SAC5002

GaN MMIC Power Amplifier
5GHz~8GHz 46dBm

Rev 1.1

Features

- Frequency: 5GHz~8GHz
- Small Signal Gain: 33dB
- Output Power: 46dBm
- Power Gain:23dB
- Package: Bare die
- Supply Voltage: +28V/-Vg

Typical Applications

- Point-to-Point Radios

General Description

SAC5002 is a broadband power amplifier delivering 46dBm with 35% power added efficiency from 5GHz to 8GHz. No external matching is required to achieve full-band operation.

Electrical Performance

T_{BASE}=23℃, V_D=+28V, I_{DQ}=1.3A, Z_0=50Ω, Pulse Width=100μs, Duty Cycle=10%

Parameter	Min.	Typ.	Max.	Units
Frequency Range	5	—	8	GHz
Small Signal Gain	—	33	—	dB
Power Gain**	—	23	—	dB
Reverse Isolation	—	-45	—	dB
RF Input Port Return Loss	—	-12	—	dB
Output Power	—	46	—	dBm
Drain Voltage (V_D)	—	28	—	V
Gate Current	—	2	22	mA
Supply Current (I_D)*	—	—	6	A

*Adjust Vg between -2.5V to -1.5V to achieve I_{DQ}= 1.3A, and typical Vg voltage is -2.1V
**Pin=23dBm

Absolute Maximum Ratings

Maximum Input Power	+28dBm	Operating Temperature (T_{BASE})	-55℃~+85℃
Channel Temperature	230℃	Storage Temperature	-55℃~+180℃
Maximum V_D	+32V	V_G Range	-5V~-1V
Mounting Temperature (30 seconds)	320℃		

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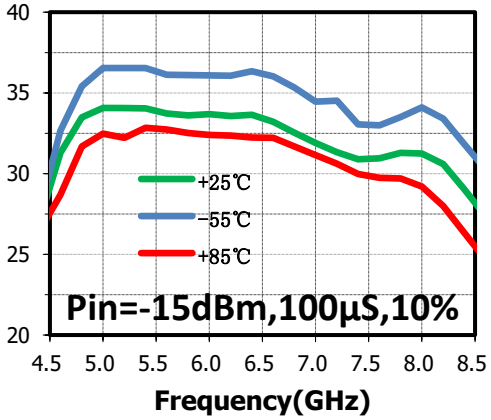
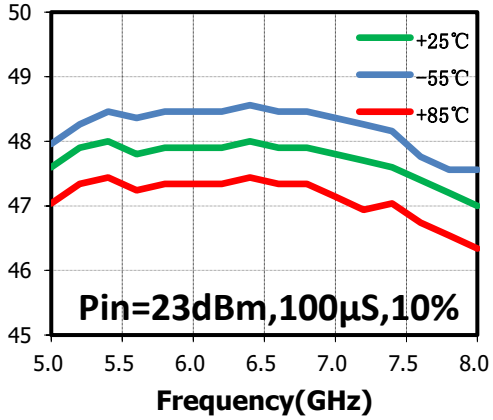
Typical Performance Curve

