

Features

- Frequency: 14~18GHz
- Gain: 18dB
- Noise Figure: 1.1dB Typ. 1.5dB Max.
- Output P_{-1dB}: 0dBm
- Power Supply: +4V@11mA/Per channel
- Die Size: 1.4mm×1mm×0.1mm

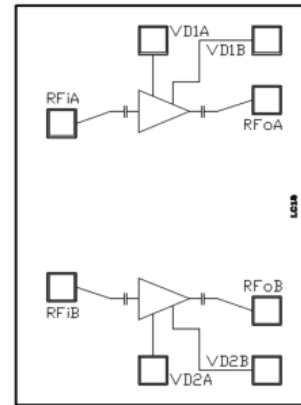
Typical Applications

- Point-to-Point Radios
- Phased Arrays

General Description

SAC3088I is a Ku band GaAs MMIC Low Noise Amplifier. SAC3088I is made of GaAs process, and the surface of the bare chip is protected by a passivation layer, which can work in the 14~18GHz frequency band. When using 4V power supply, the small signal gain of the amplifier is 18dB, the output P_{-1dB} is 0dBm, the working current of each channel is 11mA, and the typical noise figure is 1.1dB.

Functional Diagram



Electrical Performance

T_A=25°C, V_D=+4V, I_D=11mA/Per channel, Z₀=50Ω

Parameter	Min.	Typ.	Max.	Units
Frequency Range	14~18			GHz
Gain	16	18	22	dB
Gain Flatness	—	±1	±1.5	dB
Input VSWR/ Output VSWR	—	1.5	2.2	:1
Noise Figure	—	1.1	1.5	dB
Reverse Isolation	—	-35	—	dB
Output P _{-1dB}	-2	0	—	dBm
Output IP ₃	—	12	—	dBm
Supply Current (I _D)	—	11	14	mA

Absolute Maximum Ratings

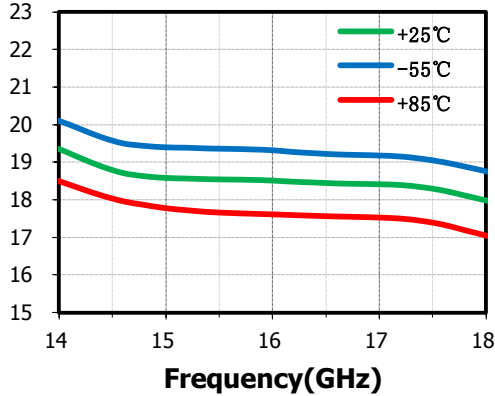
Maximum Input Power	+18dBm, CW 30s	Operating Temperature	-55°C~+85°C
Channel Temperature	+150°C	Storage Temperature	-55°C~+125°C
Supply Voltage(V _D)	+5V		

Typical Performance Curve

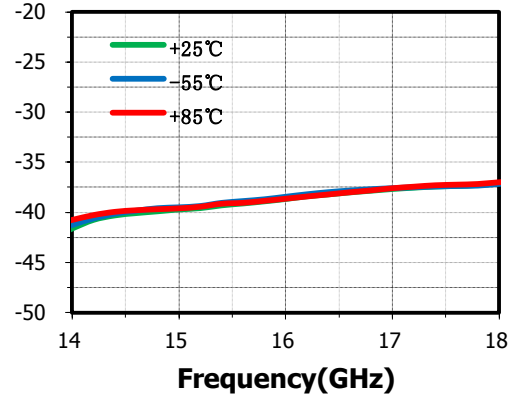
$V_D=+4V$, $I_{DQ}=22mA$ (Dual channels work simultaneously)

The following is the data after using SAC3088I evaluation board to test and embed it into the bond between gold wire and strip wire.

