

SAC3932Q3

GaAs MMIC Driver Amplifier
0.05~6 GHz 27dBm

Rev 1.1

Features

- Frequency: 0.05~6GHz
- Gain: 15dB
- Output P_{-1dB}: 27dBm
- PAE:35%@3GHz
- Single Power Supply: +8~12V/150mA
- Output IP₃: 37dBm@3GHz
- Package Size: 3mm×3mm×0.75mm

Typical Applications

- SDR
- High-density MCM

General Description

SAC3932Q3 is a GaAs MMIC Driver Amplifier in QFN surface mount package, which operates between in 0.05~6GHz.

SAC3932Q3 can provide 15dB of gain, 27dBm of output P_{-1dB} while requiring 150mA from a +12V supply voltage.

SAC3932Q3 is assembled in a 3mm x 3mm RoHS-compliant low stress injection molded plastic QFN package.

Picture



Electrical Performance (T_A=25°C, V_D=+12V, I_D=150mA, Z₀=50Ω)

Parameter	Min.	Typ.	Max.	Units
Frequency Range	0.05~6			GHz
Small Signal Gain	12	15	20	dB
Gain Flatness	—	±1.5	±2.5	dB
Reverse Isolation	—	-20	—	dB
Input/Output VSWR	—	1.75	2.5	:1
Noise Figure	—	3	4	dB
Output P _{-1dB}	26	27	—	dBm
PAE	—	35*	—	%
Output IP ₃	—	38**	—	dBm
Supply Current (I _D)	—	150	180	mA
Supply Voltage (V _D)	8	—	12	V

* Pout=P_{-1dB}, f=3GHz

**Pout/Tone=13dBm fc=3GHz, Δf=4MHz

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Absolute Maximum Ratings

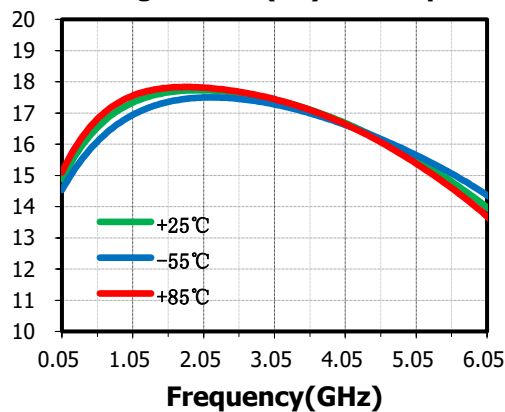
Maximum Input Power	+18dBm, CW 1min	Operating Temperature	-55°C~+85°C
Channel Temperature	150°C	Storage Temperature	-55°C~+150°C
Maximum V _D	12.5V		

Typical Performance Curve

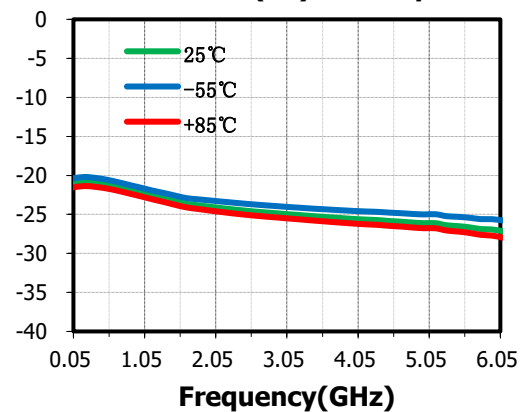
V_D=+8V, I_{DQ}=150mA, the following curves are taken from SAC3932Q3 evaluation board.