V_D = + 28V, I_{DQ} = 1.3A, T_{BASE} = + 23℃

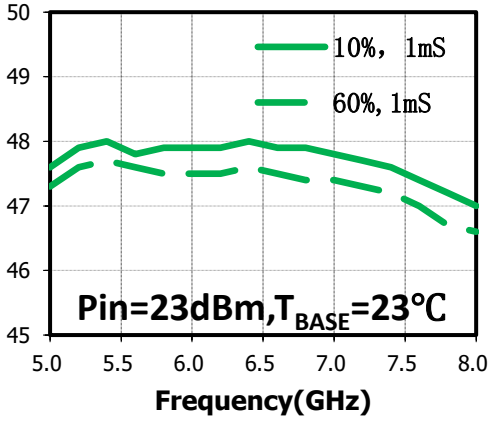
Small Signal Gain(dB) vs.Frequency



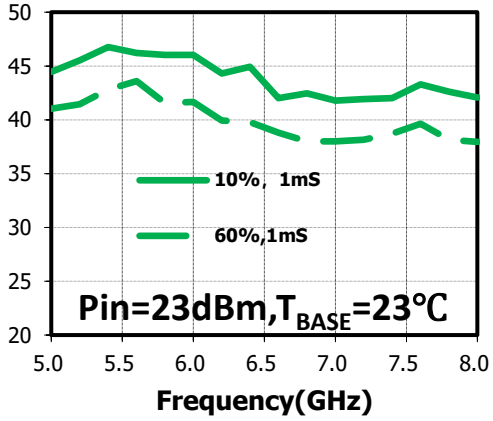
Output Power(dBm) vs.Frequency



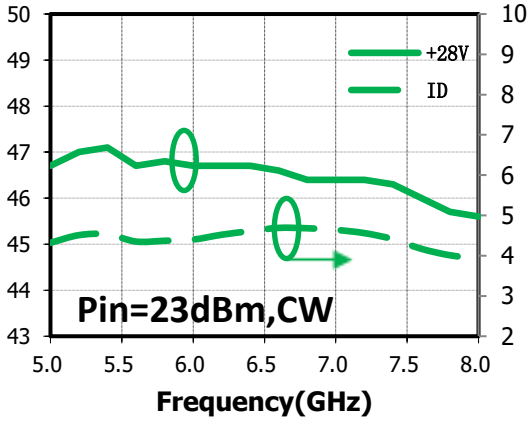
Output Power(dBm) vs.Duty Cycle



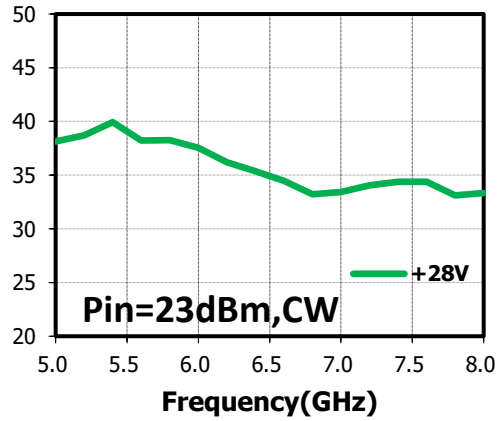
PAE(%) vs.Duty Cycle

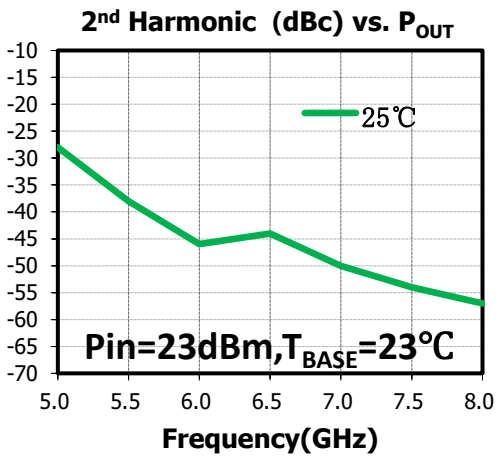


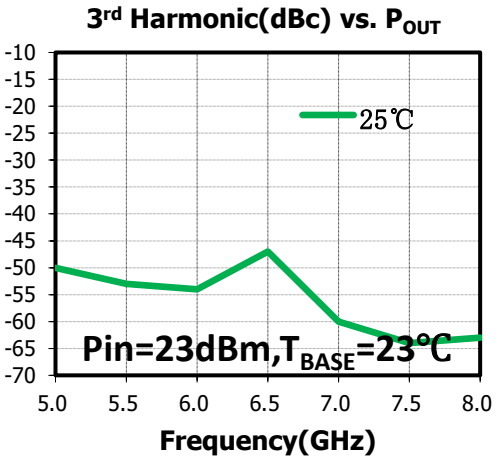
