SAC3155

GaAs MMIC Power Amplifier
15GHz~17GHz 33dBm

Rev 1.0

Features

- Frequency: 15GHz~17GHz
- Small Signal Gain: 22dB
- Output P_{-1}dB: 33dBm
- PAE: 33%@P_{-1}dB, f=16GHz
- Die size: 3.4mm×3.6mm×0.1mm
- Supply Voltage: +5V/-Vg
- Packaged: Bare Die

Typical Applications

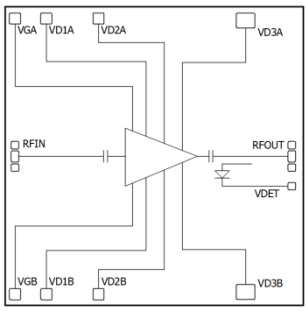
- Point-to-Point Radios
- SATCOM
- Military and Space
- Radar

General Description

SAC3155 is a Ku-band GaAs MMIC power amplifier. SAC3155 provides 22 dB of gain, and 33dBm of output power for 1 dB compression and 33% PAE from +5V supply.

The chip has surface passivation for protection and backside via holes and gold metallization to allow a conductive epoxy die attach process.

Functional Diagram



Electrical Performance

T_A=25℃, V_D=+5V, I_{DQ}=1A, Z_0=50Ω, CW

Parameter	Min.	Typ.	Max.	Units
Frequency Range	15	—	17	GHz
Small Signal Gain	16	22	—	dB
Small Signal Gain Flatness	—	±1.5	—	dB
Reverse Isolation	—	-60	—	dB
RF Input Port Return Loss	—	4	—	dB
Output P_{-1}dB	32.5	33	—	dBm
Drain Voltage (V_D)	5	—	6	V
Gate Current	—	2	14	mA
Supply Current (I_D)***	—	—	2.5	A
Thermal Resistance**	—	3.2	—	℃/W

** Measurement taken at Pout = OP_{-1}dB, IR method. 100% DC power is dissipated on the device the thermal resistance is 3.8℃/W

*** Adjust Vg between -1.5V to -0.4V to achieve I_{DQ}= 1A, and typical Vg voltage is -0.8V.

Absolute Maximum Ratings

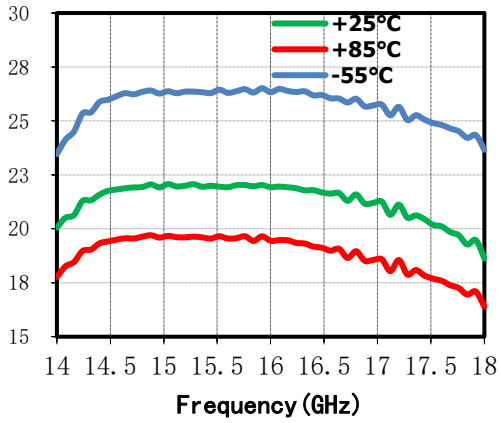
Maximum Input Power	+22dBm	Operating Temperature (Backside)	-55℃~+85℃
Channel Temperature	150℃	Storage Temperature	-55℃~+150℃
Maximum V_D	+6.5V	V_G Range	-3V~-0.4V

SuperApex, LLC
1580 S. Milwaukee Ave. Suite 405, Libertyville, IL 60048, USA
Tel: 1-847-505-8319, 1-847-573-9866
E-mail: sales@superapexco.com
Website: www.superapexco.com

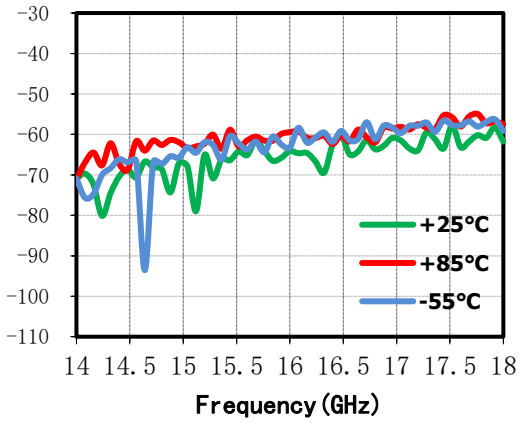
Typical Performance Curve

The following data are obtained by SAC3155 evaluation board, V_D = + 5V, I_{DQ} = 1A, CW, T_A = + 25℃

