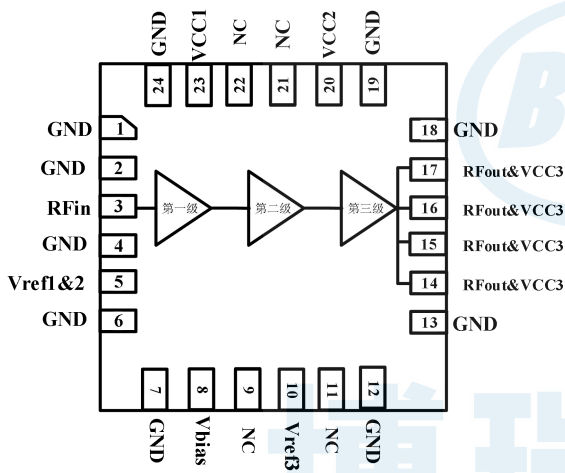


Product Features

- Frequency: 1.5GHz~2.4GHz
- Gain: 35.7dB@1.6GHz
- P1dB Compression: 36.2dBm@1.6GHz
- PAE@OP1:39.6%@1.6GHz
- Vdd=+5V, I_{DQ} 99mA
- Package: QFN24 (4mm×4mm)

Functional Block Diagram



General Description

The BR9546FPJ is a 4W drive amplifier based on the GaAs process. Which is housed in QFN24 package, It provides 35.7dB gain at 1.6GHz, the 1dB compression point is greater than 36.2dBm. Due to the product matching is flexible, the application frequency band can be adjusted by peripheral components, and the driver amplifier can be matched in any frequency band to achieve high power, high gain and other characteristics of the product. The product is suitable for Beidou, Satcom, high power amplifier driver stage and other applications.

Ordering Information

Part Number	Package	Description
BR9546FPJ	QFN24	1.5 GHz to 2.4 GHz 4W Drives Amplifier

Electrical Specifications

Parameters	Test Condition	Min.	Typ.	Max.	Units
Gain	1600MHz	—	35.7	—	dB
	2000MHz	—	32.9	—	dB
Input Return Loss	1600MHz	—	-18.3	—	dB
	2000MHz	—	-14.3	—	dB
Output Return Loss	1600MHz	—	-6.2	—	dB
	2000MHz	—	-4.2	—	dB
Isolation	1600MHz	—	-51.9	—	dB
	2000MHz	—	-54.5	—	dB
OIP3	1600MHz	—	36.2	—	dBm
	2000MHz	—	36.0	—	dBm
PAE@OP1	1600MHz	—	39.6	—	%
	2000MHz	—	35.0	—	%
Supply Voltage	—	—	5	—	V
Quiescent Current	—	—	99	—	mA
Test Conditions: Vdd=+5V, I=99mA; TA=+25°C					

Absolute Maximum Ratings

Maximum Operating Voltage (Vdd) : +5.5V

Maximum RF input Power: +26dBm

ESD Rating: Class 1C (< 2000V)

Recommended Operating Conditions

Power Supply: +5V

Quiescent Current: 99mA

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.

