

SAC3949Q4



GaAs MMIC Driver Amplifier
20GHz~43.5GHz

Rev 1.0

Features

- Frequency: 20GHz~43.5GHz
- Gain: 13dB
- Output P_{-1dB}: 23dBm
- Supply: +5V/-VG
- Package: QFN4x4

Typical Applications

- Instrument

General Description

SAC3949Q4 is a GaAs MMIC Driver Amplifier in QFN surface mount package, which operates between in 18~43.5GHz.

SAC3949Q4 is assembled in a 4mm x 4mm RoHS-compliant air cavity plastic QFN package.

Electrical Performance

(T_A=25°C, V_D=+5V, I_D=400mA, Z₀=50Ω)

Frequency	Min.	Typ.	Max.	Units
Frequency Range	18	—	43.5	GHz
Small Signal Gain	10	13	—	dB
Gain Flatness	—	±1.5	±2.2	dB
RF Input/Output VSWR	—	1.7	2.5	:1
Noise Figure	—	7	—	dB
Isolation	—	50	—	dB
Output P _{-1dB}	20	23	—	dBm
Supply Current (I _D)	—	400	480	mA

Absolute Maximum Ratings

Maximum Input Power	+20dBm, CW 30s	Operating Temperature	-55°C~+85°C
Channel Temperature	+150°C	Storage Temperature	-55°C~+150°C
Maximum V _D	+6.5V		

SuperApex, LLC

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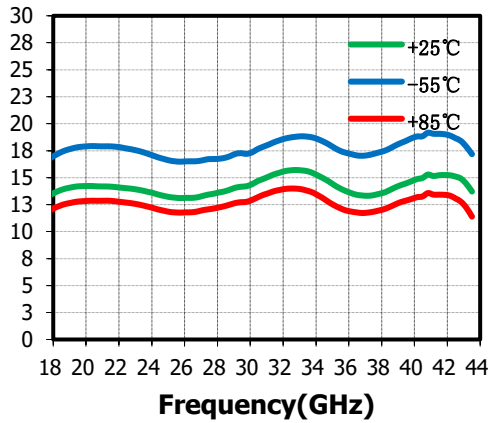
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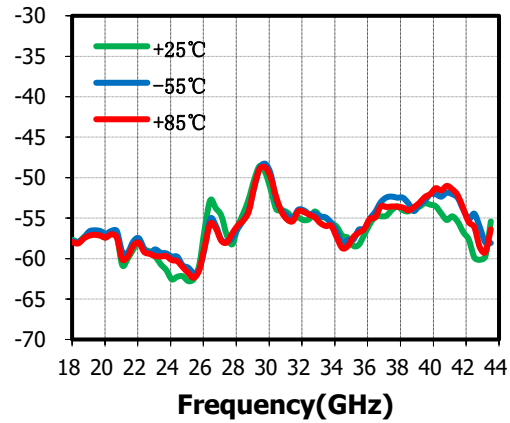
Typical Performance Curve

