

SAC3086Q3

GaAs MMIC Low Noise Amplifier
10~13GHz

Rev 1.0

Features

- Frequency: 10~13GHz
- Gain: 18dB
- Noise Figure: 1.1dB Typ. 1.5dB Max
- Output P_{-1dB}: 5dBm
- Power Supply: +3~4V, 8~11mA
- Package Size: 3mmx3mmx1.1mm

Typical Applications

- Point-to-Point Radios
- Phased Arrays

General Description

SAC3086Q3 is a GaAs MMIC Low Noise Amplifier in QFN surface mount package, which operates between in 10~13GHz.

The amplifier can provide 18dB of gain, 5dBm of output P_{-1dB} and 1.1dB noise figure and from a 8mA supply current.

SAC3086Q3 is assembled in a 3mm x 3mm QFN plastic package.

Picture



Electrical Performance 1 (T_A=25°C, V_D=+3V, I_D=8mA, Z₀=50Ω)

Parameter	Min.	Typ.	Max.	Units
Frequency Range	10~13			GHz
Gain	16	18	22	dB
Gain Flatness	—	±1	±1.5	dB
Input / Output port return loss	-8	-12	—	dB
Noise Figure	—	1.1	1.5	dB
Reverse Isolation	—	-35	—	dB
Output P _{-1dB}	-2	1	—	dBm
Output IP ₃	—	12	—	dBm
Supply Current(I _D)	—	8	13	mA

Electrical Performance 2 (T_A=25°C, V_D=+4V, I_D=11mA, Z₀=50Ω)

Parameter	Min.	Typ.	Max.	Units
Frequency Range	10~13			GHz
Gain	16	19	23	dB
Gain Flatness	—	±1	±1.5	dB
Input / Output port return loss	-8	-12	—	dB
Noise Figure	—	1.1	1.5	dB
Reverse Isolation	—	-35	—	dB
Output P _{-1dB}	3	5	—	dBm
Output IP ₃	—	17	—	dBm
Supply Current(I _D)	—	11	18	mA

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Absolute Maximum Ratings

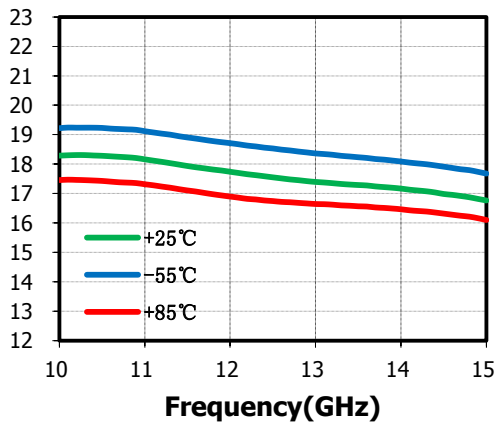
Maximum Input Power	+20dBm,CW 30s	Operating Temperature	-55°C~+85°C
Channel Temperature	+150°C	Storage Temperature	-55°C~+150°C
Supply Voltage	+6V		

Typical Performance Curve

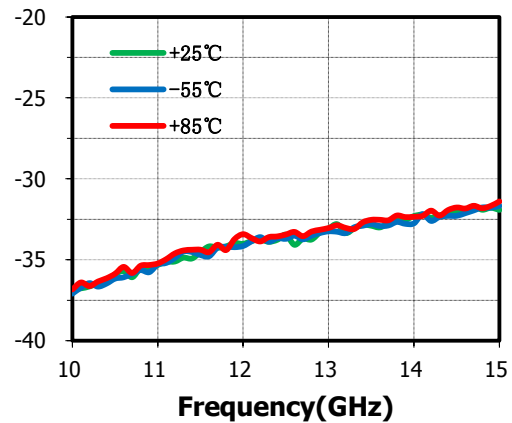
$$V_D=+3V, I_{DQ}=8mA,$$

The following curves are taken from SAC3086Q3 evaluation board. De-embedding operation has been Implemented.

