

SAC3117AQP5

GaAs MMIC Power Amplifier
13.75GHz~14.5GHz 33dBm

Rev 1.1

Features

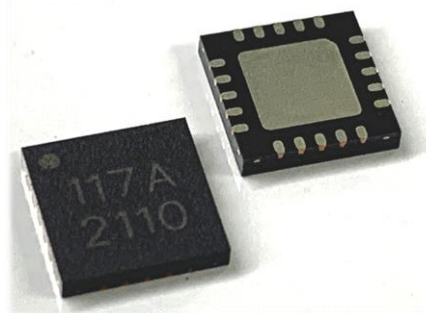
- Frequency: 13.75GHz~14.5GHz
- Small Signal Gain: 28dB
- Output P₁dB: 33 dBm
- Power-Added Efficiency: 26%@14.5GHz
- IM₃: -24dBc, 25dBm/Tone@14GHz
- Package Size: 5mm×5mm×0.8mm
- Supply Voltage: +7V/-V_g

Typical Applications

- Point-to-Point Radio
- SATCOM

General Description

SAC3117AQP5 is a Ku-band GaAs MMIC power amplifier. The SAC3117AQP5 provides 28 dB of gain, and 33dBm of output power for 3 dB compression and more than 26%PAE from a +7V supply.



Electrical Performance

T_A=25°C, V_D=+7V, I_{DQ}=1.35A, Z₀=50Ω, CW

Parameter	Min.	Typ.	Max.	Units
Frequency Range	13.75	—	14.5	GHz
Small Signal Gain	25	28	—	dB
Gain Flatness	—	±1	—	dB
Reverse Isolation	—	-60	—	dB
VSWR _i	—	1.5	2	:1
Power-Added Efficiency	—	26	—	%
Output P ₁ dB	32	33	—	dBm
Drain Voltage (VD)	—	7	—	V
Gate Current	—	2	11.5	mA
Supply Current (ID)*	—	—	2	A
Thermal Resistance	—	2.8	—	°C/W

* Adjust V_g between -0.9V to -0.4V to achieve I_{DQ}= 1.35 A typical.

Absolute Maximum Ratings

Maximum Input Power	+17dBm	Operating Temperature (Backside)	-55°C~+85°C
Channel Temperature	165°C	Storage Temperature	-55°C~+150°C
Maximum VD Supply	+8V	VG Range	-1.5V~-0.4V

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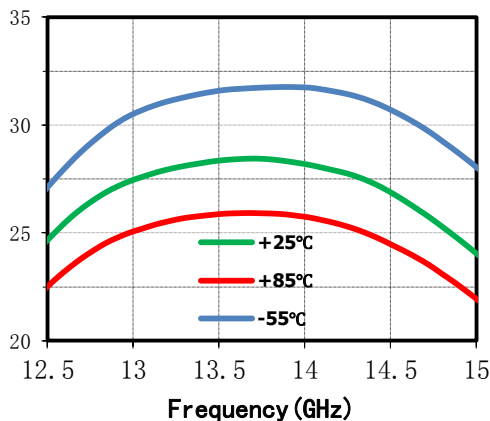
Rev 1.1

Typical Performance Curve

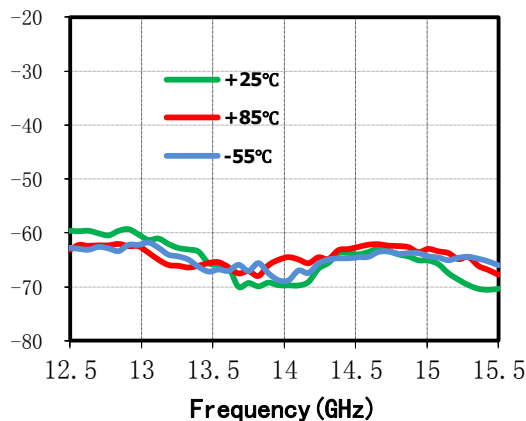
The following data are obtained from SAC3117AQP5 evaluation board