$V_D=+5V, I_{DQ}=200mA, T_A=+25^\circ C, \text{On Fixture De-embed}$

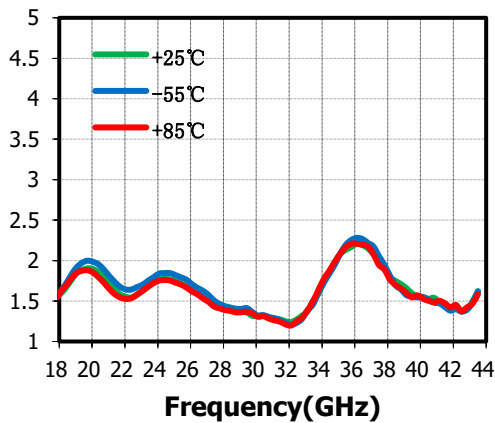
Small Signal Gain(dB) vs.Temperature



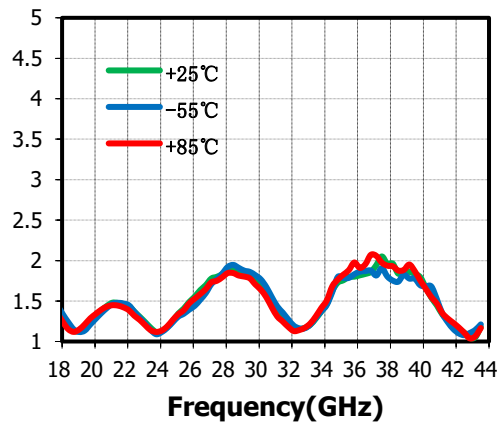
Reverse Isolation(dB) vs.Temperature



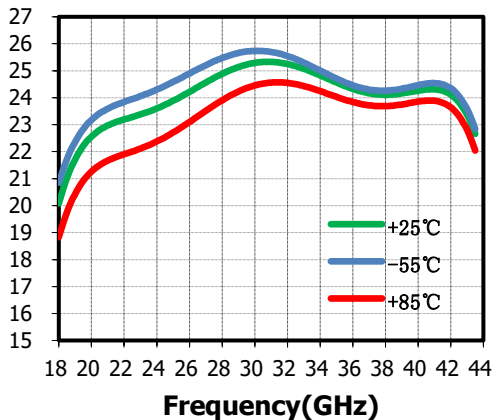
Input VSWR(:1) vs.Temperature



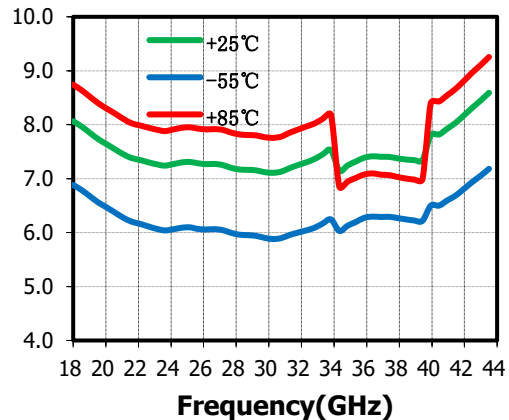
Output VSWR(:1) vs.Temperature



Output P-1dB(dBm) vs.Temperature



Noise Figure(dB) vs.Temperature



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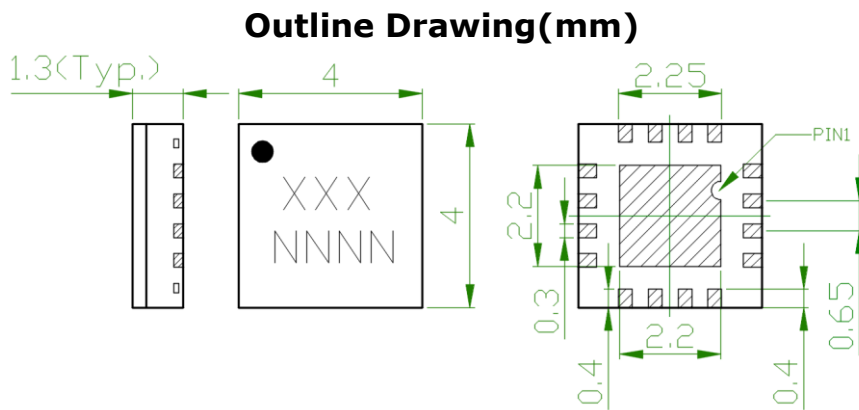
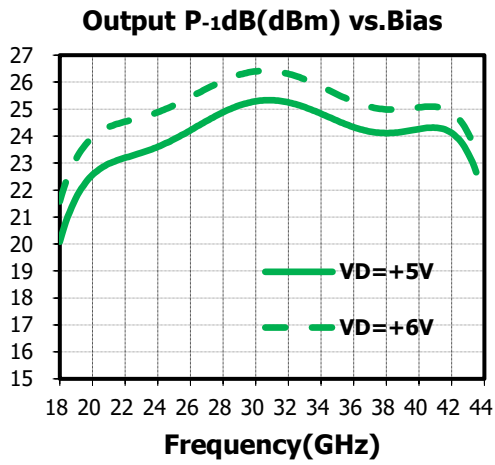
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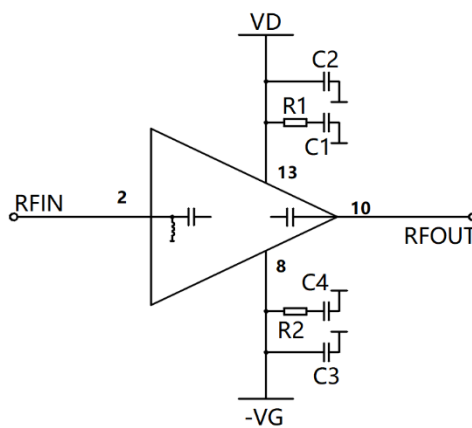
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FINISH:

ELECTROLESS NICKEL PER MIL-C-26074, CLASS 1, (2.5 μ m-7.6 μ m) THICK.GOLD PLATE PER MIL-G-45204, TYPE 3, GRADE A, CLASS 1(1 μ m-2 μ m) THICK.

