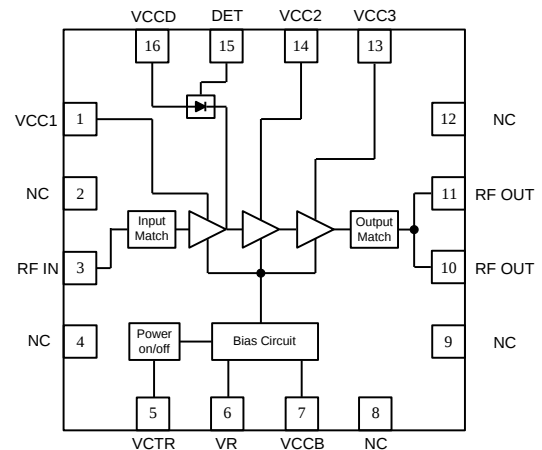


Features

- 5500~7500 MHz Frequency Range
- +25dB Gain
- >30dBm P1dB at 5.0V
- 3~5V Supply Voltage
- <-10dB Input Reflection
- Advanced InGaP/GaAs HBT Technology



Applications

Functional Block Diagram

- UNII & Pt. to Pt. Radios
- IEEE 802.11a/n & HiperLAN
- VSAT & SATCOM
- Pt. to Multi Pt. Radios
- IEEE 802.16 WiMax
- IEEE 802.11 ax (WiFi6E)

Product Description

The AC702530 is a three-stage GaAs HBT MMIC power amplifier that operates between 5.5 and 7.5GHz. It needs different matching circuit for different frequency range. The amplifier provides 26dB of Gain and +31dBm P₁ at 6.5GHz from a +5V Supply. The AC702530 is assembled in a 16-pin, 4×4mm², QFN package.

Pin Description

■ Table 1: Pin Description

Pin No.	Symbol	Description
1/ 13/ 14	VCC1/VCC3/VCC2	Supply Voltage for stage 1 / stage 3 / stage 2
3	RF IN	RF input
2, 4, 8, 9, 12	NC	No connection
5	VCTR	Power on/off control voltage. Apply >2.5VDC to power down the three power amplifier stages. Apply 0VDC to power up. If function is not desired, pin5 may be connected to GND
6	VR	Bias current control voltage
7	VCCB	Supply voltage for bias
10, 11	RF OUT	RF output
15	DET	Detector output signal
16	VCCD	Detector supply voltage
PKG Base	GND	Ground connection.

Electrical Specifications

The DC and AC specifications for the power amplifier interface signals. Refer to Table 2 for the Absolute Maximum Ratings. Refer to Table 3 for the Electrical Characteristics.

■ **Table 2: Absolute Maximum Ratings**

Parameter	Symbol	Rating	Unit
Input RF Power	RF IN	+8	dBm
Supply Voltage	VCC1,VCC2 VCC3	-0.5 to +6.0	V
Reference Voltage	VR	-0.5 to +4.0	V
Operating Ambient Temperature	T _{OP}	-40 to +85	°C
Storage Temperature	T _{ST}	-40 to +150	°C



Caution! ESD sensitive device.

