SAC3142CR4

GaAs Power Amplifier
13.75GHz~14.5GHz 40.5dBm

Rev 1.0

Features

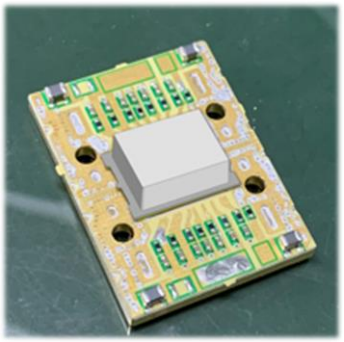
- Frequency:13.75GHz~14.5GHz
- Small Signal Gain:27dB
- Output P_{-1}dB:40.5dBm
- PAE：30%@OP_{-1}dB, f=14.25GHz
- IM_3: -25dBc, 30dBm/Tone@14.25GHz
- Size：20mm×27mm×4(Typ.) mm
- Supply：+8V/-Vg

Typical Applications

- Satcom

General Description

SAC3142CR4 is a Ku band GaAs power amplifier, it has a nominal CW performance of 27dB small signal gain, and 40.5dBm output power over the 13.75 to 14.5GHz band, The amplifier is offered in plastic package with a flange for drop-in assembly



Electrical Performance

T_A=25℃, V_D=+8V, I_{DQ}=4A, Z_0=50Ω, CW

Parameter	Min	Typ.	Max	Units
Frequency	13.75	—	14.5	GHz
Small Signal Gain	25	27	—	dB
Gain Flatness	—	±0.5	±1.2	dB
Reverse Isolation	—	-50	—	dB
RF Input VSWR	—	1.5	2.2	:1
PAE	—	30	—	%
Output P_{-1}dB	40	40.5	—	dBm
IM_3*	—	25	—	dBc
Supply Voltage (V_D)	—	8	—	V
Gate Current	—	5	27	mA
Supply Current (I_D)***	—	—	6.5	A
Thermal Resistance **	—	1.62**	—	℃/W

* Pout/Tone=30dBm, fc=14.25GHz, Δf=4MHz
**Channel to mount surface
*** Adjust Vg between -1V to -0.6V to achieve I_{DQ}= 4Amps typical.

Absolute Maximum Ratings

Maximum Input Power	+24dBm	Operating Temperature (Backside)	-55℃~+85℃
Channel Temperature	165℃	Storage Temperature	-55℃~+150℃
Maximum VD Supply	+8V	VG Range	-1.5V(Pinch-off) ~-0.5V

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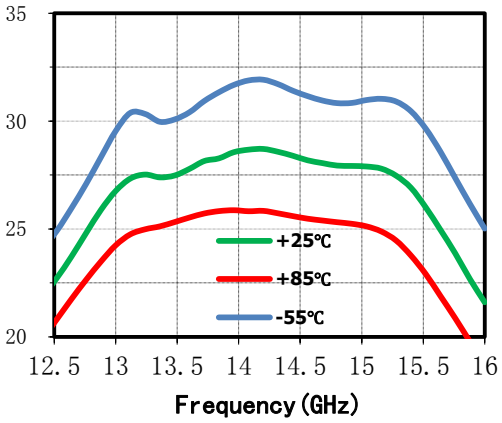
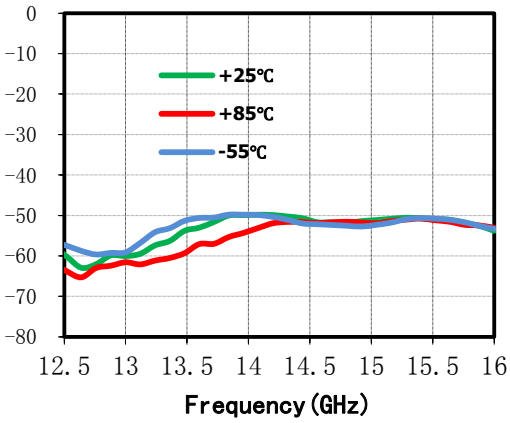
Typical Performance Curve

