

SAC3956



GaAs MMIC Power Amplifier
20GHz~55GHz 16dBm

Rev 1.0

Features

- Frequency: 20GHz~55GHz
- Small Signal Gain: 20dB
- Output P_{-1dB}: 16dBm
- Supply Voltage: +5V
- Die Size: 1.2mm×1.7mm×0.1mm
- Packaged: Bare Die

Typical Applications

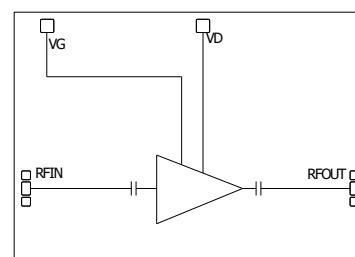
- Microwave radio
- Telecommunication
- Test instrumentation

General Description

SAC3956 is a wideband GaAs MMIC power amplifier. SAC3956 provides 20 dB of gain, and 16dBm of Output P_{-1dB} power from a +5V supply voltage.

The chip has surface passivation for protection and backside via holes and gold metallization to allow a conductive epoxy die attach process.

Functional Diagram



Electrical Performance

T_A=25°C, V_D= +5V, I_{DQ}=110mA, Z₀=50Ω

Parameter	Min.	Typ.	Max.	Units
Frequency Range	20	—	55	GHz
Small Signal Gain	18	20	25	dB
Small Signal Gain Flatness	—	±3	—	dB
Reverse Isolation	—	-55	-40	dB
Input VSWR	—	2.5	7.0	dB
Output VSWR	—	1.5	2.5	dB
Output Power for 1 dB Compression (OP _{-1dB})	14	16	—	dBm
Drain Voltage (V _D)	—	5	—	V
Supply Current (I _D)	—	110	—	mA

Absolute Maximum Ratings

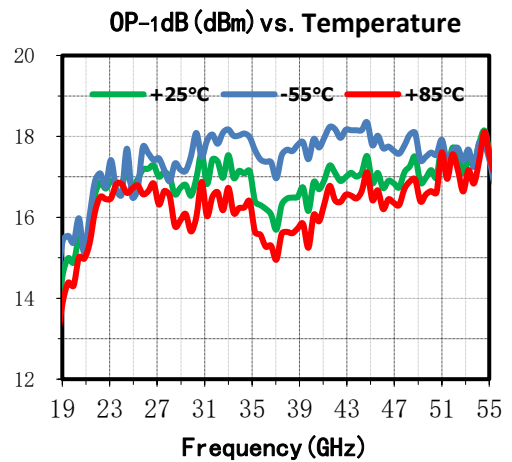
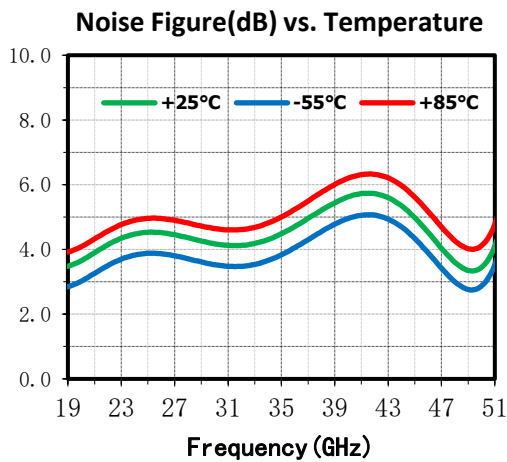
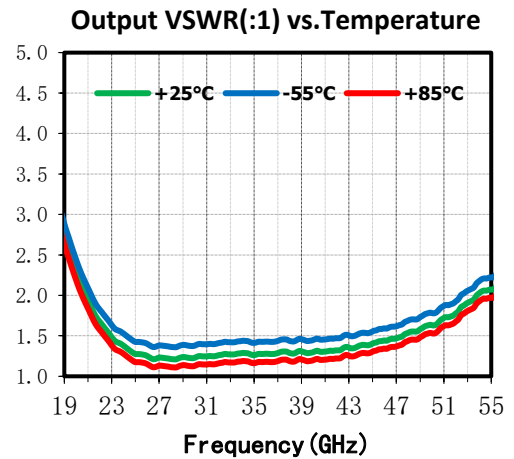
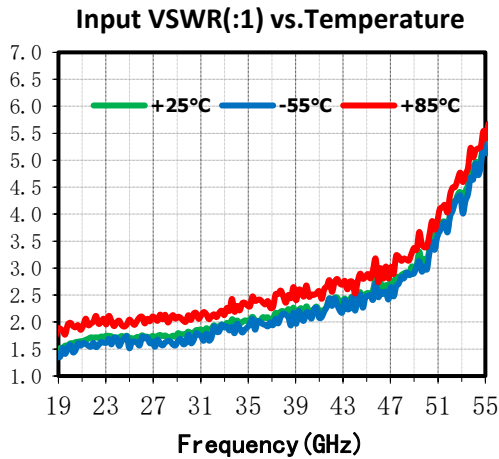
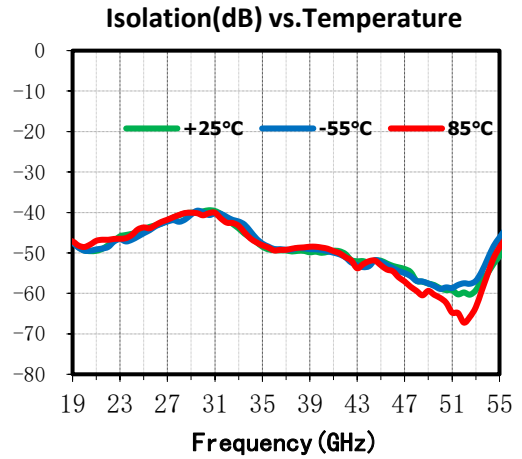
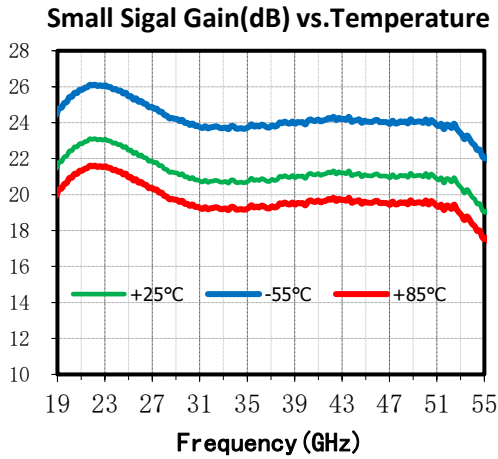
Maximum Input Power	+15dBm	Operating Temperature (Chip back temperature)	-55°C~+85°C
Channel Temperature	150°C	Storage Temperature	-65°C~+150°C
Maximum V _D	+7V		

