SAC3956

GaAs MMIC Power Amplifier
20GHz~55GHz 16dBm

Rev 1.0

Features

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

Typical Applications

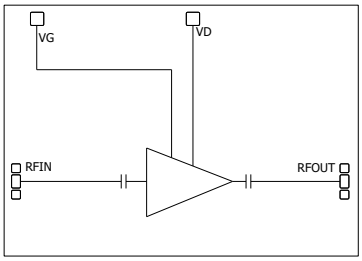
- Microwave radio
- Telecommunication
- Test instrumentation

General Description

SAC3956 is a wideband GaAs MMIC power amplifier. SAC3956 provides 20 dB of gain, and 16dBm of OutputP_{-1}dB 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℃, V_D=+5V, I_{DQ}=110mA, Z_0=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_{-1}dB)	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℃~+85℃
Channel Temperature	150℃	Storage Temperature	-65℃~+150℃
Maximum V_D	+7V		

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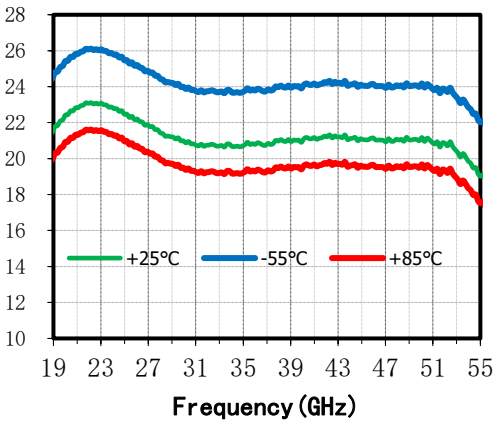
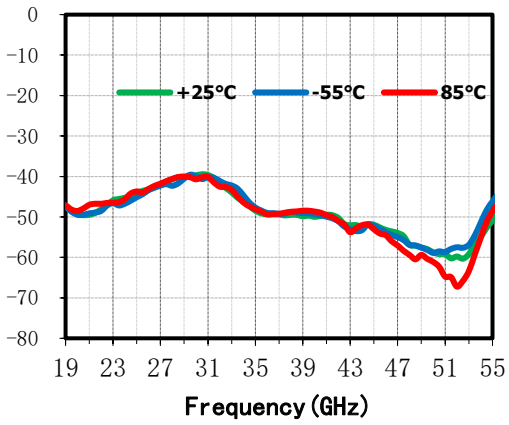
Typical Performance Curve