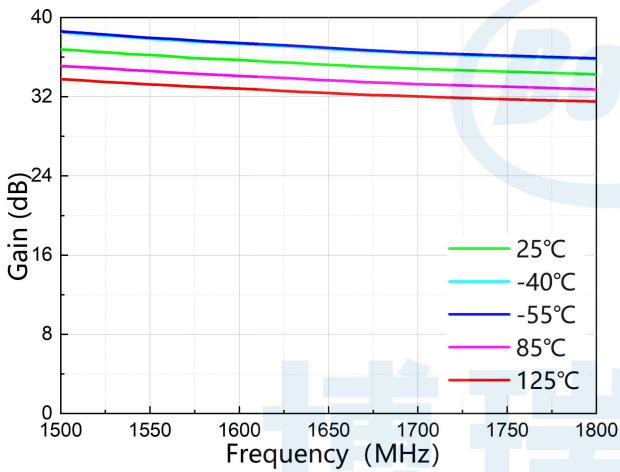
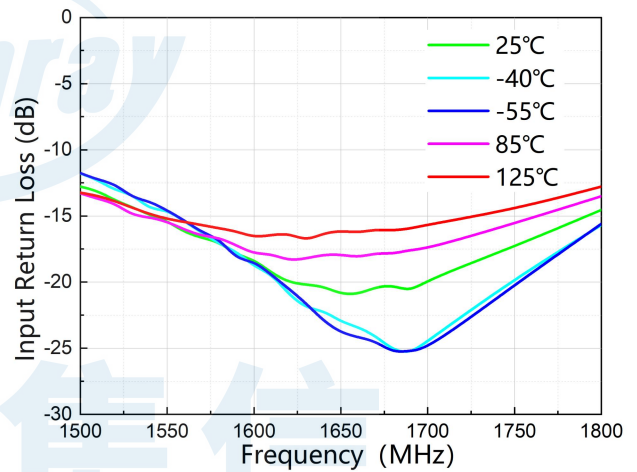
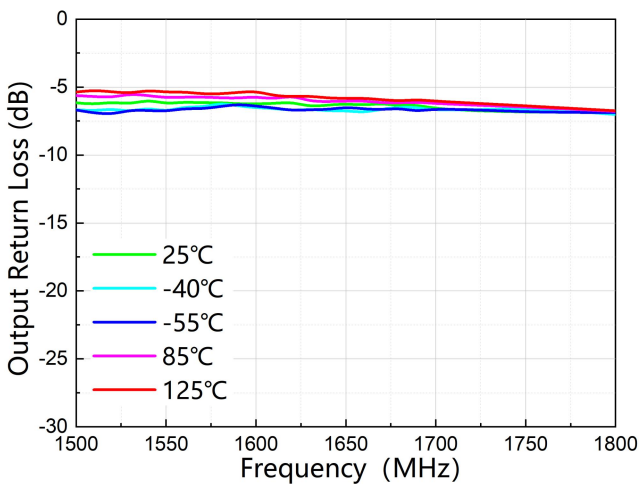
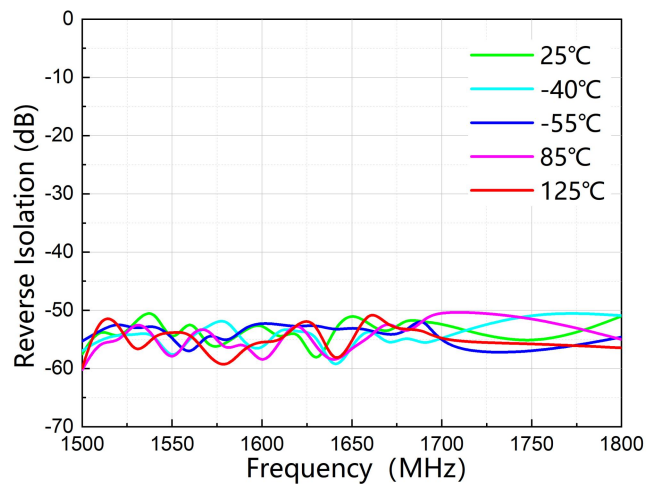
ESD WARNING

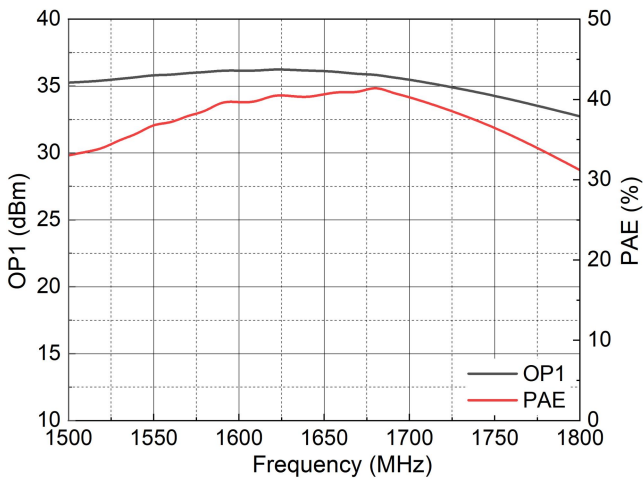
ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS
ESD Rating: Class 1

Typical Performance (EVB test results+5V , 1.5GHz~1.7GHz)