$V_D = +7V, I_{DQ} = 1.35A, CW, T_A = +25^\circ C$

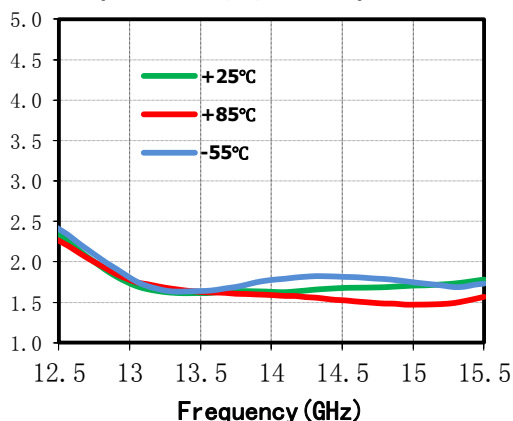
Small Signal Gain(dB) vs.Temperature



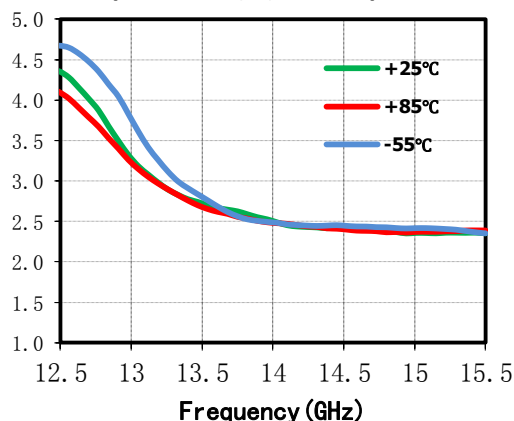
Isolation(dB) vs.Temperature



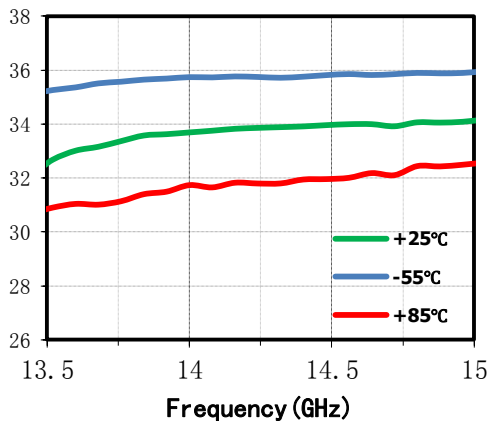
Input VSWR(:1) vs.Temperature



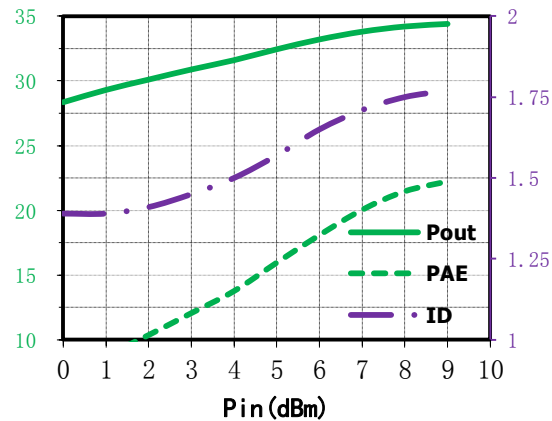
Output VSWR(:1) vs.Temperature