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Typical Performance Curve

VD=+5V, IDQ=110mA, TA=+25°C The following curves are taken from SAC3956 bare die.



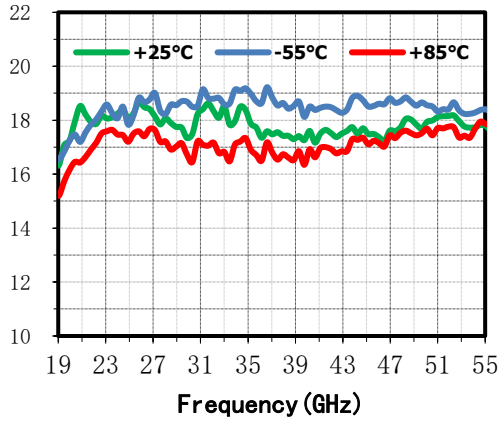
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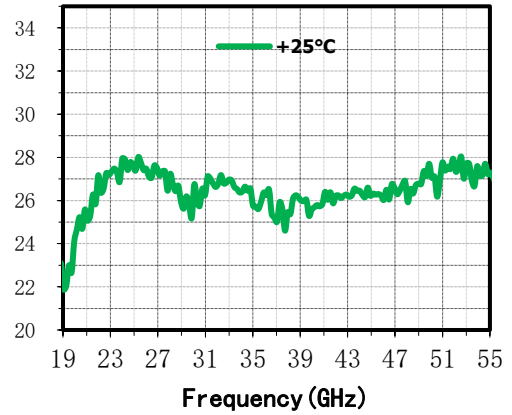
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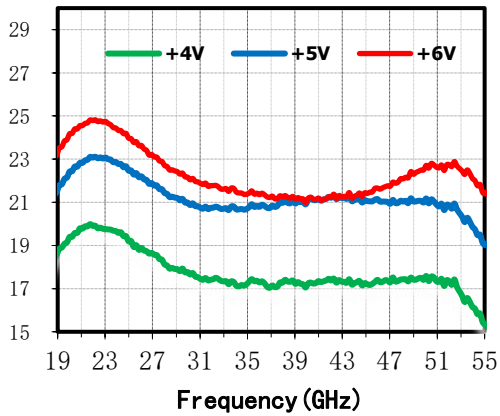
OP-3dB (dBm) vs. Temperature