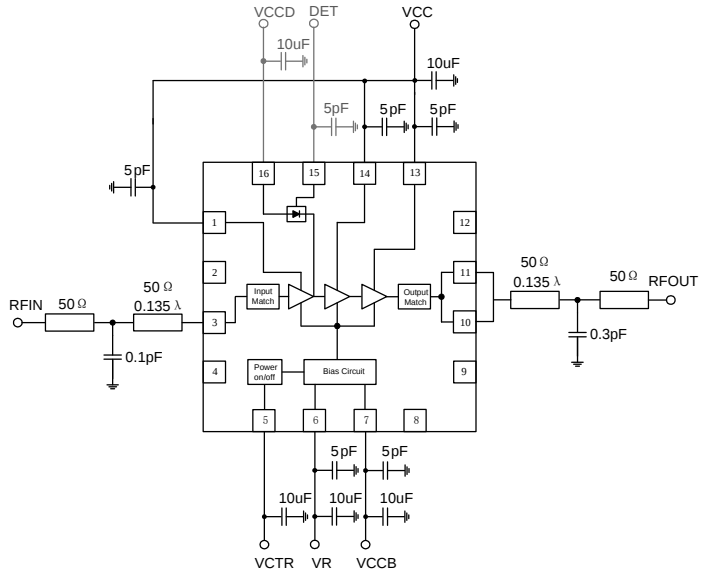
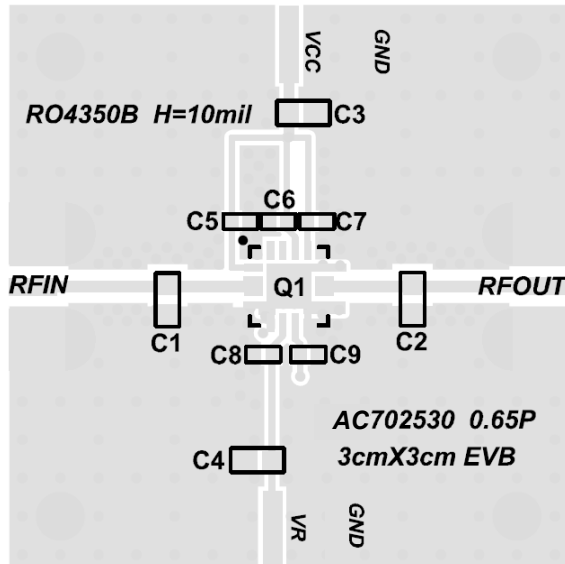
Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

■ **Table 3: Electrical Characteristics**

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC1=VCC2=VCC3=5V, ICQ=180mA, T _{OP} =+25°C, Freq=5.5GHz to 7.5GHz
Frequency Range	5500		7500	MHz	
P-1		30.5		dBm	@5.9GHz
		31.1		dBm	@6.5GHz
		30.7		dBm	@7.2GHz
EVM		2.75		%	@Pout=+23dBm, 6.0 GHz
Gain		24		dB	@5.9GHz, Pin=-20dBm
		26		dB	@6.5GHz, Pin=-20dBm
		21.6		dB	@7.2GHz, Pin=-20dBm
Efficiency		23.4		%	@6GHz
Power Supply					
VR, Reference Voltage		2.65		V	
ICQ, Quiescent Current (Total)		180		mA	
IREF, Reference Current (Total)		9		mA	

Typical Performance Data

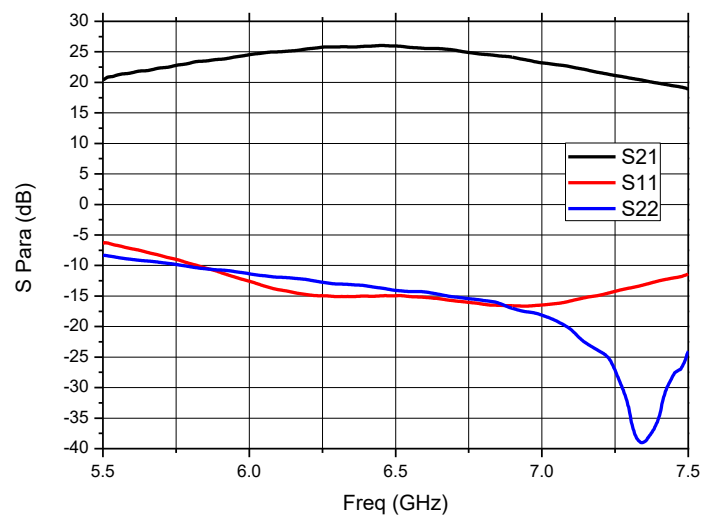
5.5GHz-7.5GHz Application (Test Condition: $VCC1=VCC2=VCC3=VCCB=5V$, $VR=2.65V$, $T_{OP}=+25^{\circ}C$)



