

SAC3914QP4



GaAs MMIC Driver Amplifier
14GHz~16GHz

Rev 1.0

Features

- Frequency: 14GHz~16GHz
- Gain: 18dB
- Output P_{1dB}: 29dBm
- Supply Voltage: +5V/-V_g
- PAE: 30%
- Package Size: 4mm×4mm×0.75mm

Typical Applications

- Microwave radio
- SatCom

General Description

SAC3914QP4 is a GaAs MMIC driver amplifier which operates between 14GHz~16GHz. The amplifier provides 18dB of gain, 29dBm Output P_{1dB} while requiring 320mA from a +5V supply voltage.

Electrical Performance (T_A=25°C, V_D=+5V, I_D=320mA, Z₀=50Ω)

Parameter	Min.	Typ.	Max.	Units
Frequency Range	14~16			GHz
Small Signal Gain	—	18	—	dB
Gain Flatness	—	±2	—	dB
Reverse Isolation	—	-40	—	dB
Input Return Loss	—	-10	—	dB
Output Return Loss	—	-5	—	dB
PAE	—	30	—	%
Output P _{1dB}	28	29	—	dBm
Supply Voltage (V _D)	5	—	6	V
Supply Current (I _D)**	—	320	730	mA
Thermal Resistance*	—	12.1	—	°C/W

*Measurement taken at P_{out} = OP_{1dB}, IR method. 100% DC power is dissipated on the device the thermal resistance is 12.1°C/W

** Adjust V_g between -1V to -0.4V to achieve I_{DQ}= 320mA, typical V_g voltage is -0.7V

Absolute Maximum Ratings

Maximum Input Power	+24dBm	Operating Temperature	-55°C~+85°C
Channel Temperature	+150°C	Storage Temperature	-65°C~+150°C
Maximum V _D	+7 V	Maximum V _G	-3V(Pinch-off)
ESD Handling	Class 1A		

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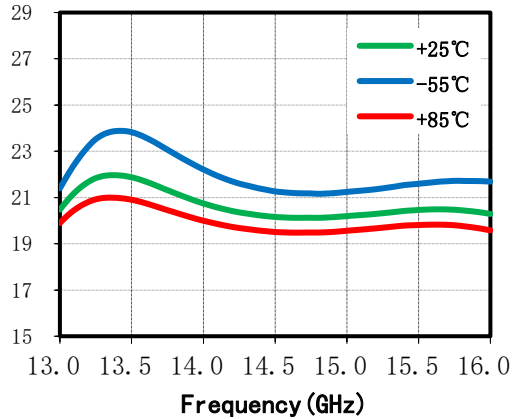
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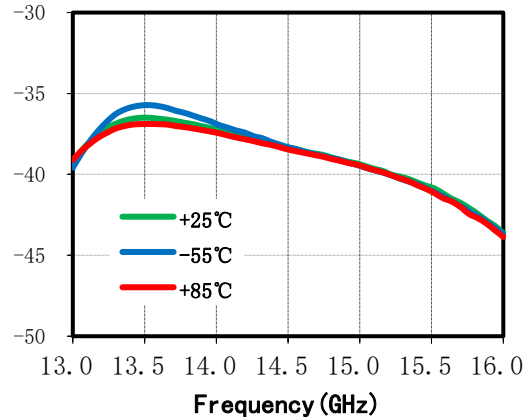
Typical Performance Curve