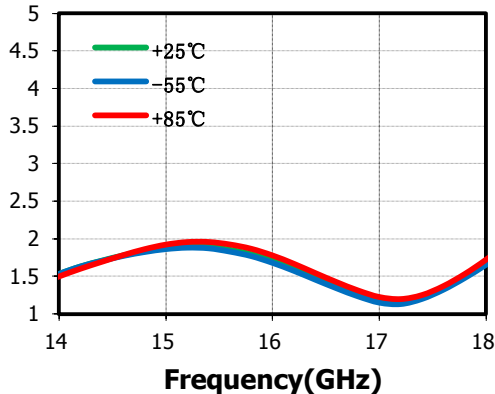
Small Signal Gain(dB) vs.Temperature



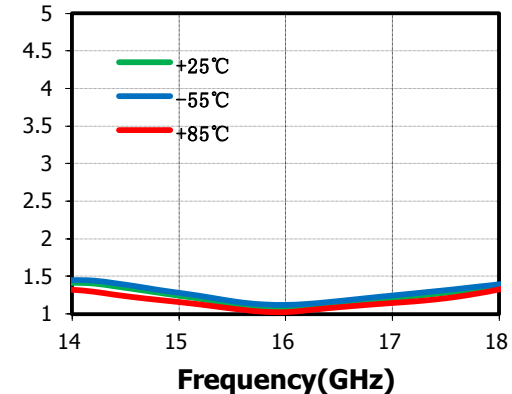
Reverse Isolation(dB) vs.Temperature



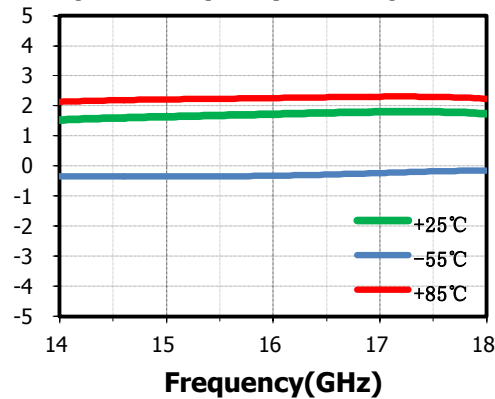
VSWRi(:1) vs.Temperature



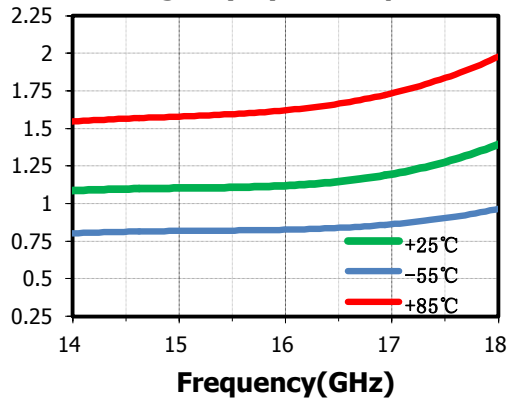
VSWRo(:1) vs.Temperature



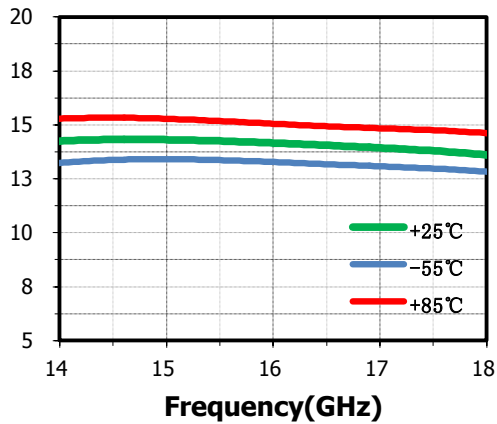
Output P-1dB(dBm) vs.Temperature



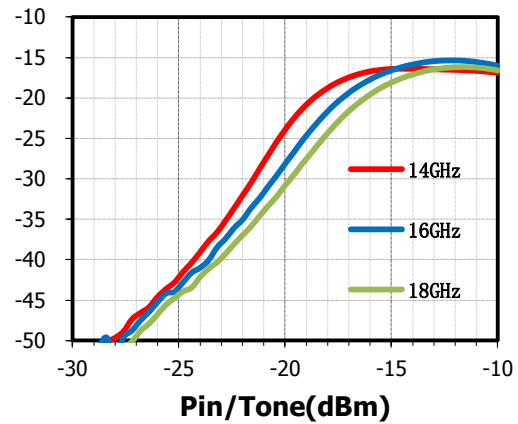