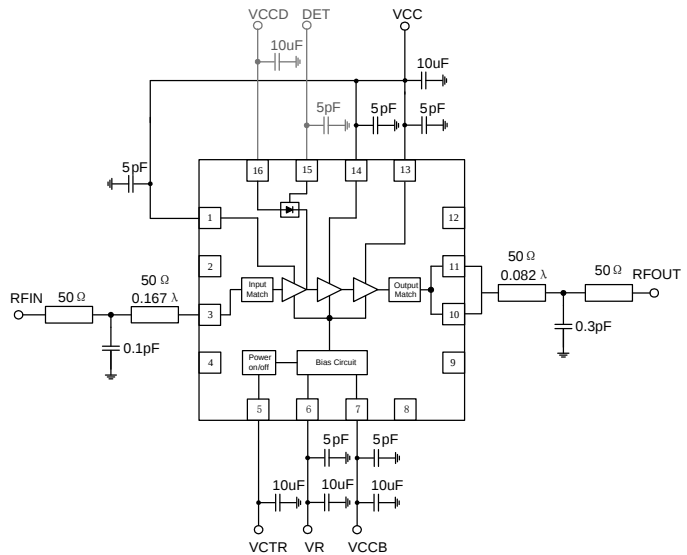
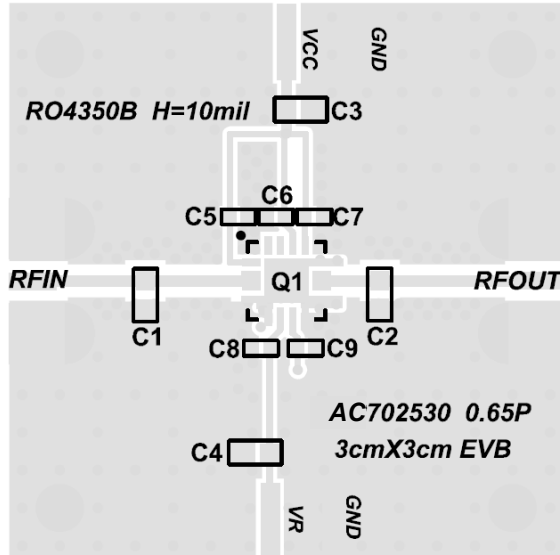
Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
Q1		AC702530, QFN4x4_16L		AC702530
C1	0.2pF	CAP, SMD, 0.2pF, 0603	Dalicap	
C2	0.3pF	CAP, SMD, 0.3pF, 0603	Dalicap	
C3, C4	10uF	CAP, SMD,10uF, 0603	various	
C5~C9	5pF	CAP, SMD, 5pF, 0402	various	

Small Signal Parameters



5.9GHz-6.5GHz Application (Test Condition: $VCC1=VCC2=VCC3=VCCB=5V$, $T_{op}=+25^{\circ}C$)



Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
Q1		AC702530, QFN4x4_16L		AC702530
C1	0.1pF	CAP, SMD, 0.1pF, 0603	Dalicap	
C2	0.3pF	CAP, SMD, 0.3pF, 0603	Dalicap	
C3, C4	10uF	CAP, SMD,10uF, 0603	various	
C5~C9	5pF	CAP, SMD, 5pF, 0402	various	