Output Power(dBm) vs.Frequency

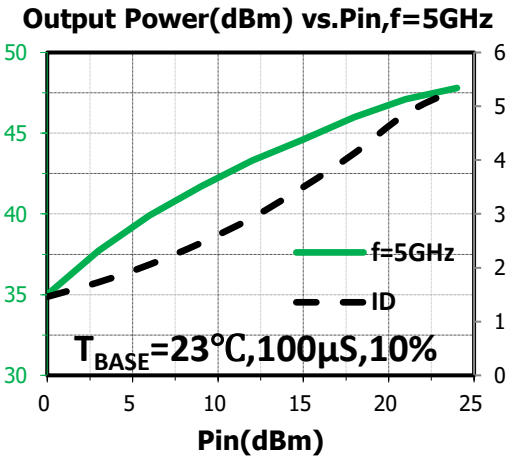


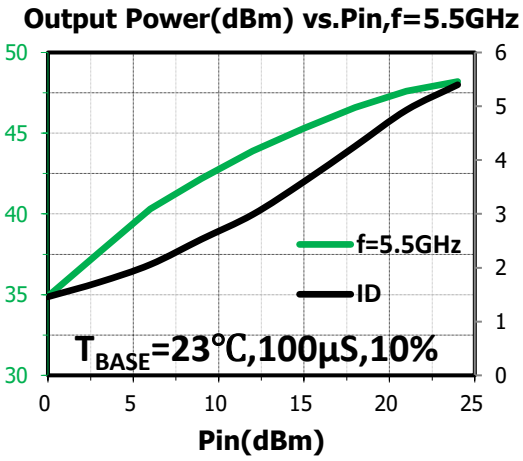
PAE(%) vs.Frequency

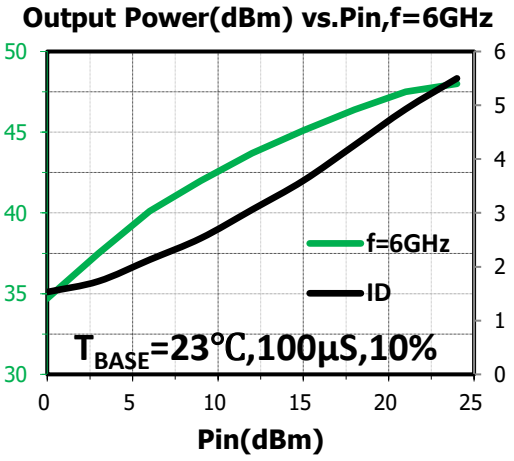


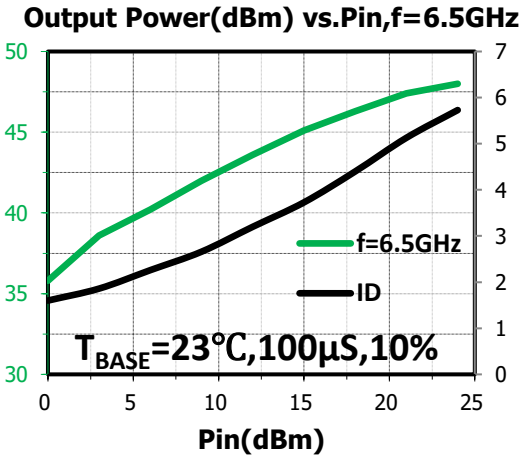












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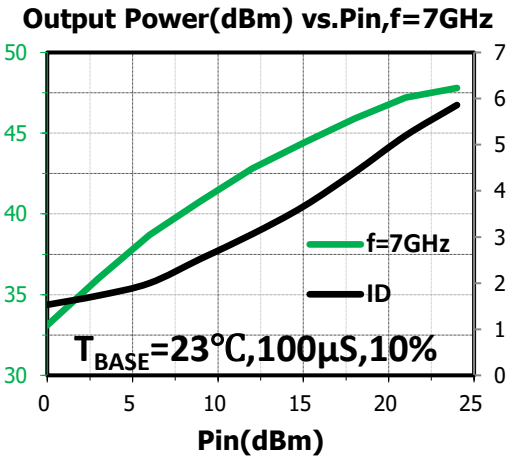
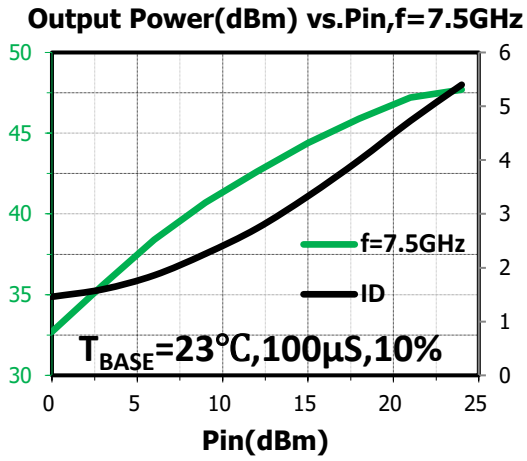
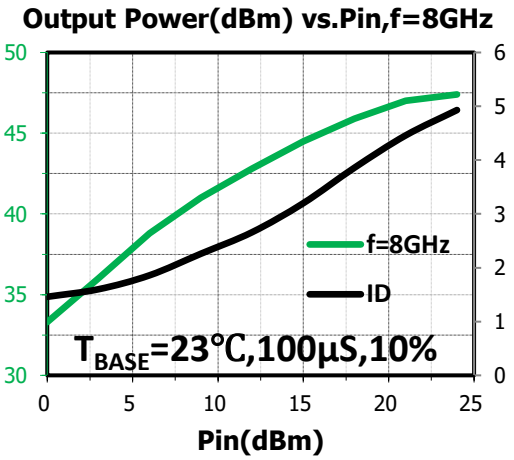






