SAC3089Q3

GaAs MMIC Low Noise Amplifier
0.03~3.5GHz

Rev 1.0

Features

- Frequency：0.03~3.5GHz
- Gain：22dB
- Noise Figure：0.9dB Typ. 1.4dB Max.
- Output P_{-1}dB：17dBm
- Output IP_3：36dBm@1GHz
- Power Supply：+5V@35~70mA
- Package Size：3mmx3mmx1.1mm

Typical Applications

- Broadband low noise amplifier
- Test and Measurement

General Description

SAC3089Q3 is a GaAs MMIC Low Noise Amplifier, which operates between in 0.03~3.5GHz.

The amplifier can provide 22dB of gain, 17dBm of output P_{-1}dB and 0.9dB noise figure and from a 70mA supply current.

SAC3089Q3 is assembled in a 3mm x 3mm QFN plastic package.

Picture

Electrical Performance 1 (T_A=25℃, V_D=+5V, I_D=35mA, Z_0=50Ω)

Parameter	Min.	Typ.	Max.	Units
Frequency Range		0.03~3.5		GHz
Gain	17	20	23	dB
Gain Flatness	—	±1.3	±2	dB
Input VSWR/ Output VSWR	—	1.5	2.5	:1
Noise Figure	—	0.9	1.4	dB
Reverse Isolation	—	-24	—	dB
Output P_{-1}dB	13	14	—	dBm
Output IP_3	—	24*	—	dBm
Supply Current(I_D)	—	35	45	mA

Electrical Performance 2 (T_A=25℃, V_D=+5V, I_D=70mA, Z_0=50Ω)

Parameter	Min.	Typ.	Max.	Units
Frequency Range		0.03~3.5		GHz
Gain	17	21	24	dB
Gain Flatness	—	±1.3	±2	dB
Input VSWR/ Output VSWR	—	1.5	2.5	:1
Noise Figure	—	0.9	1.4	dB
Reverse Isolation	—	-27	—	dB
Output P_{-1}dB	17	18	—	dBm
Output IP_3	—	36*	—	dBm
Supply Current(I_D)	—	70	100	mA

SuperApex, LLC
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Tel: 1-847-505-8319, 1-847-573-9866
E-mail: sales@superapexco.com
Website: www.superapexco.com

*Pin/Tone=-15dBm fc=1GHz， △f=4MHz

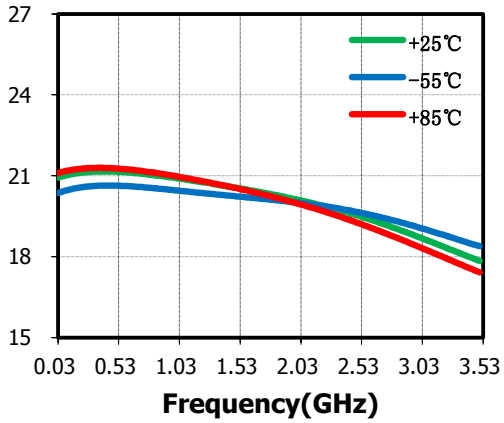
Absolute Maximum Ratings

Maximum Input Power	+15dBm,CW 30s	Operating Temperature	-55℃~+85℃
Channel Temperature	+150℃	Storage Temperature	-55℃~+150℃
Supply Voltage	+8V		

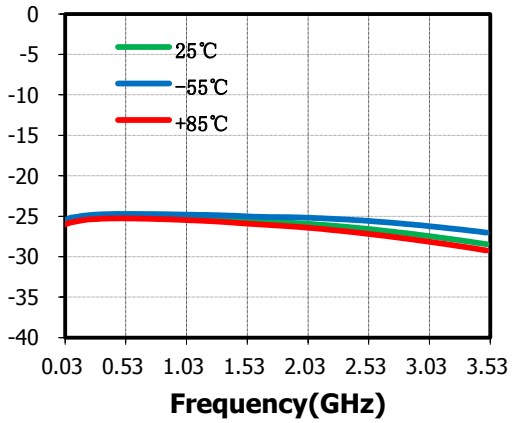
Typical Performance Curve

V_D=+5V,I_{DQ}=35mA, The following curves are taken from SAC3089Q3 evaluation board. No De-embedding operation has been Implemented.

