

Product Features

Operating Frequency: 30MHz ~ 4GHzw

Gain : 18.0dB@1GHz

Output Power for 1dB Compression:

20.5dBm@1GHz

Noise Figure: 0.64dB@1GHz

Output Third-Order Interception:

33.3dBm@1GHz

Vdd=5V, Static Supply Current 54mA

Vdd=3.3V, Static Supply Current 34mA

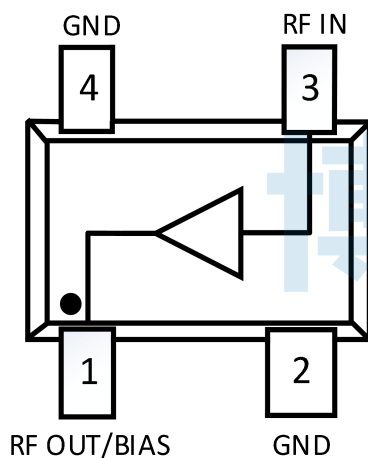
Vdd=3V, Static Supply Current 27mA

Package: SOT343 (plastic seal)

General Description

The BR95321TCJ is a high performance MMIC low noise amplifier designed based on the GaAs pHEMT process. The product can cover the frequency range of 30MHz ~ 4GHz, and the internal integrated temperature compensation network can be used in both the receiving system and the transmitting system. The product uses a +5V single power Supply Voltage, the chip matches to 50 ohms, RF input and output ports only need to be isolated capacitor. It has the characteristics of low dynamic current, low Noise Figure and high reliability.

Functional Block Diagram



Ordering Information

Part Number	Package	Description
BR95321TCJ	SOT343	30MHz ~ 4GHz Low Noise Amplifier

Electrical Specifications

Parameters	Min.	Typ.	Max.	Units	Test Condition
Gain	-	24.9	-	dB	50MHz
	-	13.0	-	dB	2000MHz
	-	8.1	-	dB	4000MHz
Output Power for 1dB Compression	-	20.5	-	dBm	1000MHz
	-	21.0	-	dBm	2000MHz
Output Third-Order Interception	-	33.3	-	dBm	1000MHz
	-	35.7	-	dBm	2000MHz
Noise Figure	-	0.76	-	dB	2000MHz
Input Return Loss	-	-17.3	-	dB	2000MHz
Output Return Loss	-	-13.9	-	dB	2000MHz
Reverse Isolation	-	-18.3	-	dB	2000MHz
Operating Voltage	-	+5	-	V	-
Static Working Current	-	54	-	mA	-

Test Conditions: Vdd=+5V, I=54mA, OIP3 spacing=1MHz, Pout=0dBm/tone, TA=+25°C

Absolute Maximum Ratings

Maximum Operating Voltage (Vdd) : +7V

Maximum RF input Power: +21.5dBm

Recommended Operating Conditions

Power Supply Voltage: +5V

Static Operating Current: 54mA

Storage Temperature: -65°C ~ +150°C

Operating Temperature: -55°C ~ +125°C

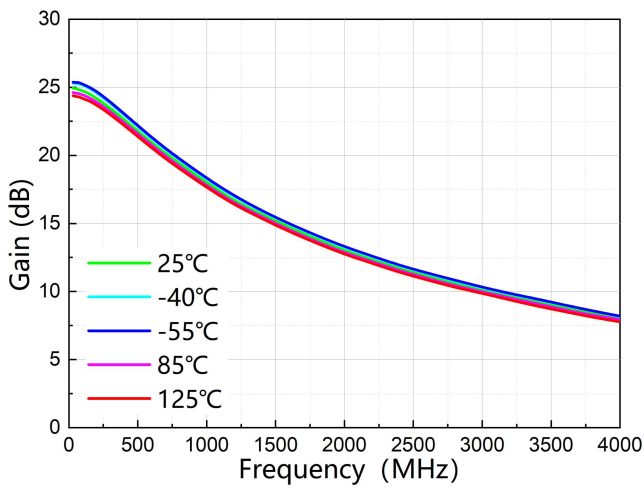
Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and. exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

ESD WARNING

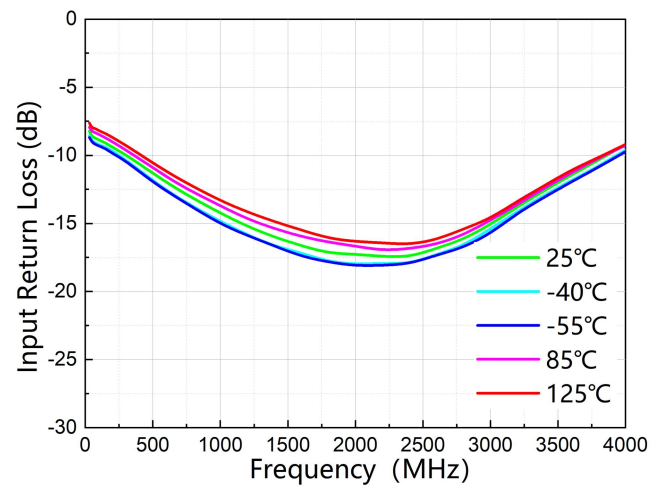

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Typical Performance (EVB test results)