OP-1dB (dBm) vs. Temperature



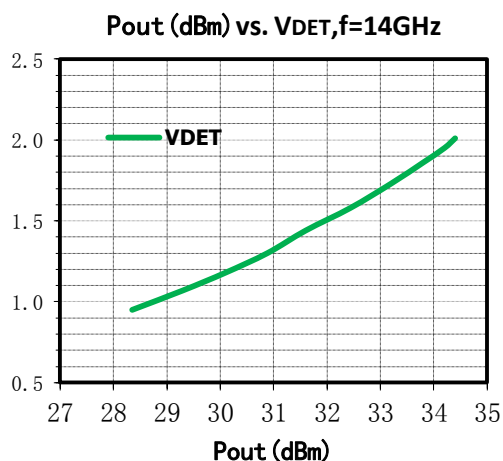
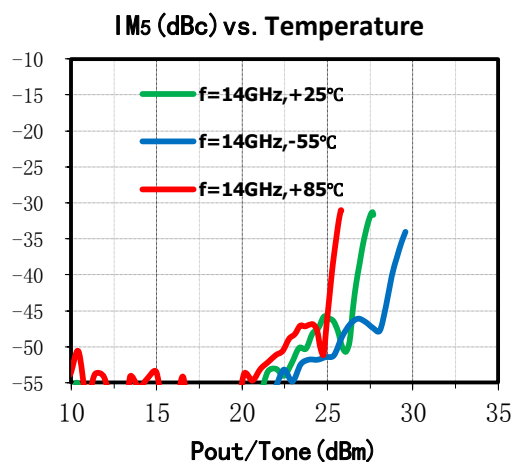
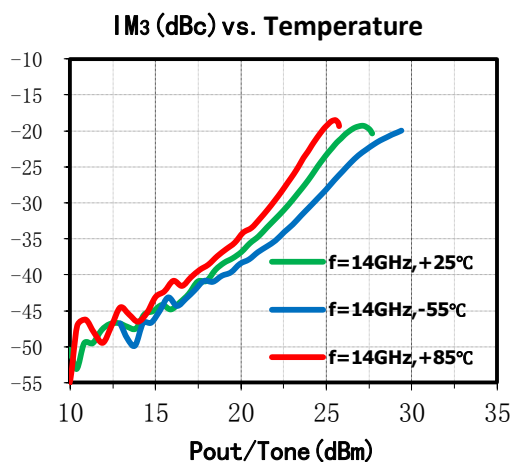
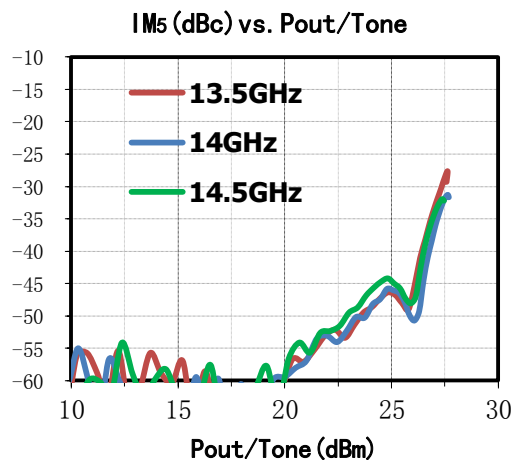
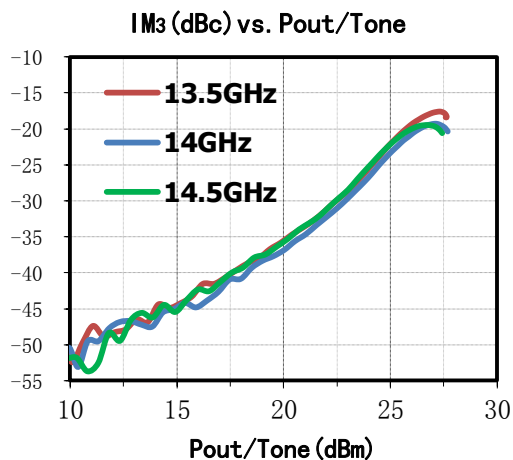
Pout (dBm) 、 PAE (%) 、 ID(A) vs. Pin,f=14GHz



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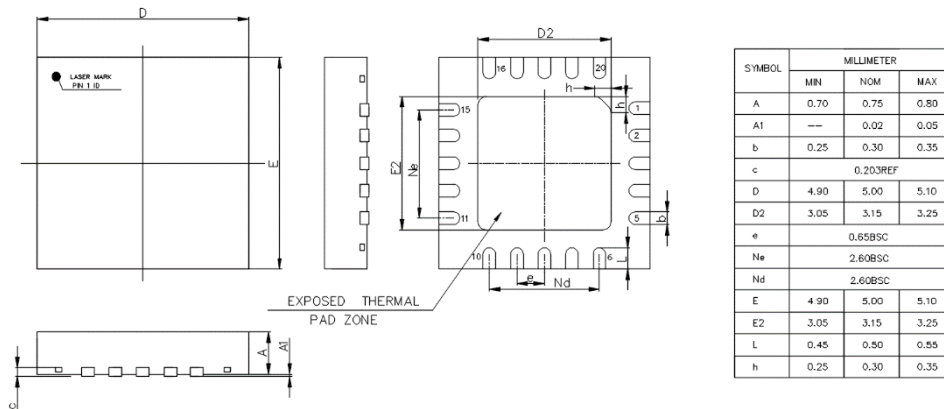