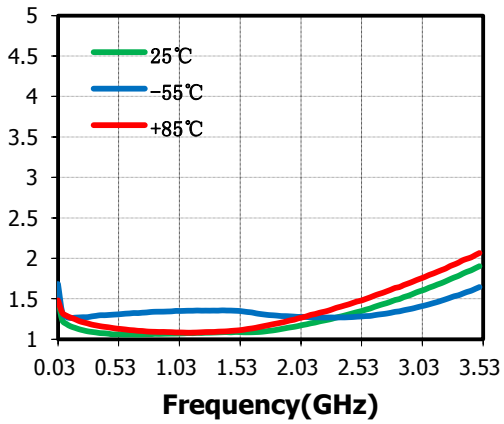
Small Signal Gain(dB) vs.Temperature



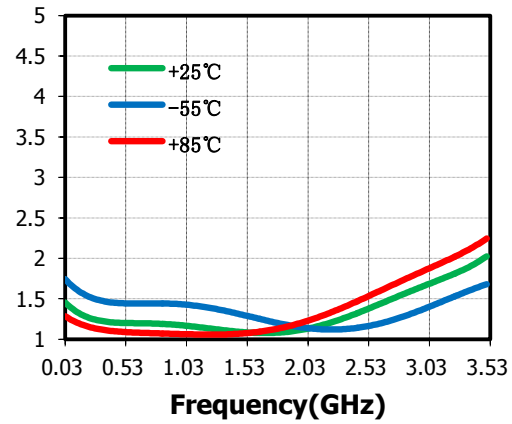
Reverse Isolation(dB) vs.Temperature



Input VSWR(:1) vs.Temperature



Output VSWR(:1) vs.Temperature



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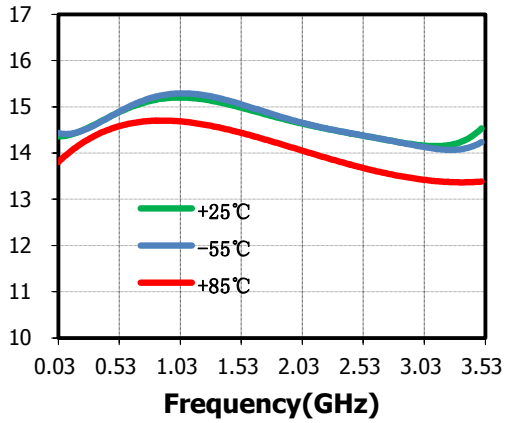
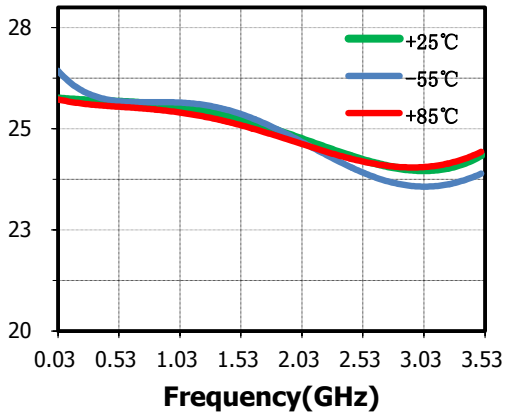
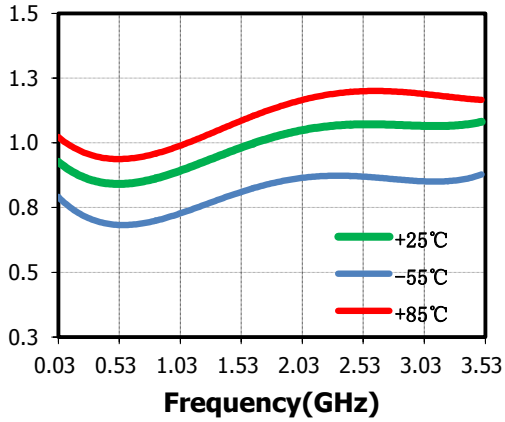
Output P-1dB(dBm) vs.Temperature