All data are measured from fixture, Bias condition: $V_D=5V$, $I_D=320mA$

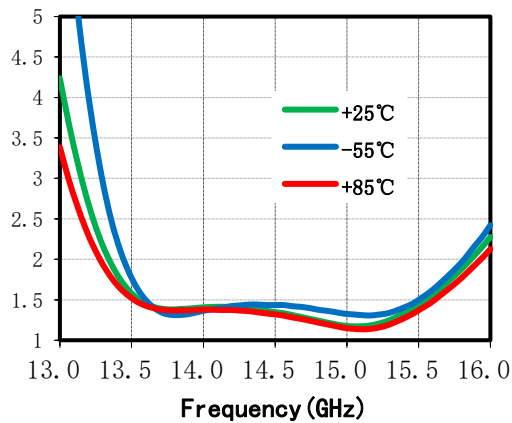
Small Signal Gain(dB) vs. temperature



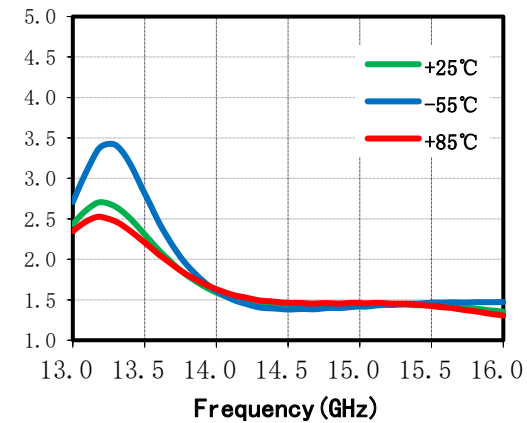
Isolation(dB) vs. temperature



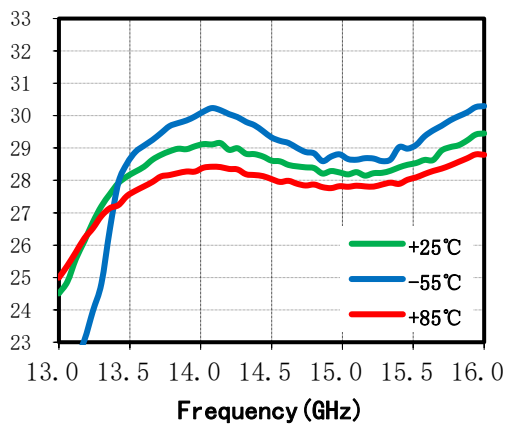
VSWRi (:1)



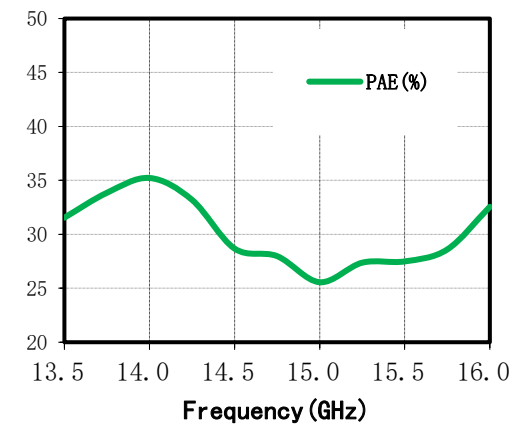
VSWRo (:1)



Output P-1dB(dBm) vs. temperature



PAE (%) @OP-1dB



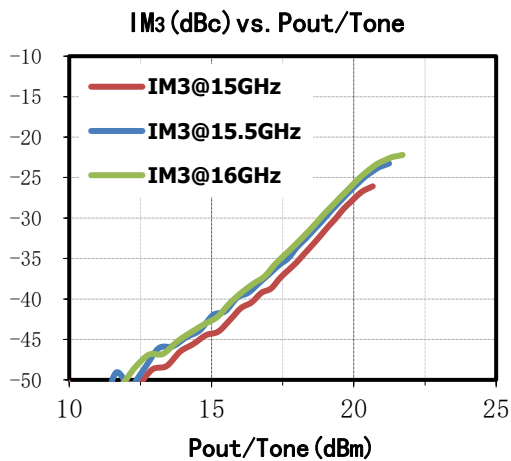
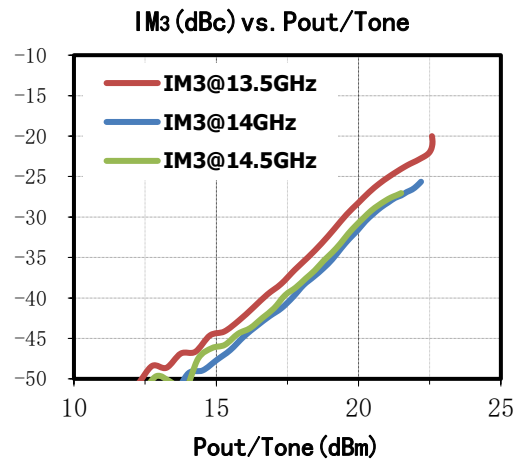
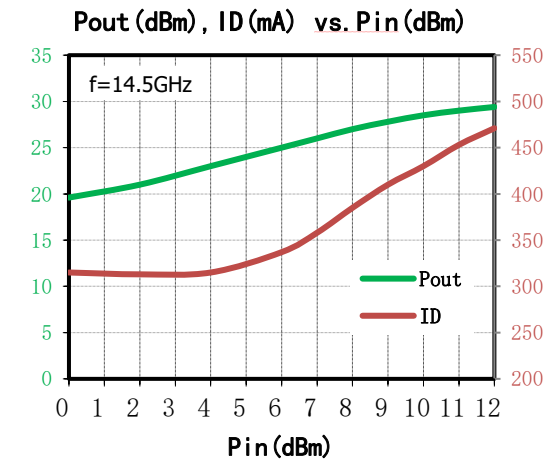
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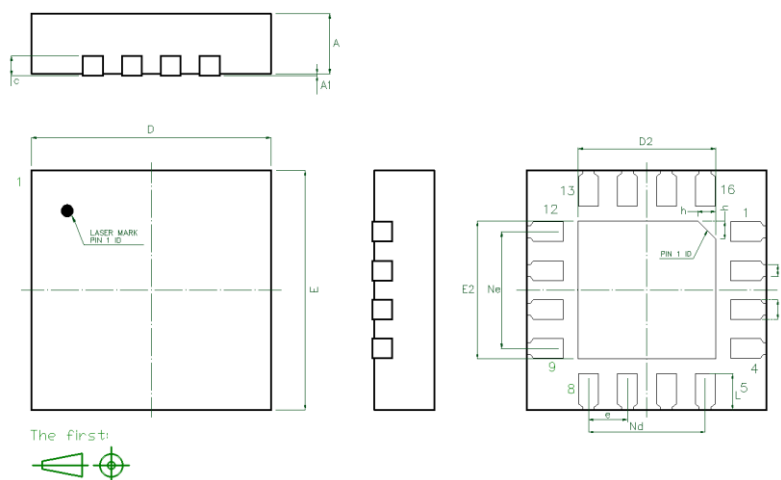
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Outline Drawing (All dimensions in mm)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	---	0.02	0.05
b	0.27	0.33	0.39
b1	0.20REF		
c	0.203REF		
D	3.90	4.00	4.10
D2	2.15	2.30	---
e	0.65BSC		
Ne	1.95BSC		
Nd	1.95BSC		
E	3.90	4.00	4.10
E2	2.15	2.30	---
L	0.50	0.60	0.70
h	0.20	0.30	0.40