VD = + 8V, I_{DQ} = 4A, CW, T_A = + 25℃

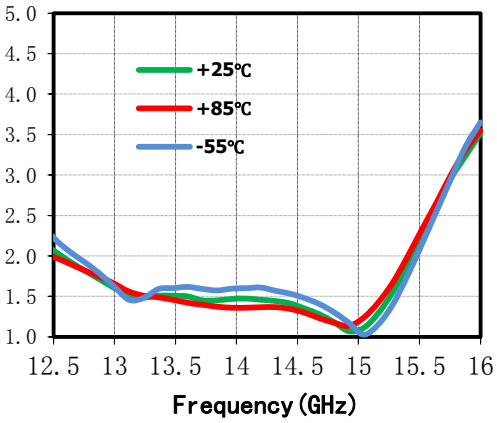
Small Signal Gain(dB) vs.Temperature



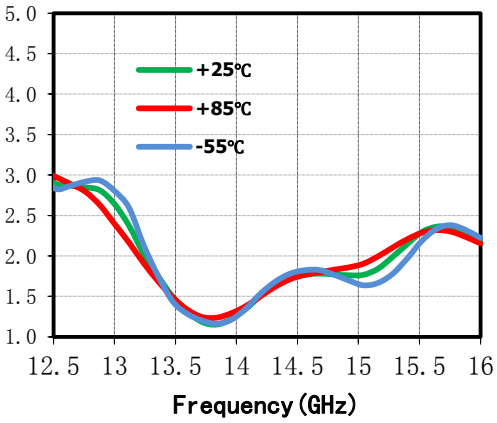
Isolation(dB) vs.Temperature



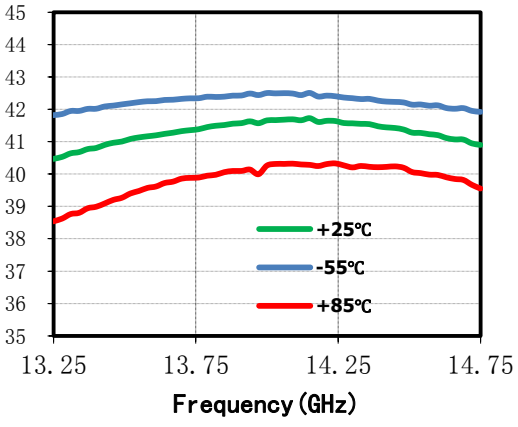
Input VSWR(:1) vs.Temperature



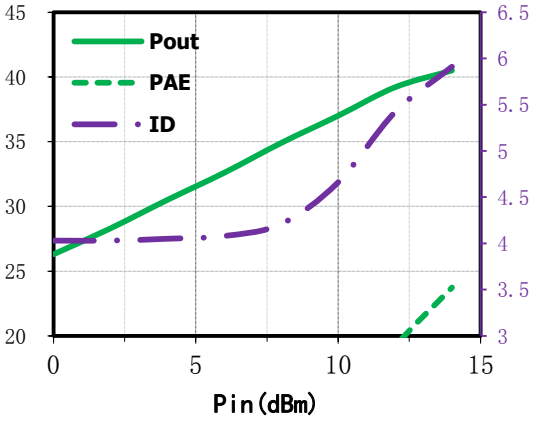
Output VSWR(:1) vs.Temperature