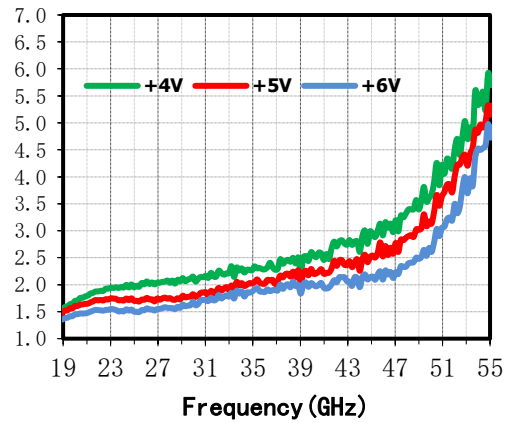
OIP3 (dBm)



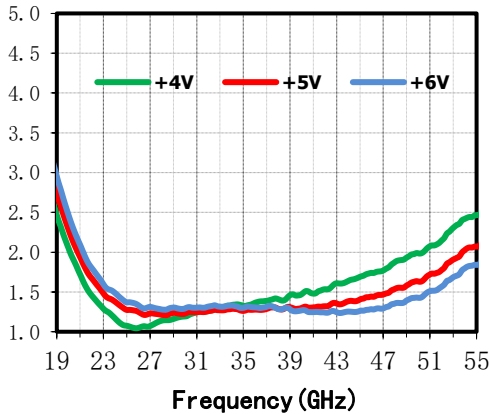
Small Signal Gain(dB) vs.Voltage



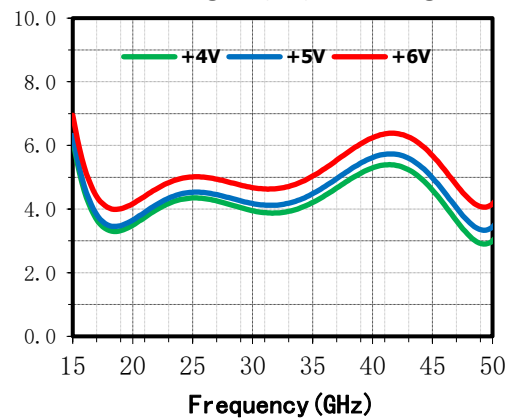
Input VSWR(:1) vs.Voltage



Output VSWR(:1) vs.Voltage



Noise Figure(dB) vs. Voltage



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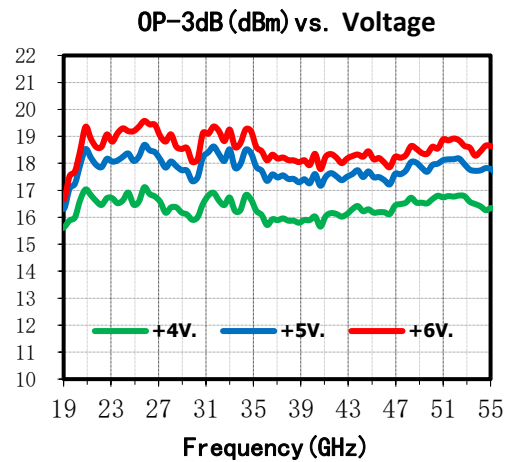
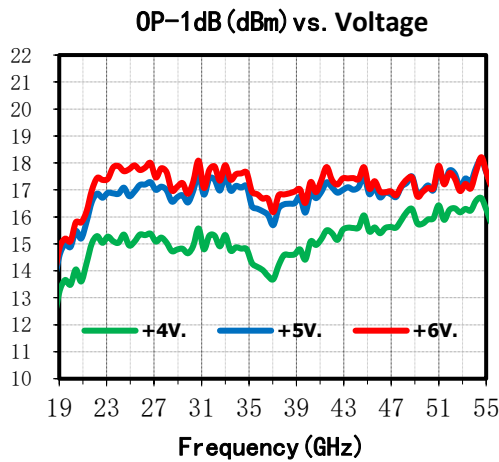
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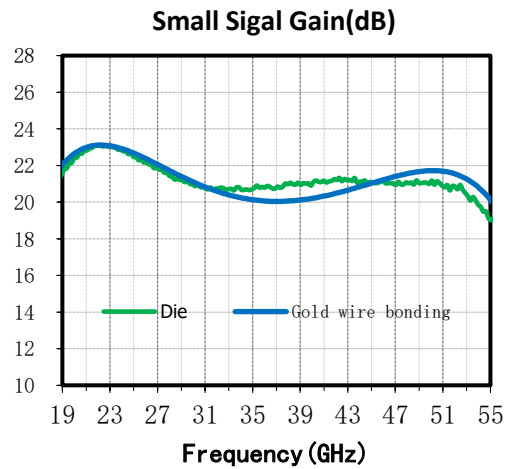
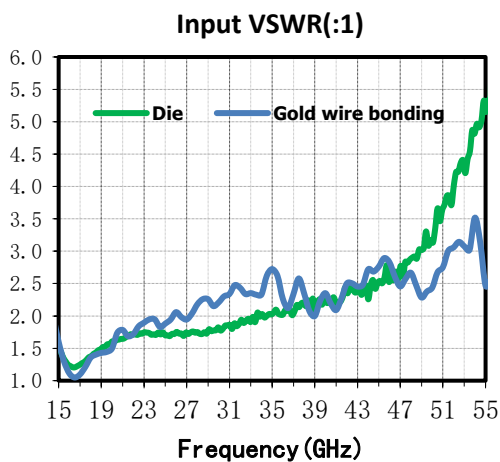


