

SAC3147Q6



GaAs MMIC Power Amplifier
6GHz~8GHz 38.5dBm

Rev 1.0

Features

- Frequency: 6GHz~8GHz
- Small Signal Gain: 20dB
- Output P_{-1dB}: 38.5dBm CW
- PAE: 30%@OP_{-1dB}, f=7GHz
- IM₃: -24dBc, 32dBm/Tone@7GHz
- Package Size: QFN6x6
- Supply Voltage: +8V/-Vg

Typical Applications

- Wireless Communication

General Description

SAC3147Q6 is a C-band GaAs MMIC power amplifier. SAC3147Q6 provides 20 dB of gain, 38.5dBm of output power for 1 dB compression and more than 30%PAE@OP_{-1dB}@7GHz from a +8V supply.

Electrical Performance

T_A=25°C, V_D= +8V, I_{DQ}=3.5A, Z₀=50Ω, CW

Parameter	Min.	Typ.	Max.	Units
Frequency Range	6	—	8	GHz
Small Signal Gain	17	20	—	dB
Gain Flatness	—	±1.5	—	dB
Reverse Isolation	—	-65	—	dB
VSWR _i	—	1.7	2.5	:1
Power-Added Efficiency	—	30	—	%
Output P _{-1dB}	38	38.5	—	dBm
IM ₃ *	—	23	—	dBc
Drain Voltage (VD)	—	8	8.5	V
Gate Current	—	7	55	mA
Supply Current (ID)***	—	—	5.25	A
Thermal Resistance **	—	3.2	—	°C/W

* Pout/Tone=32dBm, fc=7GHz, Δf=4MHz

** Pout@OP_{-1dB}, f=7GHz

*** Adjust Vg between -1V to -0.6V to achieve I_{DQ}= 3.5A typical.

Absolute Maximum Ratings

Maximum Input Power	+25dBm, 10s	Operating Temperature (Backside)	-55°C~+85°C
Channel Temperature	165°C	Storage Temperature	-55°C~+150°C
Maximum VD Supply	+8.5V	VG Range	-1.5V(Pinch-off) ~-0.6V