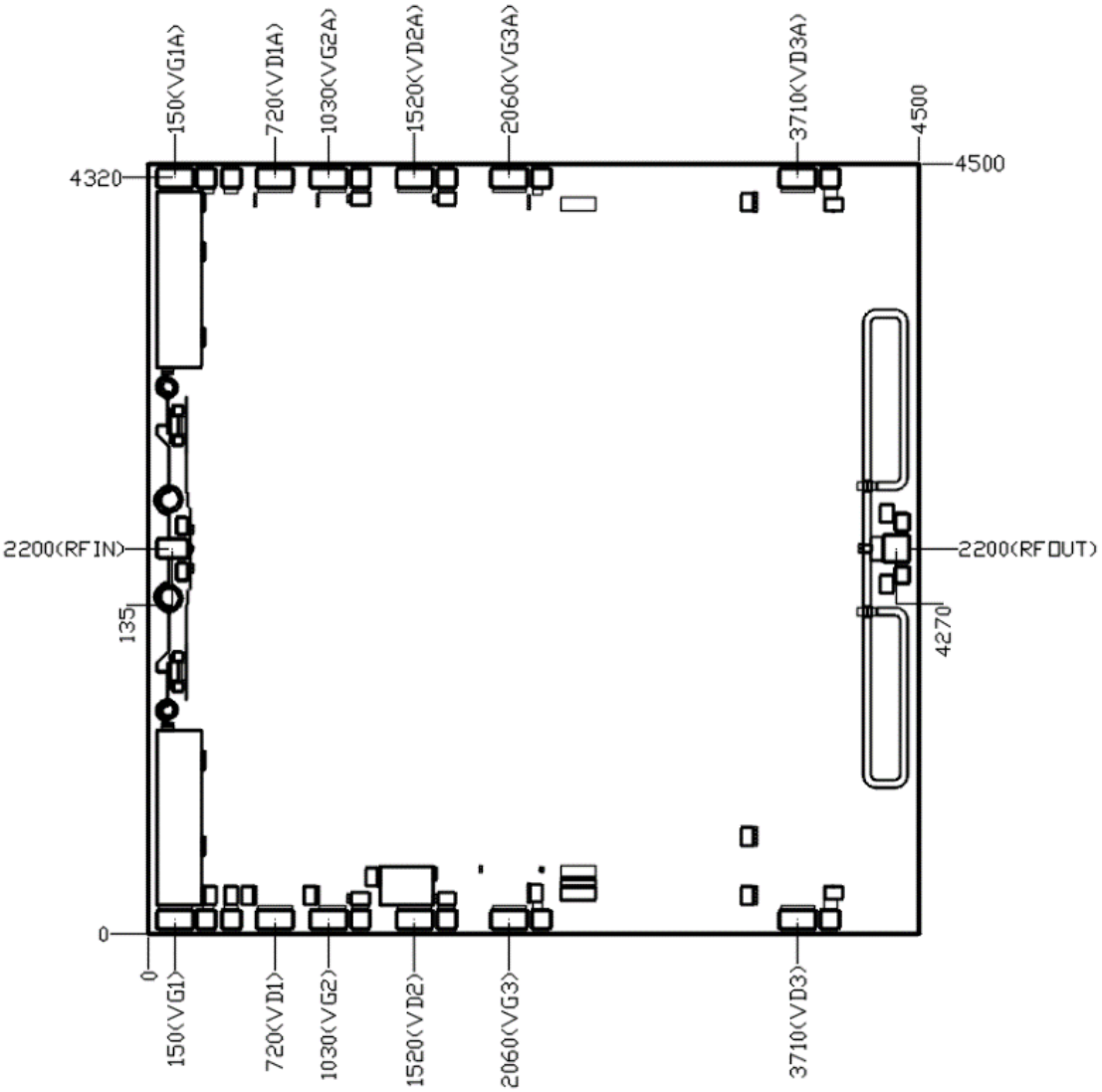
Thermal Resistance

Parameter	Conditions	Value	Unit
θ_{JC1}	VD=+28V, T_{BASE}=+70℃, Pin=+23dBm, CW, f=5.5GHz	1.06	℃/W
θ_{JC2}	VD=+28V, T_{BASE}=+70℃, Pin=+23dBm, CW, f=7.5GHz	1.26	℃/W