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

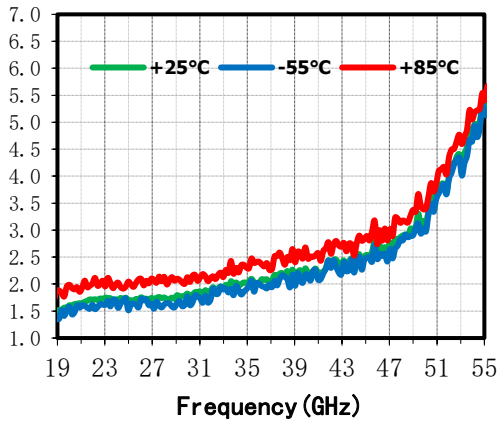
Small Sigal Gain(dB) vs.Temperature



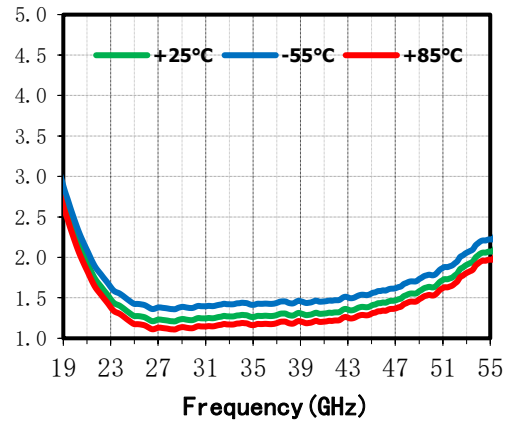
Isolation(dB) vs.Temperature



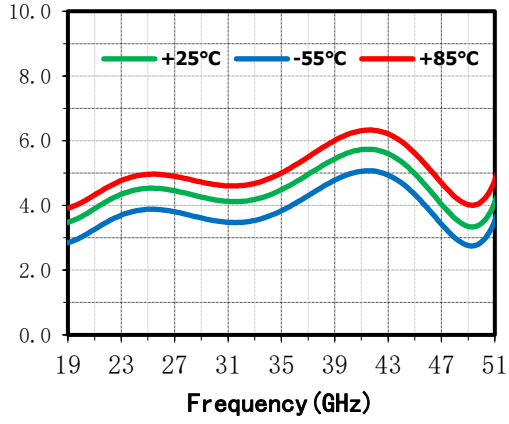
Input VSWR(:1) vs.Temperature



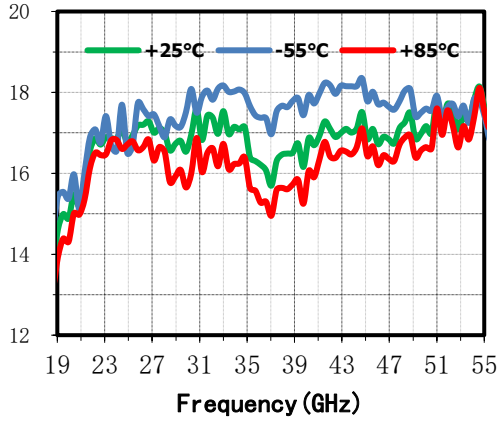
Output VSWR(:1) vs.Temperature



Noise Figure(dB) vs. Temperature



OP-1dB (dBm) vs. Temperature



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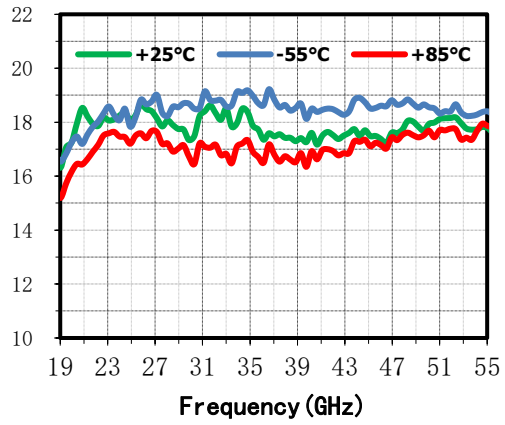
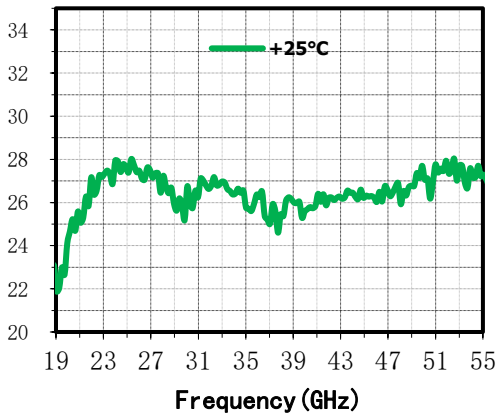
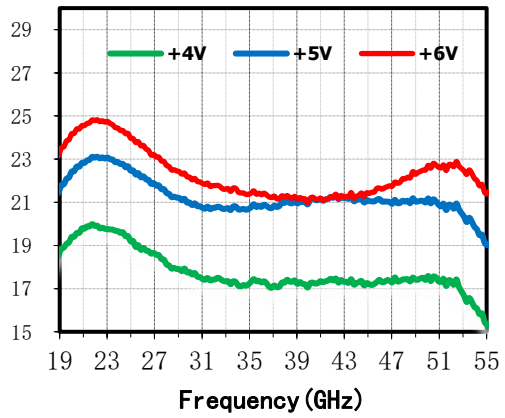
OP-3dB (dBm) vs. Temperature



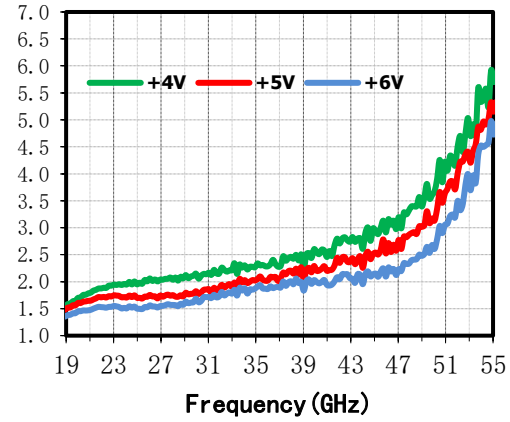
OIP3 (dBm)



