SAC3088IQP3

GaAs MMIC Low Noise Amplifier
14~18GHz

Rev 1.0

Features

- Frequency: 14~18GHz
- Gain: 18dB
- Noise Figure: 1.1dB Typ. 1.5dB Max.
- Output P_{-1}dB: 0dBm
- Power Supply: +4V@11mA/Per channel
- Package Size: 3mm×3mm×1.1mm

Typical Applications

- Point-to-Point Radios
- Phased Arrays

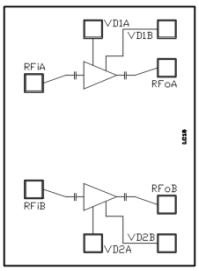
General Description

SAC3088IQP3 is a GaAs MMIC Low Noise Amplifier in QFN over molding surface mount package, which operates between in 14~18GHz.

The amplifier can provide 18dB of gain, 0dBm of output P_{-1}dB and 1.5dB noise figure and from an 8mA supply current.

SAC3088IQP3 is assembled in a 3mm × 3mm QFN plastic package.

Functional Diagram



Electrical Performance

T_A=25℃, V_D=+4V, I_D=11mA/Per channel, Z_0=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_{-1}dB	-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℃~+85℃
Channel Temperature	+150℃	Storage Temperature	-55℃~+125℃
Supply Voltage	+5V		

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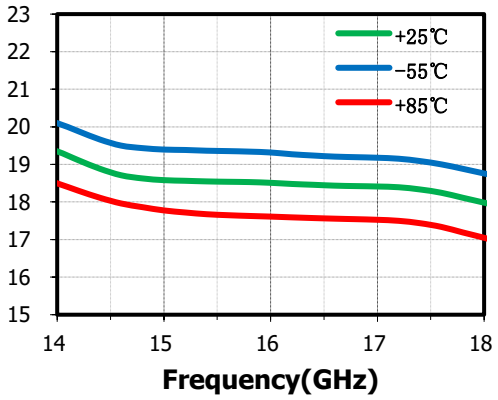
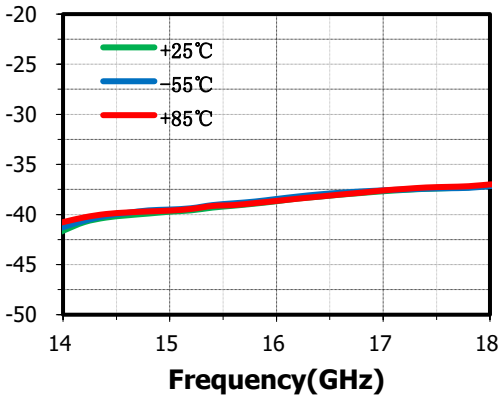
Typical Performance Curve

V_D=+4V, I_{DQ}=22mA, the following curves are taken from SAC3088IQP3 evaluation board. De-embedding operation has been Implemented.

