

Features

- Frequency: 22GHz~25GHz
- Small Signal Gain:22dB
- Output P_{-1dB}:34dBm CW
- Balanced Amplifier
- Die size:3.9mm×4.6mm×0.1mm
- Supply Voltage: +6V/-Vg
- Package: Bare Die

Typical Applications

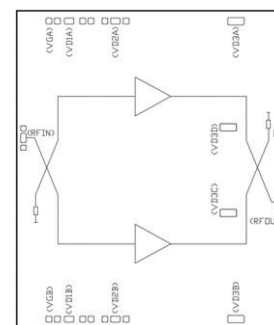
- K-band multifunction radar
- Point-to-Point Radio

General Description

SAC3148 is a K-band GaAs MMIC power amplifier. SAC3148 provides 22dB of gain, and 34dBm of output power for 1 dB compression and more than 24% PAE@OP_{-1dB},24GHz from a +6V supply.

The chip has surface passivation for protection and backside via holes and gold metallization to allow a conductive epoxy die attach process, It's ideal for Point-to-Point radio and multifunction radar applications

Functional Diagram



Electrical Performance

T_A=25°C, V_D=+6V, I_{DQ}=2A, Z₀=50Ω, CW

Parameter	Min.	Typ.	Max.	Units
Frequency Range	22	—	25	GHz
Small Signal Gain	17	22	—	dB
Gain Flatness	—	±1.5	±2.3	dB
Reverse Isolation	—	-60	—	dB
VSWRi	—	1.7	2.5	:1
Output P _{-1dB}	33	34	—	dBm
IM ₃ *	—	-25*	—	dBc
Drain Voltage (VD)	5	—	6	V
Gate Current	—	4	—	mA
Supply Current (ID)	—	2**	2.8	A
Thermal Resistance	—	3.3	—	°C/W