Noise Figure(dB) vs.Temperature



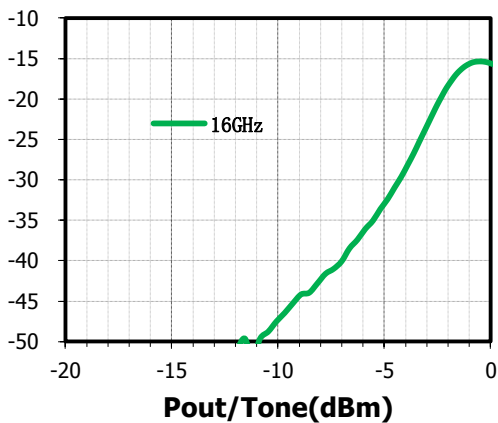
Output IP₃(dBm) vs. Temperature



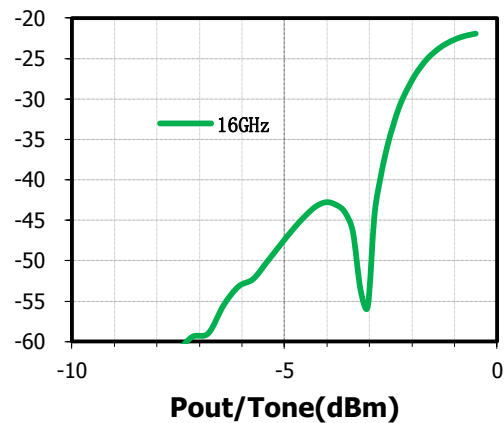
IM₃(dBc) vs. Frequency



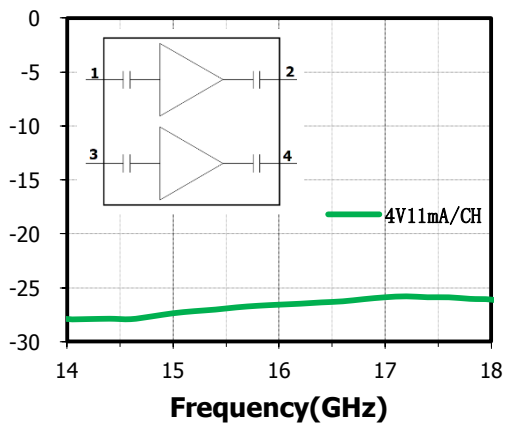
IM₃(dBc) vs. Pout/Tone



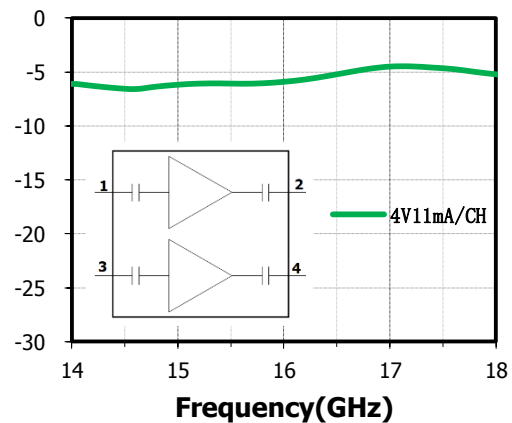
IM₅(dBc) vs. Pout/Tone

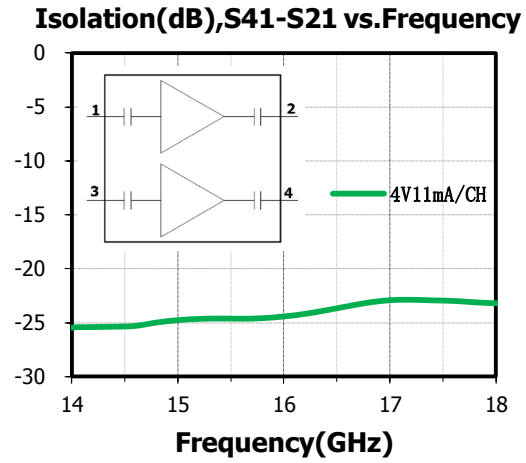
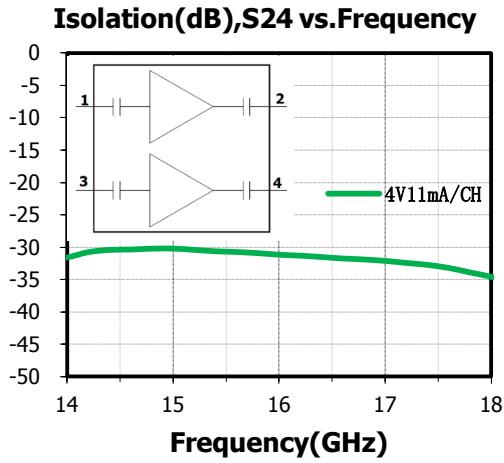


