

# RFPA5532

## Wi-Fi Integrated PA Module 4900MHz to 5925MHz

The RFPA5532 is a three-stage power amplifier (PA) designed for 802.11a/n/ac applications. The integrated input and output 50Ω match greatly reduces the layout area, bill of materials and manufacturability cost in the customer application. The PA is optimized to minimize the required external components to maintain linear performance at 3.3V. The RFPA5532 is manufactured on an advanced InGaP heterojunction bipolar transistor (HBT) process and is capable of achieving linear powers up to 21dBm with an EVM <1.8% while maintaining excellent power added efficiency. The device is provided in a 4.0mm x 4.0mm x 0.90mm package that meets or exceeds the power requirements of IEEE802.11a/n/ac Wi-Fi RF systems.



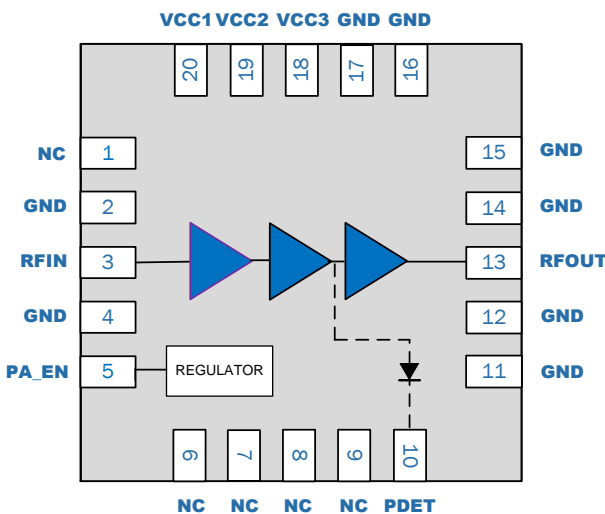
Package: QFN, 20-pin,  
4.0mm x 4.0mm x 0.90mm

### Features

- P<sub>OUT</sub> = 21dBm, 3.3V, 11ac, 80MHz MCS9 at 1.8% EVM
- P<sub>OUT</sub> = 22dBm, 3.3V, 11n, 20/40MHz MCS7 at 3% EVM
- Typical Gain = 32dB
- High PAE
- Required external components minimized
- Integrated Regulator
- Input and Output Matched to 50Ω
- Integrated Power Detector

### Applications

- Customer Premise Equipment (CPE)
- Wireless Access Points, Gateways
- Routers
- Set-Top Box Applications
- Picocell/Femtocell



Functional Block Diagram

### Ordering Information

RFPA5532SB	Standard 5-piece Sample Bag
RFPA5532SQ	Standard 25-piece Sample Bag
RFPA5532SR	Standard 100-piece Reel
RFPA5532TR13	Standard 2500-piece Reel
RFPA5532PCK-410	Fully Assembled Evaluation Board plus 5 pieces

## Absolute Maximum Ratings

Parameter	Rating	Unit
DC Supply Voltage	-0.5 to +6	V <sub>DC</sub>
DC Supply Current	1000	mA
Operating Case Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C
Maximum TX Input Power into 50Ω, 10:1 Load for 11a/n/ac (No Damage).	+10	dBm
Moisture Sensitivity Level (260°C JEDEC J-STD-020)	MSL2	



Caution! ESD sensitive device.



RFMD Green: RoHS status based on EU Directive 2011/65/EU (at time of this document revision), halogen free per IEC 61249-2-21, < 1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony in solder.