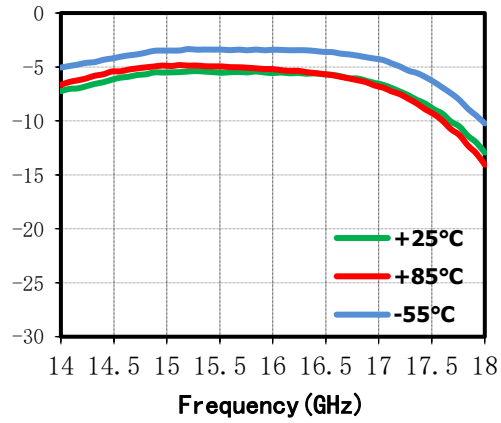
Small Signal Gain(dB) vs.Temperature



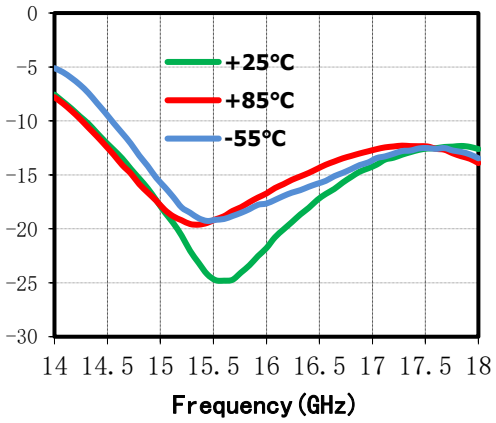
Isolation(dB) vs.Temperature



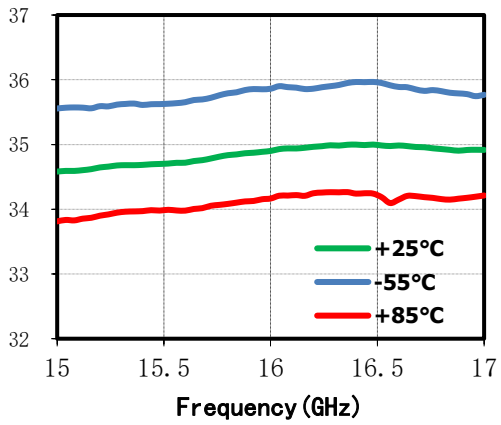
RF Input RL (dB) vs.Temperature



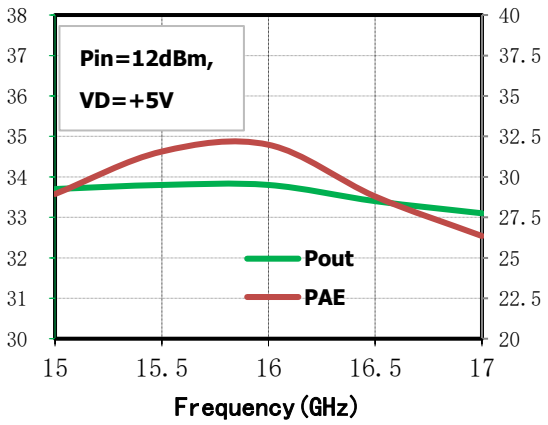
RF Output RL(dB) vs.Temperature



Output P_{-1}dB(dBm)vs.Temperature

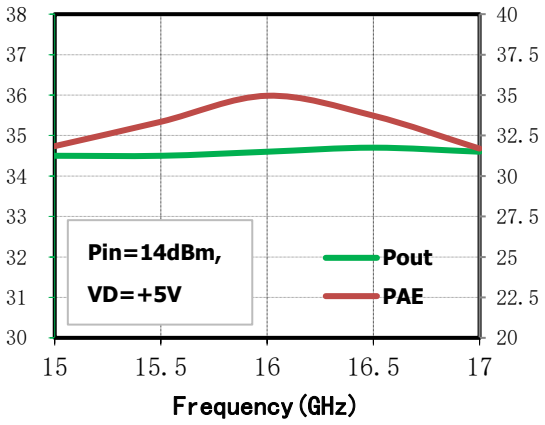


Output Power(dBm),PAE(%) vs.Frequency

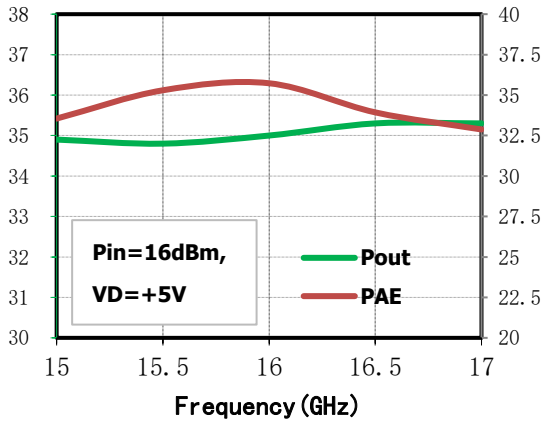


SuperApex, LLC
1580 S. Milwaukee Ave. Suite 405, Libertyville, IL 60048, USA
Tel: 1-847-505-8319, 1-847-573-9866
E-mail: sales@superapexco.com
Website: www.superapexco.com