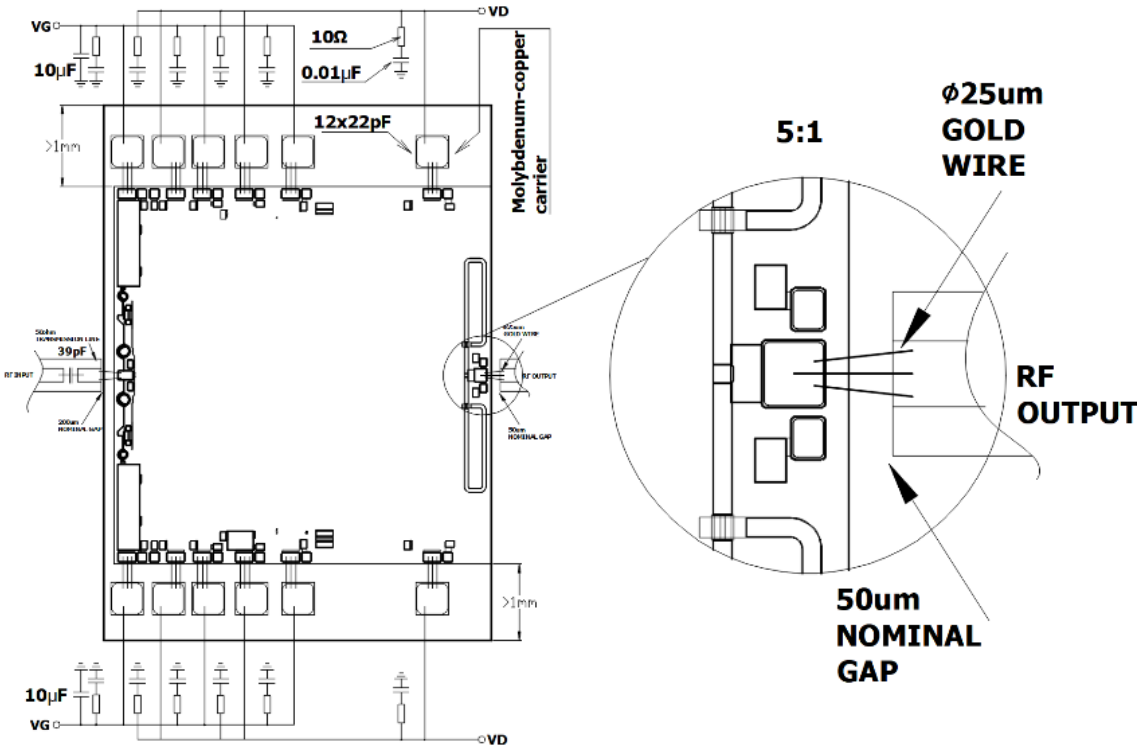
Electrostatic Discharge (ESD) Ratings

ESD Model	Conditions	Withstand Threshold (V)	Class
HBM	Human body model (HBM) per ANSI/ESDA/JEDEC JS-001	500	1B

Bare Die Outline
(μm)



Application Circuit



Notes

1. **SAC5002 requires VDx and VGx bias.**
   Turn-on: Apply VGx, Apply VDx, Apply RFIN signal.
   Turn-off: Remove RFIN signal, Decrease VG to -5V(pinch-off), Decrease VD to 0 V.
2. **Suggest molybdenum-copper thinness is 0.2mm;**
3. **Microelectronic 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	Mar. 18, 2024	First Release
1.1	Apr. 17, 2024	Optimizing the structure of heatsink, Updated the 1. Output Power(dBm) vs. Frequency,2. Output Power(dBm) vs. Duty Cycle, 3.PAE (%) vs. Duty Cycle and CW test data, Updated the thermal resistance data