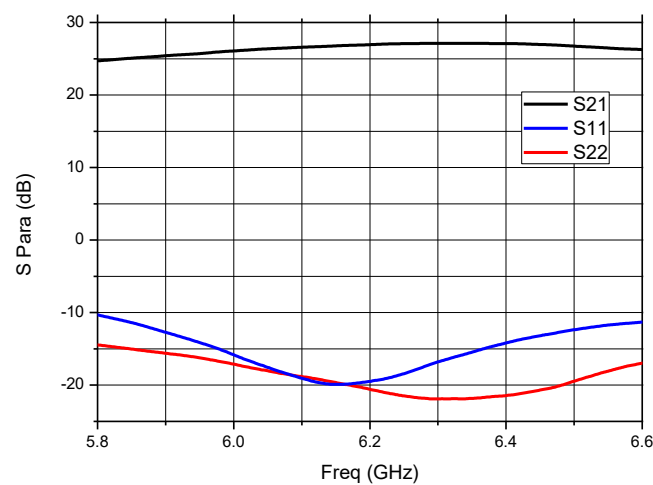


Figure: 5.9-6.5GHz Small Signal Parameters @VR=2.65V ICQ=180mA

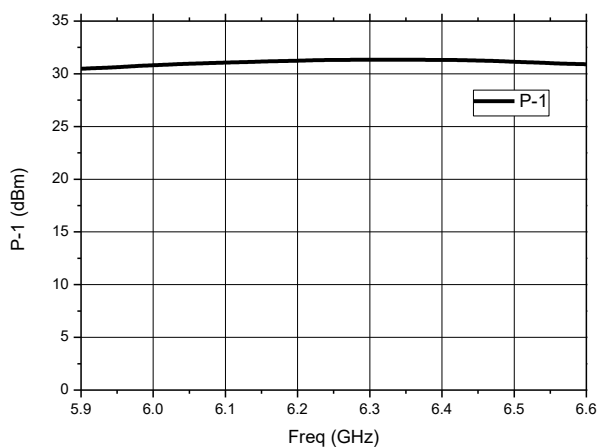


Figure: 5.9-6.5GHz P-1 @VR=2.65V

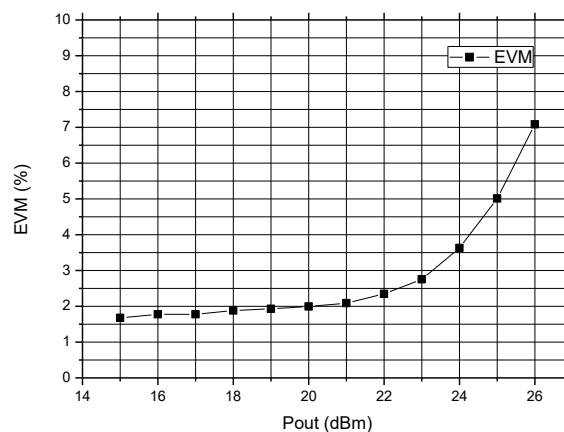
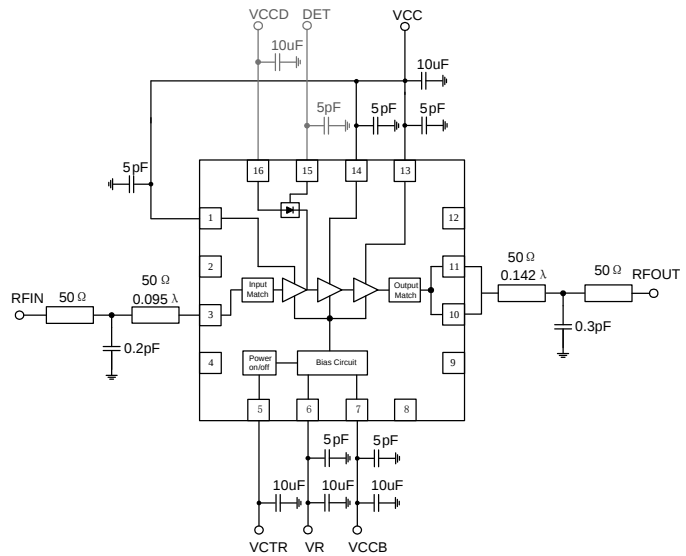
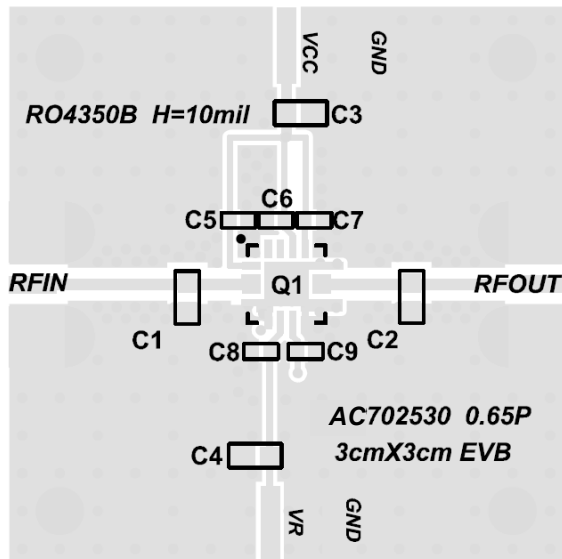