Isolation(dB),S₃₁ vs. Frequency



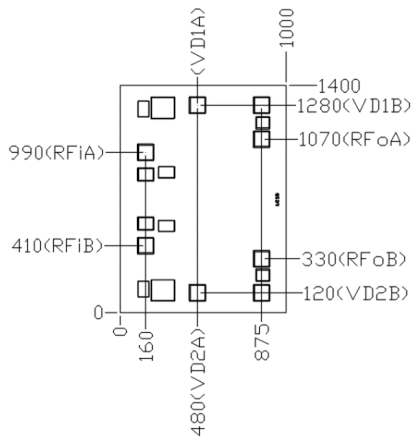
Isolation(dB),S₄₁ vs. Frequency





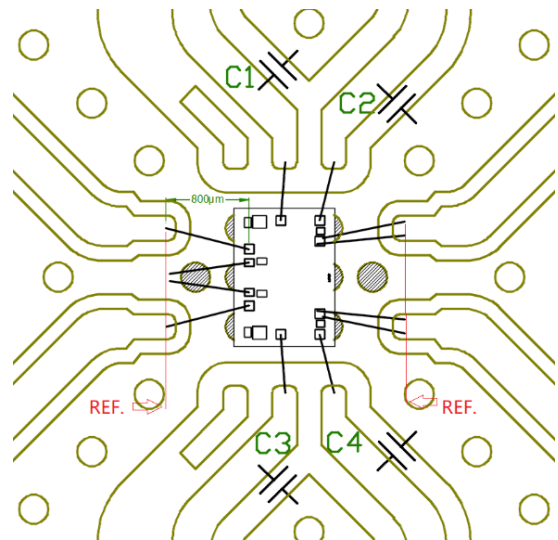
Die Outline Drawing

(All dimensions in μm)

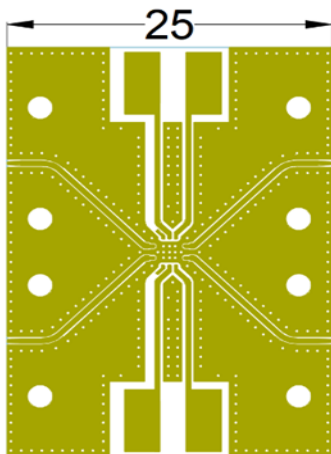


Size of bonding pad: $90\mu\text{m}^2$ SQ., $t=100\mu\text{m}$

Die Assembly Diagram



SAC3088I Evaluation Board



The Evaluation board is a 2-layer board fabricated using Rogers 4350 $t=0.254$ and using best practices for high frequency RF design. The RF input and RF output traces have a $50\ \Omega$ characteristic impedance.

BOM

Reference Des.	Value	Part Number	Manuf.	Size
C1~C4	0.047 μ F	GRM033C81A473KE05D	Murata	0201

Attention:

1. The bare chip shall be stored in a dry and nitrogen environment and used in an ultra-clean environment;
2. The bare chip is made of GaAs material, which is relatively brittle, so it cannot touch the chip surface. Be careful when using it;
3. The bare chip can be sintered with high thermal conductivity conductive adhesive or alloy (the alloy temperature cannot exceed 300 °C, and the time cannot exceed 30 seconds) to make it fully grounded;
4. The bare chip devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

Revision History

Revision	Date	Comment
1.0	April 22, 2021	First Release