* Pout/Tone=28dBm, fc=24GHz, Δf=1MHz

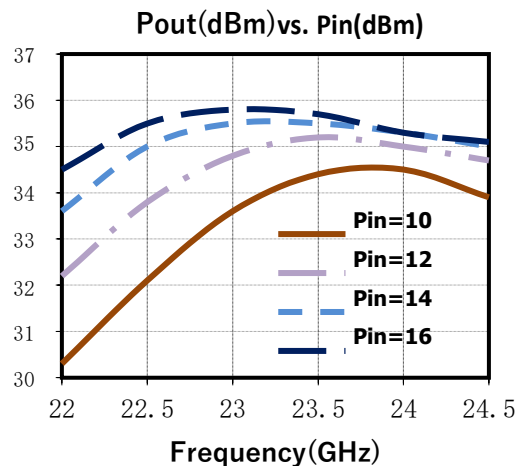
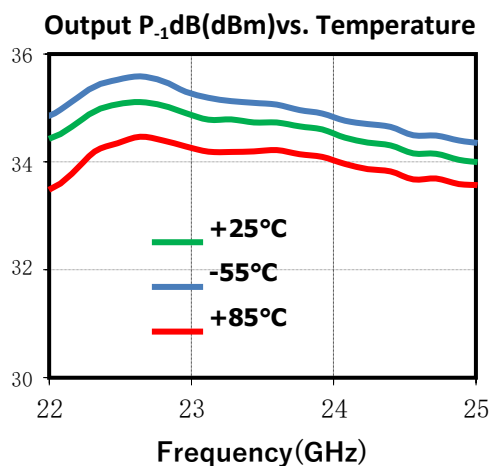
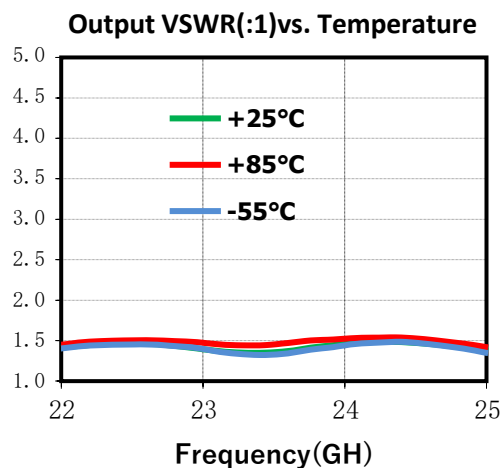
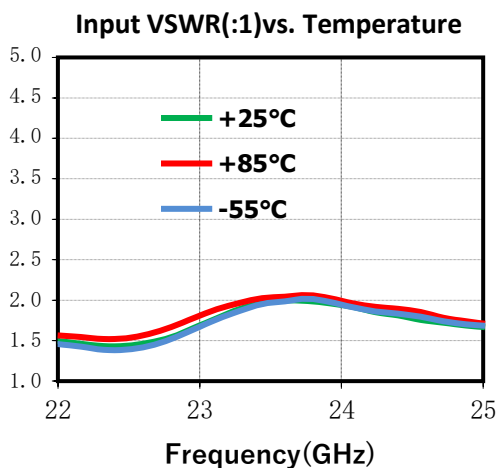
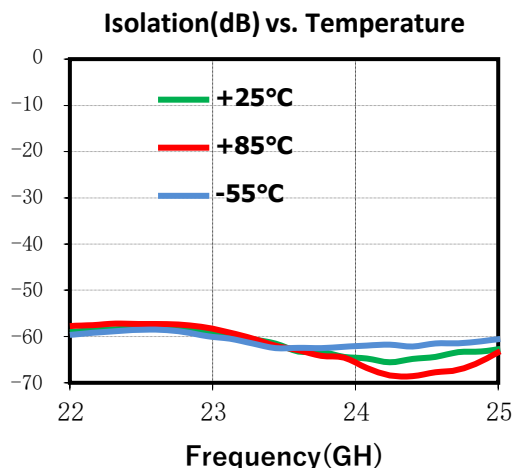
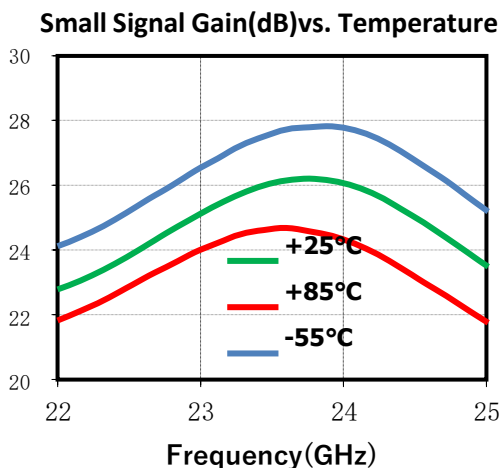
**Adjust Vg between -1.1V to -0.4V to achieve I_{DQ}= 2A typical.

Absolute Maximum Ratings

Maximum Input Power	+20dBm, CW 2min.	Operating Temperature (Backside)	-55°C~+85°C
Channel Temperature	165°C	Storage Temperature	-55°C~+150°C
Maximum VD Supply	+6.5V	VG Range	-1.5V(Pinch-off) ~-0.2V

Typical Performance Curve

The following data are obtained from SAC3148 evaluation board , VD = + 6V, IdQ = 2A, CW, TA = + 25°C

