

Features

- Frequency: 54~58GHz
- Gain: 17dB
- Output P_{-1dB}: 20dBm
- Supply Voltage: +5V/-V_g
- Balanced Amplifier
- Full Passivation for Enhanced Reliability
- Die Size: 2.3mm×1.24mm×0.1mm

Typical Applications

- Point-to-Point Radios
- HAPS

General Description

SAC3953 is a balanced GaAs MMIC driver amplifier, which operates between in 54~58GHz. SAC3953 provides 17dB of small signal gain, and 20dBm of output P_{-1dB} while requiring 300mA from a +5V supply voltage

The chip offers full passivation for increased reliability and moisture protection

Electrical Performance

T_A=25°C, V_D=+5V, I_{DQ}=300mA, Z₀=50Ω

Parameter	Min.	Typ.	Max.	Units
Frequency Range	54~58			GHz
Small Signal Gain	14	17	—	dB
Small Signal Gain Flatness	—	±1.5	±2	dB
Reverse Isolation	—	-35	—	dB
Input/ Output VSWR	—	1.35	2.5	:1
Noise Figure	—	10	—	dB
Output Power for 1 dB Compression (OP _{-1dB})	18	20	—	dBm
Output IM ₃	—	-28*	—	dBc
Supply Current (I _D)	—	300**	550	mA
Drain Voltage (V _D)	5	—	6	V
Thermal Resistance	26			°C/W

* P_{out}/Tone=0dBm, F_c=57GHz, Δf=4MHz

** Adjust V_g between -1V to -0.4V to achieve I_D= 300 mA typical.

Absolute Maximum Ratings

Maximum Input Power	+14dBm, CW 1min	Operating Temperature	-55°C~+85°C
Channel Temperature	+150°C	Storage Temperature	-55°C~+150°C
Maximum V _D	6.5V		

