SAC3161Q5

GaAs MMIC Power Amplifier
2GHz~7GHz 33dBm

Rev 1.0

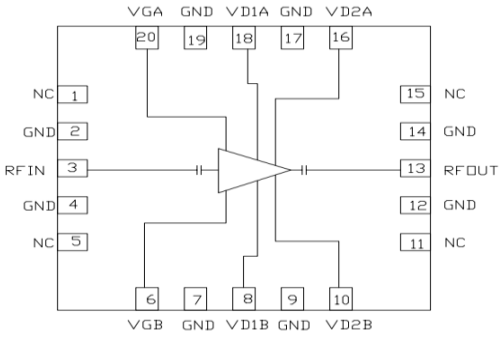
Features

- Frequency: 2GHz~7GHz
- Small Signal Gain: 28dB
- Output P-1dB: 33dBm CW
- PAE：25%@OP$_{-1}$dB, f=4GHz
- Supply Voltage: +8V/-Vg
- Package Size: 5mm×5mm×1.4mm

Typical Applications

- S. C-band multifunction radar
- Point-to-Point Radios

Functional Diagram



General Description

SAC3161Q5 is a GaAs power amplifier in QFN surface mount package. SAC3161Q5 provides 19 dB of gain, and 33dBm of output power for 1 dB compression and 23% PAE from a +8V supply voltage.

SAC3161Q5 is assembled in a lead-free 5mm x 5mm 28-lead AQFN plastic package.

Electrical Performance

T_A=25℃, V_D=+8V, I_{DQ}=1.2A, Z_0=50Ω, CW

Parameter	Min.	Typ.	Max.	Units
Frequency	2	—	7	GHz
Small Signal Gain	23	28	—	dB
Small Signal Gain Flatness	—	±4	—	dB
Reverse Isolation	—	-50	—	dB
RF input port VSWR	—	1.5	2.0	:1
RF output port VSWR	—	1.7	2.8	:1
Power-Added Efficiency	—	23	—	%
Output P$_{-1}$dB	32	33	—	dBm
IM$_3$*	—	23	—	dBc
Drain Voltage (V_D)	5	—	8.5	V
Gate Current	—	0.2	—	mA
Supply Current (I_D)**	—	—	1.5	A
Thermal Resistance	—	13.1	—	℃/W

* Pout/Tone=28dBm, fc=4GHz, Δf=4MHz

**Adjust the Vg voltage (- 1 ~ -0.65V) so that the I_{DQ} is about 1.2A, and the typical Vg voltage is -0.7V

Absolute Maximum Ratings

Maximum Input Power	+27dBm	Operating Temperature (Backside)	-55℃~+85℃
Channel Temperature	165℃	Storage Temperature	-55℃~+150℃
Maximum V_D Supply	+9V	V_G Range	-1.4V (Pinch Off)~-0.5V

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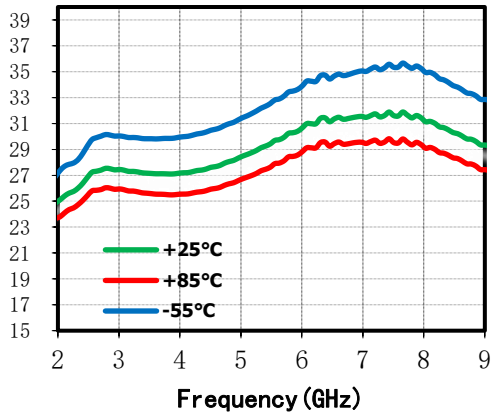
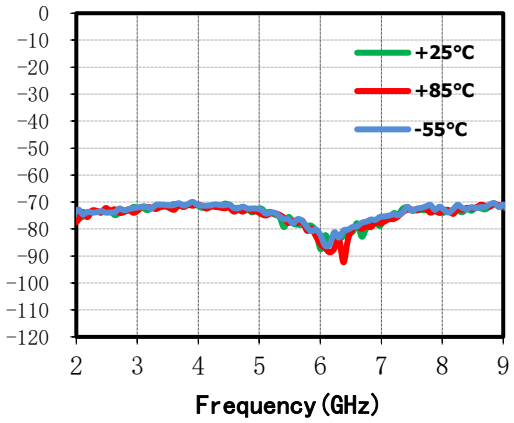
Typical Performance Curve