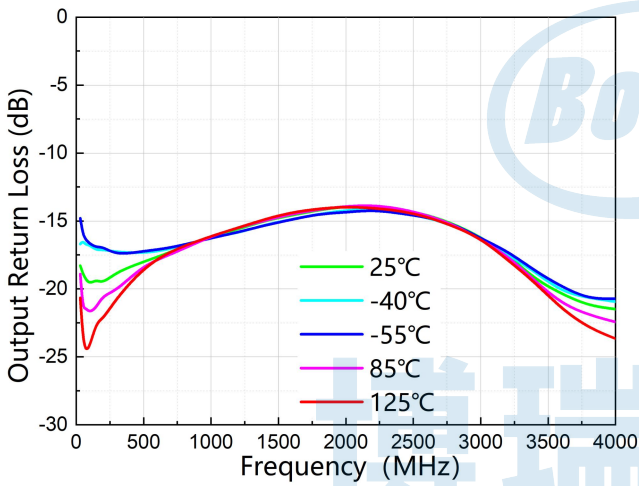
Parameters	Typ.											Units
Frequency	30	100	200	300	500	700	1000	1200	1400	1600	1800	MHz
Gain	25.0	24.7	24.2	23.5	21.8	20.1	18.0	16.7	15.6	14.7	13.8	dB
Input Return Loss	-8.2	-8.9	-9.4	-10.0	-11.3	-12.6	-14.3	-15.3	-16.0	-16.6	-17.2	dB
Output Return Loss	-18.2	-19.6	-19.6	-18.7	-18.0	-17.3	-16.1	-15.6	-15.0	-14.6	-14.2	dB
Reverse Isolation	-31.2	-31.1	-31.0	-30.3	-28.8	-26.9	-24.1	-22.6	-21.1	-20.1	-19.2	dB
Output Power for 1dB Compression	20.2	20.1	20.1	20.0	20.2	20.2	20.5	20.8	20.7	20.9	21.2	dBm
Output-Third-Order Interception	30.0	31.2	31.8	31.8	32.7	33.1	33.3	33	33.1	33.5	34.3	dBm
Noise Figure	1.62	1.08	0.78	0.69	0.53	0.69	0.64	0.69	0.64	0.66	0.64	dB
Frequency	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	MHz
Gain	13.0	12.3	11.7	11.1	10.6	10.1	9.6	9.2	8.8	8.4	8.1	dB
Input Return Loss	-17.3	-17.4	-17.5	-16.8	-16.2	-15.1	-13.8	-12.6	-11.4	-10.4	-9.2	dB
Output Return Loss	-13.9	-13.9	-14.2	-14.5	-15.2	-16.2	-17.5	-19.3	-20.4	-21.2	-21.5	dB
Reverse Isolation	-18.3	-17.6	-16.8	-16.2	-15.6	-15.2	-14.6	-14.2	-13.9	-13.4	-13.0	dB
Output Power for 1dB Compression	21.0	21.2	21.4	21.6	21.4	21.5	21.2	21.0	21.3	20.9	21.2	dBm
Output Third-Order Intercept	35.7	35.9	35.9	36.7	36	35.6	33.7	34.5	34.9	34.5	34.8	dBm
Noise Figure	0.76	0.79	0.75	0.68	0.88	0.83	0.86	0.89	0.88	1.05	1.01	dB
Test Condition: Vdd=+5V, I=54mA; OIP3 spacing=1MHz, Pout=0dBm/tone; TA=+25°C												



