SAC3931

GaAs MMIC Driver Amplifier
18~40GHz 20dBm

Rev1.0

Features

- Frequency: 18~40GHz
- Gain:14dB
- Output P_{-1}dB: 22dBm Typ. 20dBm Min.
- Supply Voltage: +5V/-Vg
- Output IP_3: 30dBm@38GHz
- Balanced Amplifier
- Die Size: 2.3mm×1.25mm×0.1mm

Typical Applications

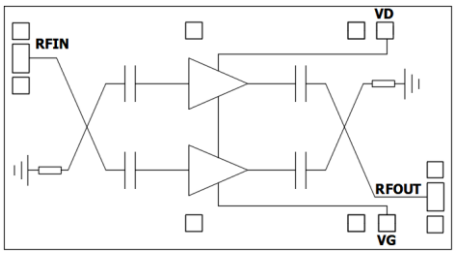
- Point-to-Point Radios
- SATCOM
- Military and Space
- Test and Measurement
- Radar

General Description

The SAC3931 is a balanced GaAs MMIC driver amplifier, which operates between in 18~40GHz . The SAC3931 provides 14dB of gain, and 22dBm of Output P_{-1}dB while requiring 350mA from a +5V supply voltage.

The chip offers full passivation for increased reliability and moisture protection.

Functional Diagram



Electrical Performance

T_A=25℃,V_D=+5V, I_D=350mA,Z_0=50Ω

Parameter	Min.	Typ.	Max.	Units
Frequency Range		18~40		GHz
Small Signal Gain	12	14	22	dB
Small Signal Gain Flatness	—	—	±3.5*	dB
Reverse Isolation	—	-35	—	dB
Input/ Output VSWR	—	1.35	2.0	:1
Noise Figure	—	6	—	dB
Output Power for 1 dB Compression (OP_{-1}dB)	20	22	—	dBm
Output IP_3	—	30**	—	dBm
Supply Current(I_D)	—	350	500	mA
Drain Voltage(V_D)	5	—	6	V
Thermal Resistance	—	22	—	℃/W

* Positive slope

**Pin/Tone=0dBm fc=30GHz,△f=4MHz

Absolute Maximum Ratings

Maximum Input Power	+15dBm，CW 1min	Operating Temperature	-55℃~+85℃
Channel Temperature	+150℃	Storage Temperature	-55℃~+150℃
Maximum V_D	6.5V		

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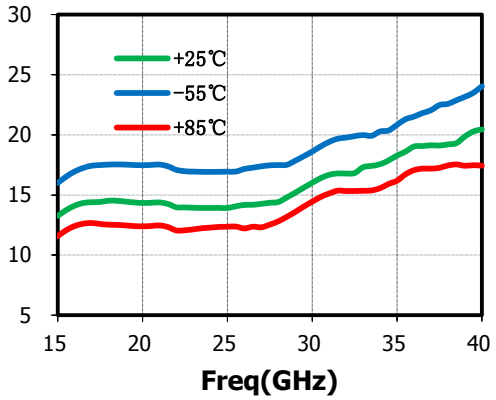
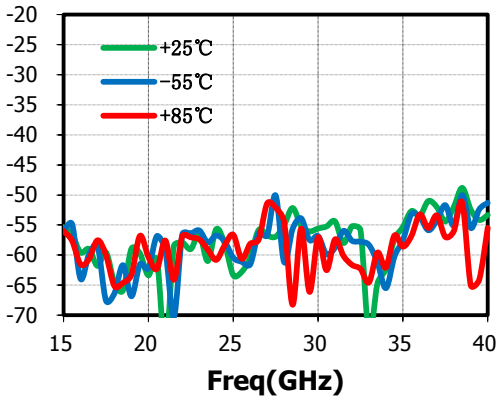
Typical Small Signal Performance Curve

V_D=+5V,I_{DQ}=350mA, The following curves are taken from SAC3931 evaluation board. No De-embedding operation has been Implemented.