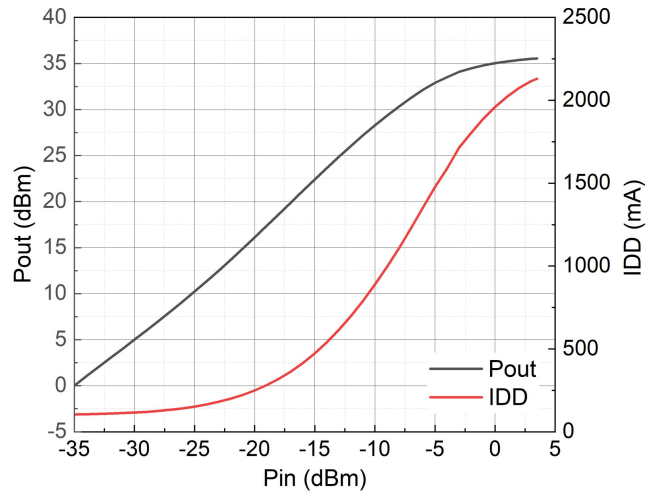
Parameters	Typ.							Units
	1500	1540	1580	1600	1640	1680	1700	
Frequency	1500	1540	1580	1600	1640	1680	1700	MHz
Gain	36.8	36.3	35.8	35.7	35.3	35.0	34.8	dB
Input Return Loss	-12.8	-14.9	-17.0	-18.3	-20.3	-20.2	-19.8	dB
Output Return Loss	-6.2	-5.9	-6.1	-6.2	-6.3	-6.4	-6.6	dB
Isolation	-57.5	-49.2	-55.7	-51.9	-52.8	-51.3	-52.1	dB
1dB Compression	35.3	35.7	36.0	36.2	36.2	35.9	35.5	dBm
PAE@OP1	33.0	35.6	38.4	39.6	40.2	41.7	40.4	%

Test Conditions: Vdd=+5V, I=99mA; TA=+25°C

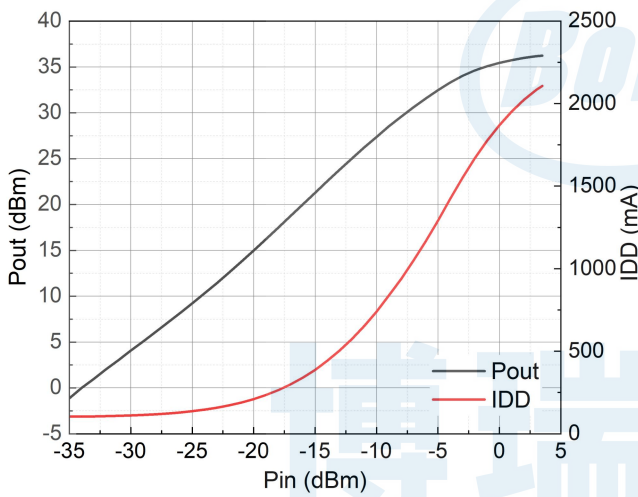

Gain vs. Freq

Input Return Loss vs. Freq

Output Return Loss vs. Freq

Reverse Isolation vs. Freq



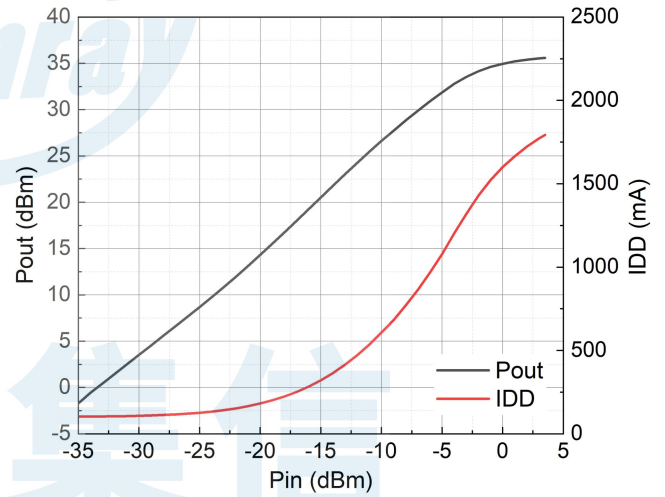
Output Power for 1dB Compression, PAE vs. Freq