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

SAC3147Q6

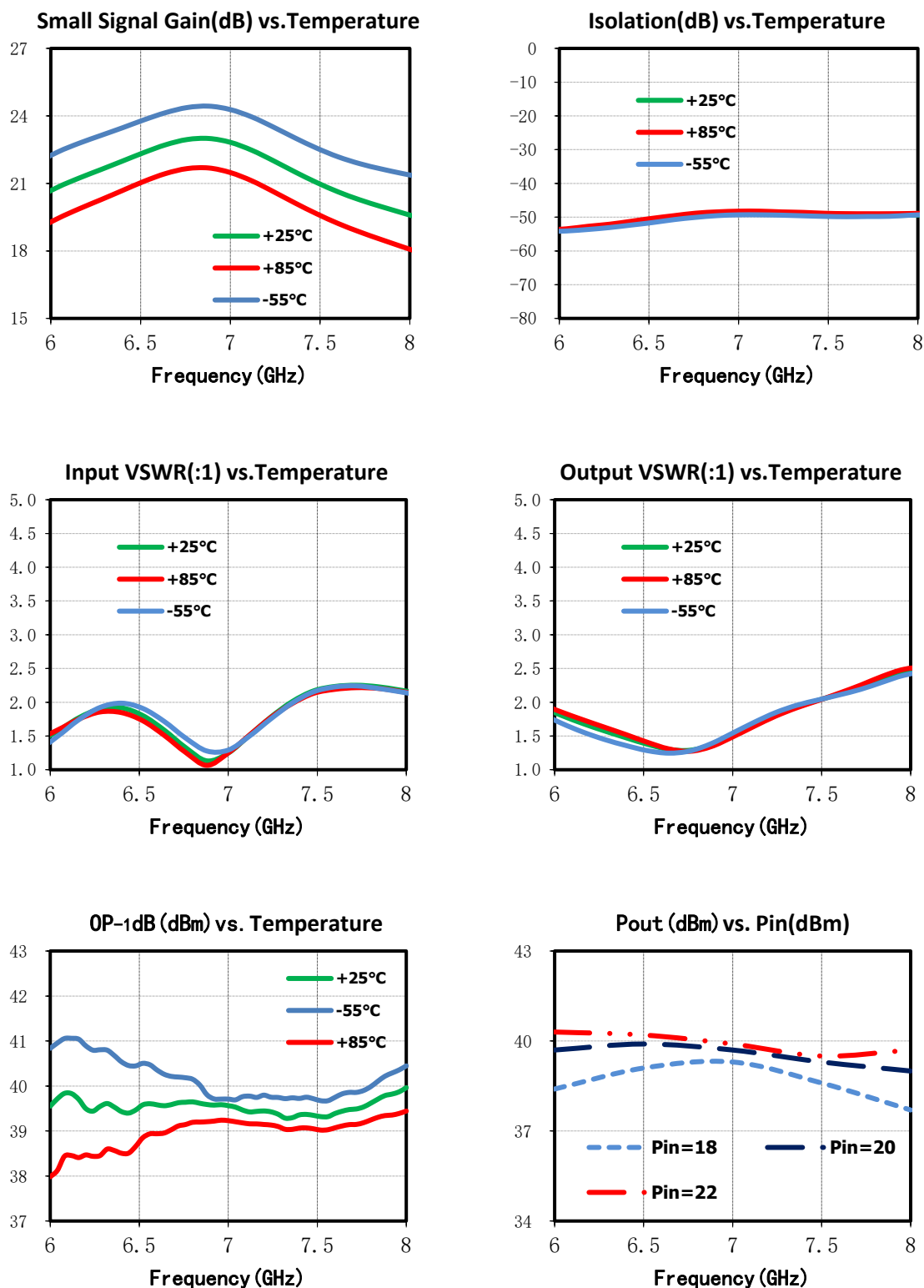


GaAs MMIC Power Amplifier
6GHz~8GHz 38.5dBm

Rev 1.0

Typical Performance Curve

$V_D = +8V, I_{DQ} = 3.5A, CW, T_A = +25^\circ C$



SuperApex, LLC

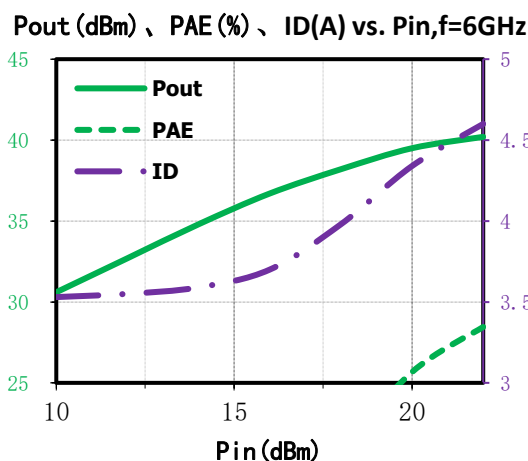
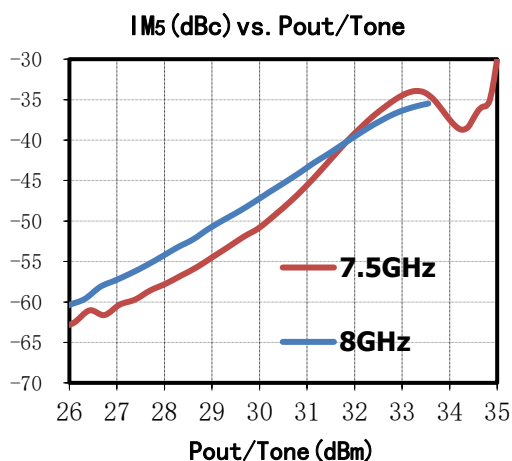
