SAC3126Q6

GaAs Power Amplifier
18GHz~26.5GHz 31dBm

Rev1.0

Features

- Frequency: 18GHz～26.5GHz
- Gain:22dB
- Output P_{-1}dB: 31dBm
- Supply Voltage: +6V/-VG
- Power-Added Efficiency: 22%
- Package Size: 6mm×6mm×1.1mm

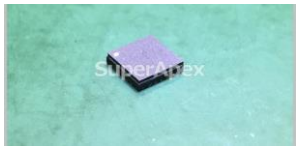
Typical Applications

- Point-to-Point Radio
- Satellite Communication

General Description

SAC3126Q6 is a microwave power amplifier in QFN surface mount package.
SAC3126Q6 provides 22 dB of gain, and 31dBm of output power for 1 dB compression and 22% PAE from a +6V supply voltage.
SAC3126Q6 is assembled in a lead-free 6mm x 6mm 28-lead air cavity plastic package.

Picture



Electrical Performance

T_A=25℃, V_D=+6V, I_D=1100mA, Z_0=50Ω

Parameter	Min.	Typ.	Max.	Units
Frequency Range		18～26.5		GHz
Small Signal Gain	20	22	—	dB
Small Signal Gain Flatness	—	±1.5	—	dB
Reverse Isolation	—	-47	—	dB
Input Return Loss	—	-7	—	dB
Output Return Loss	—	-7	—	dB
Power-Added Efficiency	—	22	—	%
Output Power for 1 dB Compression (OP_{-1}dB)	30.5	31.5	—	dBm
Supply Voltage (V_D)	5	—	6	V
Supply Current (I_D)	—	1000	2200	mA
Thermal Resistance*	—	7	—	℃/W

* The device is soldered on RO4350b t=0.254mm

Absolute Maximum Ratings

Maximum Input Power	+20dBm	Operating Temperature	-55℃～+85℃
Channel Temperature	+150℃	Storage Temperature	-65℃～+150℃
Maximum V_D	+6.5V	Maximum V_G	-2V
ESD Sensitivity (HBM)	Class 0, Passed 150V		

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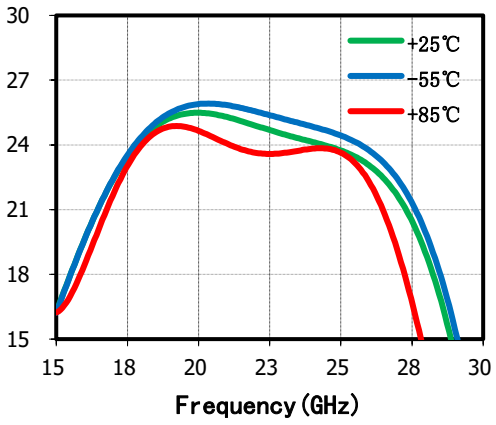
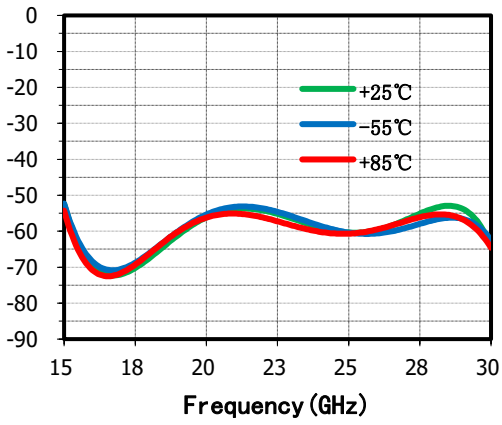
Typical Performance Curve