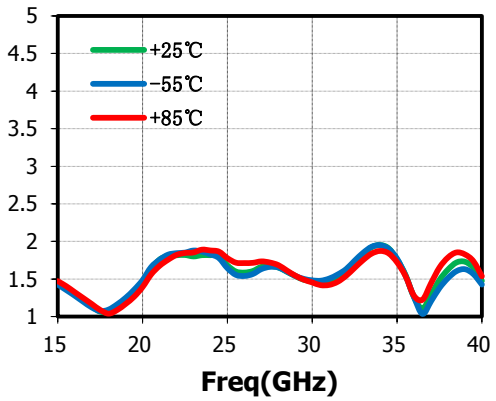
Small Signal Gain (dB) vs. Temperature



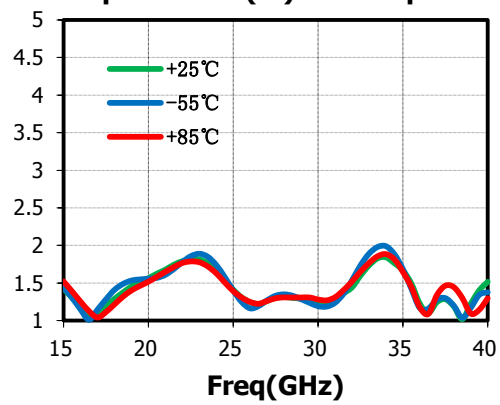
Reverse Isolation (dB) vs. Temperature



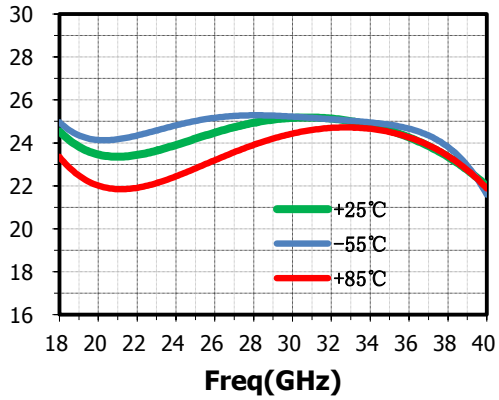
Output VSWR (:1) vs. Temperature



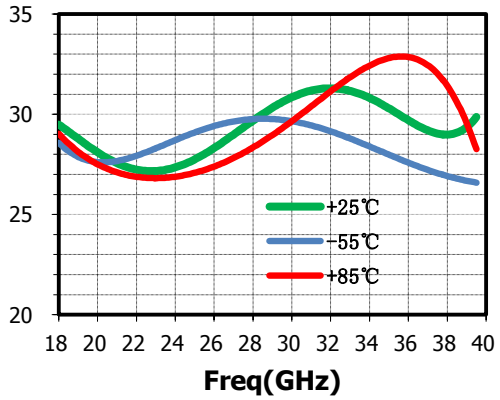
Output VSWR (:1) vs. Temperature



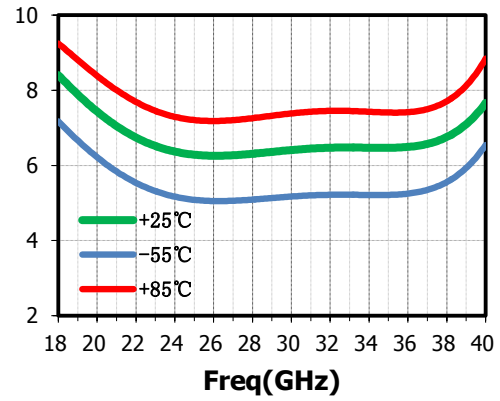
OP-1dB(dBm) vs. Temperature



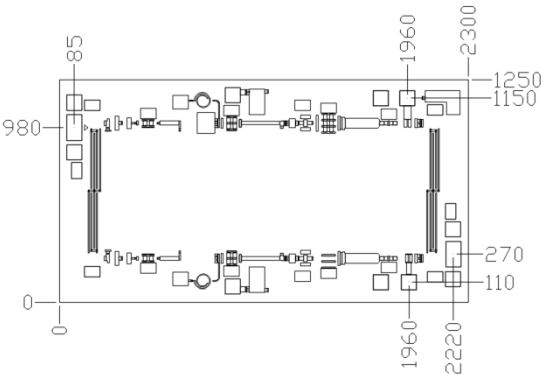
OIP3(dBm) vs. Temperature



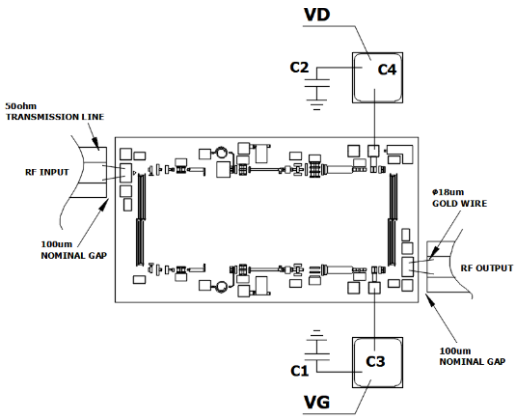
Noise Figure (dB) vs. Temperature



Die Outline(μm)



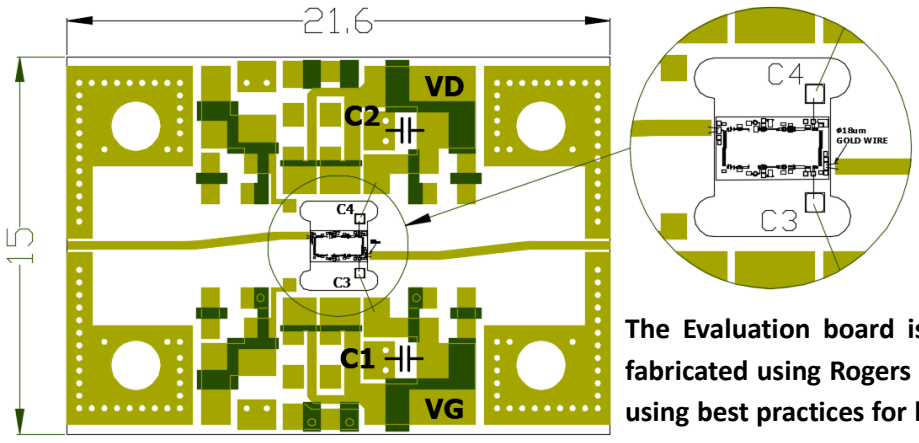
Assembly Diagram



RFIN,RFOUT pads size:140x80

VG/VD pads size:80x80

SAC3931 Evaluation Board



The Evaluation board is a 2-layer board fabricated using Rogers 5880 t=0.127 and using best practices for high frequency RF design. The RF input and RF output traces have a 50 Ω characteristic impedance.

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Components List

Reference Des.	Value	Part Number	Manuf.	Size
C1、C2	2.2uF	—	ANY	0603
C3、C4	10pF	—	ANY	SLC

Attention:

GaAs MMIC devices are susceptible to damage from electrostatic discharge. Proper precautions should be observed during handling, assembly and test.