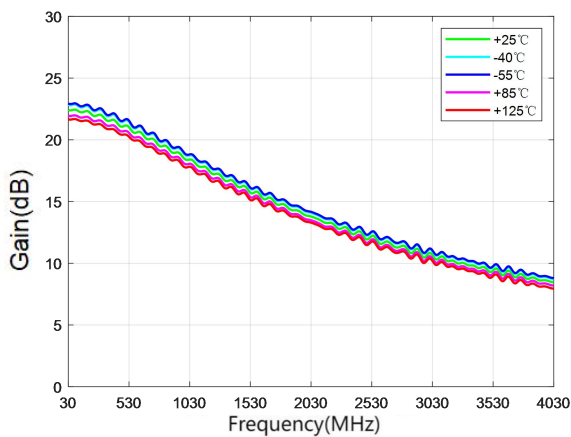
Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and. exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

ESD WARNING

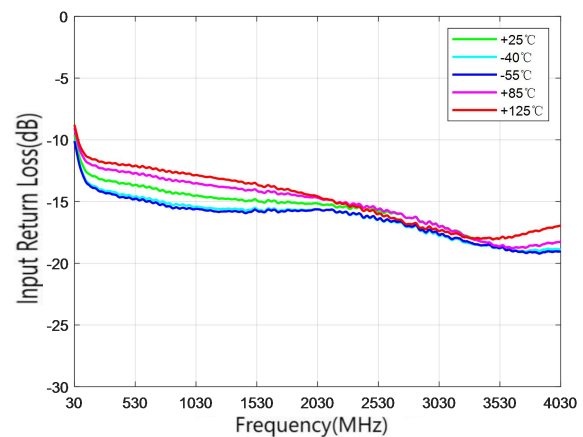
**ELECTROSTATIC SENSITIVE DEVICE****OBSERVE HANDLING PRECAUTIONS**

Typical Performance (EVB test results)

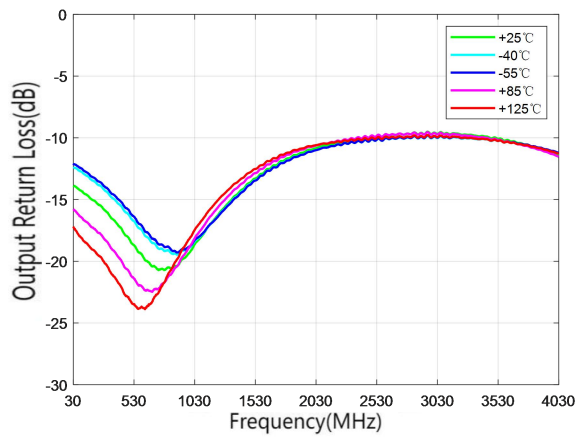
Parameters	Typ.							Units
Frequency	30	50	100	300	500	700	1000	MHz
Gain	22.4	22.4	22.4	22.0	21.1	20.1	18.4	dB
Input Return Loss	-9.6	-10.5	-12.0	-13.3	-13.6	-13.9	-14.5	dB
Output Return Loss	-13.9	-14.0	-14.6	-16.0	-18.4	-20.5	-19.1	dB
Output Power for 1dB Compression	20.1	21.8	21.9	21.9	21.6	21.9	22.1	dBm
Output-Third-Order Interception	28.9	30.1	30.7	31.8	32.4	32.7	31.4	dBm
Noise Figure	2.51	1.83	1.27	0.67	0.60	0.53	0.65	dB
Frequency	1250	1500	2000	2500	3000	3500	4000	MHz
Gain	17.7	16.1	13.8	12.0	10.8	9.3	8.5	dB
Input Return Loss	-14.8	-14.9	-15.2	-15.7	-16.8	-18.6	-19.0	dB
Output Return Loss	-15.9	-13.5	-10.9	-9.9	-9.6	-10.0	-11.3	dB
Output Power for 1dB Compression	22.0	21.9	22.6	22.6	22.9	23.2	22.9	dBm
Output Third-Order Interception	31.7	32.5	34.1	33.4	34.1	34.9	36.0	dBm
Noise Figure	0.64	0.64	0.81	0.81	0.80	0.95	0.87	dB
Test Condition: Vdd=+5V, I=46mA, OIP3 spacing=1MHz, Pout=+0dBm/100Hz, Temp=+25°C								