No de-embedding operation has been implemented

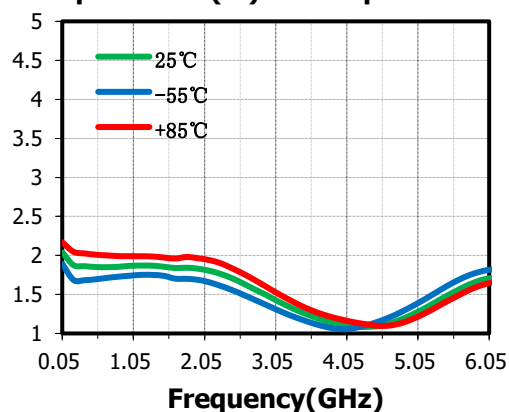
Small Signal Gain(dB) vs.Temperature



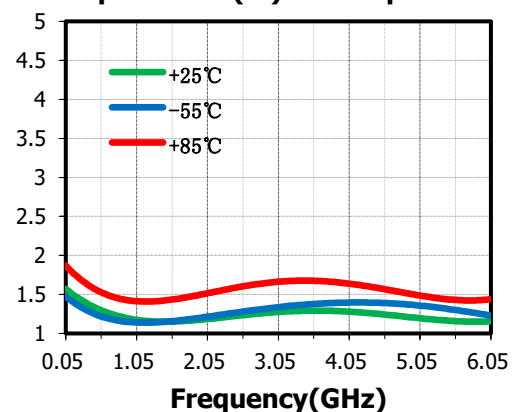
Reverse Isolation(dB) vs.Temperature



Input VSWR(:1) vs.Temperature



Output VSWR(:1) vs.Temperature



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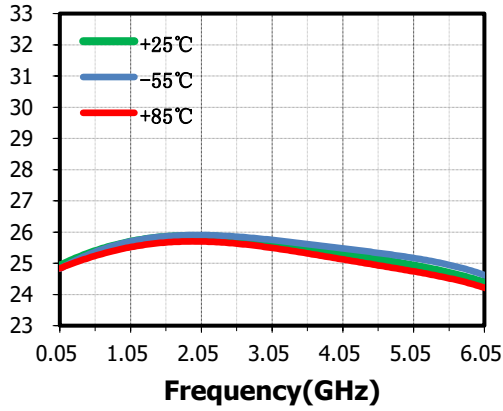
SAC3932Q3



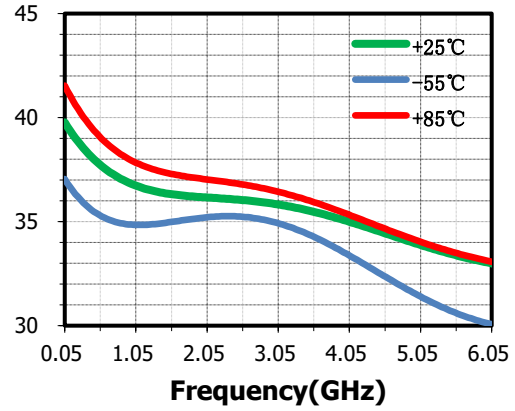
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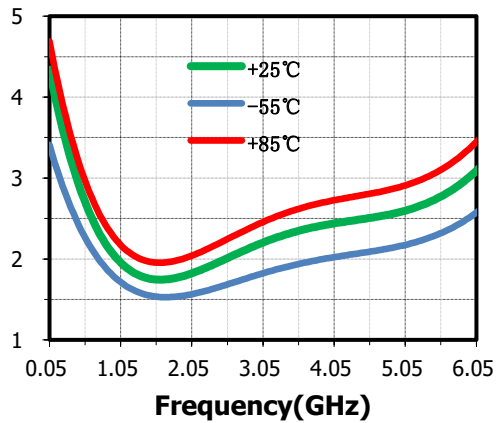
Output P-1dB(dBm) vs.Temperature



Output IP₃(dBm) vs.Temperature



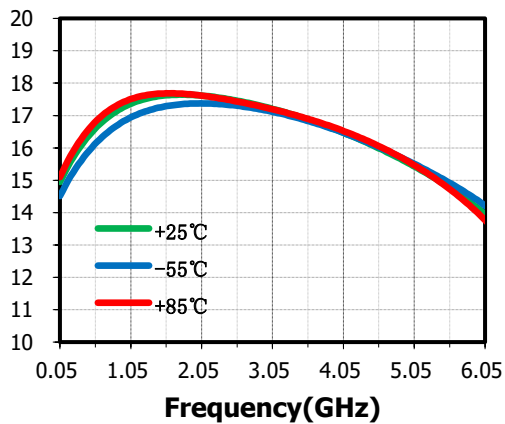
Noise Figure(dB) vs.Temperature



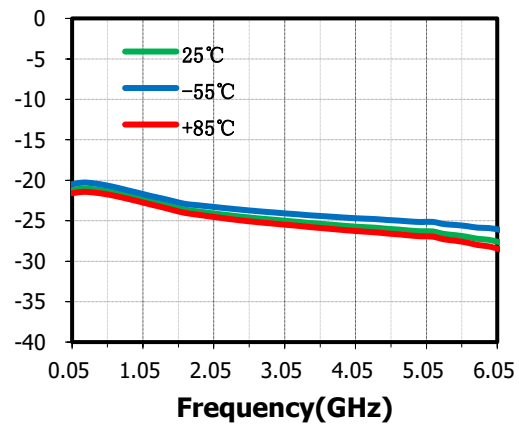
V_D=+12V, I_{DQ}=150mA, the following curves are taken from SAC3932Q3 evaluation board.

