

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-1dB, f=4GHz
- Supply Voltage: +8V/-Vg
- Package Size: 5mm × 5mm × 1.4mm

Typical Applications

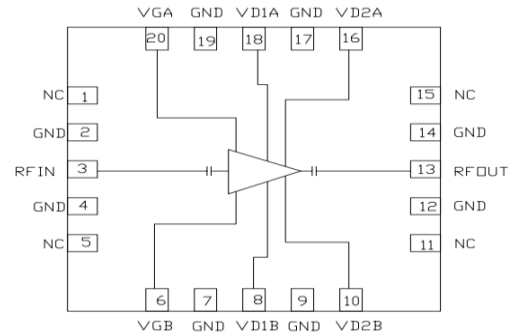
- S. C-band multifunction radar
- Point-to-Point Radios

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.

Functional Diagram



Electrical Performance

$T_A=25^\circ\text{C}$, $V_D=+8\text{V}$, $I_{DQ}=1.2\text{A}$, $Z_0=50\Omega$, 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-1dB | 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 | — | °C/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°C~+85°C |
| Channel Temperature | 165°C | Storage Temperature | -55°C~+150°C |
| Maximum V _D Supply | +9V | V _G Range | -1.4V (Pinch Off)~-0.5V |

SuperApex, LLC

1580 S. Milwaukee Ave. Suite 405, Libertyville, IL 60048, USA

Tel: 1-847-505-8319, 1-847-573-9866

E-mail: sales@superapexco.com

Website: www.superapexco.com

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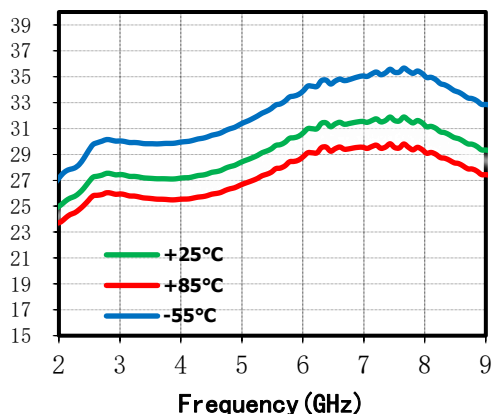
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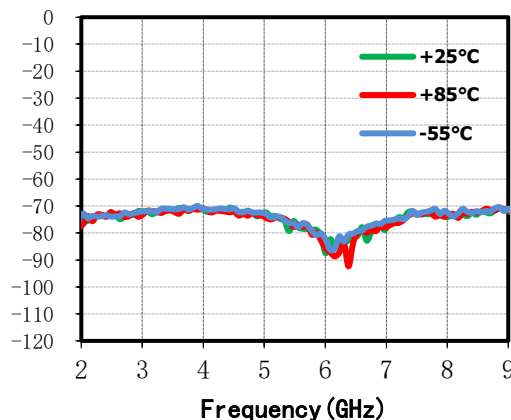
Typical Performance Curve

The following data are obtained by SAC3161Q5 evaluation board test, $V_D = +8V$, $I_{DQ} = 1.2A$, working mode CW, $T_A = +25^\circ C$