P_{out} , IDD vs. P_{in} @1.5GHz



P_{out} , IDD vs. P_{in} @1.6GHz

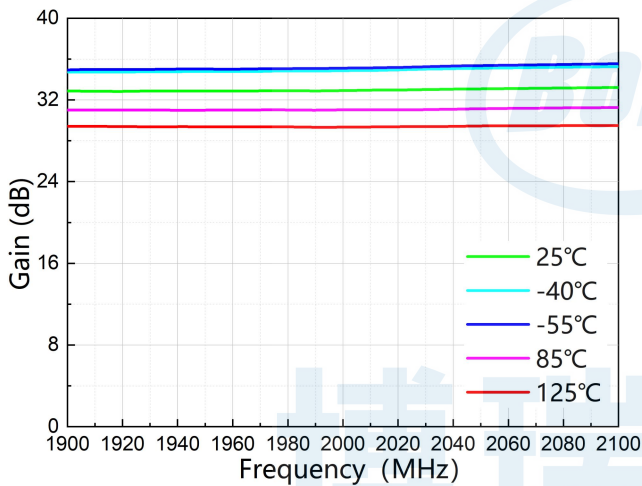


P_{out} , IDD vs. P_{in} @1.7GHz

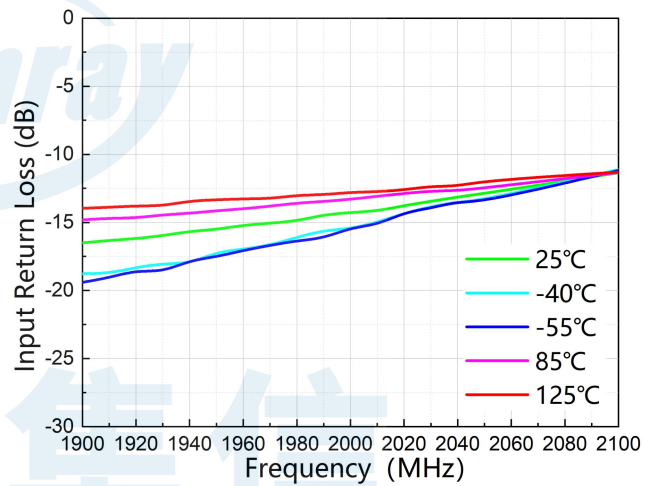
Typical Performance (EVB test results+5V , 1.9GHz~2.1GHz)

Parameters	Typ.								Units
	1900	1950	1980	1990	2000	2050	2100		
Frequency	1900	1950	1980	1990	2000	2050	2100	MHz	
Gain	32.9	32.9	32.9	32.9	32.9	33.1	33.2	dB	
Input Return Loss	-16.5	-15.5	-14.9	-14.4	-14.3	-12.9	-11.4	dB	
Output Return Loss	-4.0	-4.0	-4.4	-4.2	-4.2	-4.5	-5.0	dB	
Isolation	-50.7	-50.6	-52.6	-55.9	-54.5	-49.7	-52.8	dB	
P1dB Compression	36.3	36.3	36.1	36.0	36.0	35.6	34.9	dBm	
PAE@OP1	35.5	35.1	34.8	34.8	35.0	33.1	32.4	%	

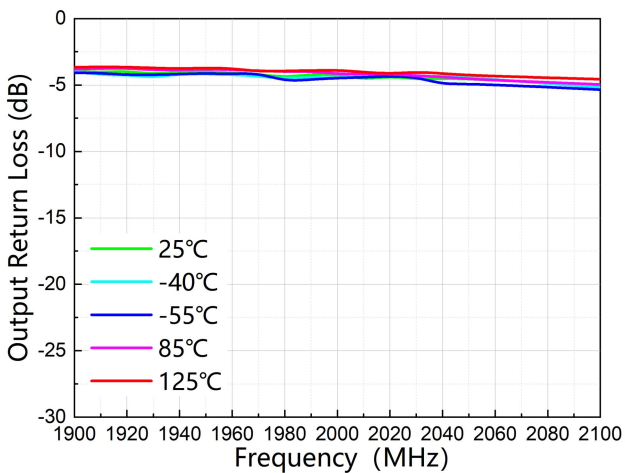
Test Conditions: Vdd=+5V, I=99mA; TA=+25°C