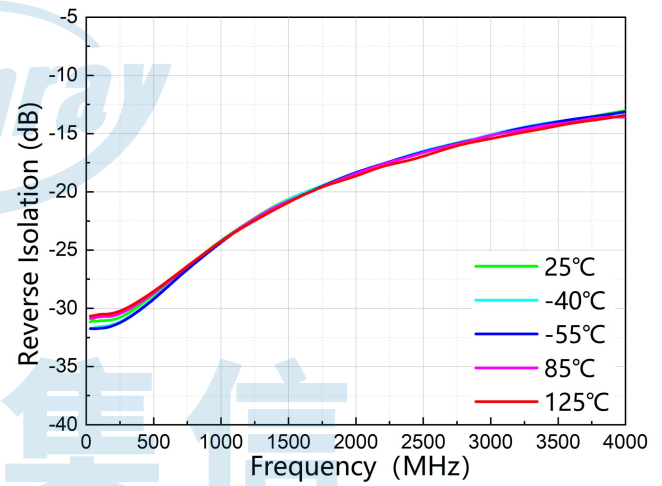
Gain vs. Freq



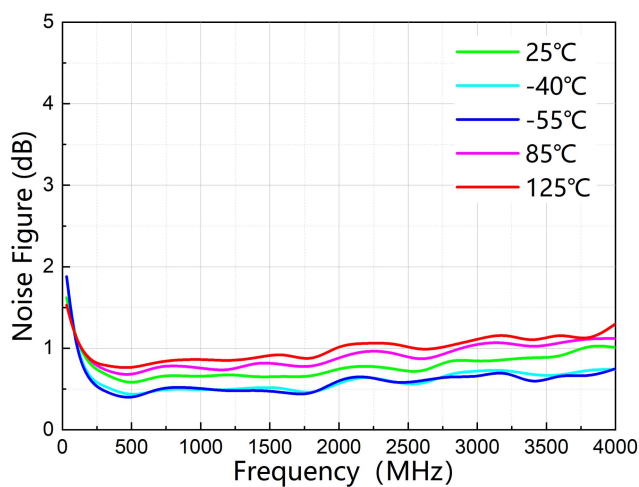
Input Return Loss vs. Freq



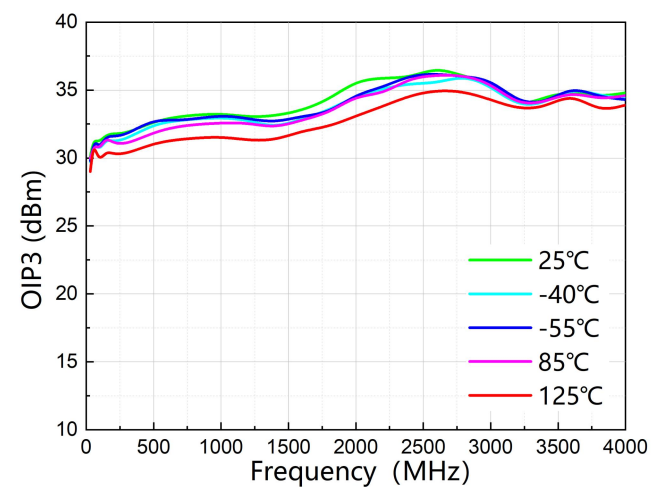
Output Return Loss vs. Freq



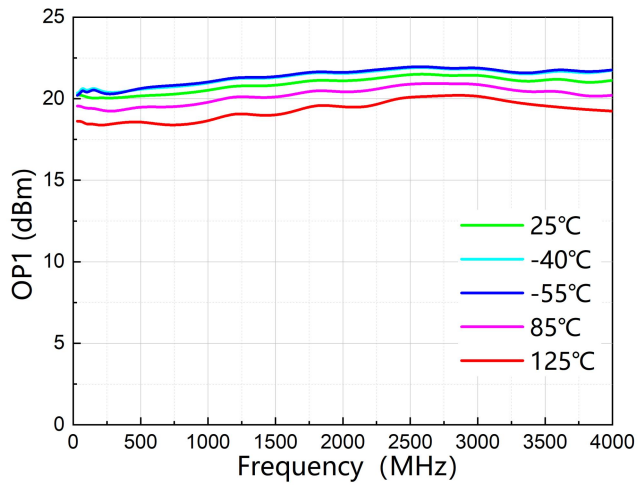
Reverse Isolation vs. Freq



Noise Figure vs. Freq



Output Third-Order Interception vs. Freq



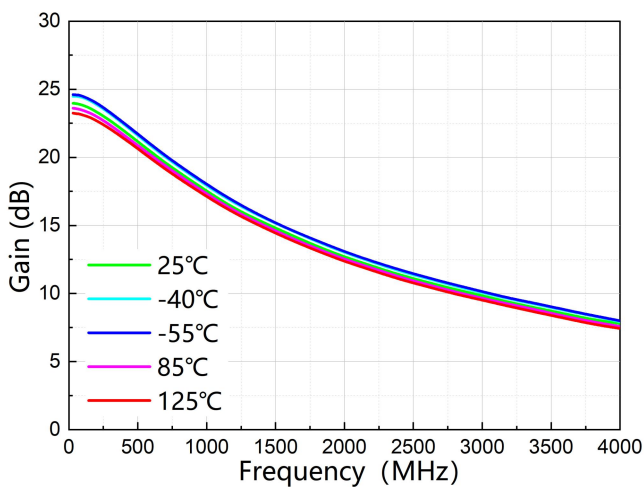
Output Power for 1dB Compression vs. Freq



