SAC3106

GaAs MMIC Power Amplifier
27GHz~33GHz 33dBm

Rev 2.1

Features

- Frequency：27GHz~33GHz
- Gain：20dB
- Output P_{-1}dB：33dBm
- OutputIP_3：38dBm
- Supply Voltage：+6V
- Power-Added Efficiency：22%
- Die Size：3.18mm×2.46mm×0.1mm

Typical Applications

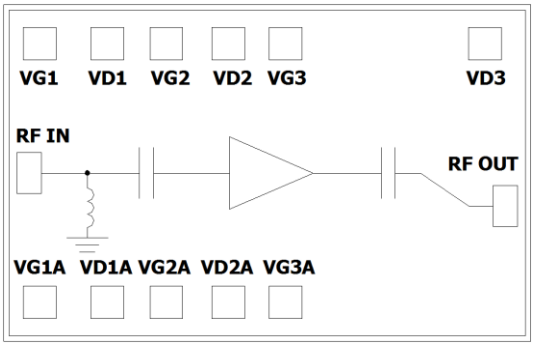
- Point-to-Point Radios
- SATCOM
- Military and Space
- Test and Measurement
- Radar

General Description

SAC3106 is a wideband GaAs MMIC power amplifier which operates between 27GHz~33GHz. The SAC3106 provides 20dB of gain, +33 dBm of output power for 1 dB compression and 22% PAE from a +6V supply.

SAC3106 offers full passivation for increased reliability and moisture protection.

Functional Diagram



Electrical Performance (T_A=25℃, V_D=+6V, I_D=1000mA, Z_0=50Ω)

Parameter	Min.	Typ.	Max.	Units
Frequency Range		27~33		GHz
Small Signal Gain	15	20	—	dB
Small Signal Gain Flatness	—	±2.5	—	dB
Reverse Isolation	—	-45	—	dB
Input Return Loss	—	-10	—	dB
Output Return Loss	—	-13	—	dB
Power-Added Efficiency	—	22	—	%
Output Power for 1 dB Compression (OP_{-1}dB)	31.5	33	—	dBm
Output Third Order Intercept (OIP_3) *	—	38	—	dBm
Drain Voltage (V_D)	5	—	6	V
Supply Current (I_D)	—	1000	1600	mA

* Measurement taken at Pout / Tone = +28 dBm

Absolute Maximum Ratings

Maximum Input Power	+19dBm	Operating Temperature	-55℃～+85℃
Channel Temperature	+150℃	Storage Temperature	-65℃～+150℃
Maximum V_D	+6.5V	Maximum V_G	-1.2V

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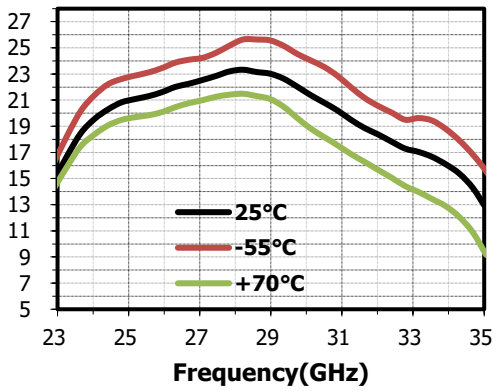
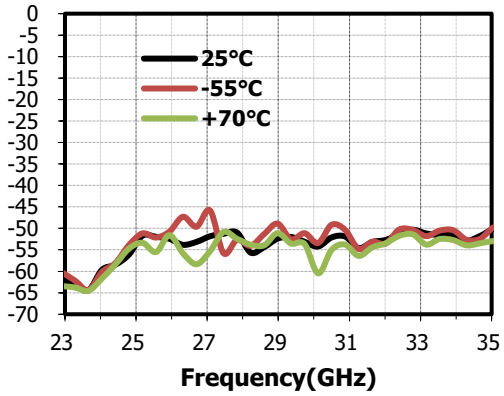
Typical Performance Curve

S-parameter Data obtained from On-Wafer RF Probe Test Results
OP-1dB and PAE Data obtained from K connector-based test fixture
***Bias Conditions: V_D =6V, I_D =1000mA**