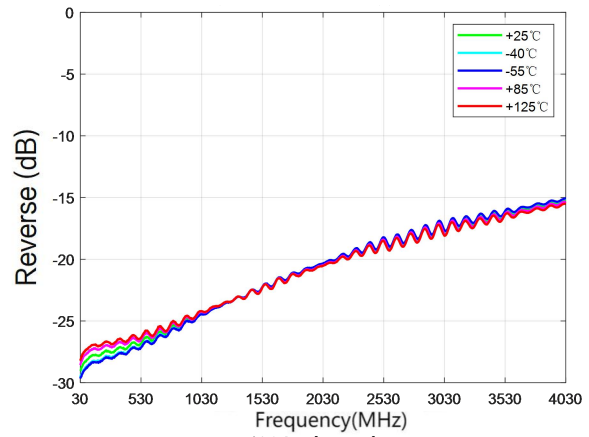
Gain vs. Freq



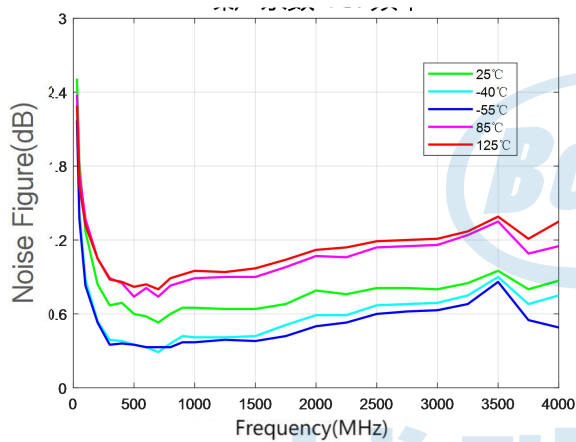
Input Return Loss vs. Freq



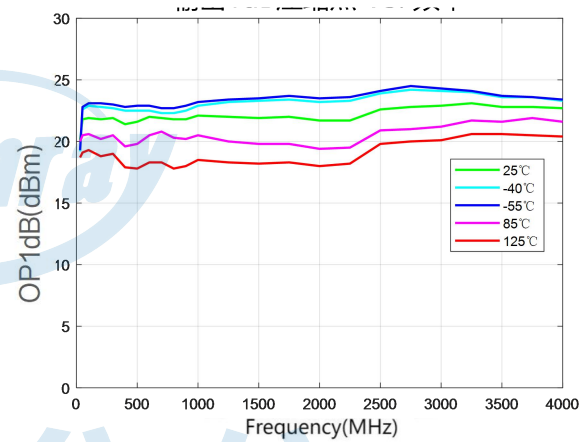
Output Return Loss vs. Freq



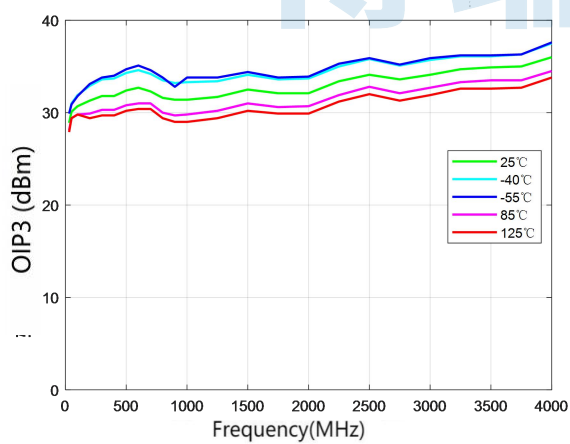
Reverse Isolation vs. Freq



Noise Figure vs. Freq



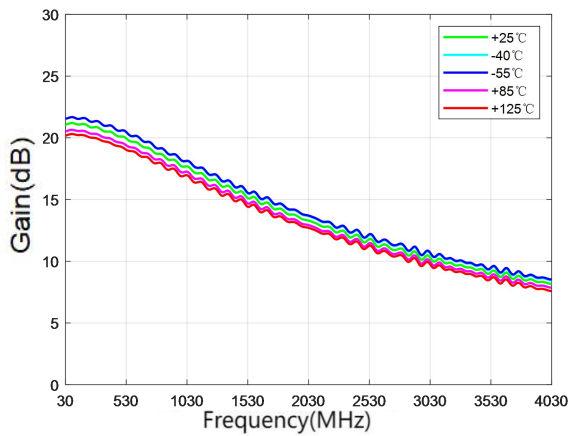
Output Power for 1dB Compression vs. Freq



