SAC3117

GaAs MMIC Power Amplifier
13.5GHz~14.75GHz 36dBm

Rev 2.1

Features

- Frequency: 13.5GHz~14.75GHz
- Gain:29dB
- Output P_{-1}dB: 36dBm
- Supply Voltage: +7V
- Power-Added Efficiency: 35%
- Die Size: 2.68mm×1.95mm×0.1mm
- Packaged: Bare Die

Typical Applications

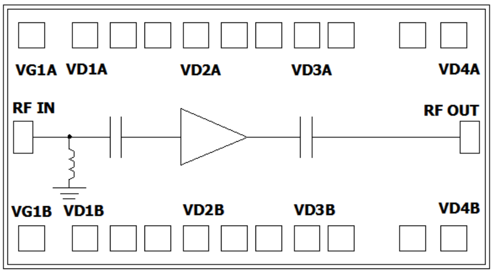
- Point-to-Point Radios
- SATCOM
- Military and Space
- Test and Measurement
- Radar

General Description

SAC3117 is a Ku-band GaAs MMIC power amplifier. The SAC3117 provides 29dB of gain, and 36dBm of output power for 1 dB compression and more than 35%PAE from a +7V supply.

The chip has surface passivation for protection and backside via holes and gold metallization to allow a conductive epoxy die attach process. This device is well suited for communications, Point to Point radio and radar applications.

Functional Diagram



Electrical Performance

T_A=25℃, V_D=+7V, I_D=1.3A, Z_0=50Ω, CW

Parameter	Min.	Typ.	Max.	Units
Frequency Range	13.5~14.75			GHz
Small Signal Gain	25	29	—	dB
Small Signal Gain Flatness	—	±1.5	—	dB
Reverse Isolation	—	-55	—	dB
Input Return Loss	—	-10	—	dB
Power-Added Efficiency	—	35	—	%
Output Power for 1 dB Compression (OP_{-1}dB)	35.5	36.4	—	dBm
Output Third Order Intercept (OIP_3) *	—	40	—	dBm
Drain Voltage (V_D)	—	7	7.5	V
Gate Current	—	8	18	mA
Supply Current (I_D)	—	1.5	1.9	A
Thermal Resistance	—	5.6	—	℃/W

* Measurement taken at Pin / Tone = 0dBm, fc= 14GHz, △f=10MHz

Absolute Maximum Ratings

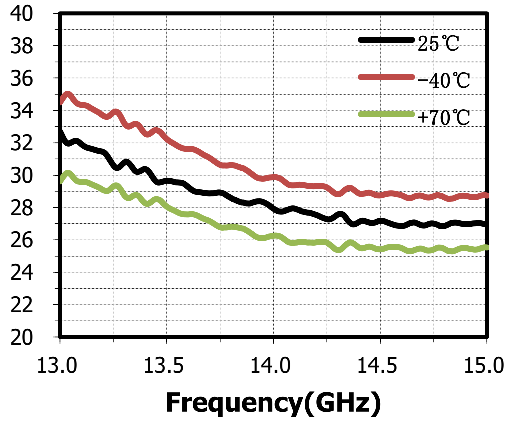
Maximum Input Power	+13dBm	Operating Temperature	-40℃~+70℃
Channel Temperature	+150℃	Storage Temperature	-65℃~+150℃
Maximum V_D	+8V	Maximum V_G	-1.2V

Typical Small Signal Performance Curve

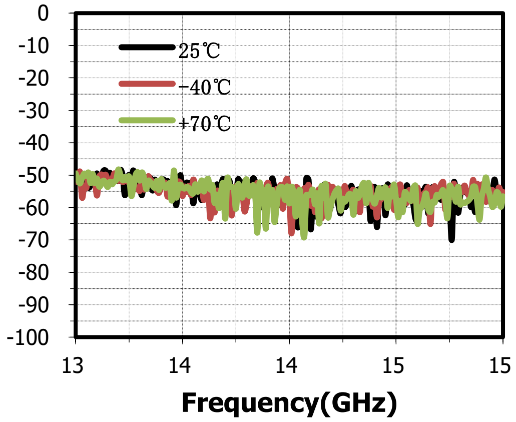
The results captured in the test-jig environment within connector plan