Output IP3(dBm) vs.Temperature

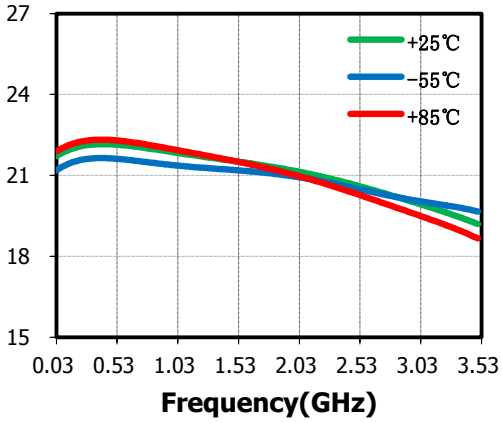


Noise Figure(dB) vs.Temperature

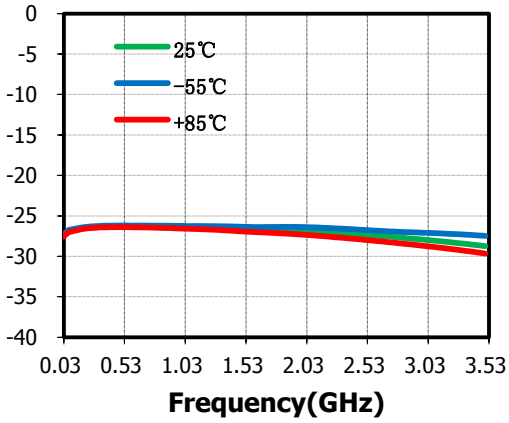


V_D=+5V,I_{DQ}=70mA, The following curves are taken from SAC3089Q3 evaluation board. No De-embedding operation has been Implemented.