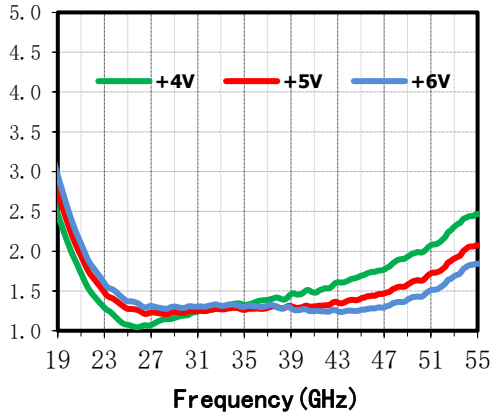
Small Signal Gain(dB) vs.Voltage



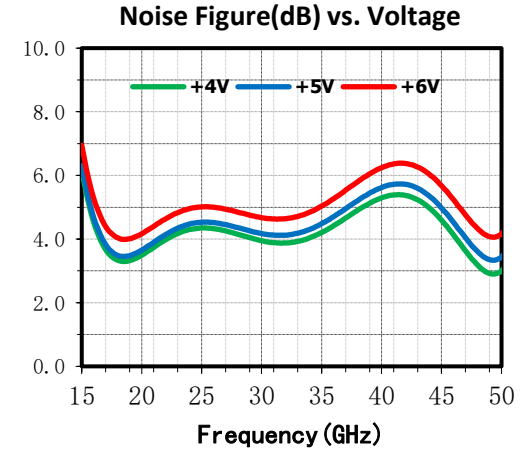
Input VSWR(:1) vs.Voltage

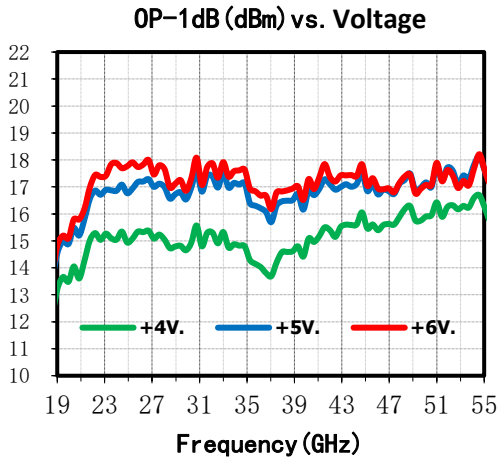


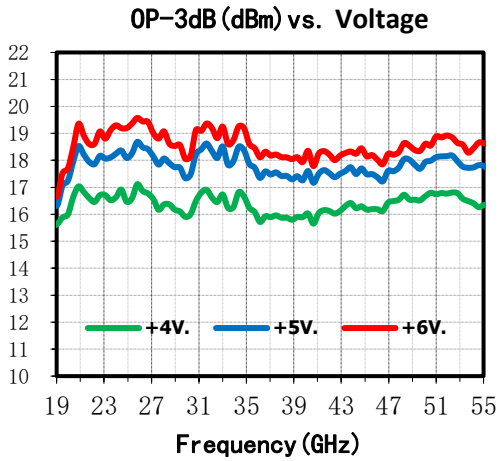
Output VSWR(:1) vs.Voltage



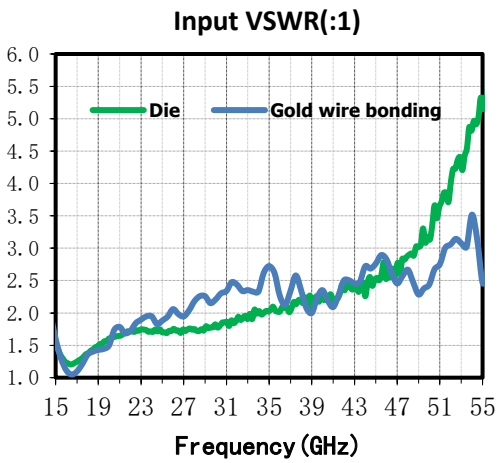
Noise Figure(dB) vs. Voltage