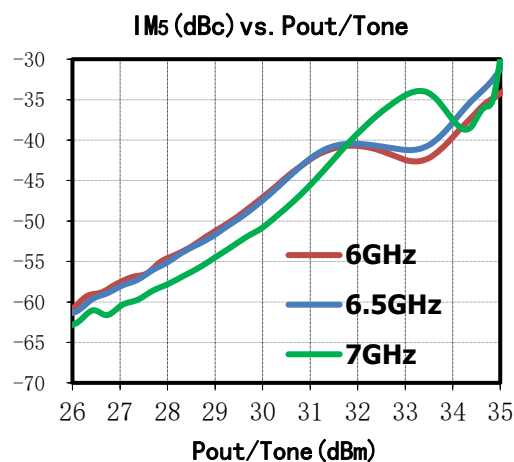
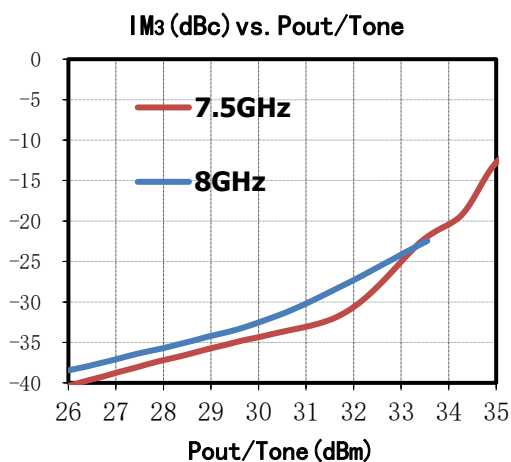
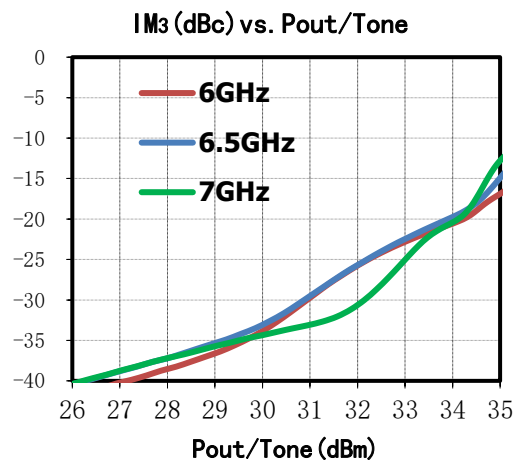
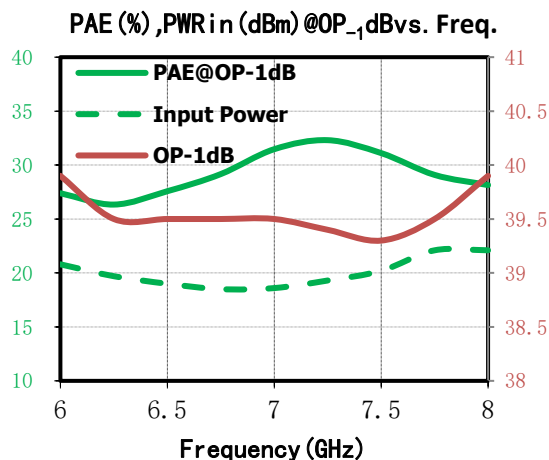
1580 S. Milwaukee Ave., Suite 405, Libertyville, IL 60048, USA
 Tel: 1-847-505-8319, 1-847-573-9866
 E-mail: sales@superapexco.com
 Website: www.superapexco.com

