SAC3150

GaN Power Amplifier
1GHz~6GHz 42dBm

Rev1.0

Features

- Frequency: 1GHz～6GHz
- Gain:12dB
- Output P_{-3}dB: 42dBm
- Supply Voltage: +28V
- Power-Added Efficiency: 54%
- Package Size: 20.43mm×5.93mm×4.1mm

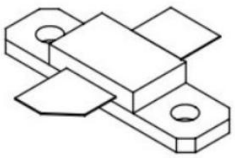
Typical Applications

- Suitable for wireless communication infrastructure, commercial radar, wideband amplifier, Jammer, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness

General Description

SAC3150 is a GaN power amplifier in Flange Ceramic package. It provides 12 dB of gain, and 42dBm of output power for 3 dB compression and 54% PAE from a +28V supply voltage.

Picture



Electrical Performance

T_A=25℃, V_D=+28V, I_D=110mA, Z_0=50Ω

Parameter	Min.	Typ.	Max.	Units
Frequency Range		1～6		GHz
Small Signal Gain	11	12	—	dB
Small Signal Gain Flatness	—	±2.5	—	dB
Input Return Loss	—	-5	—	dB
Output Return Loss	—	-5	—	dB
Power-Added Efficiency	—	54	—	%
Output Power for 3 dB Compression (OP_{-3}dB)	41	42	—	dBm
Supply Voltage (V_D)	—	28	—	V
Supply Current (I_D)	—	600	—	mA
Thermal Resistance, Junction to Case Case Temperature 85℃, Tj=200℃, RF CW operation	—	5.6	—	℃/W

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Absolute Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	VDSS	+160	Vdc
Gate--Source Voltage	VGS	-10 to +2	Vdc
Operating Voltage	VDD	40	Vdc
Maximum forward gate current	Igf	4	mA
Storage Temperature Range	Tstg	-65 to + 150	℃
Case Operating Temperature	TC	+150	℃
Operating Junction Temperature	TJ	+225	℃
Total Device Power Dissipation (Derated above 25℃, see note 2)	Pdiss	31	W

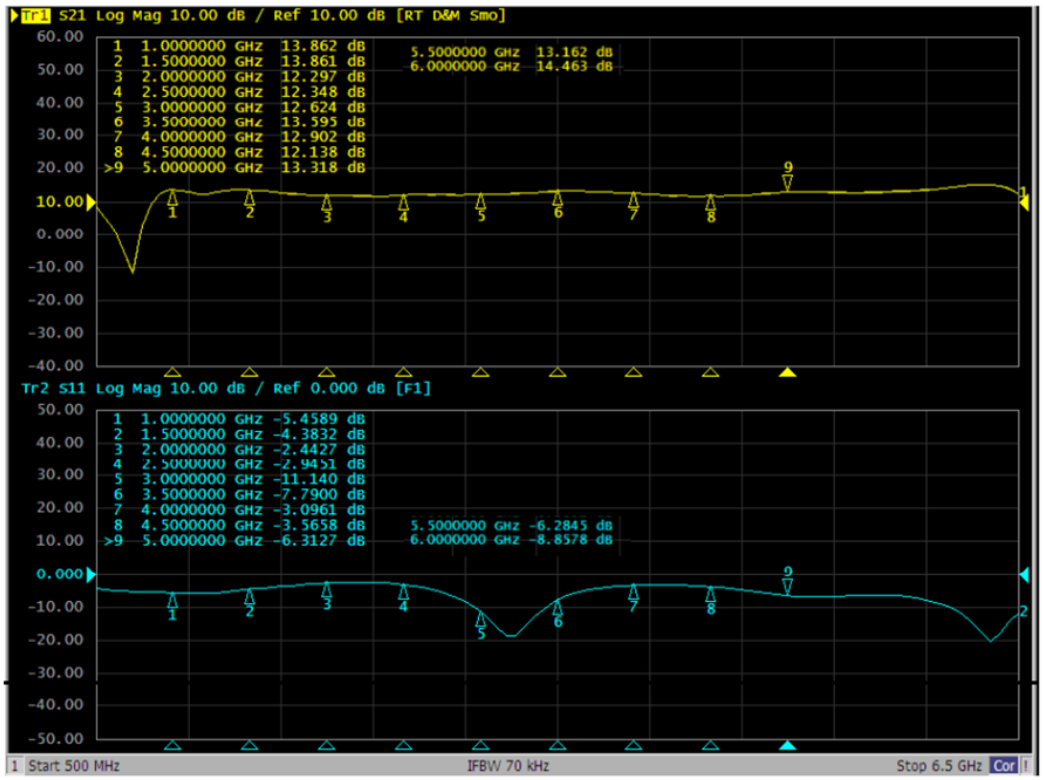
Notes: 1. Continuous operation at maximum junction temperature will offect MTTF;