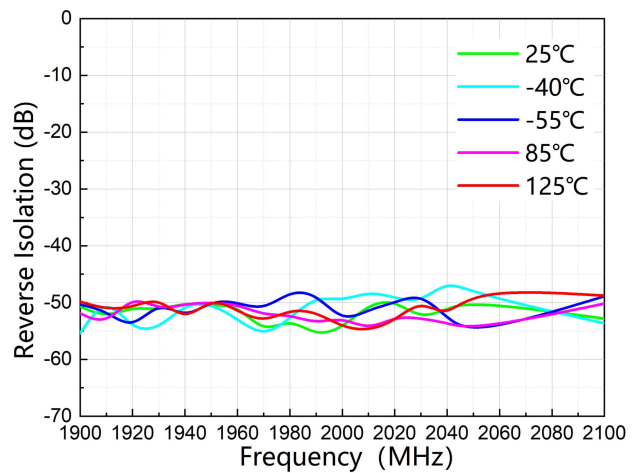
Gain vs. Freq



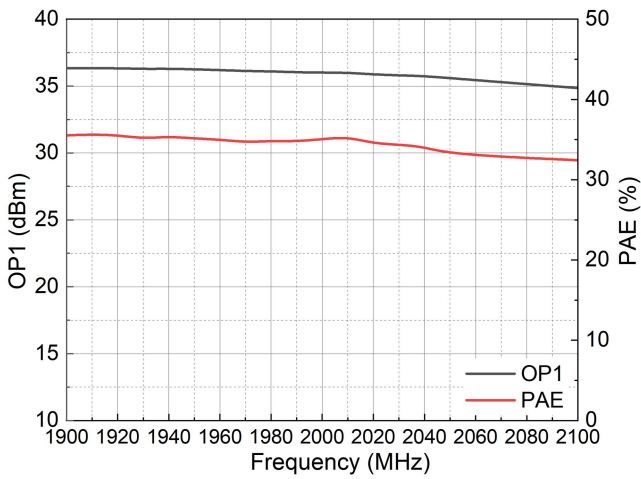
Input Return Loss vs. Freq



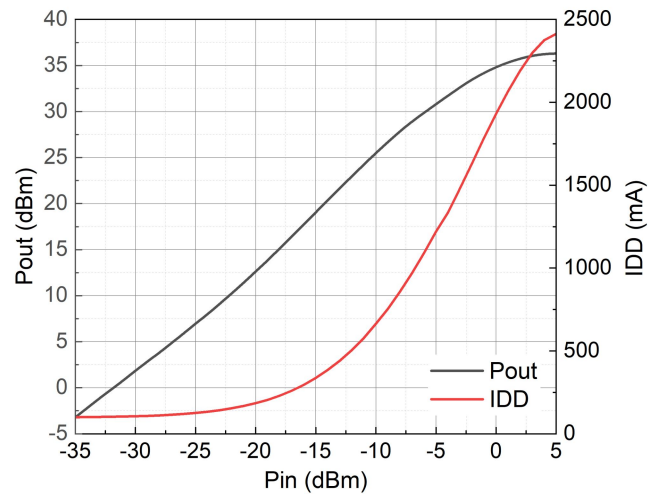
Output Return Loss vs. Freq



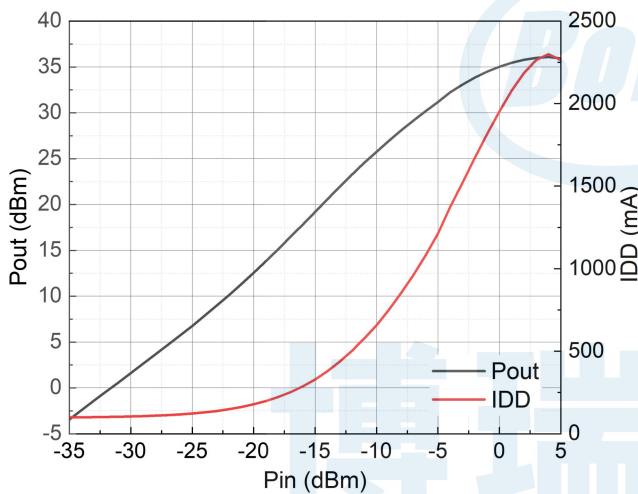
Reverse Isolation vs. Freq



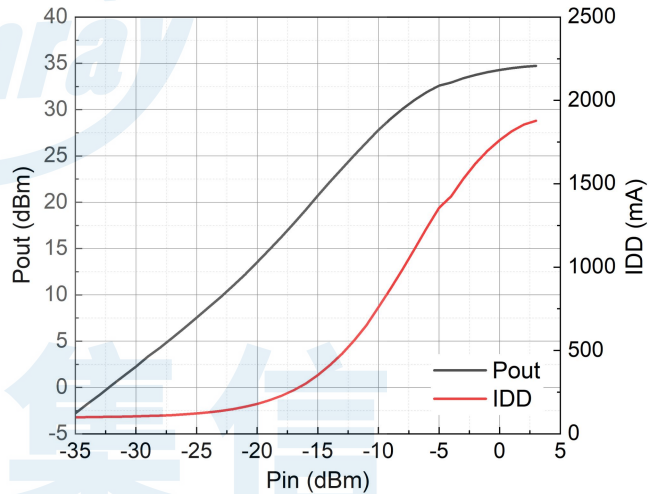
Output Power for 1dB Compression, PAE vs. Freq