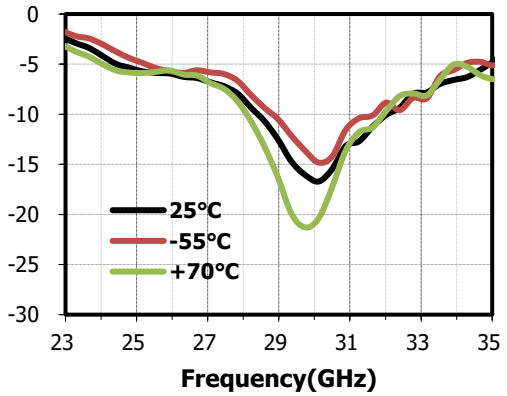
Small Signal Gain(dB) vs.Temperature



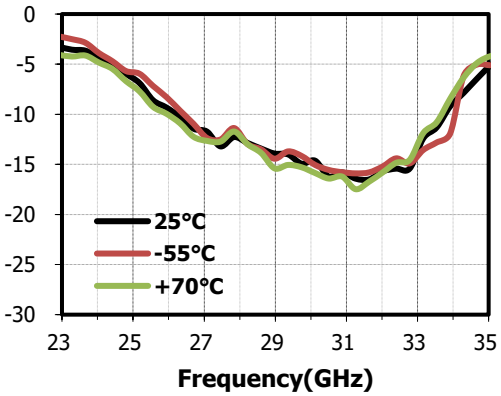
Reverse Isolation(dB) vs.Temperature



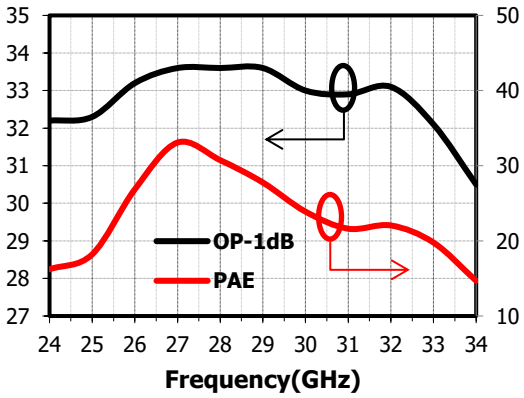
Input Return Loss(dB) vs.Temperature



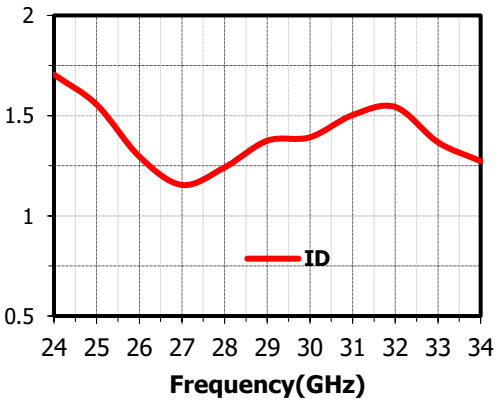
Output Return Loss(dB) vs.Temperature



OP-1dB(dBm)、PAE(%) vs.Freq



I_D(A)vs.Freq@OP-1dB



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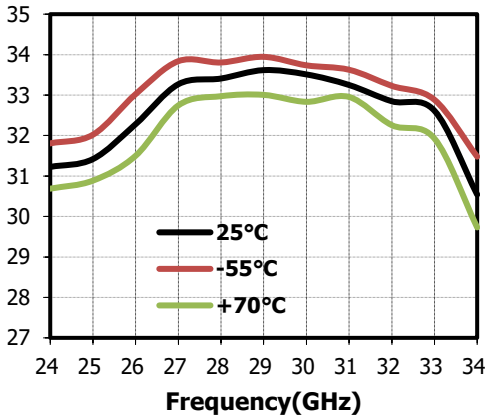
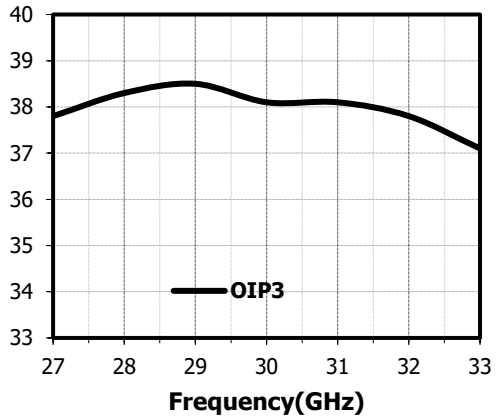
OP-1dB vs.Temperature

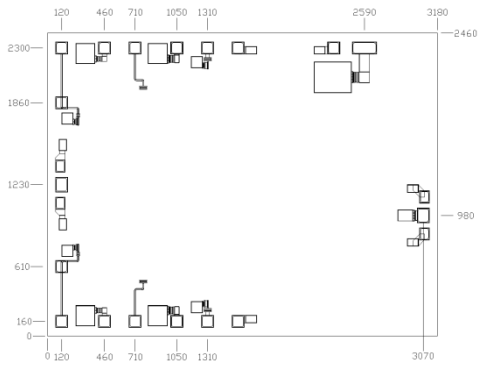


OIP3(dBm),POUT/Tone=28dBm vs.Freq



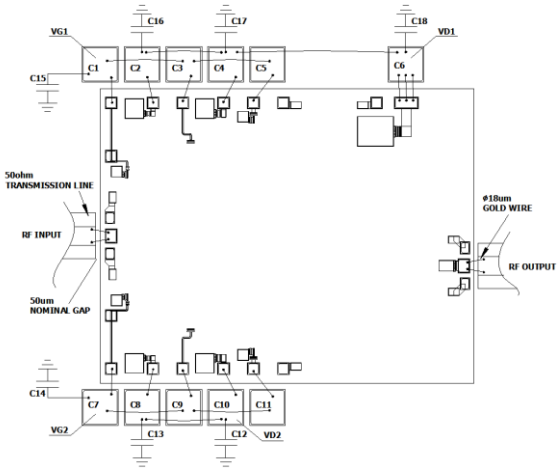
Die Outline

(All dimensions in μm)



VG1～VG3、VD1～VD2 Bonding Pad Size: 100x100um
VG1A～VG3A、VD1A～VD2A Bonding Pad
Size: 100x100um
RF IN、RF OUT Bonding Pad Size: 100x120um
VD3 Bonding Pad Size: 200x100um

Assembly Diagram



Components List

Reference Des.	Value	Part Number	Manuf.	Size
C12～C18	4.7uF	GRM155R61A475KE15D	Murata	0402
C1～C11	100pF	–	ANY	SLC

Notes

1. SAC3106 is biased with a positive drain voltage supply and negative gate voltage supply when the drain voltage is set to 6 V. The recommended gate voltage is set to -0.5~-0.8V.
2. RF connections should be made as short as possible to reduce the inductive effect of the bond wire.
3. The backside of SAC3106 is RF grounded. Die attach should be accomplished with electrically and thermally conductive epoxy only.
4. Bypass caps C12～C18 should be placed no farther than 1.5mm from the amplifier.

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