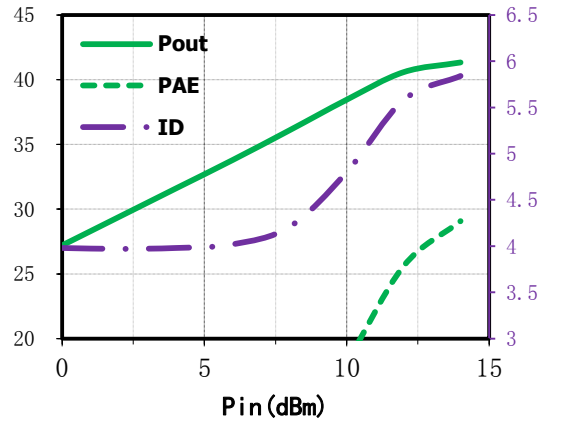
OP-1dB (dBm) vs. Temperature



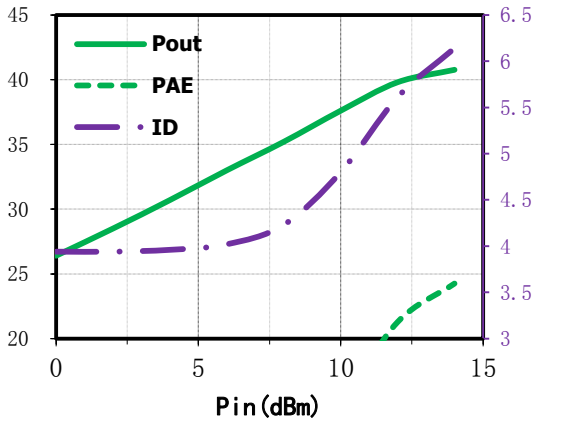
Pout (dBm)、PAE (%)、ID(A) vs. Pin,f=13.5GHz



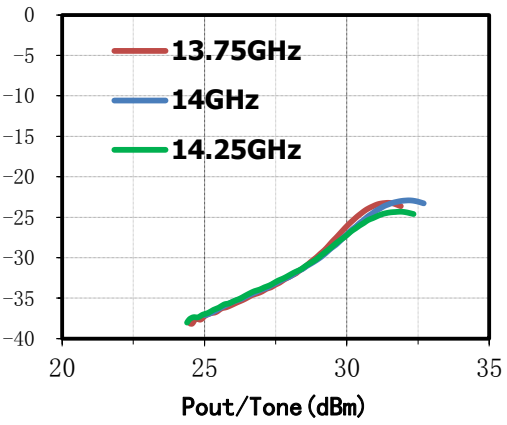
Pout (dBm)、PAE (%)、ID(A) vs. Pin,f=14GHz



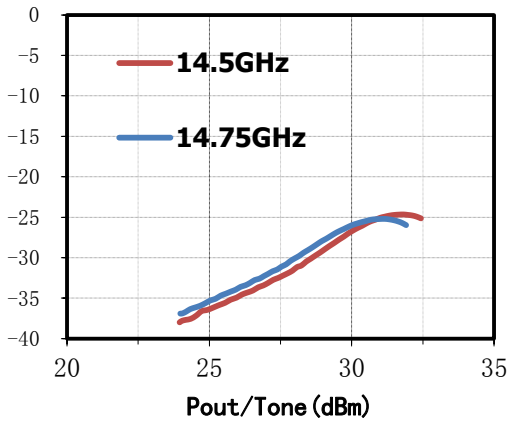
Pout (dBm)、PAE (%)、ID(A) vs. Pin,f=14.5GHz