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After the chip input port is bonded with gold wire, the standing wave will be improved



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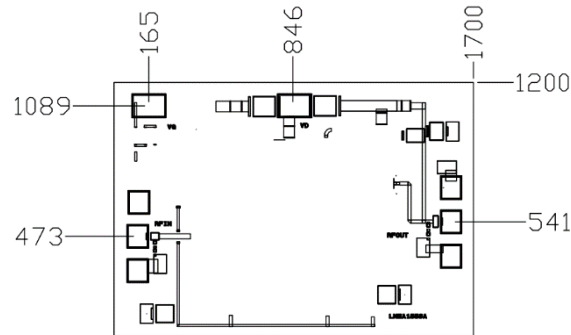
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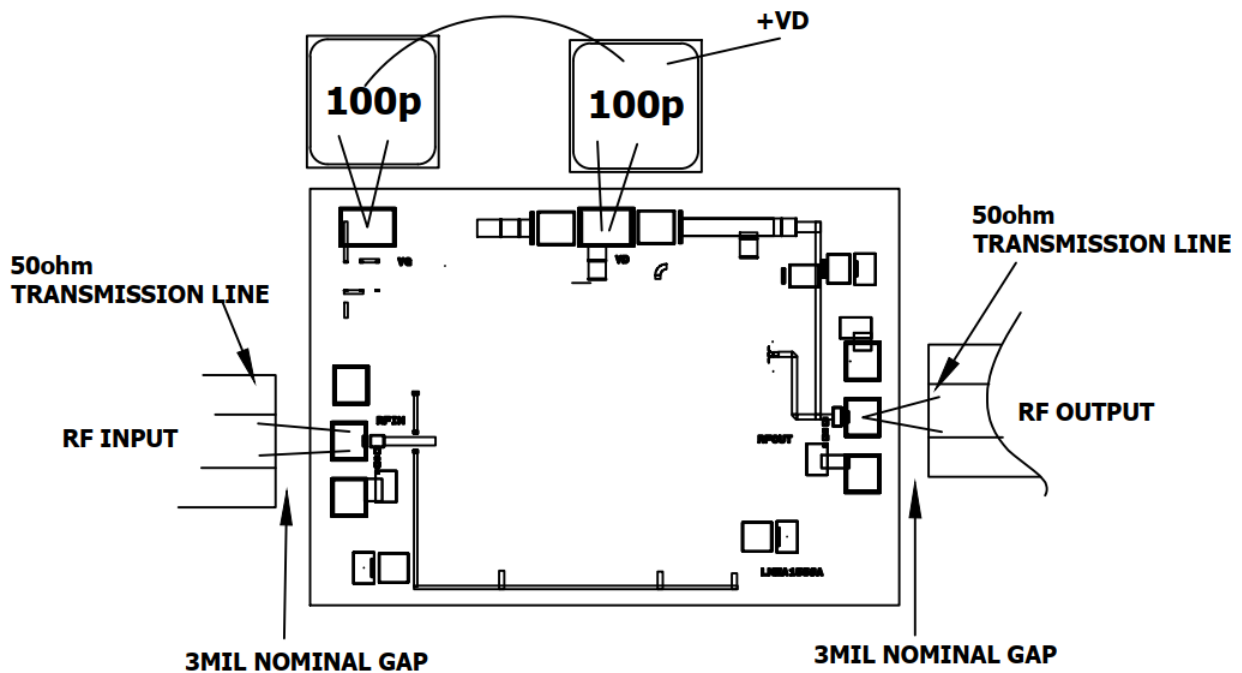
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Die Outline(μm)



Assembly Diagram



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Attention:

1. The back of chip is RF ground;
2. RF connections should be made as short as possible to reduce the inductive effect of the bond wire;
3. Bypass SLCs should be placed as close as possible to the chip;
4. GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test;
5. The RF input and RF output ports withstand voltage is 12V;
6. The ESD Sensitivity (HBM) of SAC3956 is Class 0.

Revision History

Revision	Date	Comment
1.0	Sept. 20, 2024	First Release

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