V_D=+6V I_{DQ}=1.1A CW

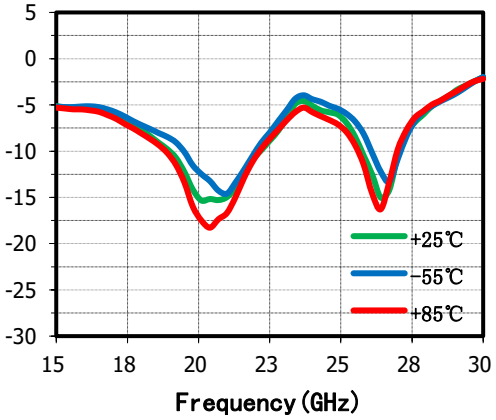
Small Signal Gain(dB)vs. Temperature



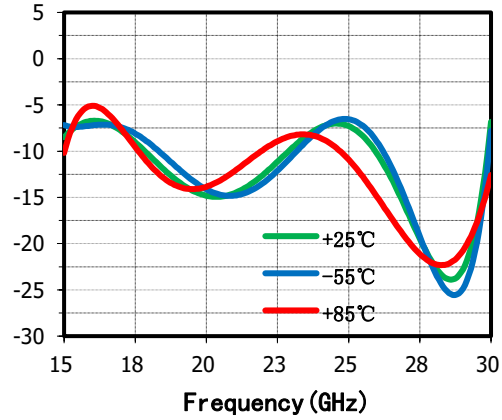
Reverse Isolation(dB) vs. Temperature



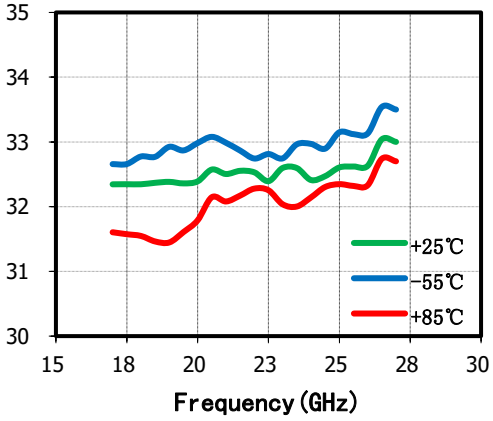
RF Input Return Loss (dB)



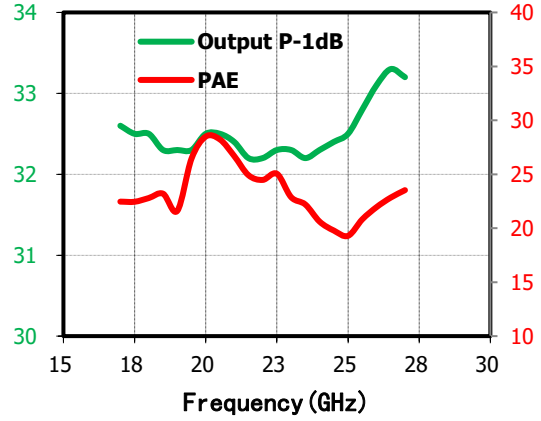
RF Output Return Loss (dB)



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



PAE@OP_{-1}dB(dBm)vs. Temperature



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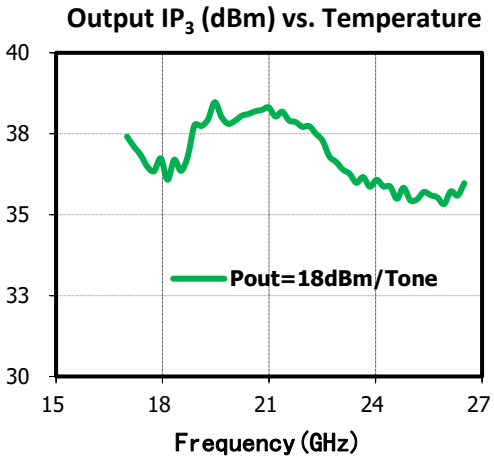
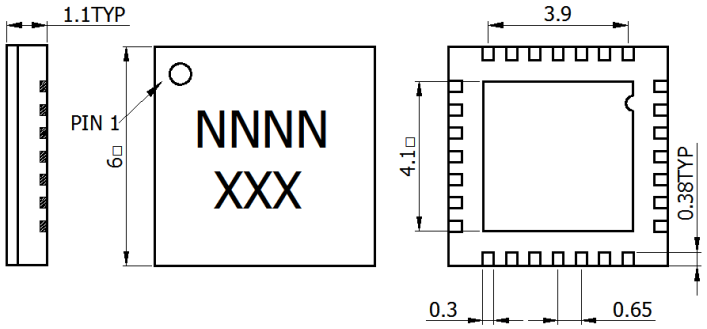