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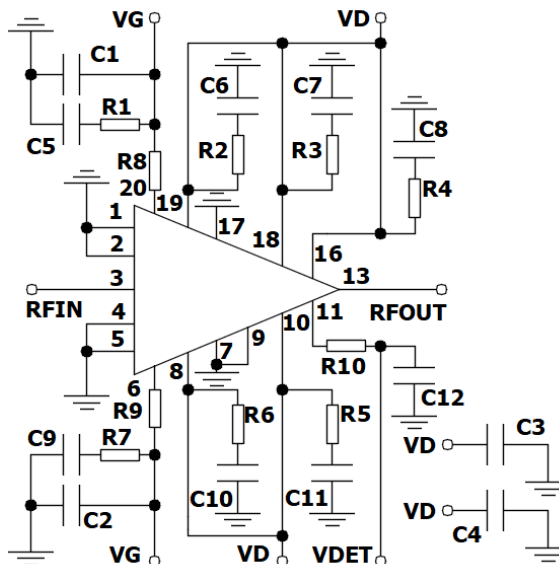
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Rev 1.1

Outline Drawing



Application Circuit



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Rev 1.1

BOM

Reference Des.	Value	Part Number	Manuf.	Size
C1~C4	10uF	—	—	0805
C5~C11	0.22uF	—	—	0603
C12	0.01uF	—	—	0603
R1~R7	10R	—	—	0603
R8、R9	1R	—	—	0603
R10	100R	—	—	0603

Pin Function

Pin No.	Description	Pin No.	Description	Pin No.	Description	Pin No.	Description
1	Connect to ground	7	Connect to ground	13	RF output,AC coupled	19	Drain Bias
2	Connect to ground	8	Drain Bias	14	Connect to ground	20	Gate Bias
3	RF input, AC coupled	9	Connect to ground	15	Connect to ground		
4	Connect to ground	10	Drain Bias	16	Drain Bias		
5	Connect to ground	11	VDET	17	Connect to ground		
6	Gate Bias	12	Connect to ground	18	Drain Bias		

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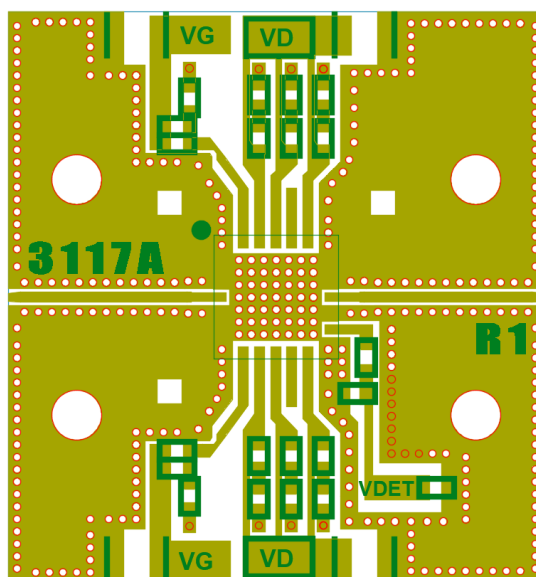
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SAC3117AQP5 Evaluation board



Notes

1. SAC3117AQP5 is biased with a positive drain supply and negative gate supply. The recommended gate voltage is set to -0.4 to -0.9V when the drain voltage is set to 8V;
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+/-5 degree environment before soldering.
4. GaAs MMIC 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	March 12, 2021	First Release
1.1	APR 02, 2021	Revise "Electrical Performance /Thermal Resistance "from 4.3 to 2.8°C/W