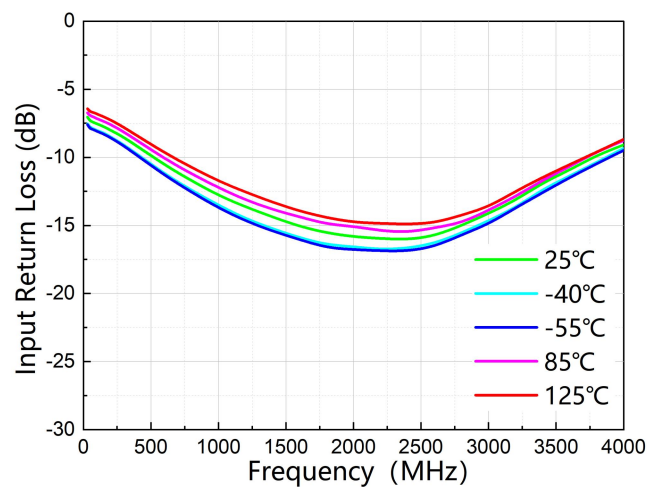
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Typical Performance (EVB test results at +3.3V power supply)

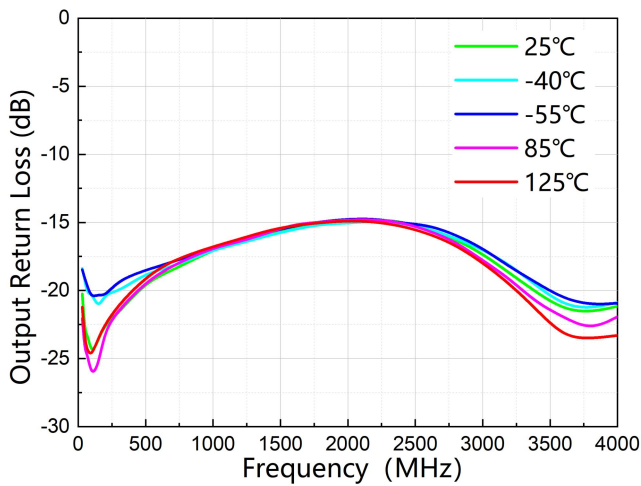
Parameters	Typ.											Units
Frequency	30	100	200	300	500	700	1000	1200	1400	1600	1800	MHz
Gain	24.0	23.8	23.3	22.7	21.2	19.6	17.5	16.2	15.3	14.4	13.5	dB
Input Return Loss	-7.0	-7.5	-8.0	-8.5	-9.9	-11.2	-12.8	-13.6	-14.4	-15.1	-15.5	dB
Output Return Loss	-20.2	-24.7	-22.5	-21.6	-19.4	-18.5	-17.0	-16.4	-15.9	-15.4	-15.0	dB
Reverse Isolation	-30.6	-30.5	-30.3	-29.9	-28.4	-26.5	-23.9	-22.4	-21.0	-19.7	-19.1	dB
Output Power for 1dB Compression	15.4	15.4	15.3	15.8	15.2	15.8	16.5	17.2	17.0	17.3	17.8	dBm
Output-Third-Order Interception	27.2	27.6	27.8	28	28.6	28.9	29.6	29.5	29.3	29.9	30.1	dBm
Noise Figure	1.67	1.10	0.75	0.62	0.49	0.64	0.62	0.63	0.67	0.65	0.61	dB
Frequency	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	MHz
Gain	12.7	12.0	11.4	10.8	10.3	9.9	9.3	8.9	8.5	8.1	7.8	dB
Input Return Loss	-15.8	-16.0	-16.0	-15.8	-15.0	-14.1	-13.2	-11.9	-10.9	-9.8	-9.1	dB
Output Return Loss	-14.9	-14.8	-14.9	-15.6	-16.2	-17.3	-18.7	-20.1	-21.4	-21.6	-21.2	dB
Reverse Isolation	-18.2	-17.5	-16.8	-16.0	-15.5	-15.0	-14.4	-14.0	-13.6	-13.4	-13.2	dB
Output Power for 1dB Compression	17.6	17.7	18.1	18.2	18.1	18.2	17.9	17.7	17.6	18.0	17.8	dBm
Output Third-Order Intercept	31.3	31.5	32.1	32.8	32.8	31.8	32.5	32.3	33.1	31.7	32.1	dBm
Noise Figure	0.76	0.77	0.73	0.72	0.85	0.83	0.89	0.86	0.91	0.98	0.92	dB
Test Conditions: Vdd=+3.3V, I=34mA; OIP3 spacing=1MHz, Pout=0dBm/tone; TA=+25°C												



