

Features

- Frequency: 2GHz~6GHz
- Small Signal Gain: 19dB
- Output P-1dB: 33dBm CW
- PAE: 27%@OP₁dB, f=4GHz
- IM₃: -23dBc, 28dBm/Tone@4GHz
- Die Size: 2.93mm×2.5mm×0.1mm
- Supply Voltage: +8V/-Vg
- Packaged: Bare Die

General Description

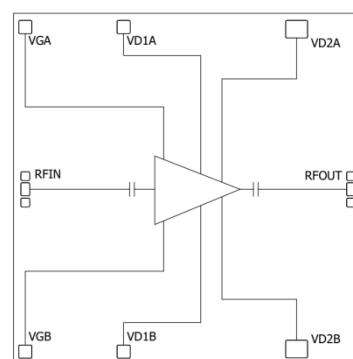
SAC3146 is a S-band and C-band GaAs power amplifier. SAC3146 provides 19 dB of gain, and 33dBm of output power for 1 dB compression (Typ.) from a +8 supply.

The surface of SAC3146 chip is covered with dielectric layer protective layer, which has good environmental adaptability and stability. At the same time, the chip adopts on-chip metallization process to ensure good grounding. The back of the chip is metallized

Typical Applications

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

Functional Diagram



Electrical Performance

T_A=25°C, V_D=+8V, I_{DQ}=0.96A, Z₀=50Ω, CW

Parameter	Min.	Typ.	Max.	Units
Frequency	2	—	6	GHz
Small Signal Gain	18	19	—	dB
Small Signal Gain Flatness	—	±2	—	dB
Reverse Isolation	—	-50	—	dB
RF input port VSWR	—	1.9	2.2	:1
RF output port VSWR	—	1.7	2.1	:1
Power-Added Efficiency	—	25	—	%
Output P-1dB	32	33	—	dBm
IM ₃ *	—	23	—	dBc
Drain Voltage (V _D)	7	—	8.5	V
Gate Current	—	20	—	μA
Supply Current (I _D)**	—	—	1.2	A
Thermal Resistance	—	14.2	—	°C/W

* P_{out}/Tone=28dBm, f_c=4GHz, Δf=4MHz

**Adjust the V_g voltage (-1 ~ -0.65V) so that the I_{DQ} is about 0.96A, and the typical V_g voltage is -0.65V

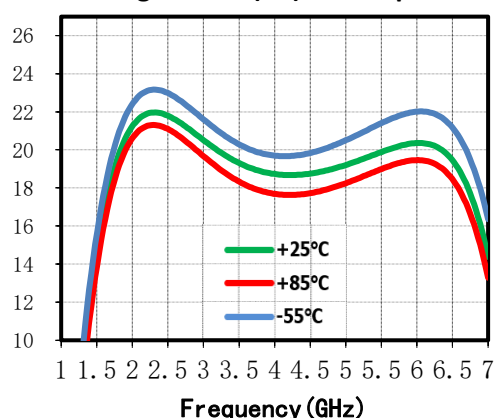
Absolute Maximum Ratings

Maximum Input Power	+24dBm	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

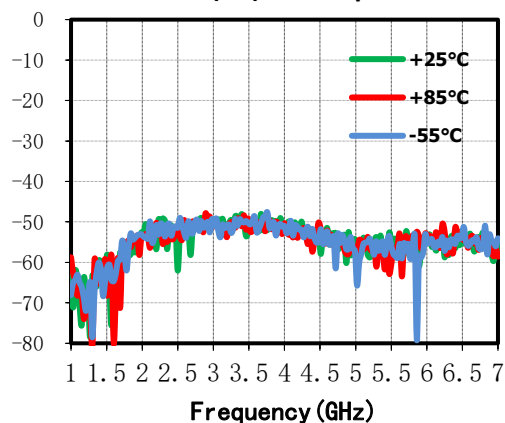
Typical Performance Curve

The following data are obtained by SAC3146 evaluation board test, V_D = + 8V, I_{DQ} = 0.96A, working mode CW, T_A = + 25°C