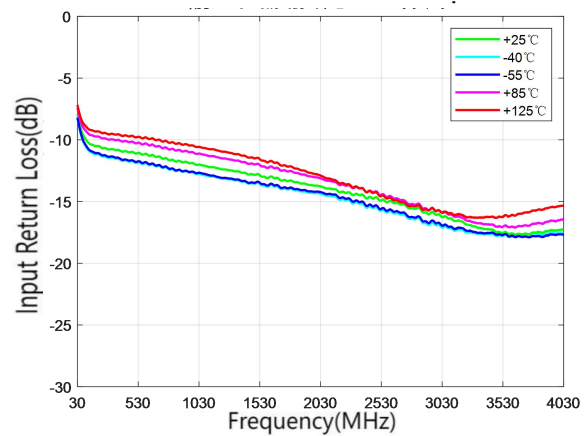
Output Third-Order Interception vs. Freq

Typical Performance (EVB test results)

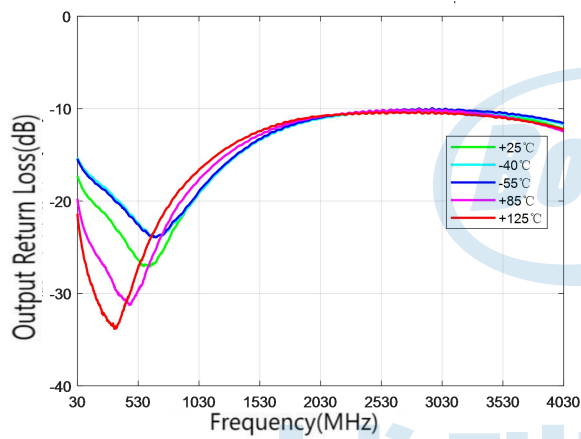
Parameters	Typ.							Units
Frequency	30	50	100	300	500	700	1000	MHz
Gain	21.1	21.1	21.2	20.8	20.1	19.2	17.7	dB
Input Return Loss	-7.9	-8.8	-10.0	-10.8	-11.1	-11.3	-12.0	dB
Output Return Loss	-17.3	-18.0	-19.3	-22.0	-25.8	-26.0	-19.7	dB
Output Power for 1dB Compression	13.6	18.0	18.5	18.3	18.1	18.2	18.8	dBm
Output-Third-Order Interception	23.2	24.7	24.9	25.3	25.7	25.3	24.6	dBm
Noise Figure	2.33	1.63	1.17	0.62	0.47	0.53	0.68	dB
Frequency	1250	1500	2000	2500	3000	3500	4000	MHz
Gain	16.6	15.4	13.4	11.6	10.4	9	8.2	dB
Input Return Loss	-12.4	-12.8	-13.7	-14.8	-16.0	-17.5	-17.3	dB
Output Return Loss	-16.0	-13.6	-11.2	-10.3	-10.1	-10.6	-12.1	dB
Output Power for 1dB Compression	18.5	18.8	19.6	20.0	20.2	19.6	19.4	dBm
Output-Third-Order Interception	24.9	25.7	25.0	27.0	27.0	27.8	29.1	dBm
Noise Figure	0.68	0.67	0.81	0.86	0.87	1.03	0.87	dB
Test Condition: Vdd=+3V, I=23mA, OIP3 spacing=1MHz, Pout=+0dBm/tone, Temp=+25°C								