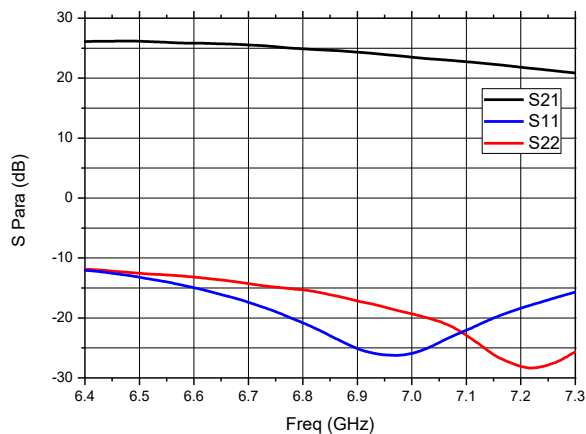
Figure: 802.11a 64QAM EVM vs Output Power @6.0GHz VR=2.9V

6.5GHz-7.2GHz Application (Test Condition: $V_{CC1}=V_{CC2}=V_{CC3}=V_{CCB}=5V$, $V_R=2.65V$, $T_{OP}=+25^{\circ}C$)



Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
Q1		AC702530, QFN4x4_16L		AC702530
C1	0.2pF	CAP, SMD, 0.2pF, 0603	Dalicap	
C2	0.3pF	CAP, SMD, 0.3pF, 0603	Dalicap	
C3, C4	10uF	CAP, SMD,10uF, 0603	various	
C5~C9	5pF	CAP, SMD, 5pF, 0402	various	



**Figure: Small Signal Parameters
@ $V_R=2.65V$ $I_{CQ}=180mA$**

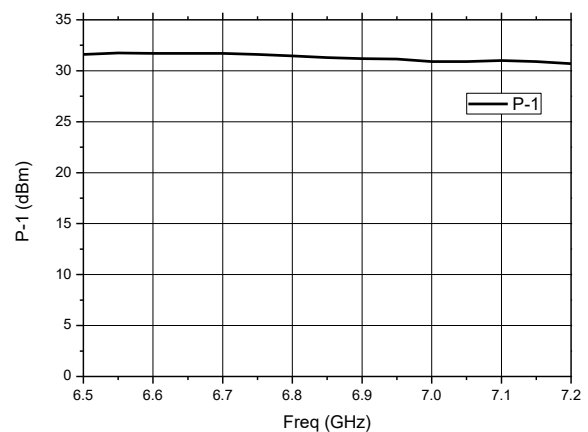
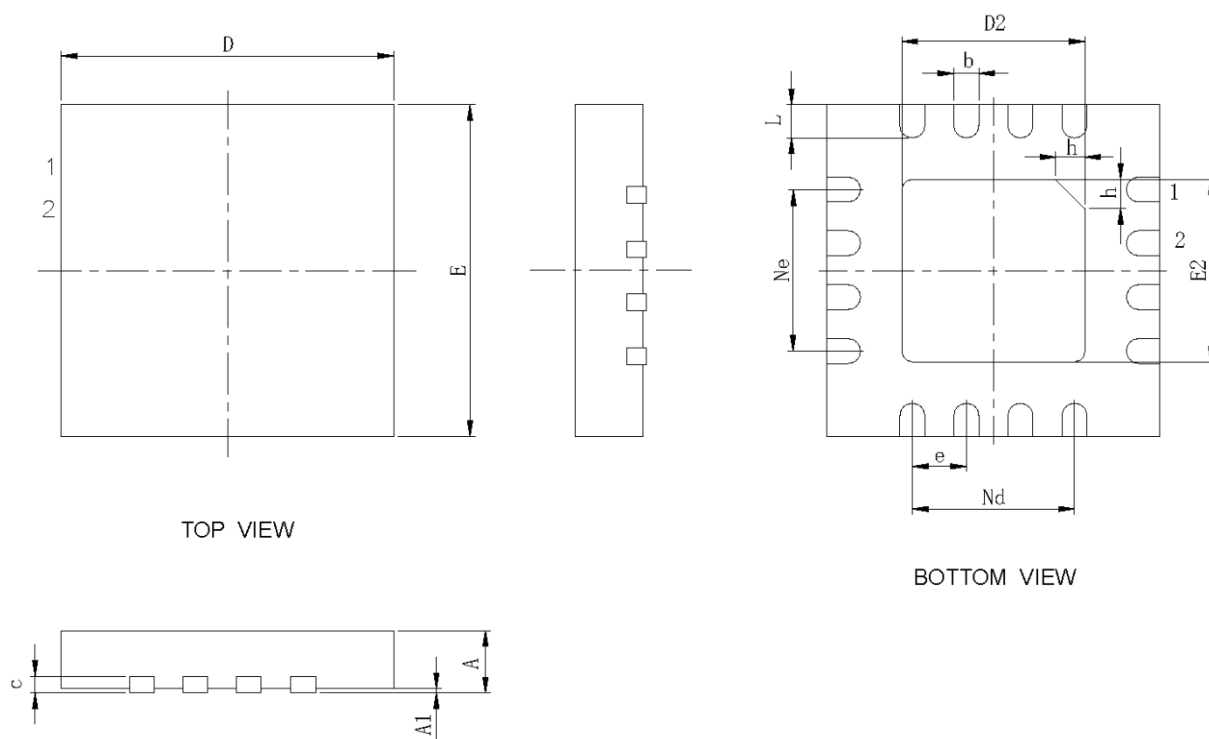