The following data are obtained by SAC3161Q5 evaluation board test, VD = + 8V, I_{DQ} = 1.2A, working mode CW, T_A = + 25℃

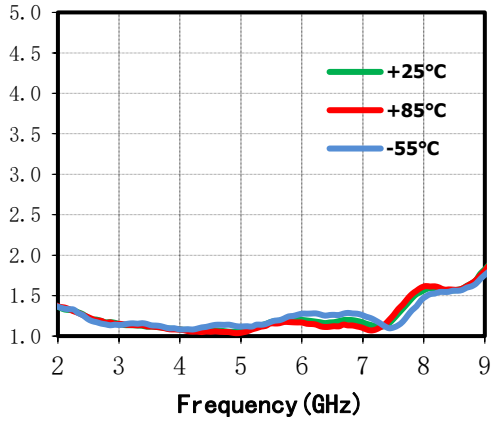
Small Signal Gain(dB) vs.Temperature



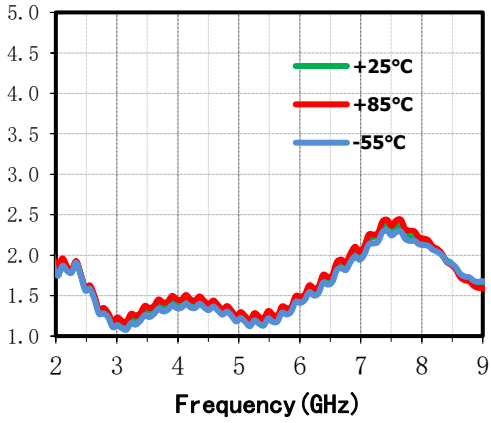
Isolation(dB) vs.Temperature



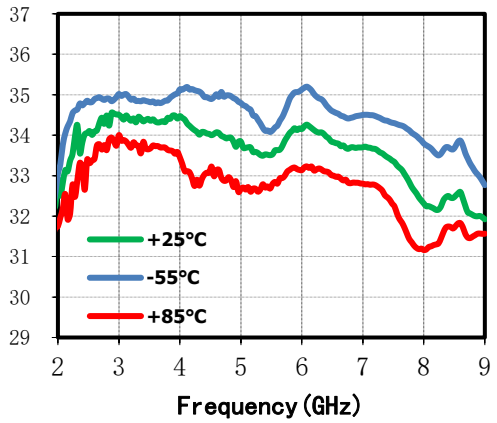
Input VSWR(:1) vs.Temperature



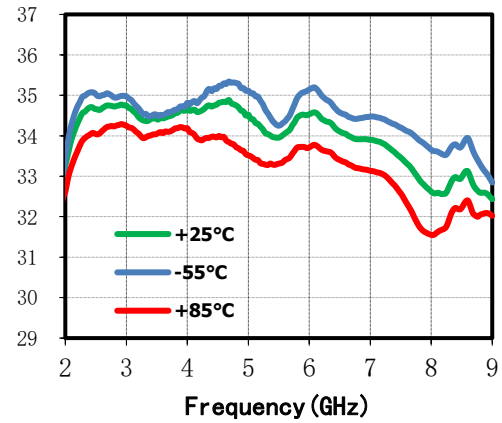
Output VSWR(:1) vs.Temperature



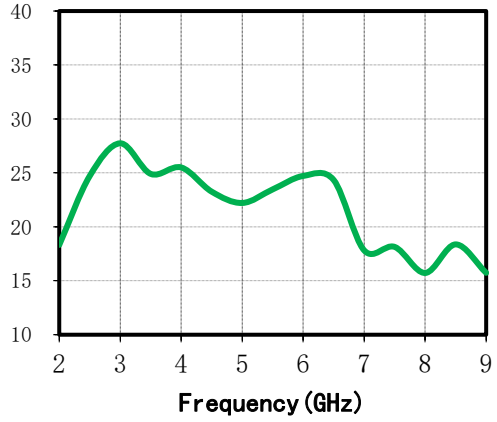
OP-1dB (dBm) vs. Temperature



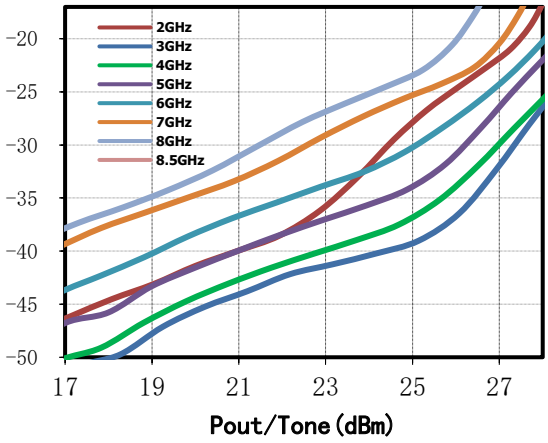
OP-3dB (dBm) vs. Temperature



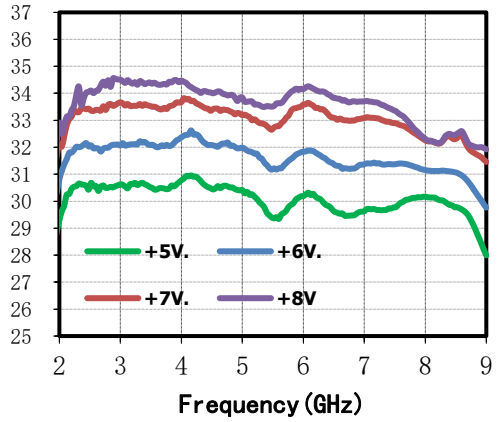
PAE (%) vs. 1dB Comp



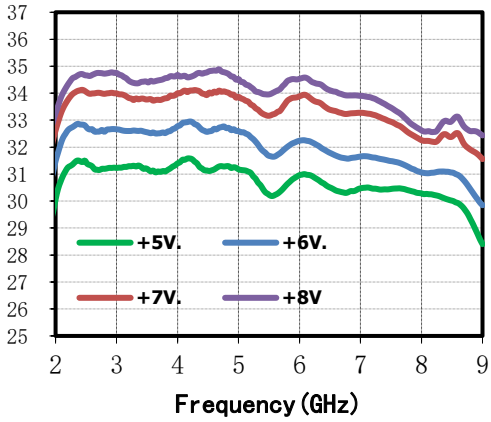
IM3 (dBc) vs. Pout/Tone