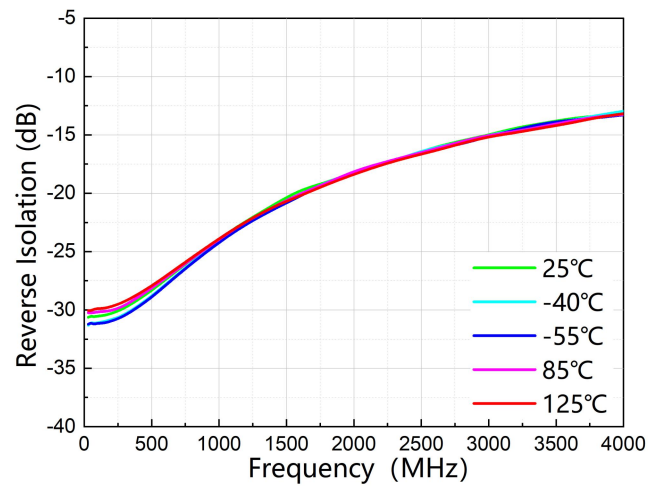
Gain vs. Freq



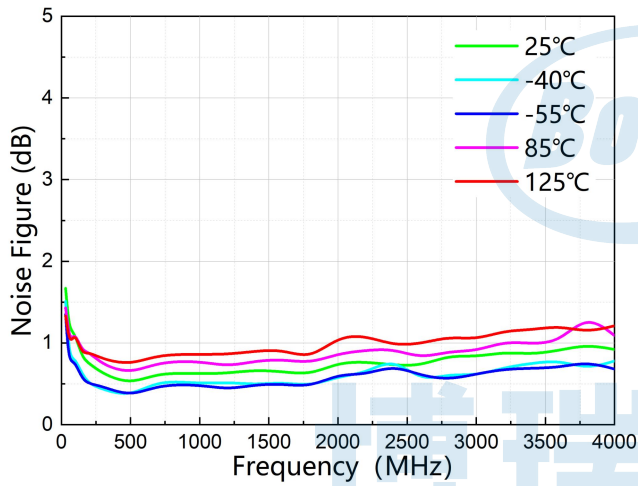
Input Return Loss vs. Freq



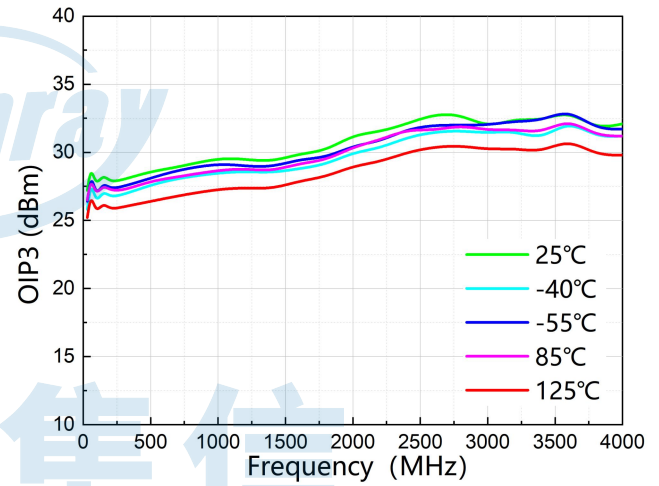
Output Return Loss vs. Freq



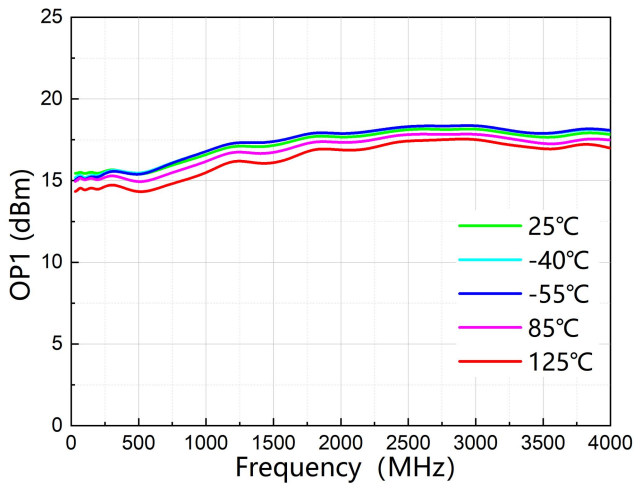
Reverse Isolation vs. Freq



Noise Figure vs. Freq



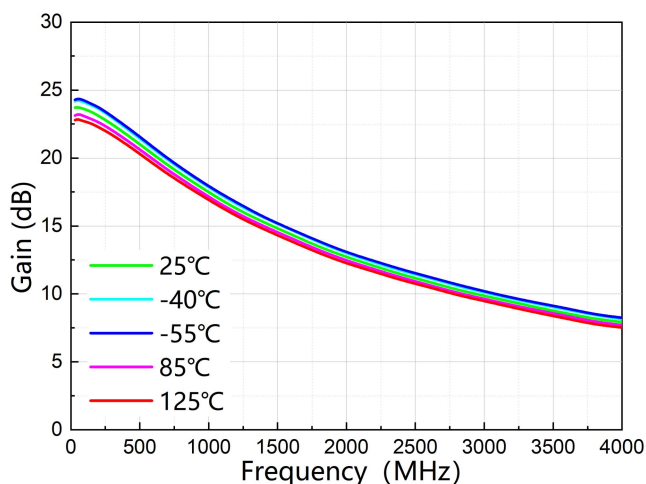
Output Third-Order Interception vs. Freq