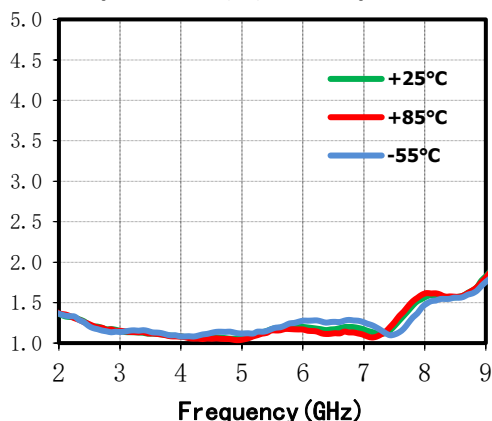
Small Signal Gain(dB) vs. Temperature



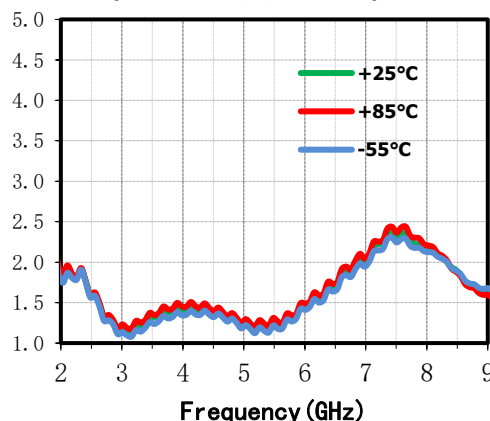
Isolation(dB) vs. Temperature



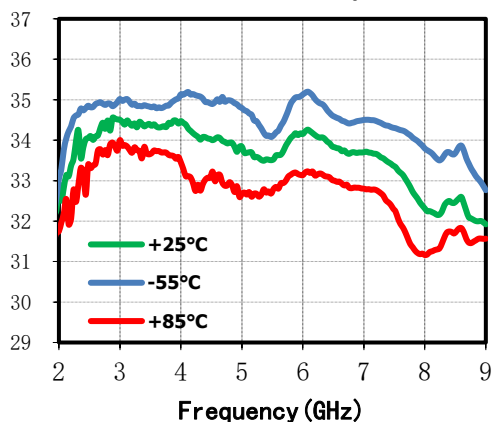
Input VSWR(:1) vs. Temperature



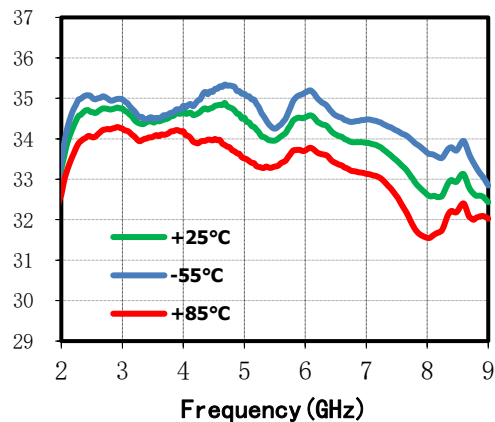
Output VSWR(:1) vs. Temperature



OP-1dB (dBm) vs. Temperature



OP-3dB (dBm) vs. Temperature



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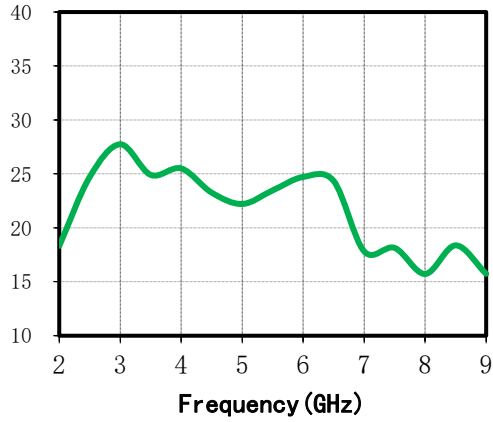
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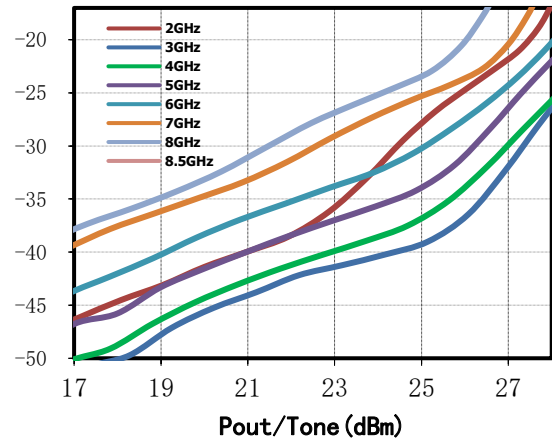
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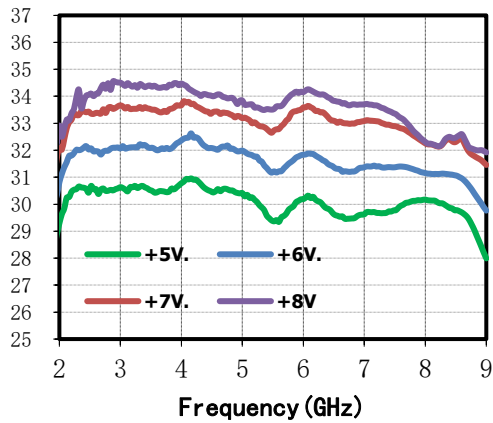
PAE (%) vs. 1dB Comp



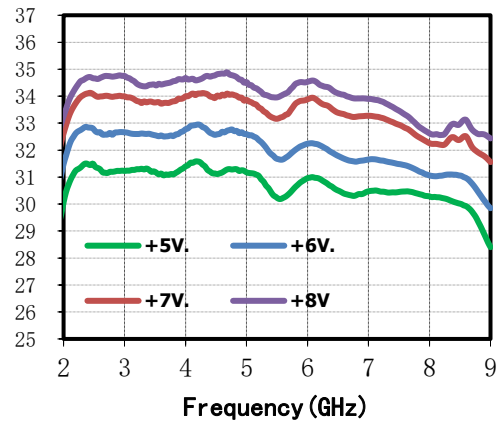
IM3 (dBc) vs. Pout/Tone



OP-1dB (dBm) vs. VD



OP-3dB (dBm) vs. VD



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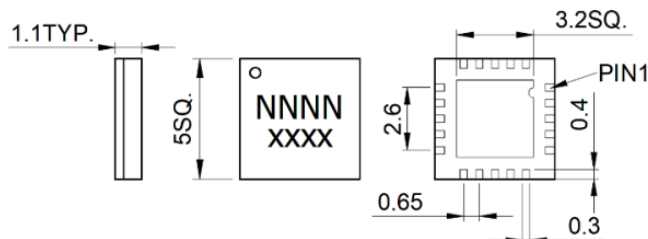
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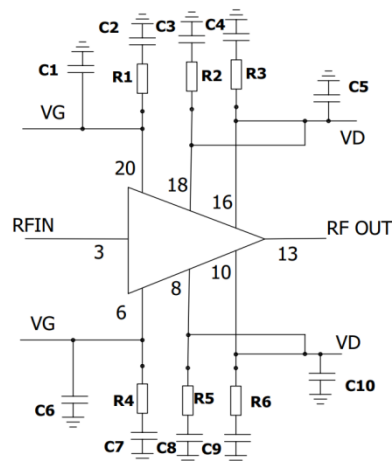
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Outline Drawing (All dimensions in mm)



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 | 10 μ F | — | — | 0805 |
| C2~C13 | 0.47 μ F | — | — | 0603 |
| R1~R6 | 2.2 Ω | — | — | 0603 |

Revision History

| Revision | Date | Comment |
|----------|------------------|---------------|
| 1.0 | October 31, 2024 | First Release |