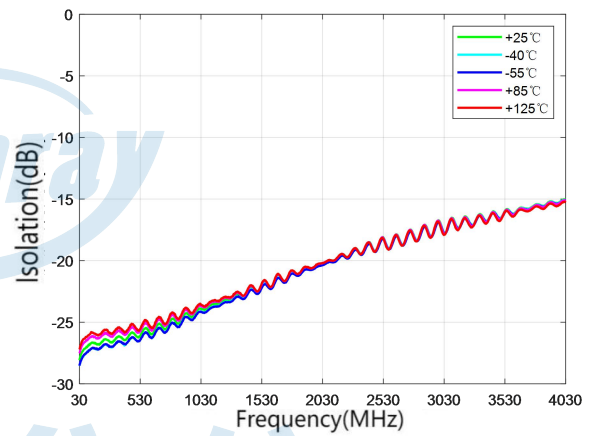
Gain vs. Freq



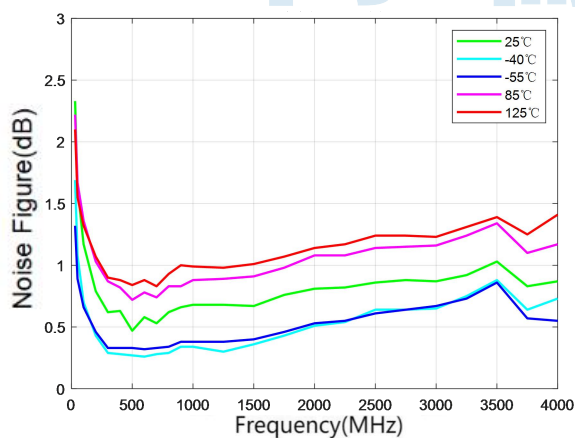
Input Return Loss vs. Freq



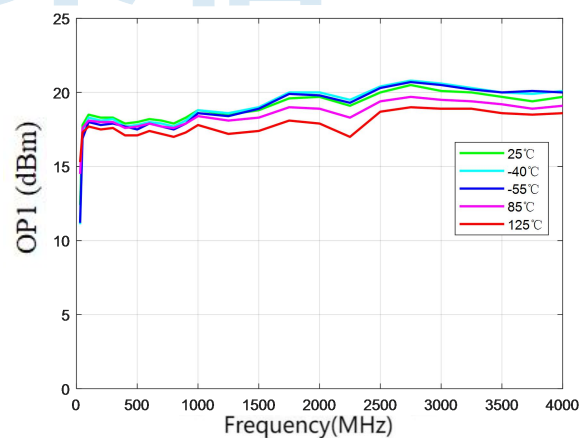
Output Return Loss vs. Freq



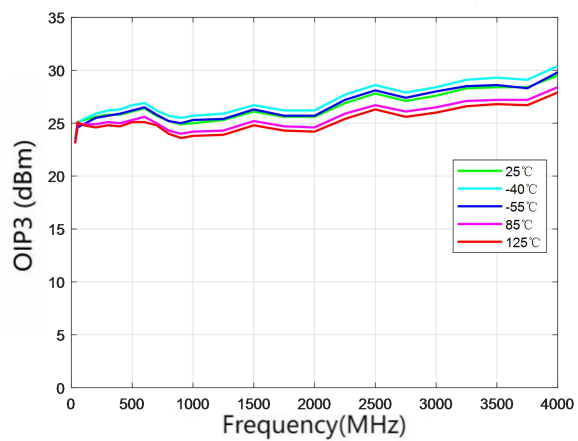
Reverse Isolation vs. Freq



Noise Figure vs. Freq



Output Power for 1dB Compression vs. Freq

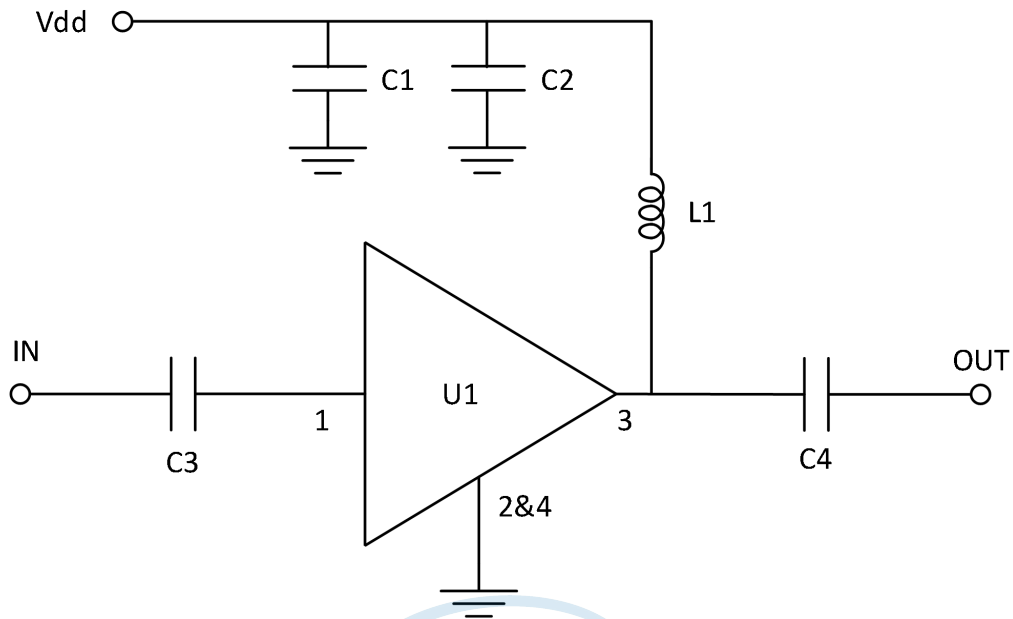


Output Third-Order Intercept



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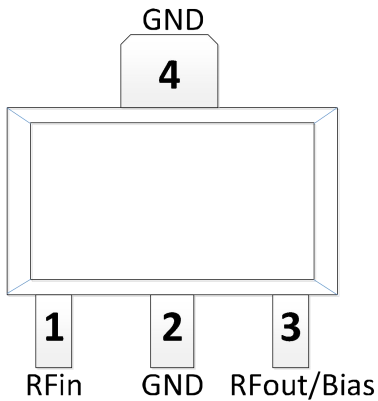
Typical Application Schematic



Bill of Material

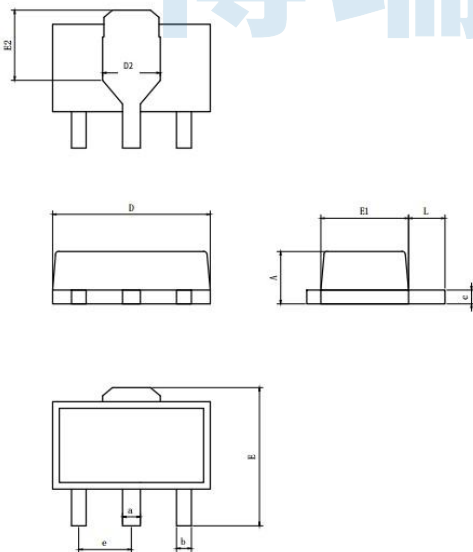
Reference Designator	Package Size	Value	P/N
U1	SOT89	30MHz ~ 4GHz	BR9123TA
C2	0402	100pF	GRM1555C1H101JA01D
C1, C3, C4	0402	1000pF	GRM1555C1H102JA01D
L1	1008	1.1uH	1008AF-112XJRB

Pin Configuration and Description



Pin Number	Pin Name	Description
1	RFin	Rf input pins; The pin is DC coupled and has been internally matched to 50 ohms, and only needs to be added with a spacer capacitor.
2,4	GND	Ground pins; This pin and the package substrate must be connected to the RF/DC ground.
3	RFout/Bias	Rf output pin; The pin is DC coupled and has been internally matched to 50 ohms, only need to add a isolating capacitor.

Package Dimensions (mm)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.40	1.50	1.60
b	0.37	0.42	0.45
c	0.38	--	0.42
a	0.45	0.48	0.51
D	4.40	4.50	4.60
E	4.00	4.10	4.20
E1	2.40	2.50	2.60
e	1.50BSC		
L	0.89	1.045	1.20
D2	1.50	1.60	1.70
E2	2.218	2.318	2.418