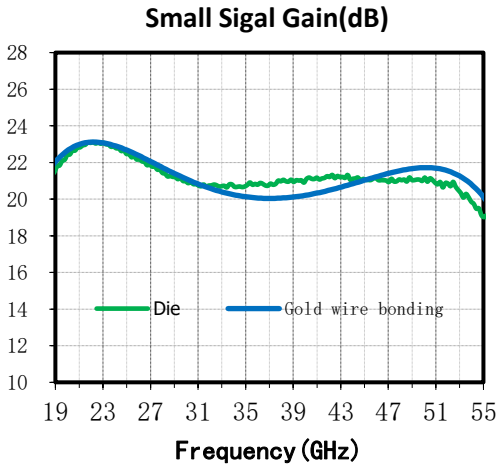






After the chip input port is bonded with gold wire, the standing wave will be improved





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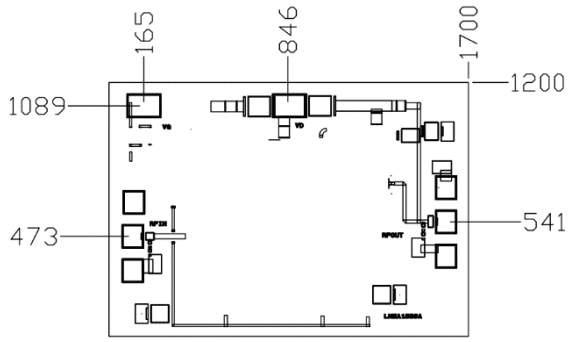
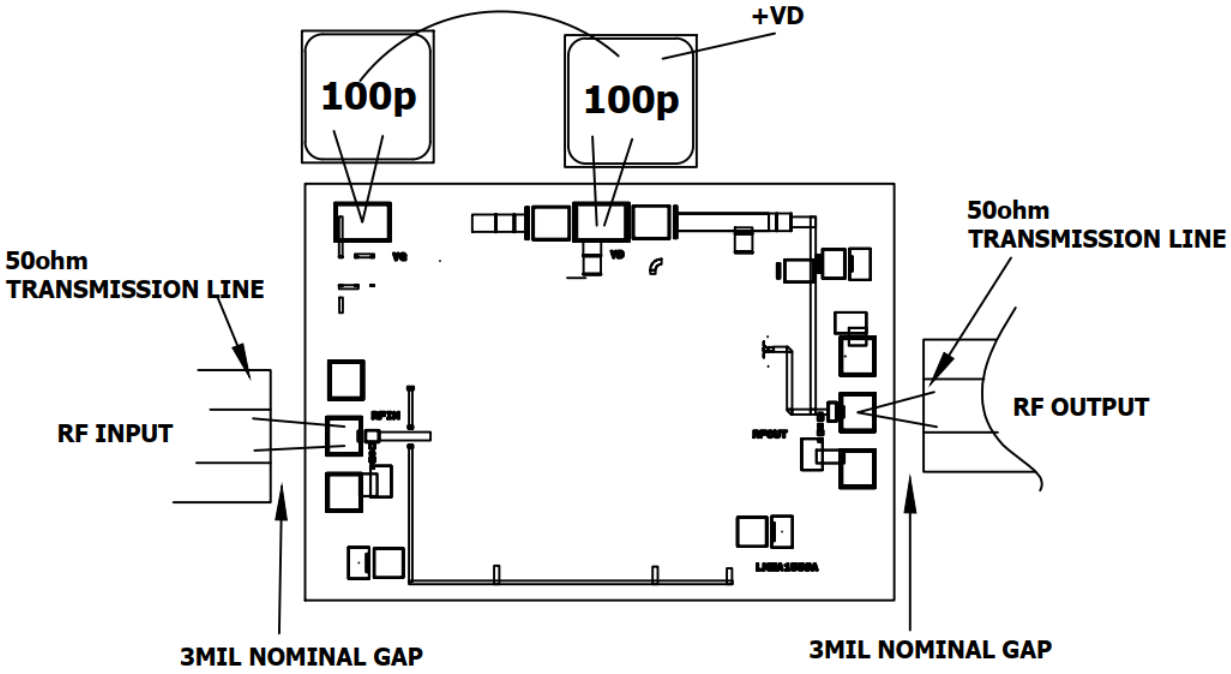
Die Outline(μm)



Assembly Diagram



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