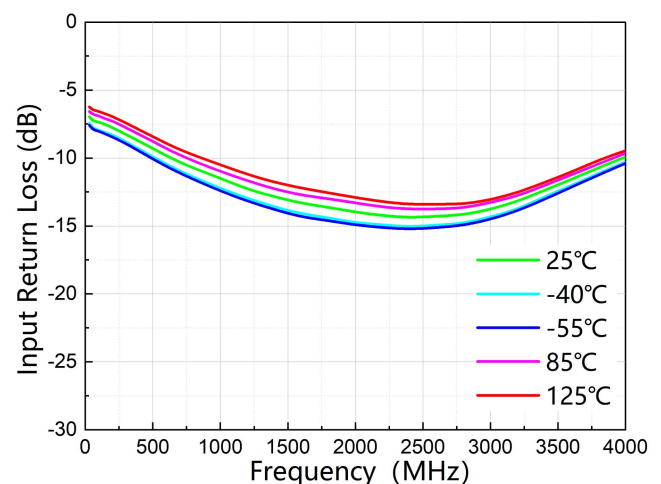
Output Power for 1dB Compression vs. Freq

Typical Performance (EVB test results at +3V power supply)

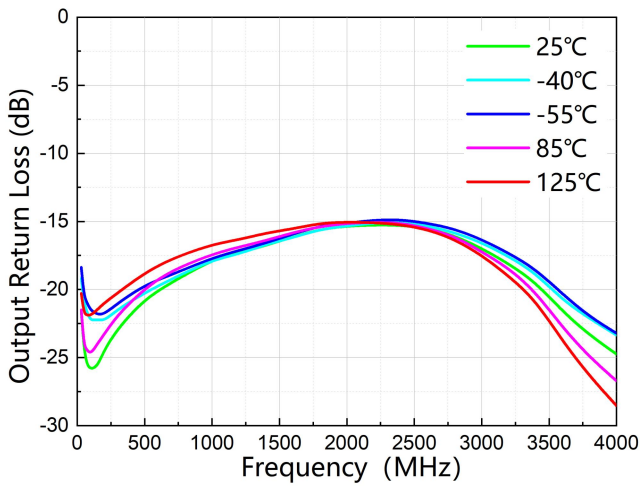
Parameters	Typ.											Units
Frequency	30	100	200	300	500	700	1000	1200	1400	1600	1800	MHz
Gain	23.7	23.6	23.1	22.5	21.0	19.5	17.5	16.2	15.3	14.4	13.5	dB
Input Return Loss	-7.0	-7.4	-7.8	-8.3	-9.3	-10.4	-11.5	-12.3	-12.8	-13.3	-13.6	dB
Output Return Loss	-21.6	-25.9	-24.5	-22.9	-20.7	-19.5	-17.8	-17.3	-16.8	-16.1	-15.6	dB
Reverse Isolation	-30.7	-30.1	-29.9	-29.5	-28.1	-26.4	-24.0	-22.5	-21.4	-20.3	-19.3	dB
Output Power for 1dB Compression	14.4	14.5	14.5	14.6	14.9	15.2	15.4	15.6	15.9	16.4	16.6	dBm
Output Third-Order Intercept	26.0	26.5	26.5	26.7	27.3	27.7	28.1	28.1	28.3	28.8	28.9	dBm
Noise Figure	2.02	1.10	0.76	0.58	0.46	0.59	0.63	0.67	0.58	0.59	0.57	dB
Frequency	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	MHz
Gain	12.7	12.1	11.4	10.9	10.3	9.9	9.4	9.0	8.6	8.2	7.9	dB
Input Return Loss	-14.0	-14.2	-14.4	-14.3	-14.2	-13.8	-13.2	-12.4	-11.6	-10.7	-9.9	dB
Output Return Loss	-15.3	-15.3	-15.3	-15.5	-16.0	-17.0	-18.1	-19.5	-21.6	-23.4	-24.7	dB
Reverse Isolation	-18.5	-17.7	-17.0	-16.3	-15.7	-15.2	-14.7	-14.2	-13.8	-13.5	-13.2	dB
Output Power for 1dB Compression	17.1	16.9	17.0	17.1	17.1	17.1	17.0	16.9	17.0	17.3	16.9	dBm
Output Third-Order Intercept	29.4	30.3	30.5	31.4	31.0	30.6	30.9	30.6	30.5	30.5	31.4	dBm
Noise Figure	0.70	0.78	0.76	0.70	0.74	0.77	0.79	0.76	0.72	0.79	0.71	dB
Test Condition: Vdd=+3V, I=27mA; OIP3 spacing=1MHz, Pout=0dBm/1MHz; TA=+25°C												