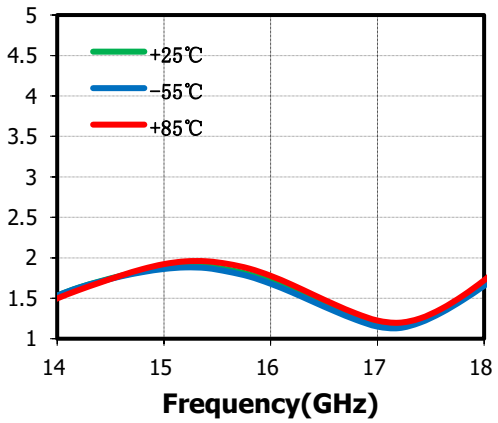
Small Signal Gain(dB) vs.Temperature



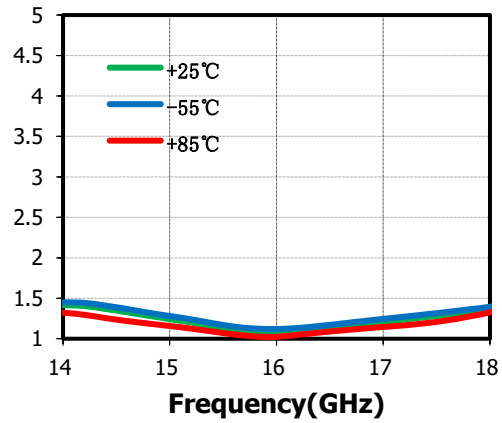
Reverse Isolation(dB) vs.Temperature



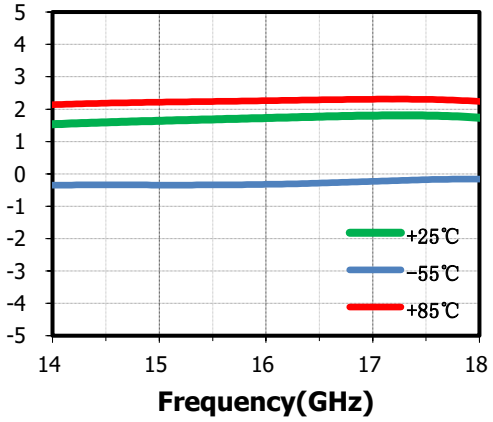
VSWRi(:1) vs.Temperature



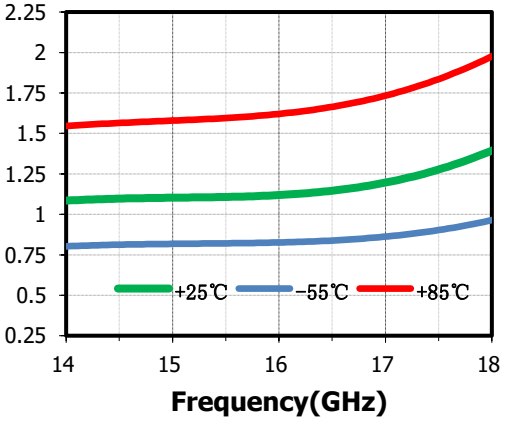
VSWRo(:1) vs.Temperature



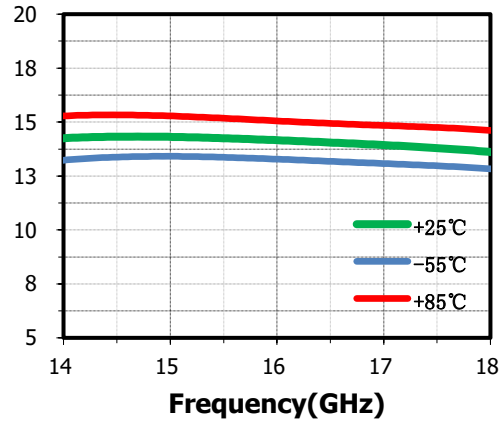
Output P-1dB(dBm) vs.Temperature



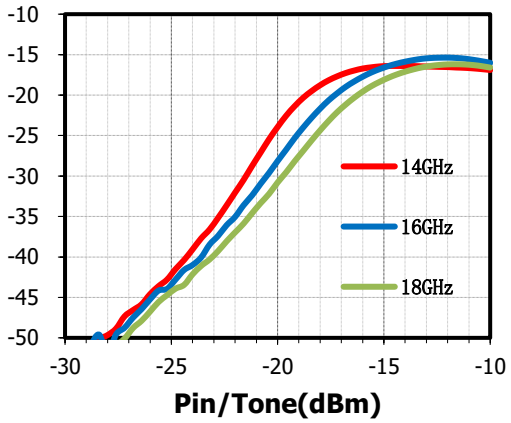
Noise Figure(dB) vs.Temperature



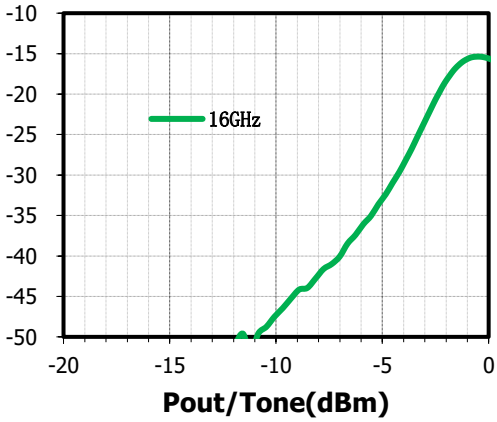
Output IP3(dBm) vs.Temperature



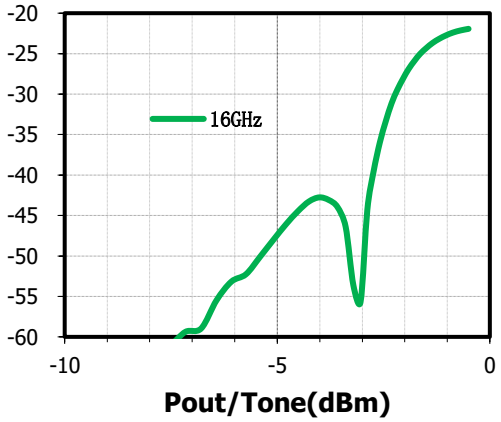
IM3(dBc) vs.Frequency



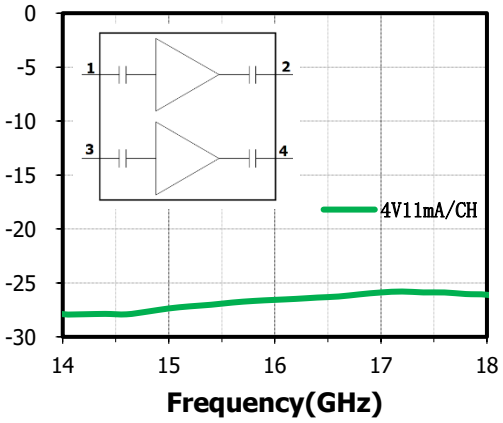
IM3(dBc) vs.Pout/Tone



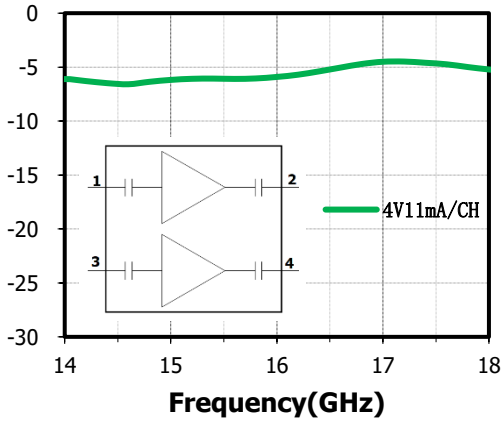
IM5(dBc) vs.Pout/Tone



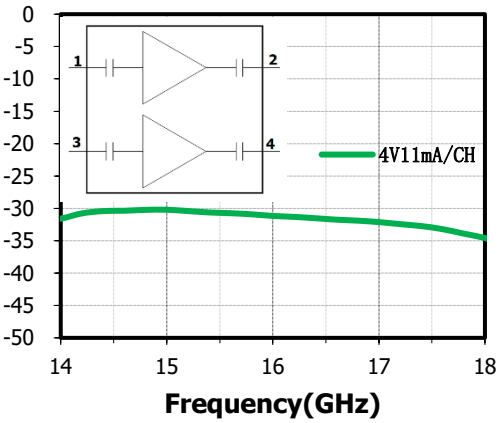
Isolation(dB),S31 vs.Frequency



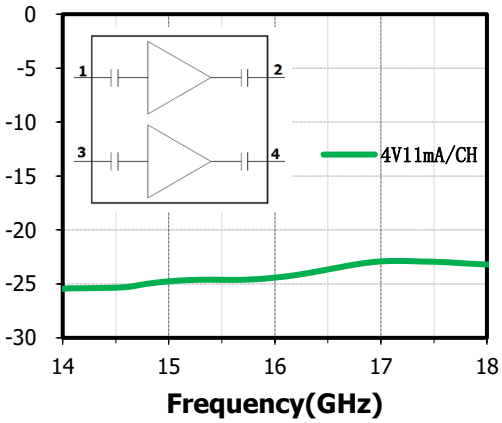
Isolation(dB),S41 vs.Frequency



Isolation(dB),S24 vs.Frequency

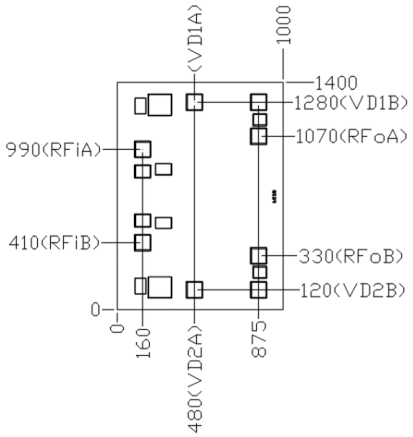


Isolation(dB),S41-S21 vs.Frequency