P_{out}, IDD vs. P_{in} @1.9GHz

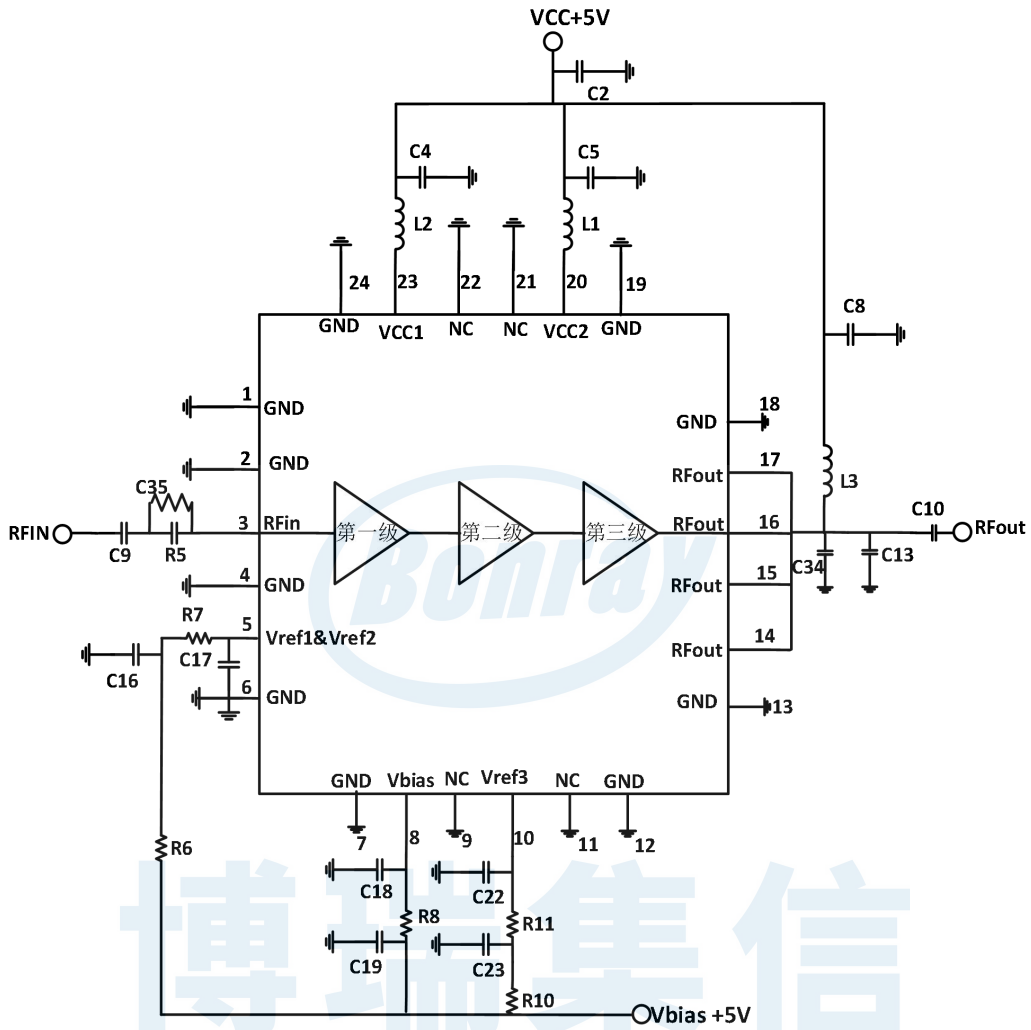


P_{out}, IDD vs. P_{in}@2GHz



P_{out}, IDD vs. P_{in} @2.1GHz

Application Information



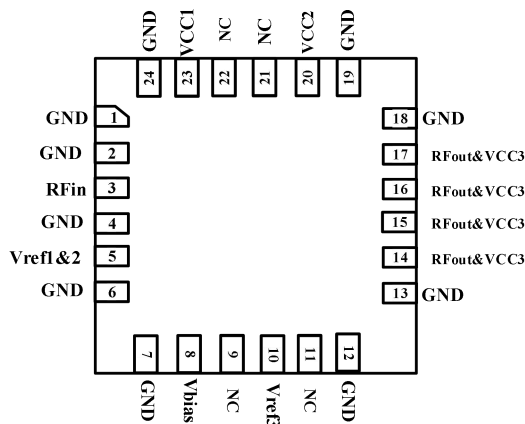
Bill of Material (1.5GHz~1.7GHz)

Designator	Package	Description	Part Number
U1	QFN24	Drive amplifier 1500MHz~2.4GHz	BR9546FPJ
L3	0603	10nH $\pm 5\%$ 1400mA	0603HP-10NXJEW
L1, L2	0603	1.0nH $\pm 5\%$ 1600mA	0603CT-1N0XJLU
C5, C4, C8, C16, C19, C23	0402	0.1uF 25V $\pm 20\%$	GRM155C81E104ME11D
R6, R10	0402	$\pm 1\%$ 1K Ω 1/16 W	RC0402FR-071KL
C17, C18, C22	0402	50V 100pF $\pm 5\%$	GRM1555C1H101JA01D
C2	1210	47uF 16V $\pm 20\%$	GRM32ER61C476ME15L
C9, C10	0603	150pF $\pm 10\%$ 50V	0603B151K500NT
C35	0603	10PF 250V 0603	GQM1875C2E100FB12#
R5	0402	$\pm 5\%$ 8.2 Ω 1/16W	RC0402JR-078R2L
C34	0603	2.7PF 250V 0603	GQM1875C2E2R7BB12#
R7, R8, R11	0402	$\pm 1\%$ 0 Ω 1/16 W	RC0402FR-070RL