Outline Drawing
(All dimensions in mm)



Pin Descriptions

Pin No.	Function	Pin No.	Function
1	GND	16	GND
2	GND	17	GND
3	GND	18	RF Output, DC blocked
4	RF Input, Internal grounding	19	GND
5	GND	20	GND
6	GND	21	GND
7	GND	22	Drain 3
8	Gate 1A	23	GND
9	GND	24	Drain 2B
10	Drain 1A	25	GND
11	Drain 2A	26	Drain 1B
12	GND	27	GND
13	GND	28	Gate 1B
14	GND		
15	DCPL		

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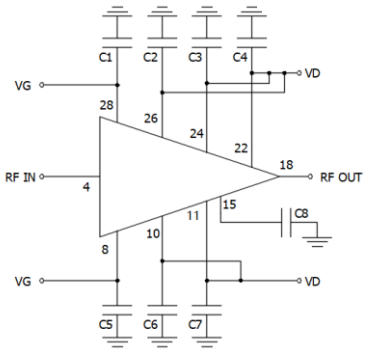
BOM

Reference Des.	Value	Part Number	Manuf.	Size
C1，C5	4.7μF	GRM155R61A475MEAAD	Murata	0402
C2～C4，C6～C7	0.01μF	GRM155R61A103KE15D	Murata	0402
C8	1μF	GRM155R61A105MEAAD	Murata	0402

Application Circuit



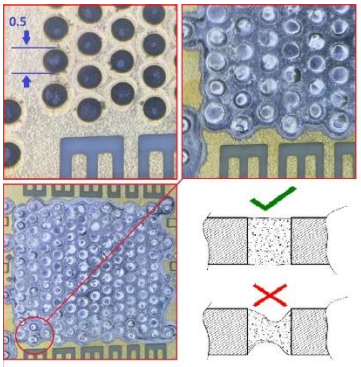
Superapex recommend the PCB fabricated using Rogers 4350b t=0.254 and using best practices for high frequency RF design. The RF input and RF output traces should have a 50 Ω characteristic impedance.

The bottom center pad of SAC3126Q6 is used for RF grounding and heat dissipation. For best heat dissipation, copper-filled vias are highly recommended, SAC3126Q6 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.

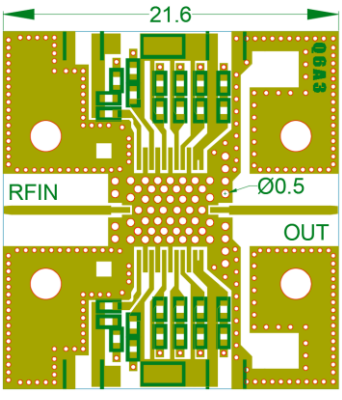
The use of multiple copper-filled vias or solder-filled vias under the package's heat slug while using a indium foil between the PCB and chassis provides a low thermal resistance mount, Insufficient number of vias or insufficient solder filling will significantly affect the heat dissipation process of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

As shown in Figure 1, It is a simple way to fill vias by solder. After soldering process, it's is should be check top and bottom layers of PCB carefully to make sure the solder is fully filled in the via holes.

Figure 1



Evaluation Board



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Notes

1. SAC3126Q6 requires VDx and VGx bias.

Turn-on: Apply VGx,Apply VDx,Apply RFIN signal.

Turn-off: Remove RFIN signal, Decrease VG to -1.5 V(pinch-off), Decrease VD to 0 V

2. The moisture resistant grade of products is 2a, the storage environment ≤30° 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° C 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	Jul. 2, 2021	First Release

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