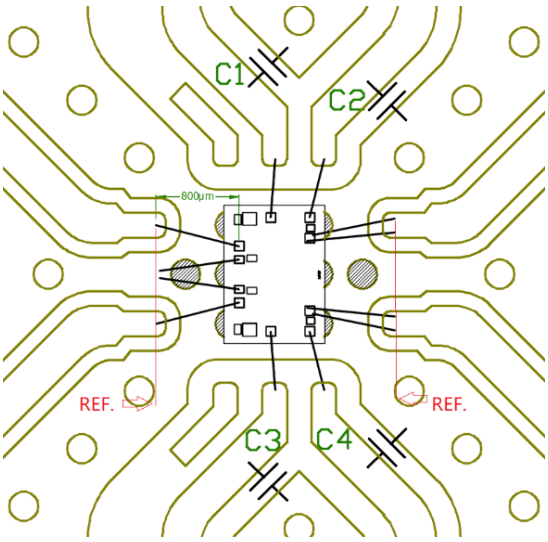
Die Outline Drawing

(All dimensions in μm)

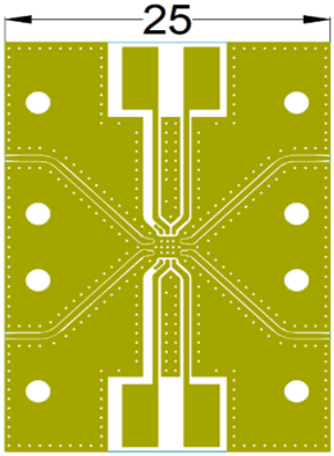


Size of bonding pad:90μm² SQ., t=100μm

Die Assembly Diagram



SAC3088IQP3 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 Ω characteristic impedance.

Components List

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

Attention:

1. The moisture resistant grade of SAC3088IQP3 is 2a, the storage environment ≤30℃/60% RH, the surrounding workshop life is 4 weeks.

2. After un-packing, it is necessary to bake the parts for 6 hours in 125+/-5degree environment before soldering.

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

4. The back of bare chip is RF and DC ground.

5. RF connections should be made as short as possible to reduce the inductive effect of the bond wire. Use of a 1 mil thermosonic wedge bonding is highly recommended as the loop height will be minimized.

Revision History

Revision	Date	Comment
1.0	April 22, 2021	First Release