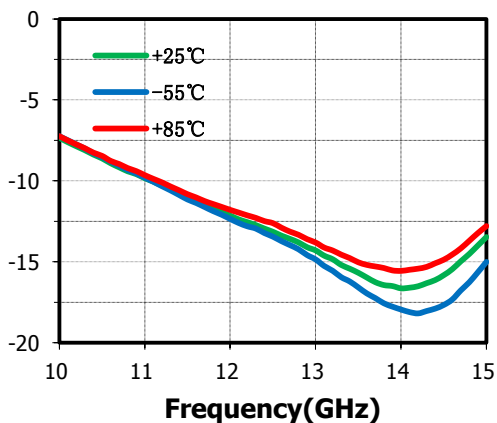
Small Signal Gain(dB) vs.Temperature



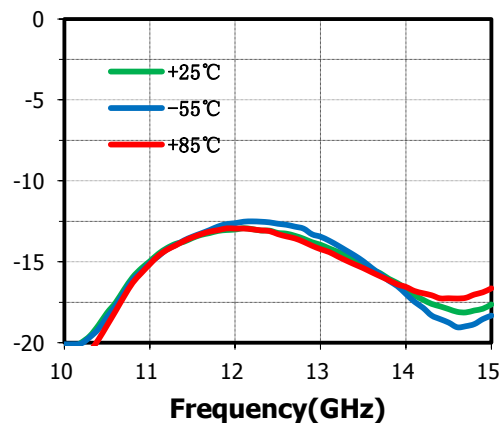
Reverse Isolation(dB) vs.Temperature



Input RL(dB) vs.Temperature



Output RL(dB) vs.Temperature



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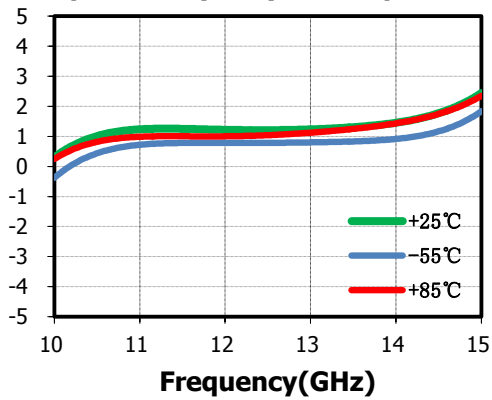
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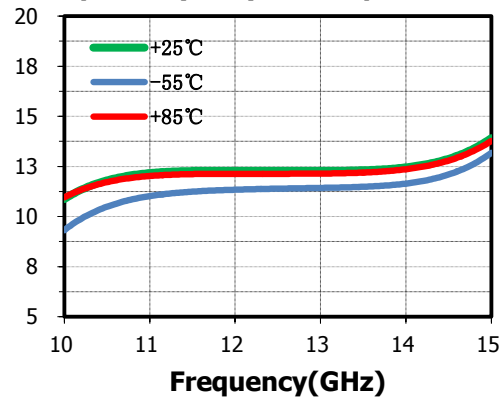
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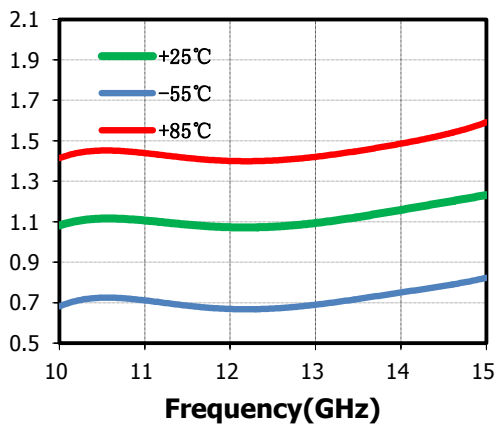
Output P-1dB(dBm) vs.Temperature