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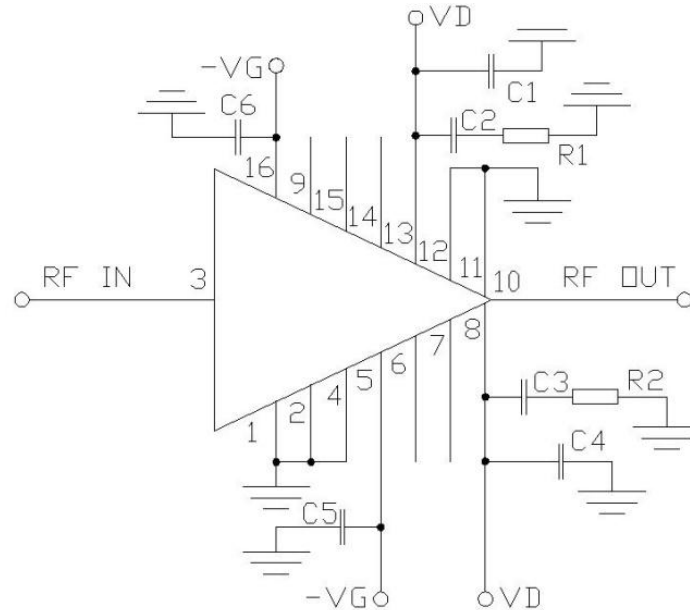
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Assembly Diagram



Pin Descriptions

No.	Function	No.	Function
1	Connect to Ground	10	RF OUT
2	Connect to Ground	11	Connect to Ground
3	RF IN	12	Connect to Ground
4	Connect to Ground	13	Drain2
5	Gate1	14	NC
6	NC	15	NC
7	NC	16	Gate2
8	Drain1		
9	Connect to Ground		

BOM

No.	Value	Size
C1、C4、C6、C5	2.2 μ F	0603
C2、C3	0.01 μ F	0402
R1、R2	2.2 Ω	0402

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Notes

1. SAC3914QP4 requires Gate bias and Drain bias,
Turn-on: Apply Gate bias, Apply Drain bias
Turn-off: Decrease Gate bias to -1.5 V(pinch-off), Decrease Drain bias to 0 V
2. The moisture resistant grade of products is 2a, the storage environment $\leq 30^{\circ}\text{C}/60\%\text{RH}$, the surrounding workshop life is 4 weeks,
3. After un-packing, it is necessary to bake the parts for 6 hours in $125\pm 5^{\circ}$ environment before Soldering,
4. GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test,
5. The bottom center pad of SAC3914QP4 is used for RF grounding and heat dissipation. For best heat dissipation, copper-filled vias are highly recommended.

Revision History

Revision	Date	Comment
1.0	Nov 08, 2023	First Release

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