V_D=+7v I_D=1.3A

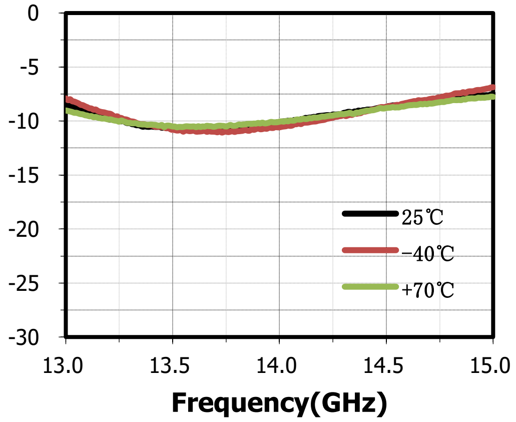
Small Signal Gain(dB) vs.Temperature



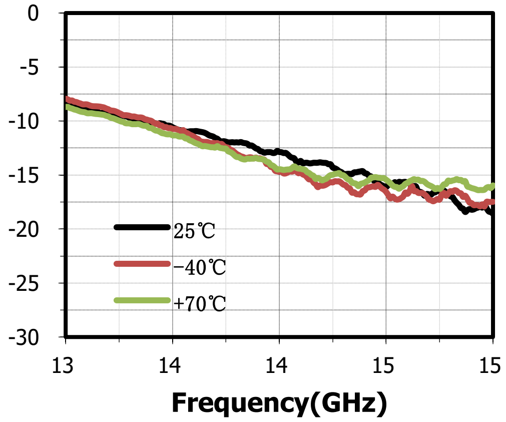
Reverse Isolation(dB) vs.Temperature



Input Return Loss(dB) vs.Temperature



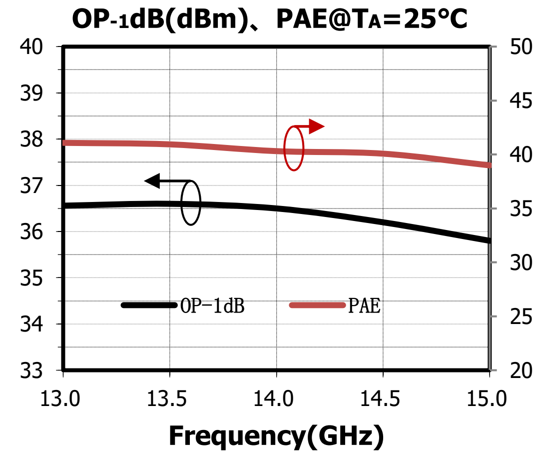
Output Return Loss(dB) vs.Temperature

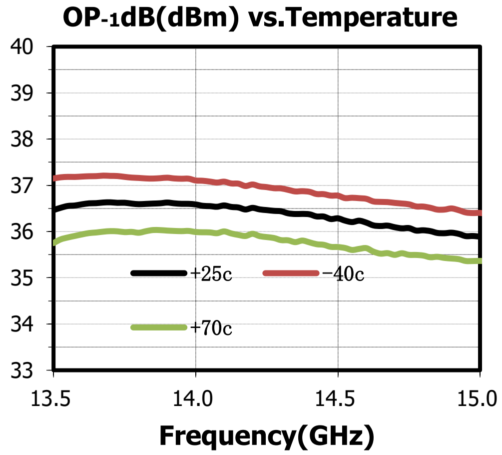


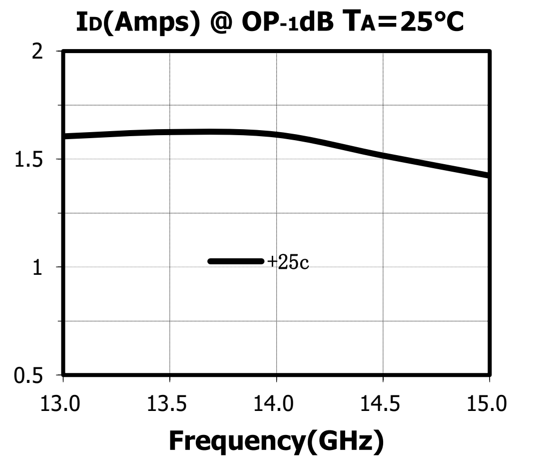
Power and PAE Performance Curve