2. Bias conditions shuould also satisfy the following expression: Pdiss<(Tj- Tc)/RJC and Tc=Tcase.

Typical Small Signal Performance Curve

All data is taken with the device in a 50 ohm test fixture

V_D=+28V I_D=110mA



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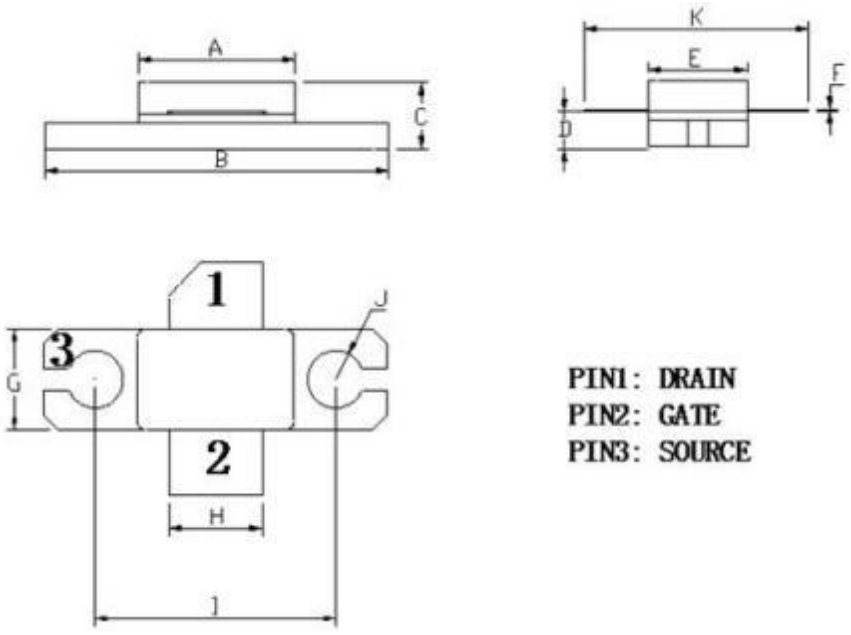
Pulsed CW 20% duty cycle，20Us VDS=28V, IDQ=100mA

Freq(MHz)	Gain (dB)	P3dB(dBm)	P3dB(W)	Efficiency(%)
1000	13.4	41.9	15.4	70
1500	13.2	42.9	19.8	71
2000	11.8	43.3	21.5	57
2500	12.6	42.7	18.5	42
3000	12.5	42.2	16.6	41
3500	12.9	43.3	21.6	54
4000	11.7	43.4	21.9	56
4500	11.9	43.1	20.5	52
5000	12.4	43.2	21.0	51
5500	12.6	43.1	20.2	50
6000	13.9	42.1	16.3	58

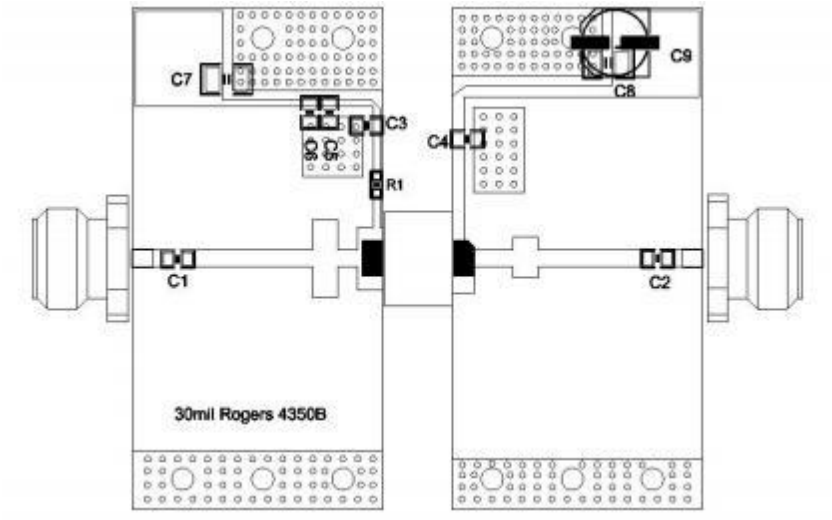
Package Outline

Flanged ceramic package, 2 leads(DRAIN, GATE) and Backside grounding is source



DIM	INCHES		MILLIMETRE	
	MIN	MAX	MIN	MAX
A	0.360	0.362	9. 15	9.2
B	0.794	0.804	20. 17	20.43
C	0. 143	0. 163	3.62	4. 14
D	0.077	0.087	1.95	2.21
E	0.226	0.228	5.75	5.8
F	0.004	0.006	0.11	0. 15
G	0.223	0.233	5.67	5.93
H	0.211	0.233	5.37	5.93
I	0.554	0.564	14.07	14.33
J	0. 120	0. 140	3.05	3.55
K	0.405	0.445	10.3	1 1.3

PCB layout



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BOM		
C1,C2	3.6pF	ATC600F
C3,C4	2.7pF	ATC600F
C5	1nF	C0805
C6	100nF	C0805
C7,C8	10uF/50V	C1210
C9	470uF	/63V
R1	10ohm	R0603
PCB	RO4350B 30mil 1oz	

Important notes:

Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set VGS to the pinch--off (VP) voltage, typically –5 V;
2.Turn on VDS to nominal supply voltage (50 V);
3.Increase VGS until IDS current is attained;
4.Apply RF input power to desired level.

Turning the device OFF

1.Turn RF power off;
2.Reduce VGS down to VP, typically –5 V;
3.Reduce VDS down to 0 V;
4.Turn off VGS.