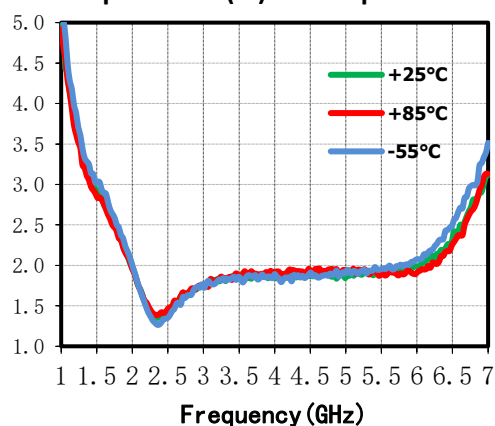
Small Signal Gain(dB) vs.Temperature



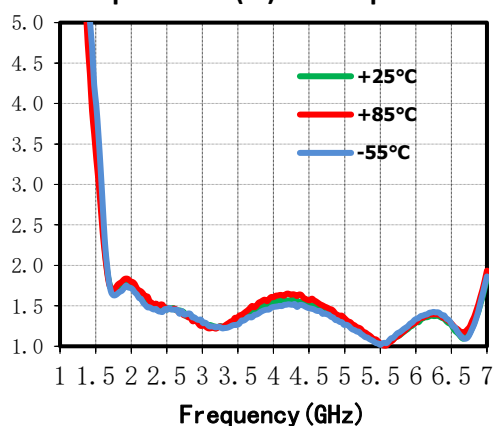
Isolation(dB) vs.Temperature

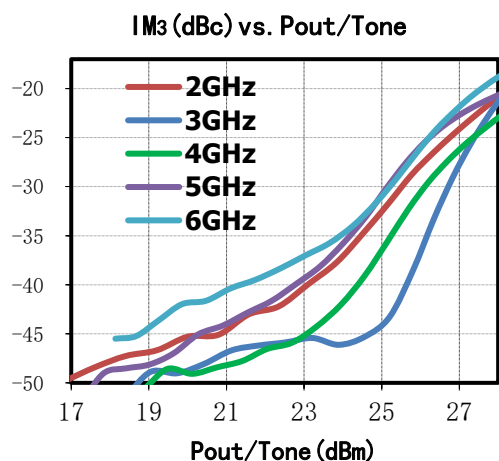
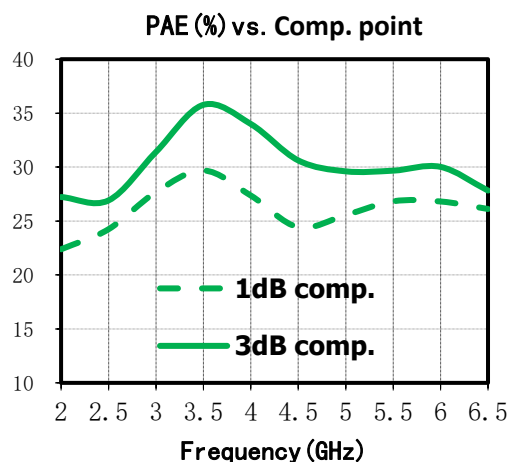
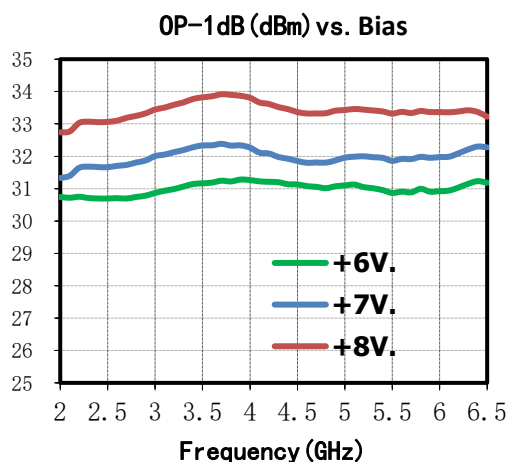
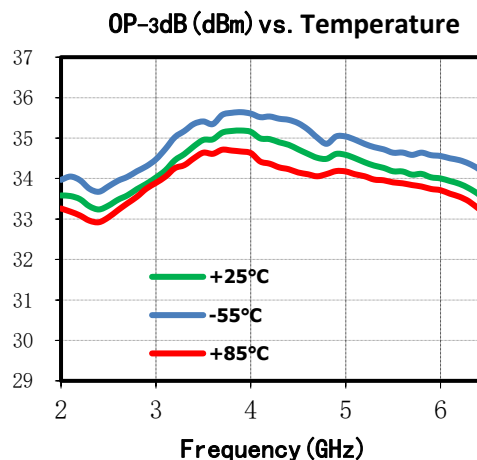
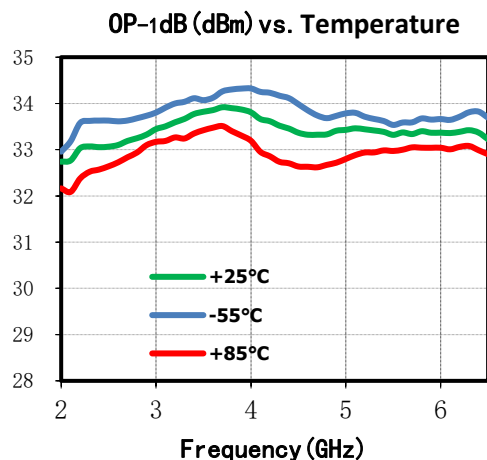