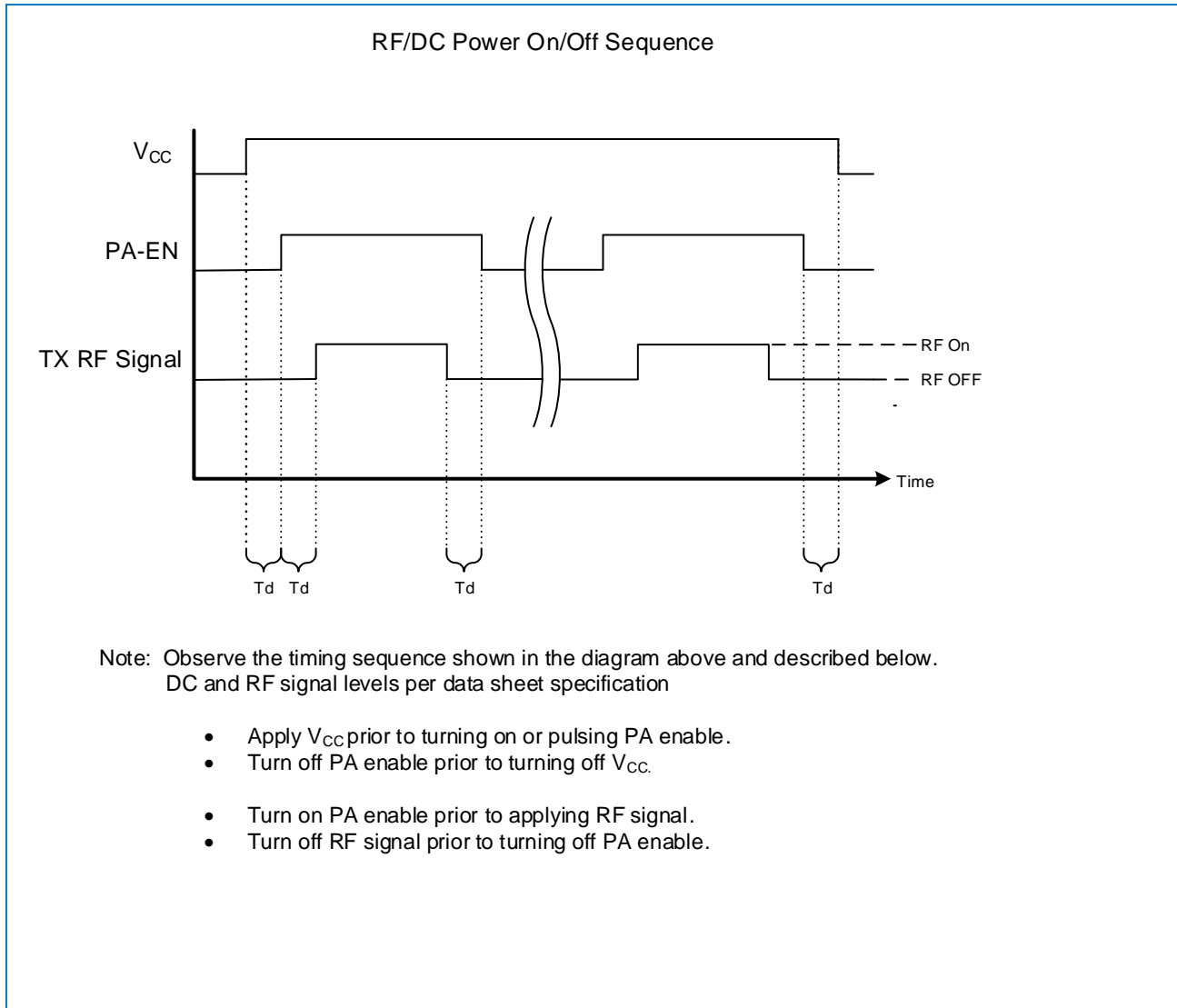
Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied. This is an InGaP PA designed for high duty cycle applications with T<sub>j</sub>>30°C over ambient.