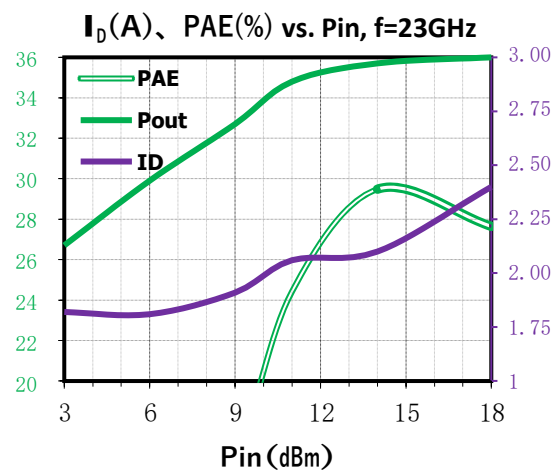
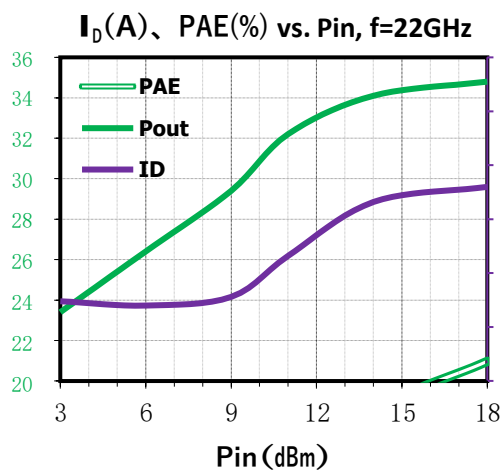
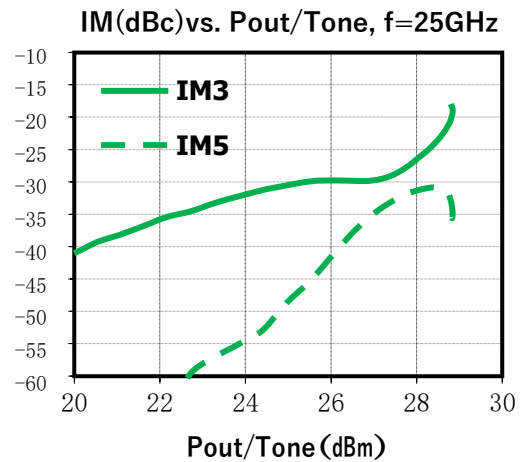
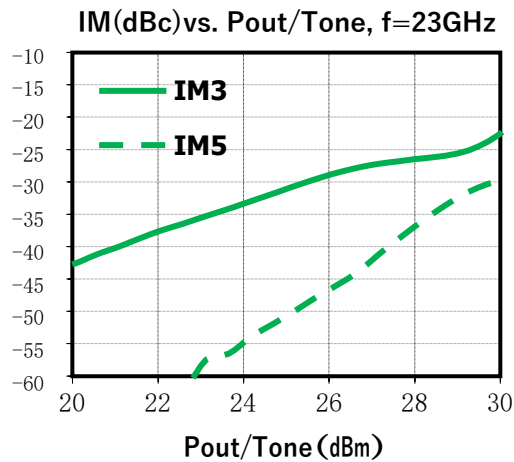
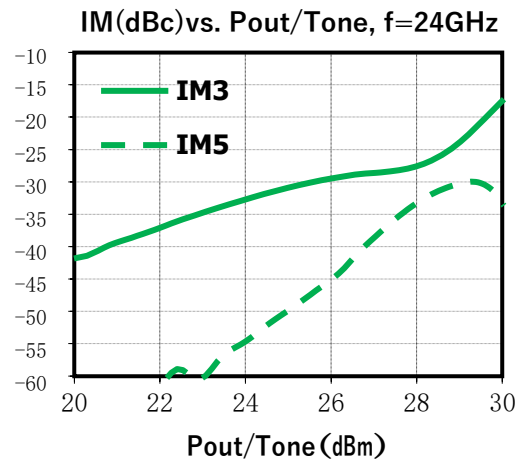
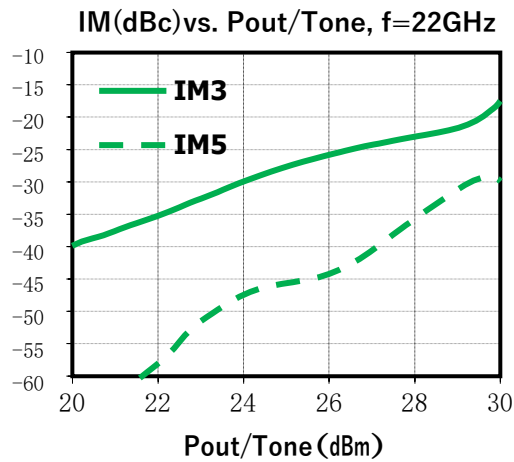