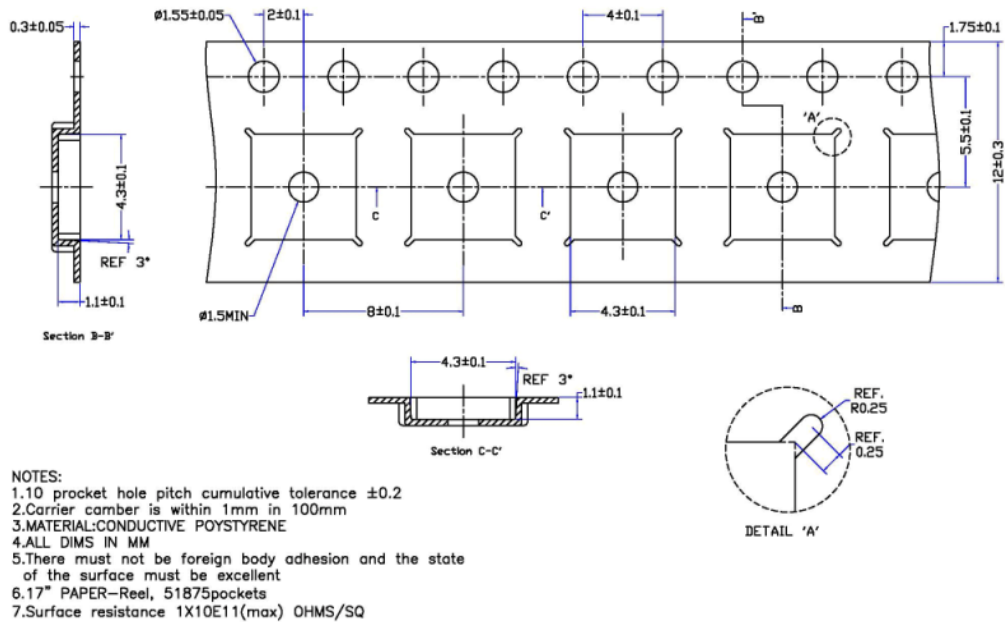
Figure: 6.5-7.2GHz P-1 @ $V_R=2.65V$

Packaging Diagram



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
	0.80	0.85	0.90
A1	--	0.02	0.05
b	0.25	0.30	0.35
c	0.18	0.20	0.25
D	3.90	4.00	4.10
D2	2.10	2.20	2.30
e	0.65BSC		
Ne	1.95BSC		
Nd	1.95BSC		
E	3.90	4.00	4.10
E2	2.10	2.20	2.30
L	0.35	0.40	0.45
h	0.30	0.35	0.40

Tape dimensions and Orientation



Reel dimensions and Orientation