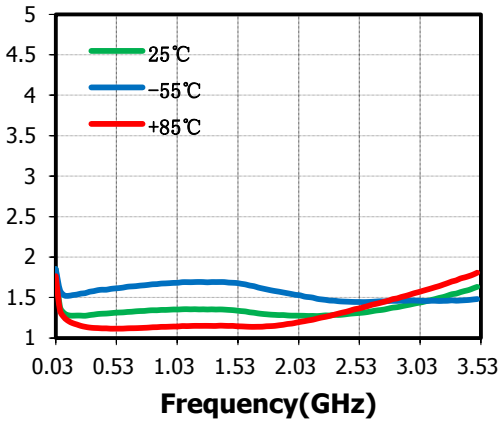
Small Signal Gain(dB) vs.Temperature



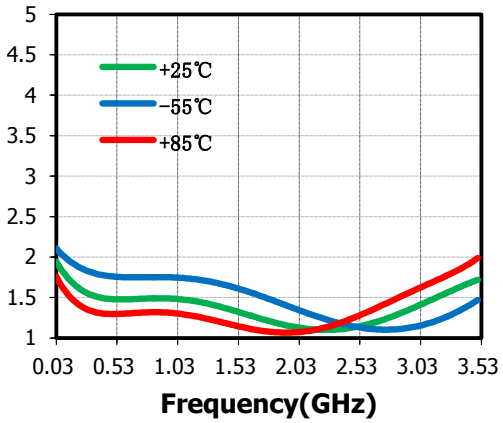
Reverse Isolation(dB) vs.Temperature



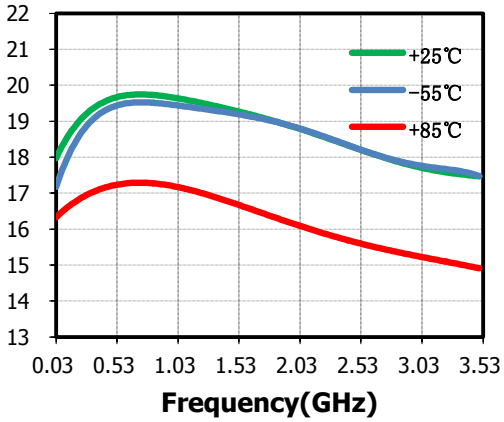
Input VSWR(:1) vs.Temperature



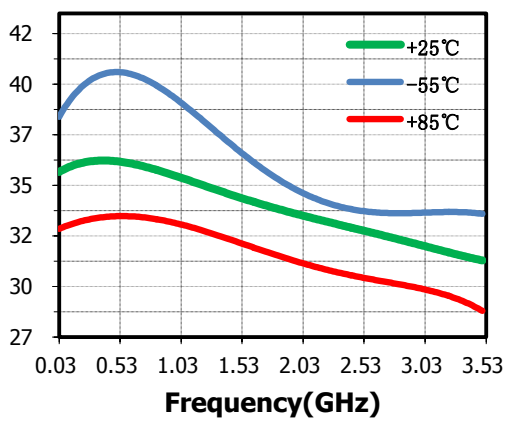
Output VSWR(:1) vs.Temperature



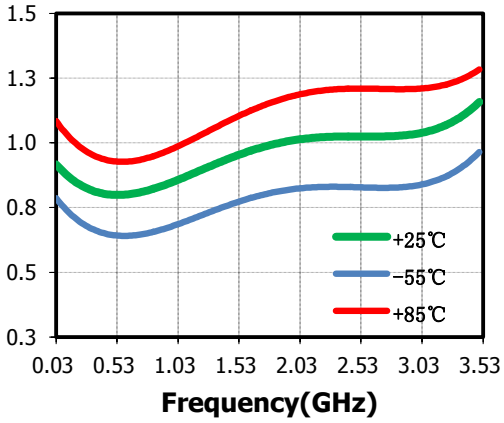
Output P-1dB(dBm) vs.Temperature



Output IP3(dBm) vs.Temperature



Noise Figure(dB) vs.Temperature



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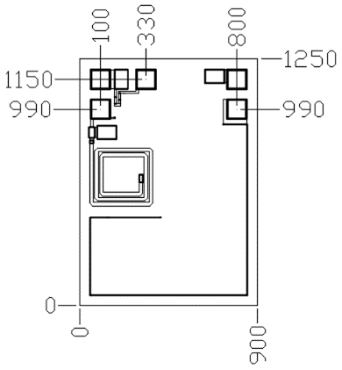
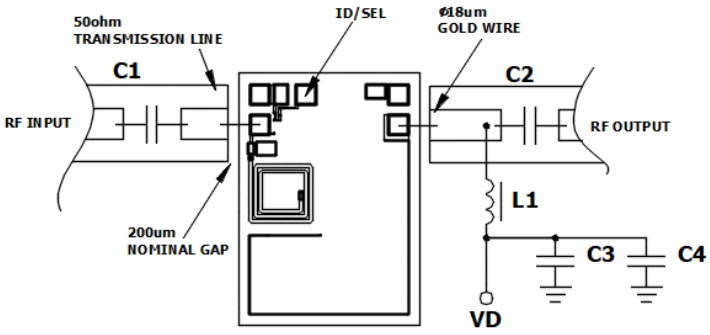
Die Outline

(All dimensions in μm)



Pads size：90x90

Assembly Diagram

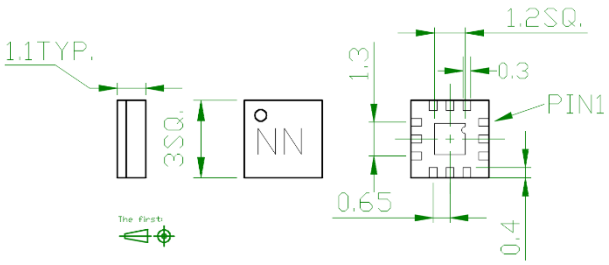


I_{DQ}/SEL connect to GND,I_{DQ}=35mA

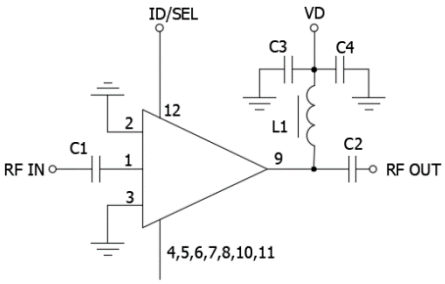
I_{DQ}/SEL Floating,I_{DQ}=70mA

Package Outline Drawing

(all dimensions in mm)



Application Circuit



Pin Function

Pin No.	Description	Pin No.	Description
1	RF input, DC Coupled	7	Connect to ground
2	Connect to ground	8	Connect to ground
3	Connect to ground	9	RF input/Bias, DC Coupled
4	Connect to ground	10	NC or Connect to ground
5	Connect to ground	11	NC or Connect to ground
6	Connect to ground	12	I_{DQ} select

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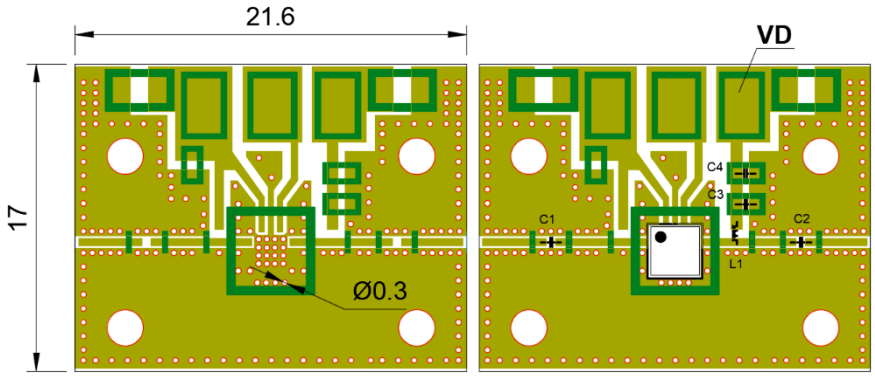
SAC3089Q3 Evaluation Board



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	Manuf.
C1、C2、C3	1000pF	GRM1555C1H102JA	Murata
C4	1uF	GRM0336R61A105KE	Murata
L1	-	BLM15HG102SN	Murata

Attention:

1. The moisture resistant grade of products is 2a, the storage environment ≤30° C/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+/-5 degree environment before soldering.
3. GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.