No de-embedding operation has been implemented

Small Signal Gain(dB) vs.Temperature



Reverse Isolation(dB) vs.Temperature



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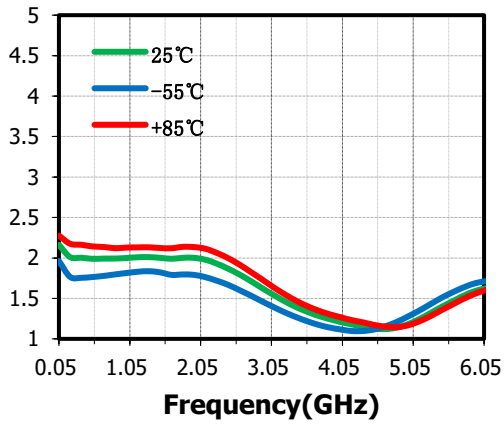
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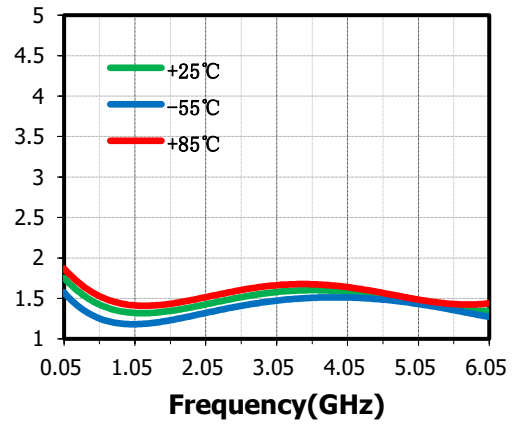


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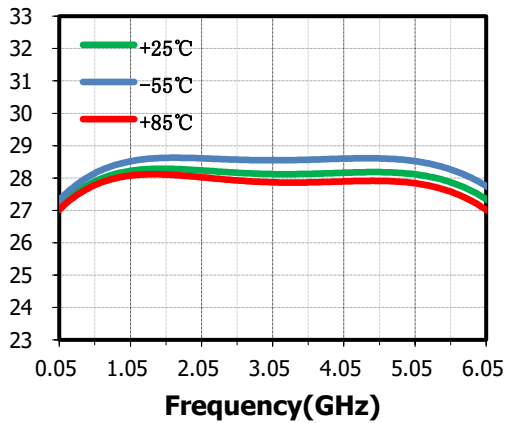
Input VSWR(:1) vs.Temperature