SAC3147Q6



GaAs MMIC Power Amplifier
6GHz~8GHz 38.5dBm

Rev 1.0



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

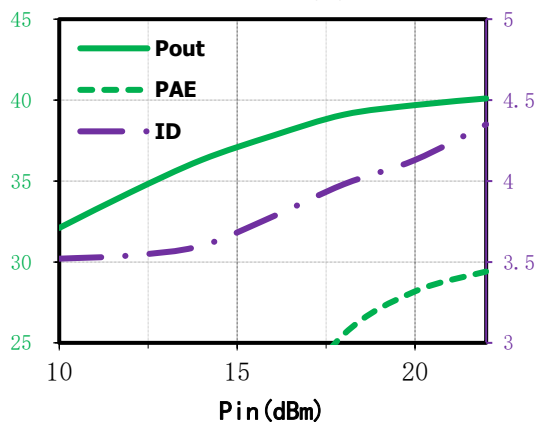
SAC3147Q6



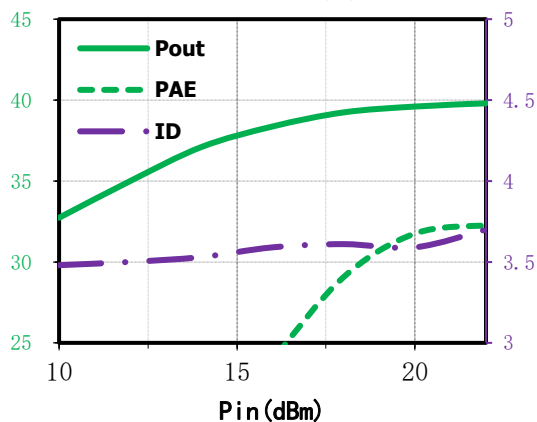
GaAs MMIC Power Amplifier
6GHz~8GHz 38.5dBm

Rev 1.0

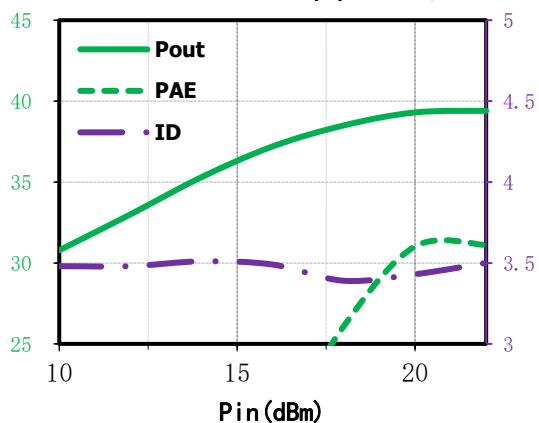
Pout (dBm)、PAE (%)、ID(A) vs. Pin,f=6.5GHz



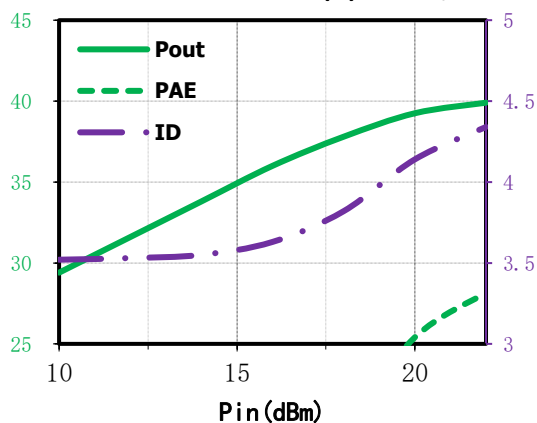
Pout (dBm)、PAE (%)、ID(A) vs. Pin,f=7GHz



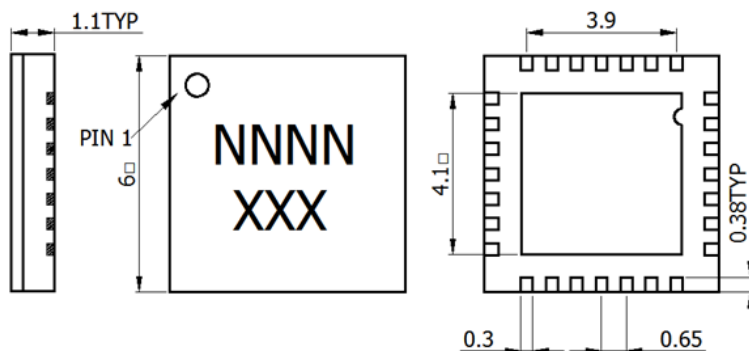
Pout (dBm)、PAE (%)、ID(A) vs. Pin,f=7.5GHz