## Nominal Operating Parameters

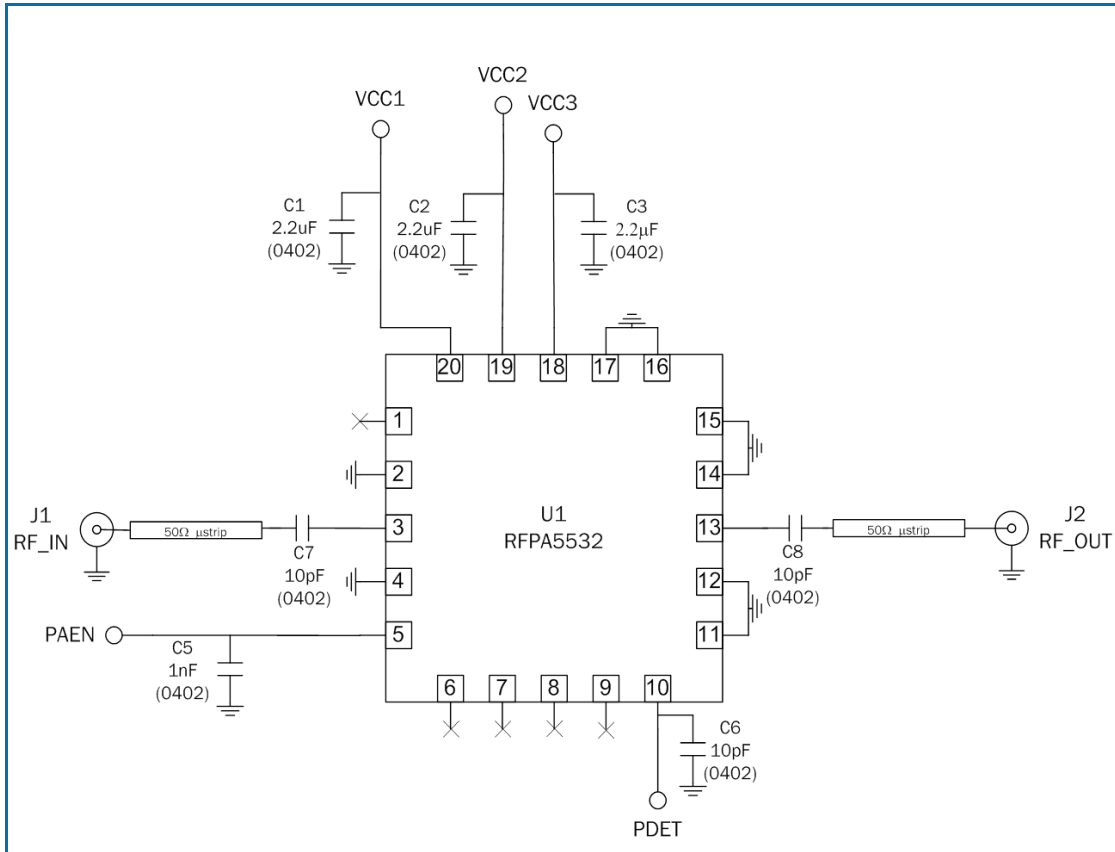
Parameter	Specification			Unit	Condition
	Min	Typ	Max		
<b>Compliance</b>					<b>802.11a/n/ac</b>
Operating Frequency	5.180		5.925	GHz	
Extended Operating Frequency	4.900		5.180	GHz	
Power Supply V <sub>CC</sub>	3.0	3.3	3.6	V	
PA Enable - High	1.7	3.0	<V <sub>CC</sub>	V	
PA Enable - Low	0		0.5	V	
<b>Transmit Performance</b>					<b>T = +25°C, V<sub>CC</sub>=3.3V, V<sub>PAEN</sub> = 3.0V, Unless otherwise noted</b>
11ac 80MHz Output Power	20	21		dBm	MCS9 256QAM
11ac 80MHz DEVM		1.5	1.8	%	
		-36.5	-35	dB	
11ac 160MHz Output Power		18.5		dBm	MCS9 256QAM
11ac 160MHz DEVM			1.8	%	
			-35	dB	
11n 20/40MHz Output Power	20.5	22		dBm	MCS7 64QAM
11n 20/40MHz DEVM		2.5	3	%	
		-32	-30.5	dB	
Gain	30	32		dB	
Gain Variation	-2.5		+2.5	dB	Temp= -40 °C to +85°C; Over 100MHz BW
Margin to Spectral Mask		5		dBm	P <sub>OUT</sub> =20dBm; MCS0 160MHz
		5		dBm	P <sub>OUT</sub> =22dBm; MCS0 80MHz
		5		dBm	P <sub>OUT</sub> =23dBm; MCS0 40MHz
		5		dBm	P <sub>OUT</sub> =24dBm; MCS0 20MHz
Operating Current		240	310	mA	P <sub>OUT</sub> =20dBm
		275	340	mA	P <sub>OUT</sub> =21dBm
		350	400	mA	P <sub>OUT</sub> =24dBm
Quiescent Current		150	175	mA	
PA Enable Current		1	5	uA	PA_EN High

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
Leakage Current		0.2	1	uA	RF OFF; V <sub>PAEN</sub> = 0V
Second Harmonic		-47	-40	dBm/MHz	P <sub>OUT</sub> = 24dBm; OFDM 6Mbps signal.
Third Harmonic		-50	-40	dBm/MHz	P <sub>OUT</sub> = 24dBm; OFDM 6Mbps signal
OOB Gain		-10	-5	dB	3.3-3.8GHz
		7	12	dB	7.0-15.0GHz
Input Return Loss		12		dB	
Output Return Loss		8		dB	
Power Detector Range		0.25		V	P <sub>OUT</sub> = 3dBm
		0.55		V	P <sub>OUT</sub> = 21dBm
		0.75		V	P <sub>OUT</sub> = 24dBm
<b>General Specifications</b>					
Stability					
Output VSWR			6:1		CW signal, No spurious above -41.25dBm/MHz for non-harmonic related signals
Output Power Range	0		24	dBm	
Output P <sup>1dB</sup>		30		dBm	CW signal
Ramp ON/OFF time		200		nS	10-90% / 90-10% of gain
Thermal Resistance		27		°C/W	
ESD HBM		1500		V	EIA/JESD22-114A; All pins
ESD CDM		500		V	JESD22-C101C; All pins