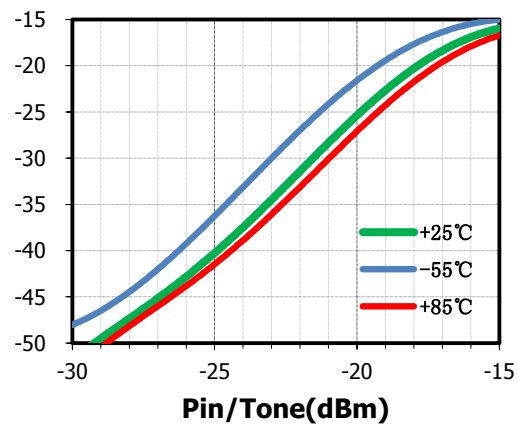
Output IP₃(dBm) vs.Temperature



Noise Figure(dB) vs.Temperature



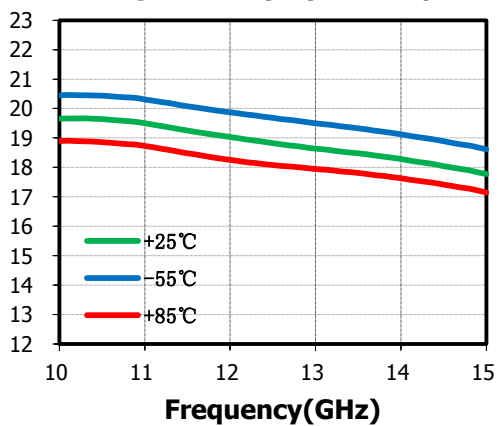
IM₃(dBc) vs.Temperature, f=12GHz



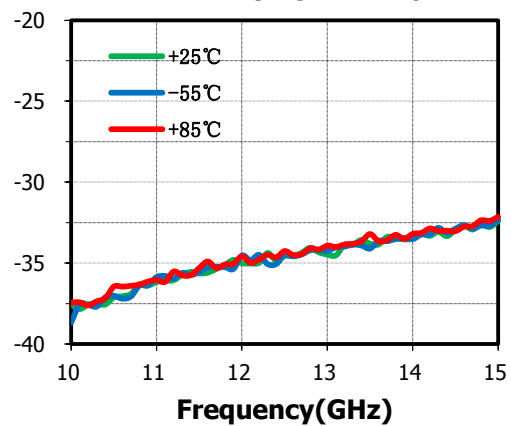
$$V_D=+4V, I_{DQ}=11mA,$$

The following curves are taken from SAC3086Q3 evaluation board. De-embedding operation has been implemented.

Small Signal Gain(dB) vs.Temperature



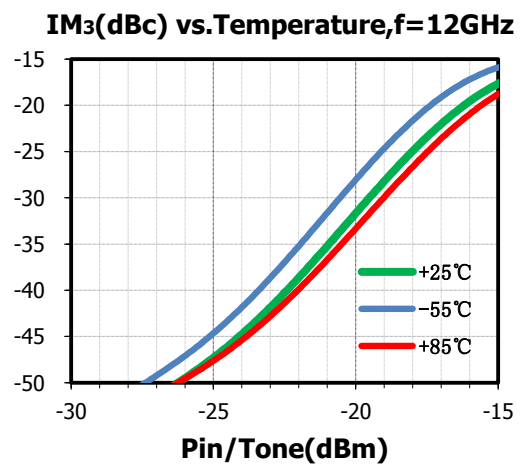
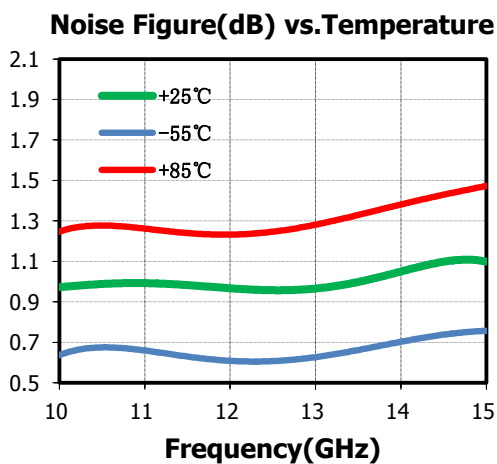
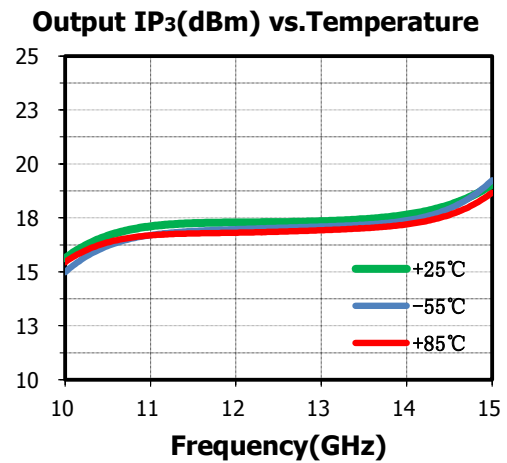
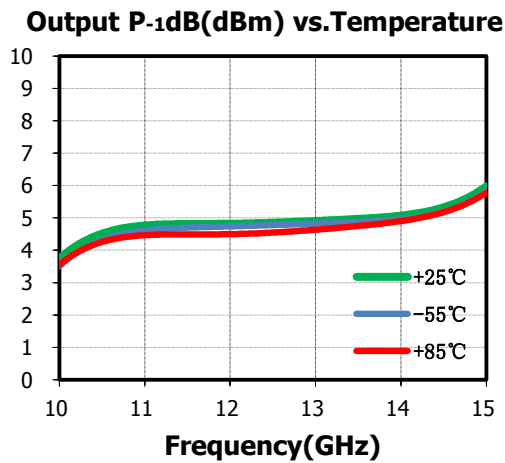
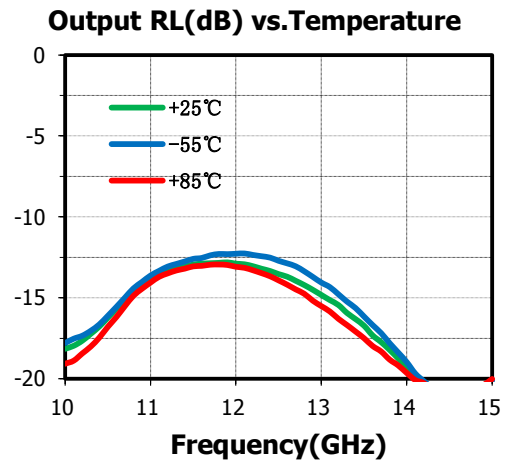
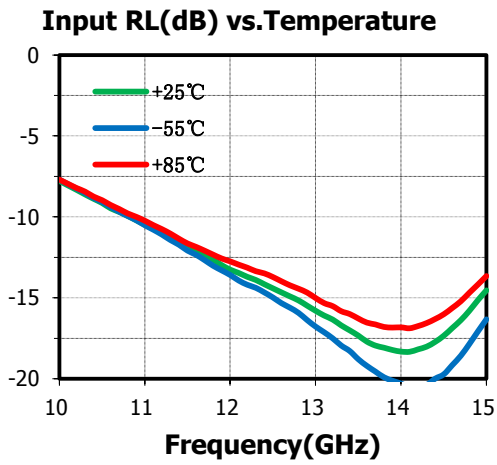
Reverse Isolation(dB) vs.Temperature