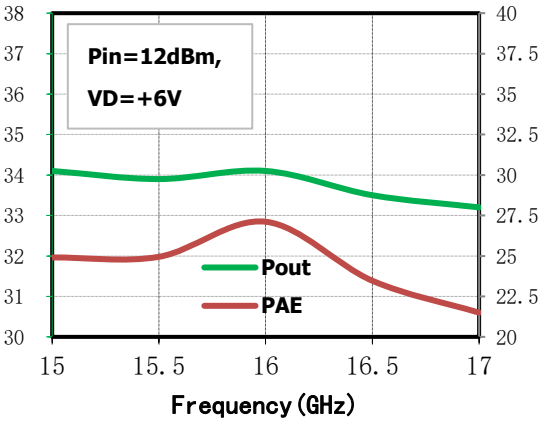
Output Power(dBm),PAE(%) vs.Frequency



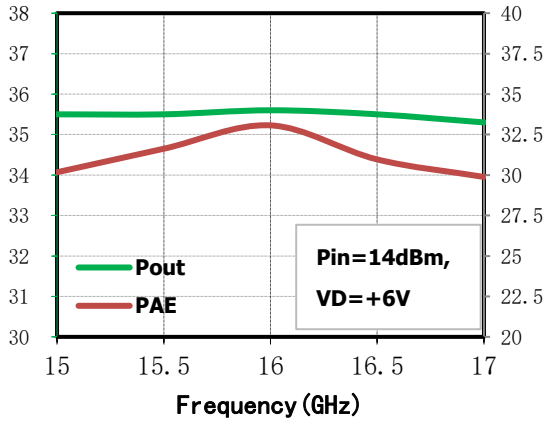
Output Power(dBm),PAE(%) vs.Frequency



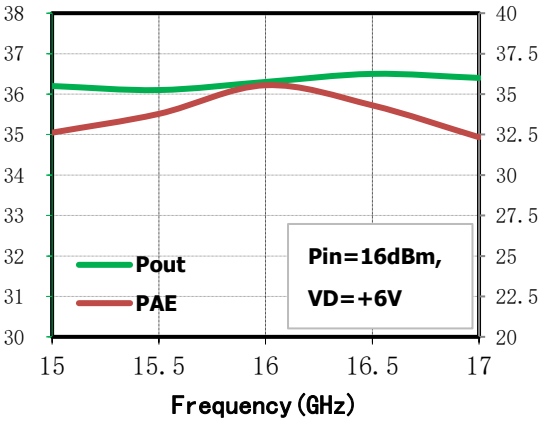
Output Power(dBm),PAE(%) vs.Frequency



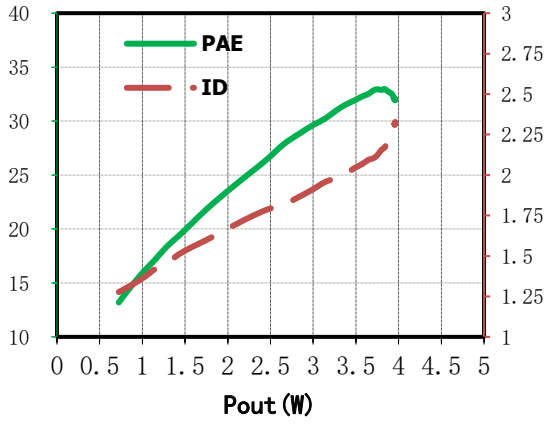
Output Power(dBm),PAE(%) vs.Frequency



Output Power(dBm),PAE(%) vs.Frequency

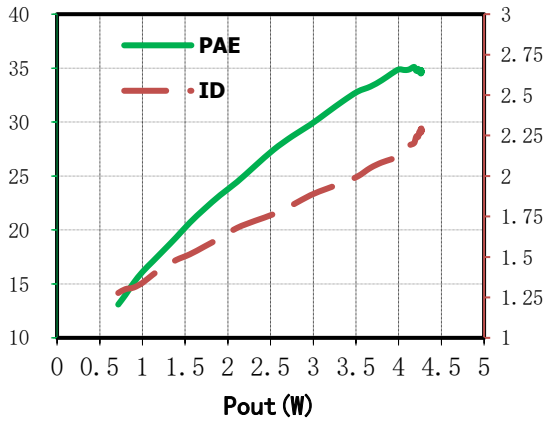


PAE(%),ID(A) vs.Pout,f=15GHz

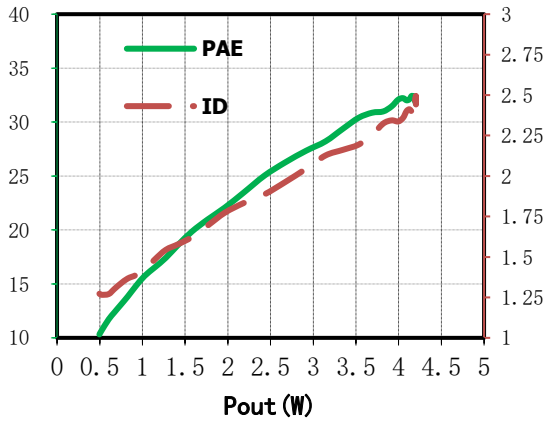


SuperApex, LLC
1580 S. Milwaukee Ave. Suite 405, Libertyville, IL 60048, USA
Tel: 1-847-505-8319, 1-847-573-9866
E-mail: sales@superapexco.com
Website: www.superapexco.com

PAE(%),ID(A) vs.Pout,f=16GHz

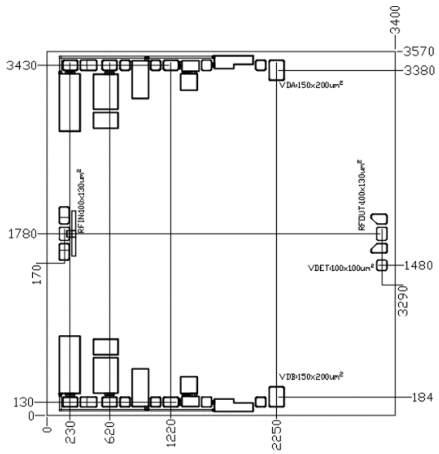


PAE(%),ID(A) vs.Pout,f=17GHz



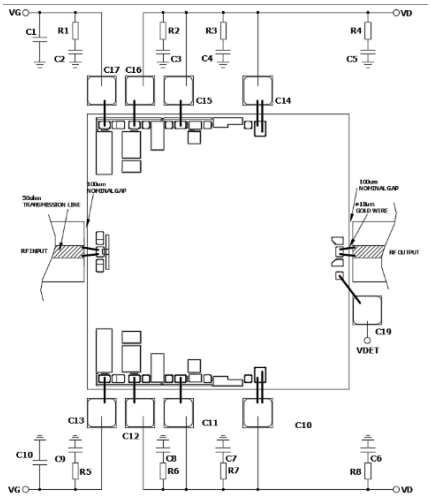
Die Outline

(All dimensions in μm)



t=100μm

Assembly Diagram



VDx and VGx need to be fed simultaneously on both sides

BOM

Reference Des.	Value	Part Number	Manuf.	Size
C10~C17、C19	100pF	—	—	SLC
C2~C9	0.47μF	—	—	0603
C1、C10	10μF	—	—	0805
R1~R8	1Ω	—	—	0603

Attention:

1. SAC3155 requires drain positive voltage (VDx) and gate negative voltage (VGx) bias, which shall be applied before applying drain positive voltage Ensure that the gate negative voltage is applied;
2. Vacuum AuSn eutectic soldering is recommended;
3. The single-layer decoupling capacitor shall be of small volume and thin dielectric type as far as possible;
4. When using drain pulse voltage modulation, ensure that the maximum overshoot voltage does not exceed 8V.

Revision History

Revision	Date	Comment
1.0	December 2, 2022	First Release

SuperApex, LLC
1580 S. Milwaukee Ave. Suite 405, Libertyville, IL 60048, USA
Tel: 1-847-505-8319, 1-847-573-9866
E-mail: sales@superapexco.com
Website: www.superapexco.com