Input VSWR(:1) vs.Temperature



Output VSWR(:1) vs.Temperature



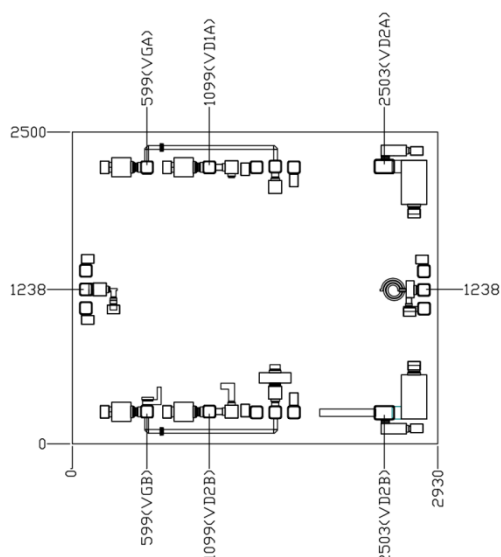


SAC3146

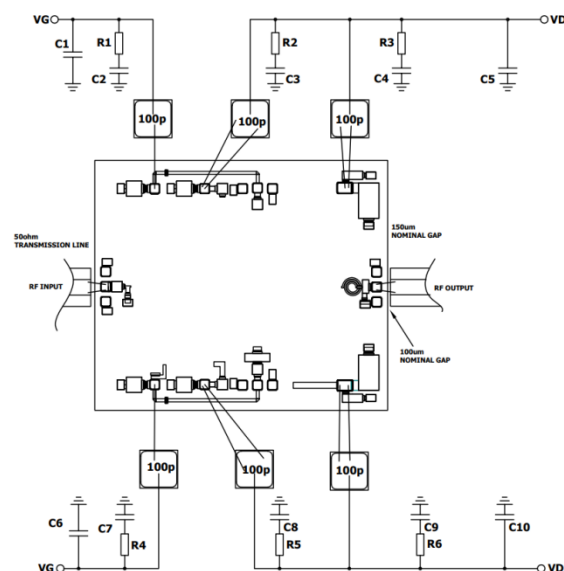
GaAs MMIC Power Amplifier
2GHz~6GHz 33dBm

Rev 1.0

Outline Drawing (All dimensions in μm)



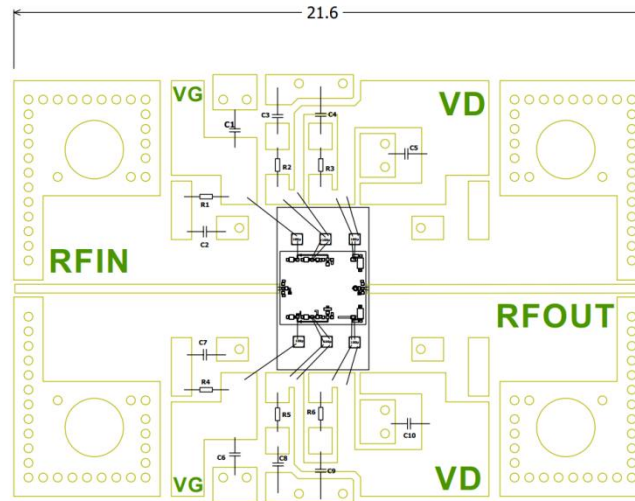
Assembly Diagram



Components List

Reference Des.	Value	Part Number	Manuf.	Size
C1、C5、C6、C10	10uF	—	—	0805
C2~C13	0.47uF	—	—	0603
R1~R6	2R2	—	—	0603

SAC3146 Chip Test Fixture



Attention:

1. SAC3146 requires drain positive voltage (VD_x) and grid negative voltage (VG_x) bias. Before applying drain positive voltage, ensure that grid negative voltage has been applied. When closing, ensure that drain positive voltage is turned off before grid negative pressure;
2. The length of RF input / output gold wire shall be shortened as much as possible. It is recommended to use gold wire with a diameter of 25 μm ;
3. It is recommended to use vacuum AuSn eutectic welding.

Revision History

Revision	Date	Comment
1.0	August 26, 2021	First Release