C13	0402	6.2PF, accuracy 0.1pF, 50V withstand voltage value	C0402C629C5GACTU

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Bill of Material (1.9GHz~2.1GHz)

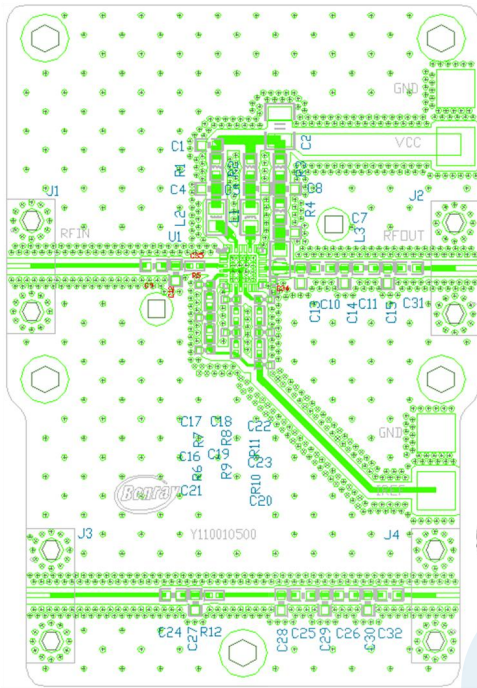
Designator	Package	Description	Part Number
U1	QFN24	1500MHz~2.4GHz drive amplifier	BR9546FPJ
L3	0603	10nH ±5% 1400mA	0603HP-10NXJEW
L1, L2	0603	1.0nH ±5% 1600mA	0603CT-1N0XJLU
C5, C4, C8, C16, C19, C23	0402	0.1uF 25V ±20%	GRM155C81E104ME11D
R6, R10	0402	±1% 1KΩ 1/16 W	RC0402FR-071KL
C17, C18, C22	0402	50V 100pF ±5%	GRM1555C1H101JA01D
C2	1206	Withstand voltage 50V, capacity 100uF, accuracy ±20%	CT41G-1206-X5R-10V-107-M
C9, C10	0402	50V 100pF ±5%	GRM1555C1H101JA01D
C35	0402	50V 10pF ±5%	GRM1555C1H100JA01D
R5	0402	±5% 8.2Ω 1/16W	RC0402JR-078R2L
C34	0402	50V 6.8pF ±0.25pF	GRM1555C1H6R8CA01D
R7, R8, R11	0402	±1% 0Ω 1/16 W	RC0402FR-070RL
C13	0402	50V 1.8pF ±0.25pF	GRM1555C1H1R8CA01D