SAC3148



GaAs MMIC Power Amplifier
22GHz~25GHz 34dBm

Rev 1.0



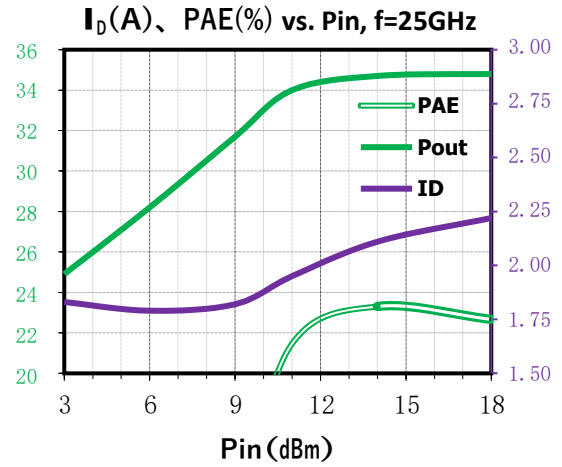
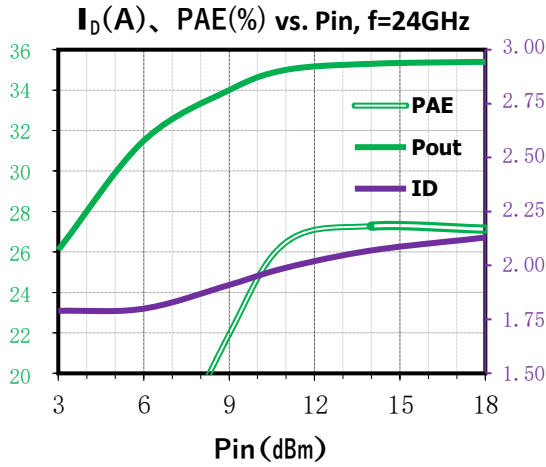
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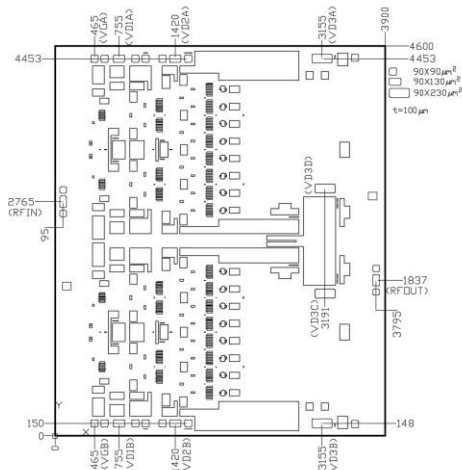
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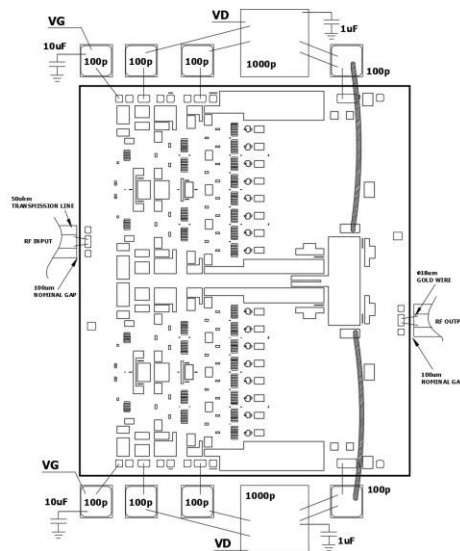
Rev 1.0



Die Outline(μm)



Assembly Diagram



Notes

1. SAC3148 is biased with a positive drain supply and negative gate supply. The recommended gate voltage is set to -0.4 to -0.9V when the drain voltage is set to 6V;
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 1 mil 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;
6. The maximum spike voltage at drains(VDxx) should not exceed 6.5V.

Revision History

Revision	Date	Comment
1.0	Nov. 23, 2021	First Release

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