The results captured in the test-jig environment within connector plan, then de-embedded the housing an come back in the die plan

VD=+7v ID=1.3A CW

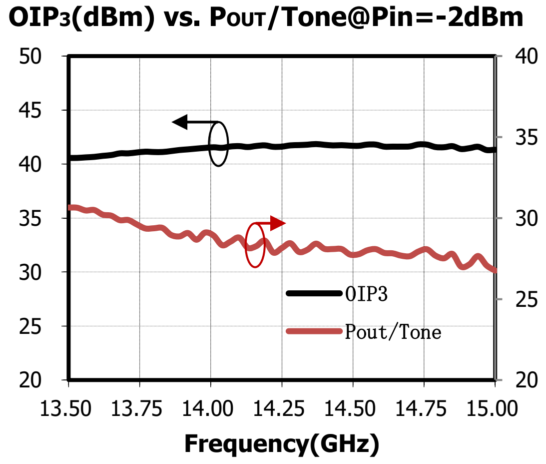


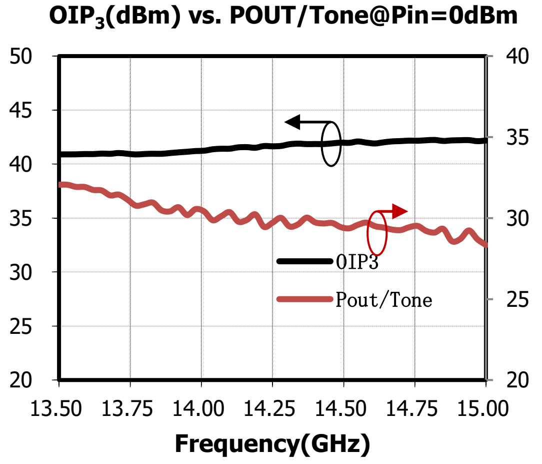


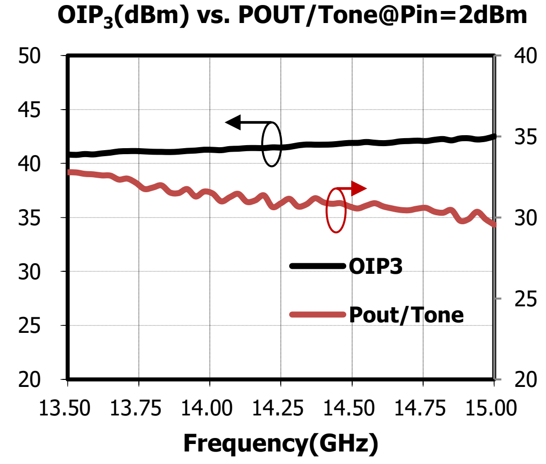


SuperApex, LLC
1580 S. Milwaukee Ave., Suite 405, Libertyville, IL 60048, USA
Tel: 1-847-505-8319, 1-847-573-9866
E-mail: sales@superapexco.com
Website: www.superapexco.com