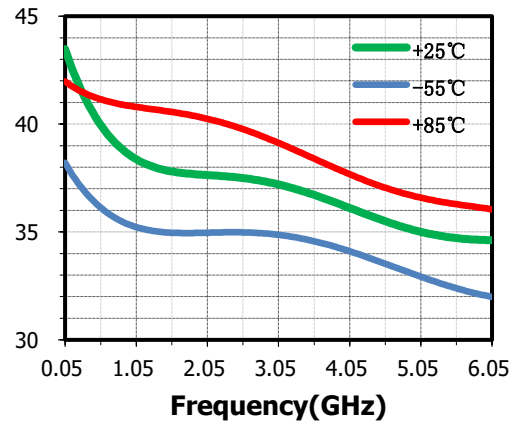
Output VSWR(:1) vs.Temperature



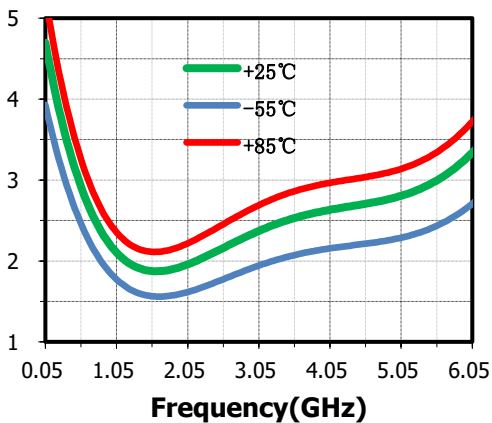
Output P-1dB(dBm) vs.Temperature



Output IP3(dBm) vs.Temperature



Noise Figure(dB) vs.Temperature



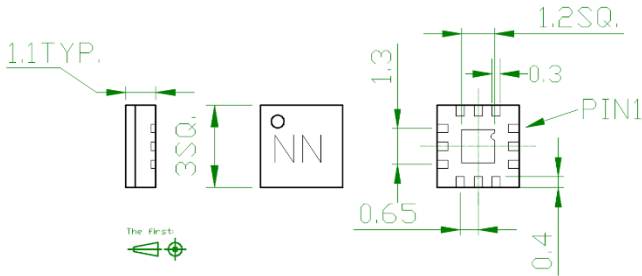
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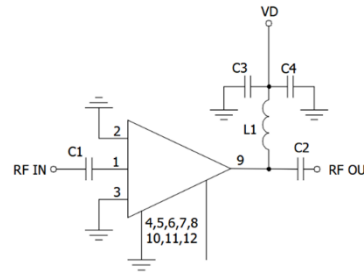
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Outline Drawing (All dimensions in mm)



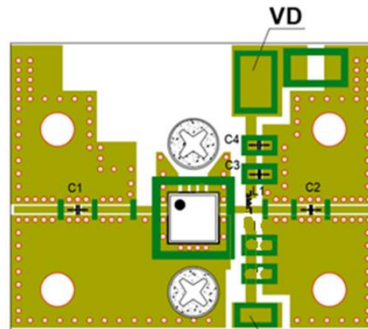
Application Circuit



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 Output,/Bias
4	Connect to ground	10	Connect to ground
5	Connect to ground	11	Connect to ground
6	Connect to ground	12	Connect to ground

SAC3932Q3 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、C4	300pF	GRM1555C1H301JA	Murata
C5	1μF	GRM0336R61A105KE	Murata
L1	-	BLM15HG102SND1	Murata

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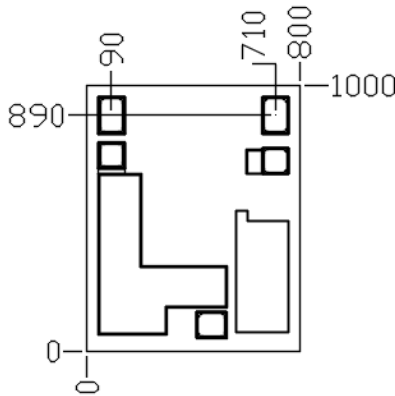
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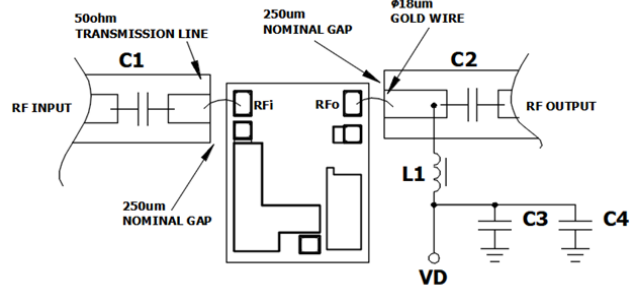
Die Outline

(All dimensions in μm)



Pad size: $150 \times 100 \mu\text{m}^2$, $t=100 \mu\text{m}$

Assembly Diagram



Attention:

1. The moisture resistant grade of products is 2a, the storage environment $\leq 30^\circ \text{C}/60\% \text{RH}$, 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. The back of chip is RF ground;
4. RF connections should be made as short as possible to reduce the inductive effect of the bond wire. Use of a 0.8 mil thermosonic wedge bonding is highly recommended as the loop height will be minimized;
5. GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test;
6. The maximum spike voltage at drain (VD) should not exceed 12.5v.

Revision History

Revision	Date	Comment
1.0	Jul 13,2020	First Release
1.1	Mar 31,2021	Add Bare die outline drawing; Revise Attention description