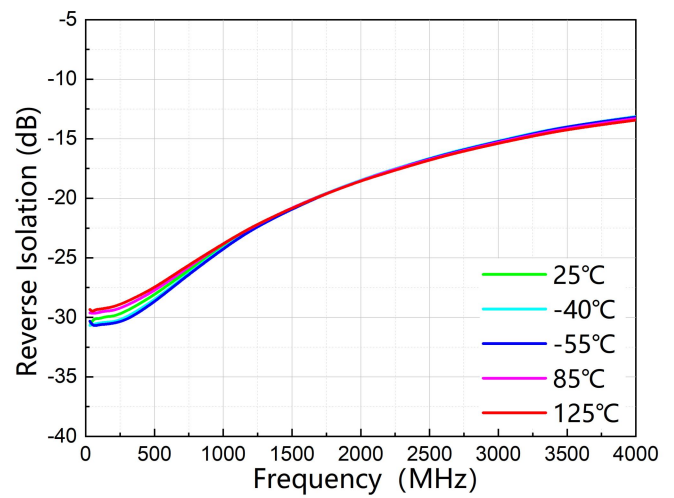
Gain vs. Freq



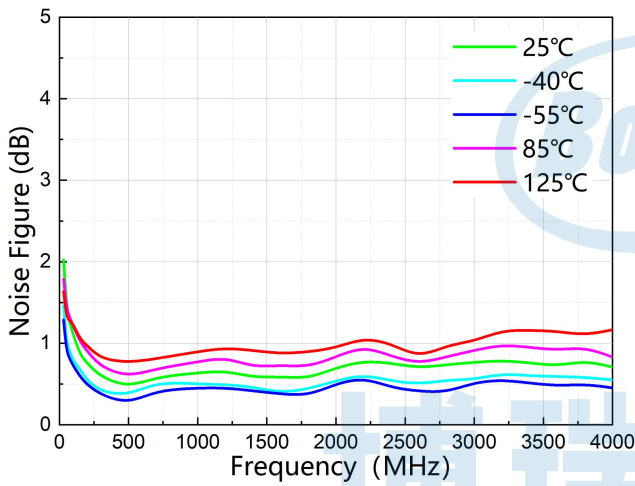
Input Return Loss vs. Freq



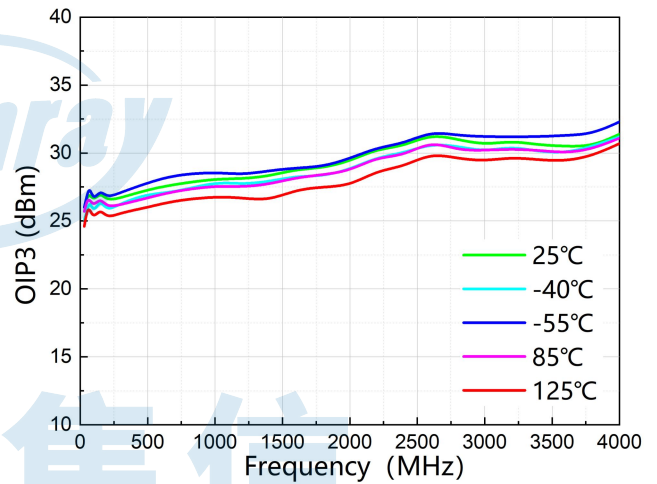
Output Return Loss vs. Freq



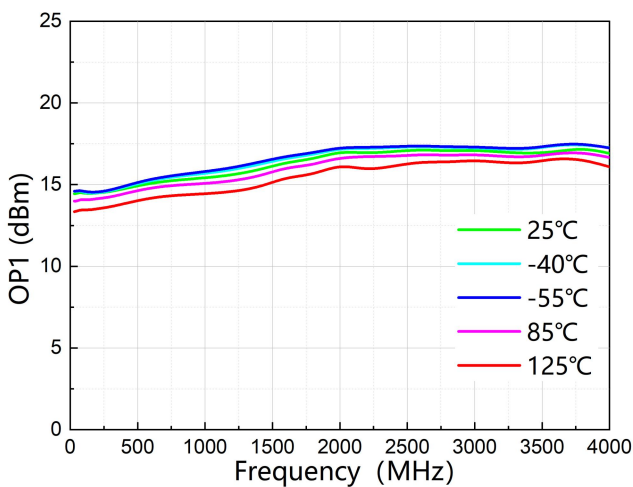
Reverse Isolation vs. Freq



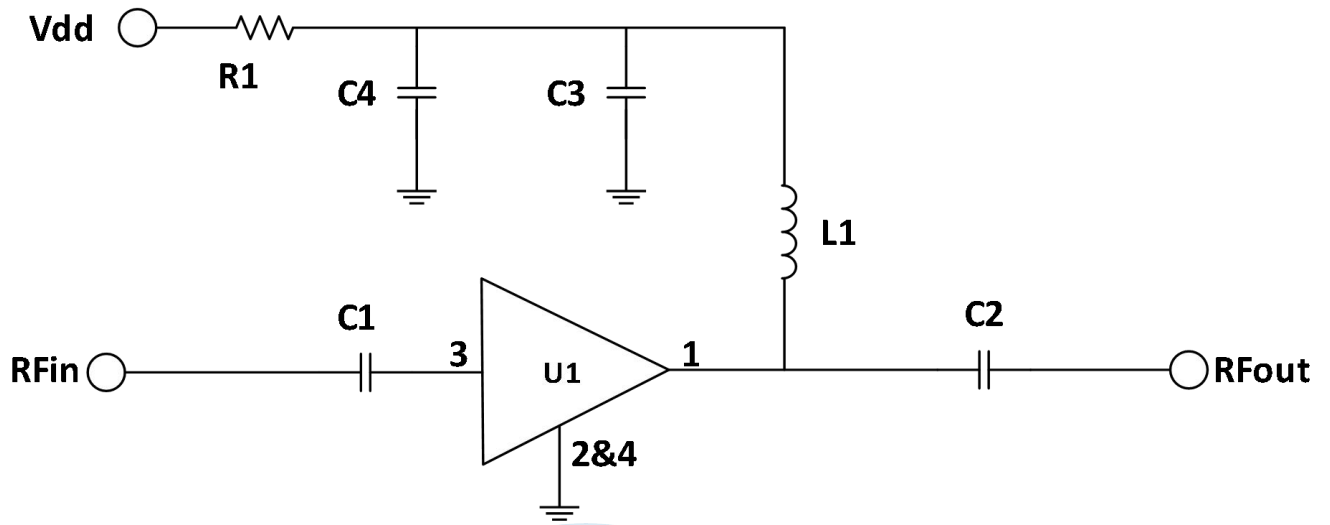
Noise Figure vs. Freq



Output Third-Order Interception vs. Freq



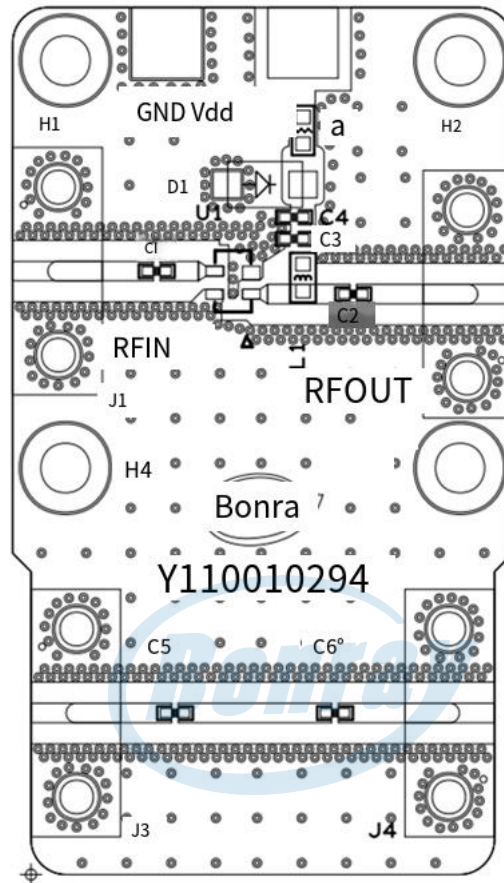
Output Power for 1dB Compression vs. Freq

Typical Application Schematic

Bill of Material

Reference Designator	Package Size	Value	P/N
U1	SOT343	30MHz ~ 4GHz	BR95321TCJ
L1	L1008	1.1uH	1008AF-112XJRB
C1, C2	C0402	1nF	GRM1555C1H102JA01D
C3	C0402	100pF	GRM1555C1H101JA01D
C4	C0402	100nF	0402F104M500NT
R1	C0402	0Ω	RC0402FR-070RL

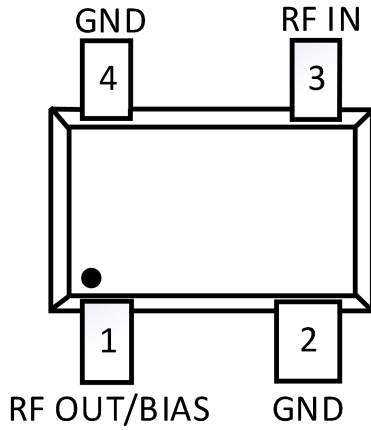
Note: The R1 bit number actually uses 0 ohm wire for short-circuiting;

PCB Evaluation Board



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Pin Configuration and Description



Pin Number	Pin Name	Description
1	RFOUT/BIAS	Rf output pins (Supply Voltage ports) require off-chip isolation capacitors and choke inductors
2 & 4	GND	Ground
3	RFIN	Rf input pin, requires a straight off chip capacitor

Package Dimensions (mm)