Pout (dBm)、PAE (%)、ID(A) vs. Pin,f=8GHz



Outline Dimension (mm)



SuperApex, LLC

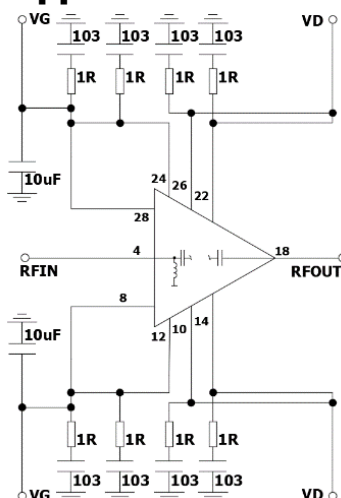
1580 S. Milwaukee Ave., Suite 405, Libertyville, IL 60048, USA
 Tel: 1-847-505-8319, 1-847-573-9866
 E-mail: sales@superapexco.com
 Website: www.superapexco.com

SAC3147Q6

GaAs MMIC Power Amplifier
6GHz~8GHz 38.5dBm

Rev 1.0

Application Circuit



Pin Descriptions

Pin No.	Function	Pin No.	Function
1	Connect to GND	15	Connect to GND
2	Connect to GND	16	Connect to GND
3	Connect to GND	17	Connect to GND
4	RFIN	18	RFOUT
5	Connect to GND	19	Connect to GND
6	Connect to GND	20	Connect to GND
7	Connect to GND	21	Connect to GND
8	Gate bias 1B	22	Drain bias 2
9	Connect to GND	23	Connect to GND
10	Drain bias 1B	24	Gate bias 2
11	Connect to GND	25	Connect to GND
12	Gate bias 2B	26	Drain bias 1
13	Connect to GND	27	Connect to GND
14	Drain bias 2B	28	Gate bias 1

Superapex recommend the PCB fabricated using Rogers 4350b $t=0.254$ and using best practices for high frequency RF design. The RF input and RF output traces should have a 50Ω characteristic impedance.

The bottom center pad of SAC3147Q6 is used for RF grounding and heat dissipation. For best heat dissipation, copper-filled vias are highly recommended, SAC3147Q6 is high power dissipation surface mount components and require a well-designed thermal mount. All the heat generated by the device is expected to be removed through the bottom heat slug with a low thermal resistance path to the chassis.

The use of multiple copper-filled vias or solder-filled vias under the package's heat slug while using a indium foil between the PCB and chassis provides a low thermal resistance mount, Insufficient number of vias or insufficient solder filling will significantly affect the heat dissipation process of the device, and then reduce the performance or even damage the device.

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

SAC3147Q6



GaAs MMIC Power Amplifier
6GHz~8GHz 38.5dBm

Rev 1.0

Notes

1. SAC3147Q6 requires V_{Dx} and V_{Gx} bias.
Turn-on: Apply V_{Gx}, Apply V_{Dx}, Apply RFIN signal.
Turn-off: Remove RFIN signal, Decrease V_G to -1.5 V(pinch-off), Decrease V_D to 0 V
2. The moisture resistant grade of products is 2a, the storage environment $\leq 30^{\circ}$ C/60% RH, the surrounding workshop life is 4 weeks;
3. After un-packing, it is necessary to bake the parts for 6 hours in $125\pm 5^{\circ}$ environment before soldering;
4. GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test;
5. Ultrasonic cleaning is prohibited;

Revision History

Revision	Date	Comment
1.0	Sep. 18, 2023	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