SAC3953



GaAs MMIC Driver Amplifier

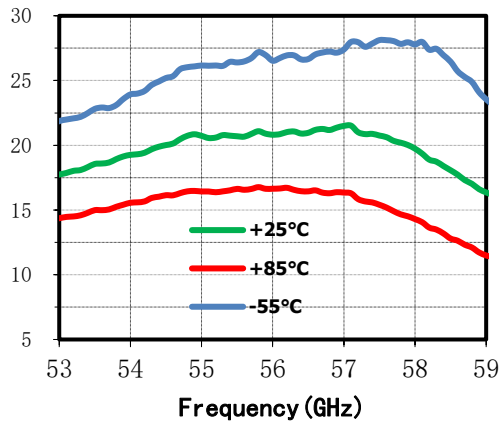
54~58GHz 20dBm

Rev 1.0

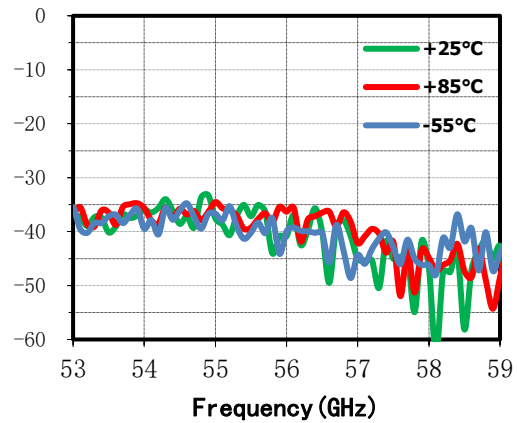
Typical Small Signal Performance Curve

$V_D=+5V$, $I_{DQ}=300mA$, On probe measurement

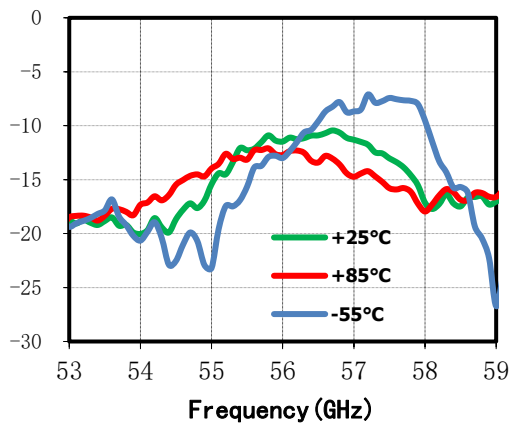
Small Signal Gain(dB) vs.Temperature



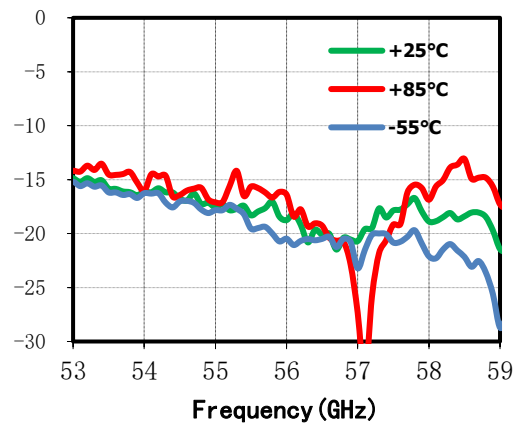
Isolation(dB) vs.Temperature



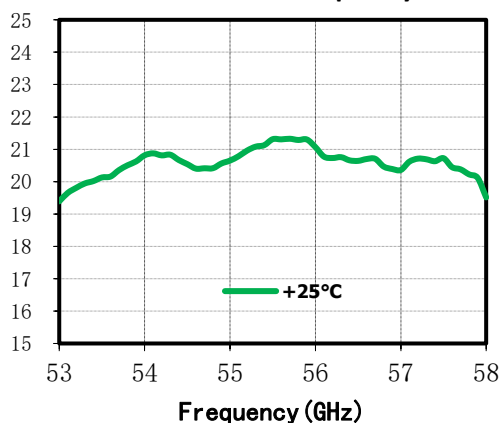
Input Return Loss(dB) vs.Temperature



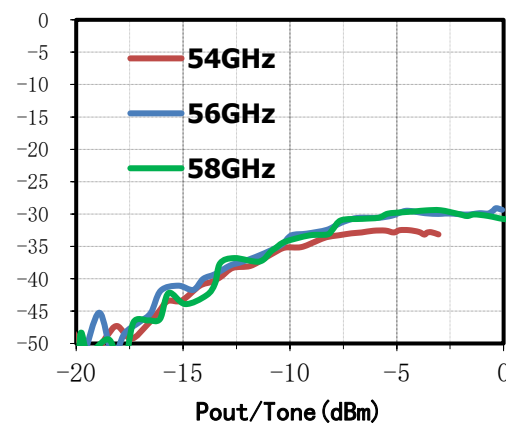
Output Return Loss(dB) vs.Temperature



OP-1dB (dBm) vs. Frequency



IM3 (dBc) vs. Pout/Tone



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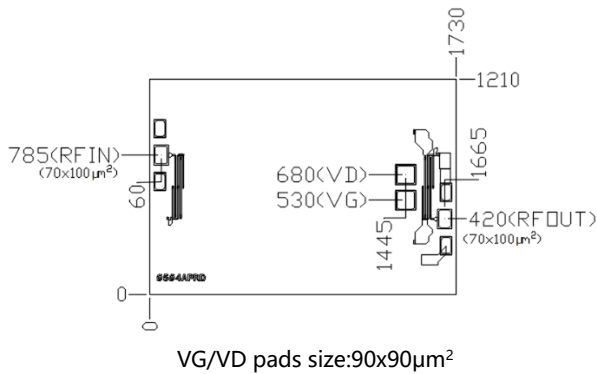
SAC3953



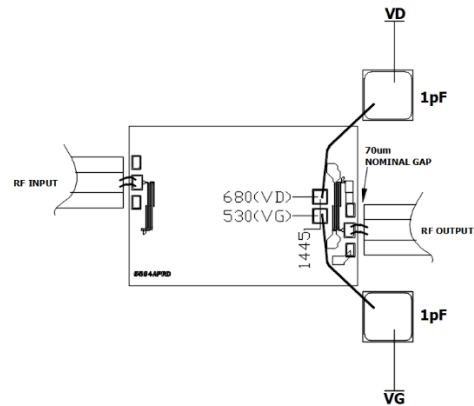
GaAs MMIC Driver Amplifier
54~58GHz 20dBm

Rev 1.0

Die Outline (μm)



Assembly Diagram



Notes

1. SAC3953 is biased with a positive drain supply and negative gate supply. The recommended gate voltage is set to -0.2 to -1V when the drain voltage is set to 5V.
2. The back of chip is RF ground.
3. RF connections should be made as short as possible to reduce the inductive effect of the bond wire. Use of a 0.8mil thermosonic wedge bonding is highly recommended as the loop height will be minimized.
4. Bypass SLCs should be placed as close as possible to the chip.
5. GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

Revision History

Revision	Date	Comment
1.0	Apr. 2022	First Release

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