Application Circuit



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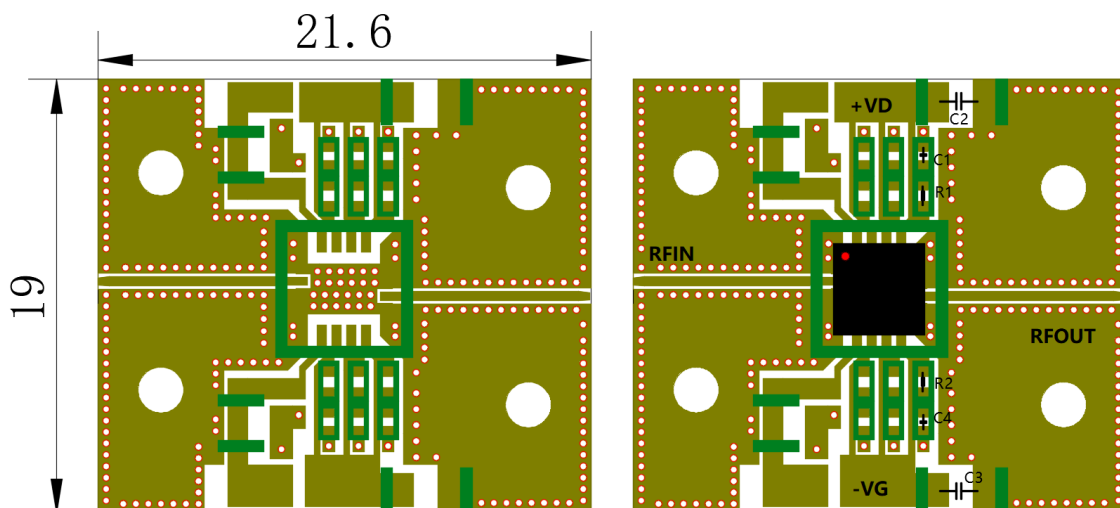
Pin Descriptions

Pin No.	Function	Pin No.	Function
1	Connect to GND	11	Connect to GND
2	RFIN	12	Connect to GND
3	Connect to GND	13	+VD
4	Connect to GND	14	Connect to GND
5	Connect to GND	15	Connect to GND
6	Connect to GND	16	Connect to GND
7	Connect to GND		
8	-VG		
9	Connect to GND		
10	RFOUT		

BOM

Reference Des.	Value	Part Number	Manuf.	Size
R1、R2	2.2Ω	—	—	0402
C1、C2	0.47μF	—	—	0402
C3、C4	10μF	—	—	0805

SAC3949Q4 Evaluation Board



The evaluation board is a 2-layer board fabricated using Rogers 4350b t=0.254 and using best practices for high frequency RF design. The RF input and RF output traces have a 50 Ω characteristic impedance. The bottom center pad of SAC3949Q4 is used for RF grounding and heat dissipation. For best heat

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dissipation, copper-filled vias are highly recommended, SAC3949Q4 is high power dissipation surface mount components and require a well-designed thermal mount. All the heat generated by the device is expected to be removed through the bottom heat slug with a low thermal resistance path to the chassis.

The use of multiple copper-filled vias or solder-filled vias under the package's heat slug while using a indium foil between the PCB and chassis provides a low thermal resistance mount, Insufficient number of vias or insufficient solder filling will significantly affect the heat dissipation process of the device, and then reduce the performance or even damage the device.

Attention:

1. SAC3949Q4 requires VDx and VGx bias.
Turn-on: Apply VGx,Apply VDx,Apply RFIN signal.
Turn-off: Remove RFIN signal, Decrease VG to -1.5 V(pinch-off), Decrease VD 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. Ultrasonic cleaning is prohibited;
6. It is extremely not recommended to heat the package directly from the top.

Revision History

Revision	Date	Comment
1.0	Dec. 30, 2023	First Release

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