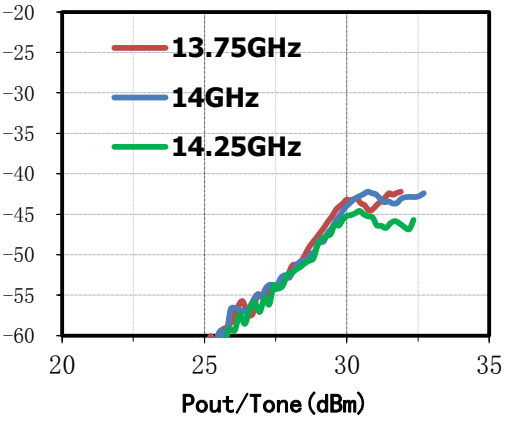
IM3 (dBc) vs. Pout/Tone



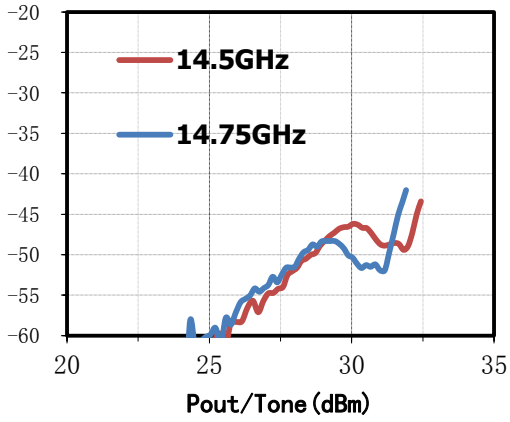
IM3 (dBc) vs. Pout/Tone

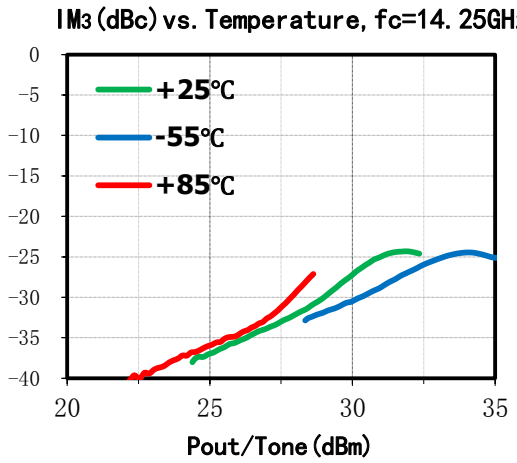


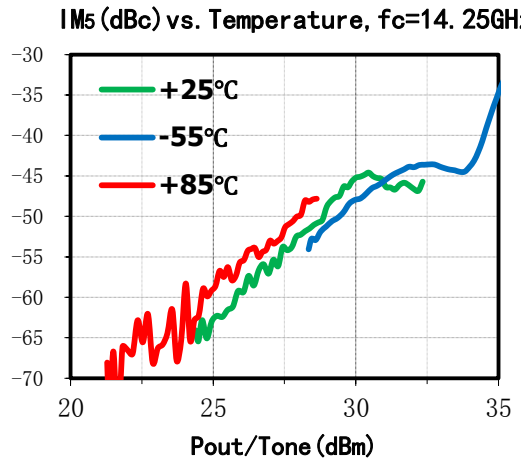
IM5 (dBc) vs. Pout/Tone



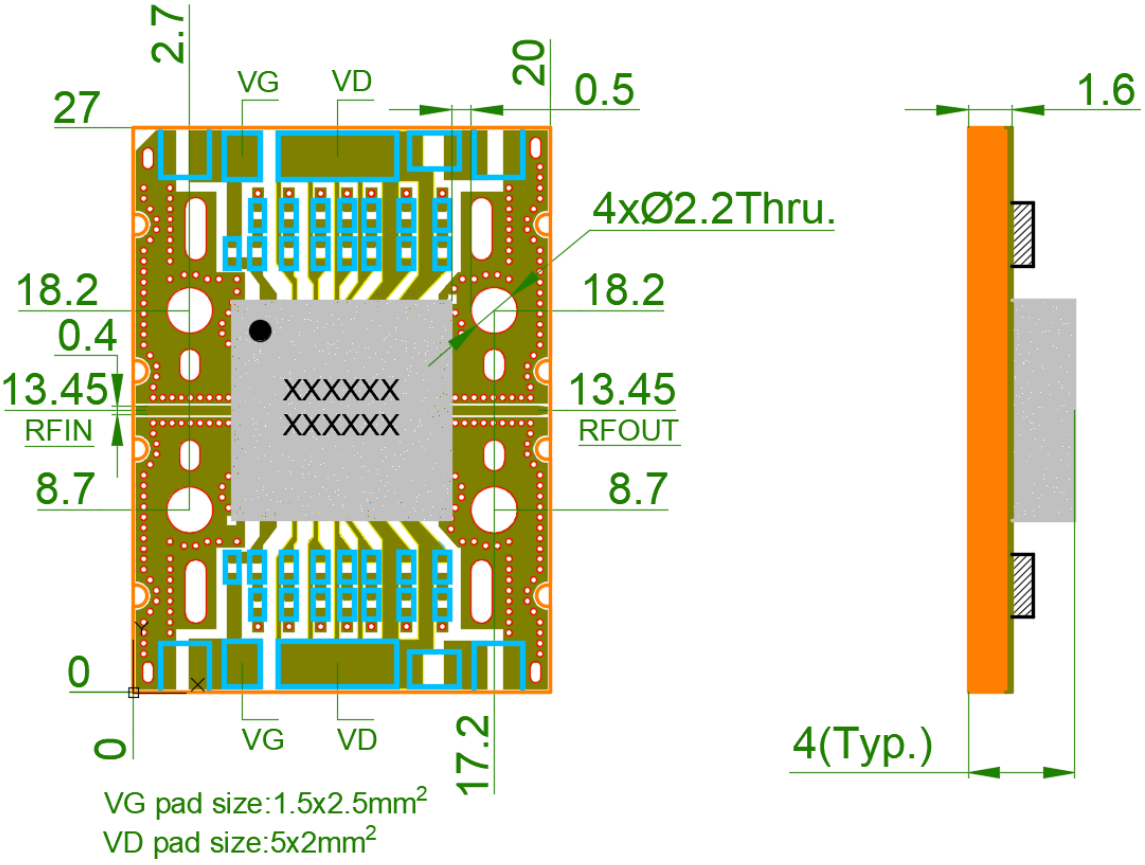
IM5 (dBc) vs. Pout/Tone



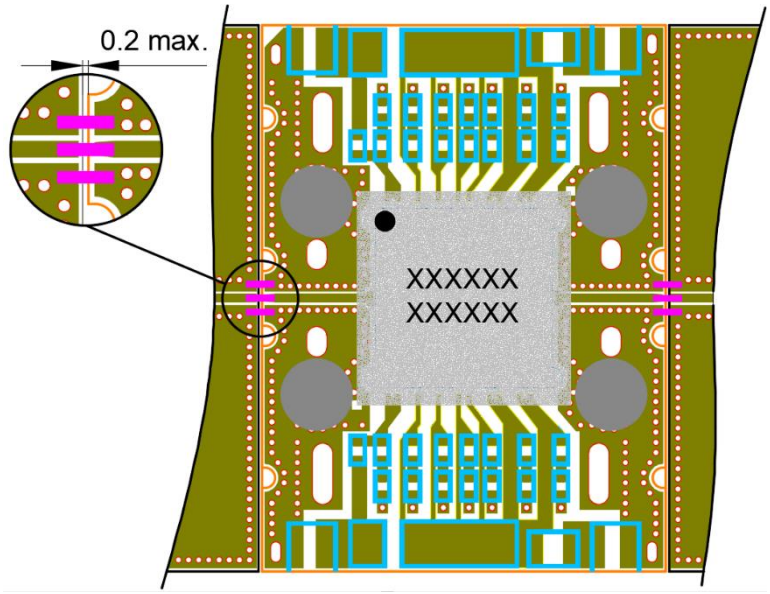




Outline Drawing(mm)



Assembly Diagram



Notes

1. SAC3142CR4 is biased with a positive drain supply and negative gate supply. The recommended gate voltage is set to -0.6 to -0.9V when the drain voltage is set to 8V;
2. The back of chip is RF and DC ground;
3. RF connections should be made as short as possible to reduce the inductive effect of the bond wire. Use of thermocompression bonded is highly recommended as the loop height will be minimized;
4. GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test;
5. Because of high DC power dissipation, good heat sinking is required;
6. The maximum spike voltage at drains(VDx) should not exceed 8.5V.

Revision History

Revision	Date	Comment
1.0	Aug 8, 2021	First Release

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