Output IP_3 Performance Curve

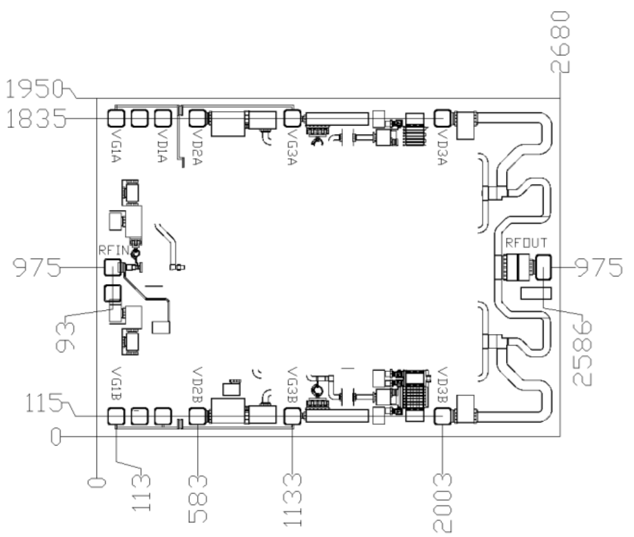






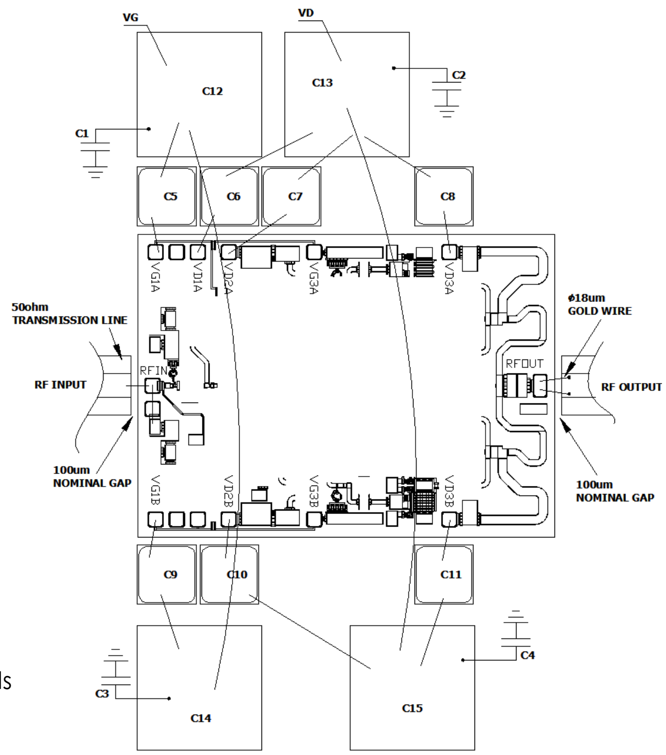
SuperApex, LLC
1580 S. Milwaukee Ave., Suite 405, Libertyville, IL 60048, USA
Tel: 1-847-505-8319, 1-847-573-9866
E-mail: sales@superapexco.com
Website: www.superapexco.com

Die Outline (μm)



Bonding pad size:
150x90um VG1x、VD1x~VD3x、RF IN、RFOUT pads
190x140um VD4 pads

Assembly Diagram



Components List

Reference Des.	Value	Part Number	Manuf.	Size
C8、C9、C17、C19	47uF	TPSB476K010R0500	AVX	—
C1~C5、C11~C15	300pF	—	ANY	SLC
C6、C7、C10、C16、C18、C20	1000pF	—	ANY	SLC

Notes

1. SAC3117 is biased with a positive drain supply and negative gate supply. The recommended gate voltage is set to -0.7~-0.8V;
2. RF connections should be made as short as possible to reduce the inductive effect of the bond wire. Use of a 1 mil thermosonic wedge bonding is highly recommended as the loop height will be minimized. The RF input require a single bond wire output require a double bond wire as shown;
3. The backside of the SAC3117 is RF ground. Eutectic mounting is preferred, if using conductive epoxy, recommended epoxies are Die Mat DM6030HK or DM6030HK-Pt cured per the manufacturer's cure schedule. Epoxy should be applied in accordance with the manufacturers specifications and should avoid contact with the top surface of the die. An epoxy fillet should be visible around the total die periphery;
4. Bypass caps C1~C4 should be placed no farther than 1.5mm from the chip.

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