Pin layout and Description


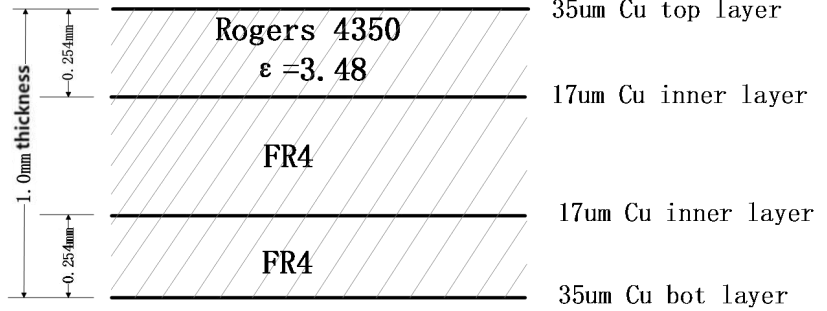
Pin Number	Pin Name	Description
3	RFin	Rf input pins.
5, 10	Vref1&2, Vref3	Bias control voltage.
8	Vbias	Bias the supply voltage.
14,15,16,17	RFout(VCC3)	Rf output pin and third stage amplifier supply pin.
23),	VCC1/VCC2	The first stage amplifier supplies pins to the second stage amplifier
1,2,4,6,7,9,11,12,13,18,19,21,22,24	NC/GND	No electrical connection, ground pins.

Note: This product has no power-on and power-off timing when designing the circuit.

Evaluation Board



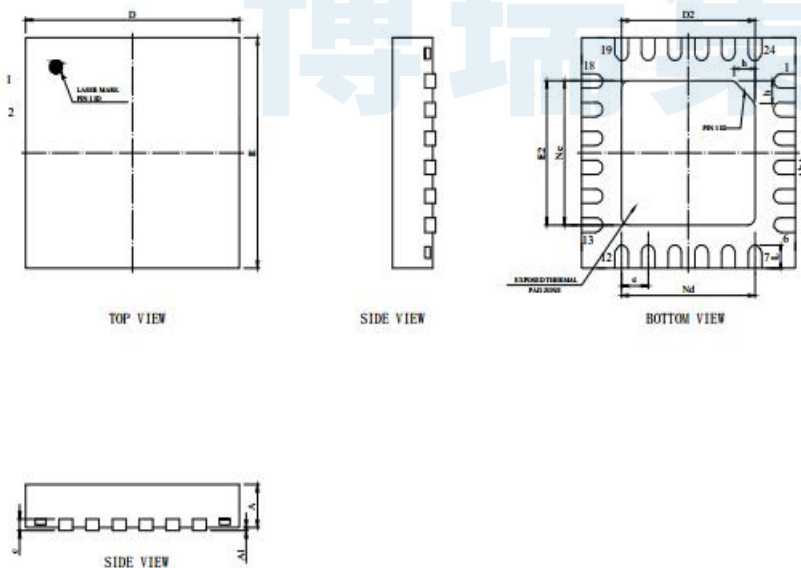
PCB



50 ohms Impedance Signal Lines: width=0.52mm, spacing=0.52mm

Note: The R1, R2, R3, R9, C11, C31 digit numbers actually use 0 ohm lines for short-circuit processing.

Package Dimensions (mm)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.75	0.80	0.85
A1	0.01	0.02	0.05
b	0.20	0.25	0.30
c	0.270REF		
D	3.90	4.00	4.10
D2	2.60	2.70	2.80
e	0.50BSC		
Ne	2.50BSC		
Nd	2.50BSC		
E	3.90	4.00	4.10
E2	2.60	2.70	2.80
L	0.35	0.40	0.45
h	0.35	0.40	0.45