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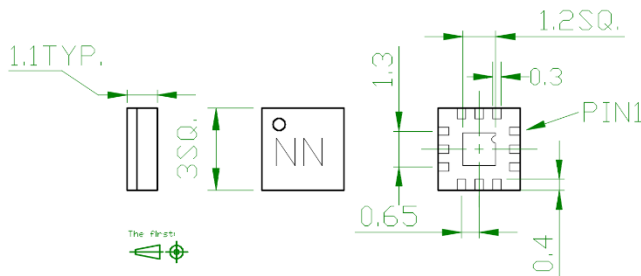
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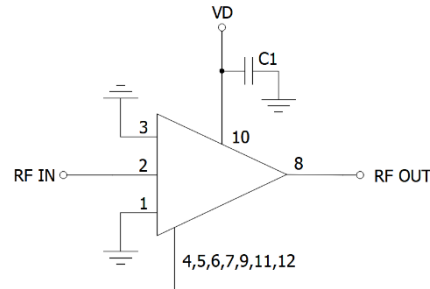
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Outline Drawing (all dimensions in mm)



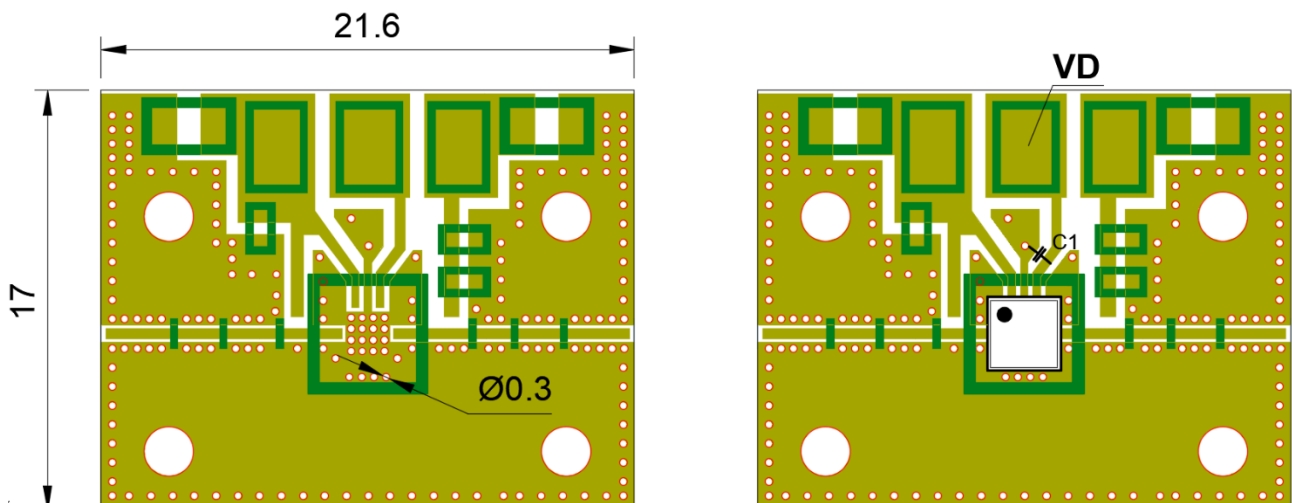
Application Circuit



Pin Function

Pin No.	Description	Pin No.	Description
1	Connect to ground	7	Connect to ground
2	RF input, AC Coupled	8	RF output, AC Coupled
3	Connect to ground	9	Connect to ground
4	Connect to ground	10	Drain(VD)
5	Connect to ground	11	NC or Connect to ground
6	Connect to ground	12	NC or Connect to ground

SAC3086Q3 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.

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Components List

Reference Des.	Value	Part Number	Manuf.
C1	1uF	GRM0336R61A105KE	Murata

Attention:

1. The moisture resistant grade of products is 2a, the storage environment $\leq 30^{\circ}$ 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.