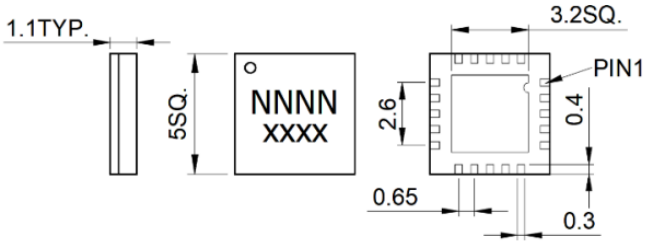
OP-1dB (dBm) vs. VD



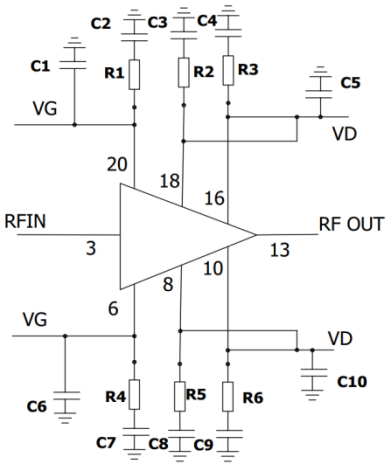
OP-3dB (dBm) vs. VD



Outline Drawing
(All dimensions in mm)



Assembly Diagram



Pin Function

Pin No.	Description	Pin No.	Description
1	NC or connect to ground	11	NC or connect to ground
2	GND	12	GND
3	RF Input, DC blocked	13	RF Output, DC blocked
4	GND	14	GND
5	NC or connect to ground	15	NC or connect to ground
6	VGB	16	VD2A
7	GND	17	GND
8	VD1B	18	VD1A
9	GND	19	GND
10	VD2B	20	VGA

Components List

Reference Des.	Value	Part Number	Manuf.	Size
C1、C5、C6、C10	10μF	—	—	0805
C2~C13	0.47μF	—	—	0603
R1~R6	2.2Ω	—	—	0603

Revision History

Revision	Date	Comment
1.0	October 31, 2024	First Release