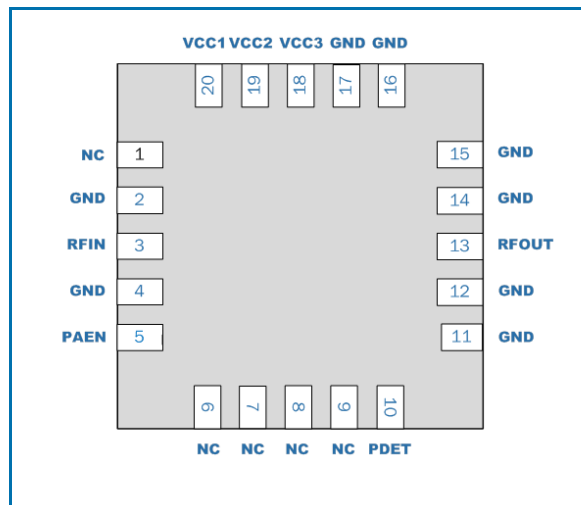
## Timing Diagram



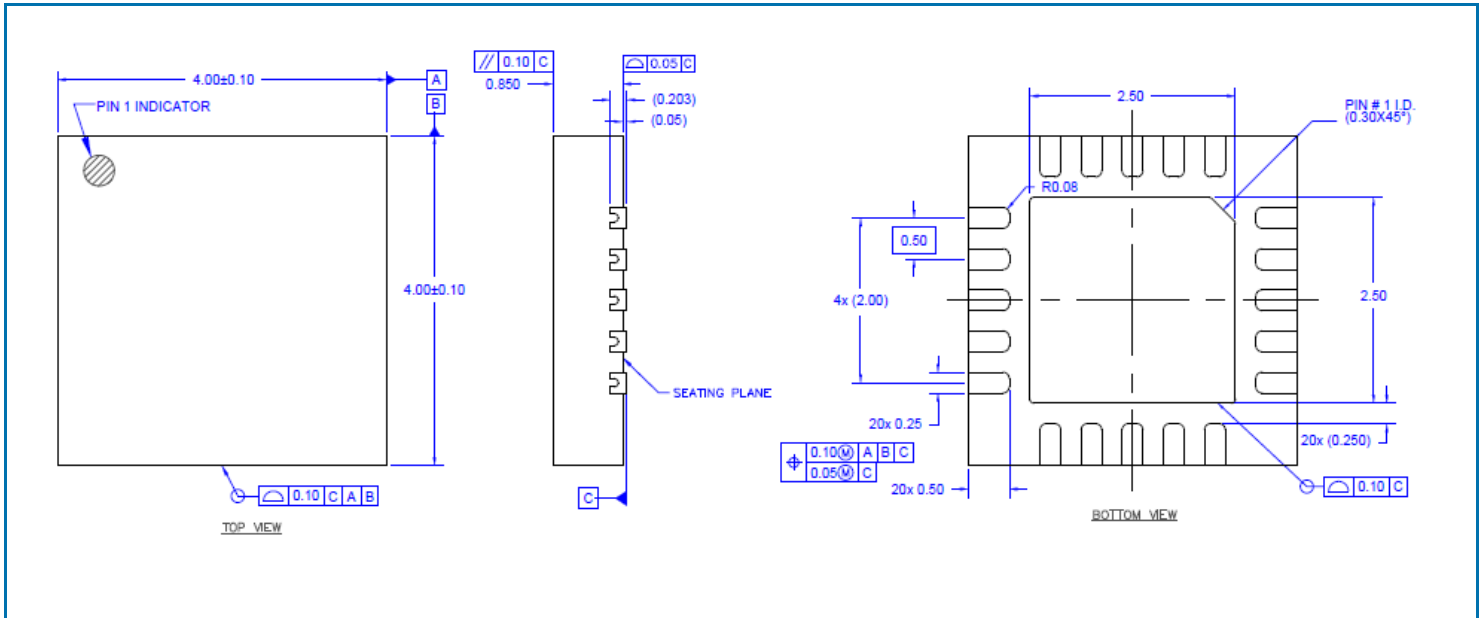
**RFPA5532 Applications Schematic**



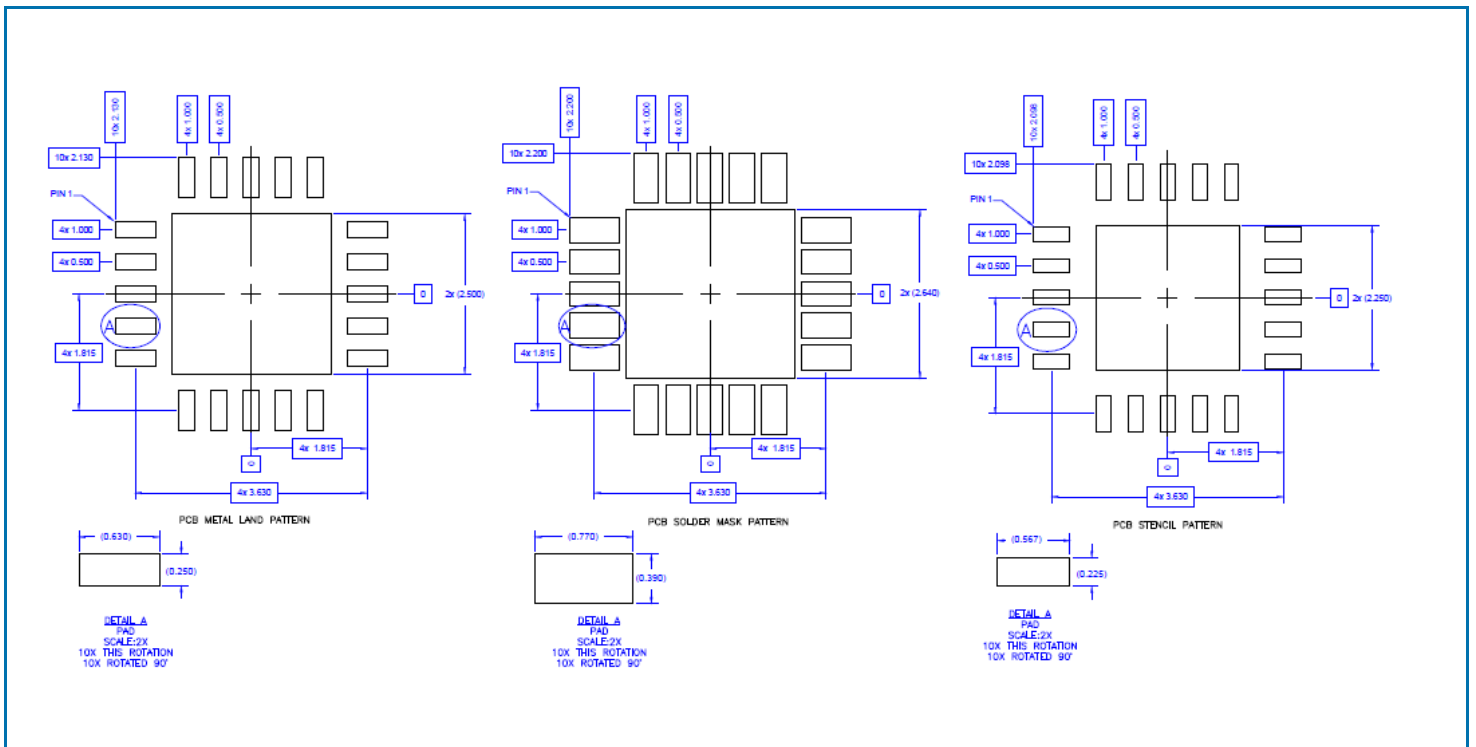
**Pin Out**



Package Drawing (in mm)



PCB Patterns (in mm)



## Pin Names and Descriptions

Pin	Name	Description
1	NC	Not connected internally. It may be left floating or connected to ground.
2	GND	Ground connection. This pin is not connected internally and can be left floating or connected to ground.
3	RFIN	RF input, internally matched to 50Ω and DC shorted. External DC blocking capacitor required.
4	GND	Ground connection. This pin is not connected internally and can be left floating or connected to ground.
5	PAEN	Input enable bias voltage (regulated internally).
6	NC	Not connected internally. It may be left floating or connected to ground.
7	NC	Not connected internally. It may be left floating or connected to ground.
8	NC	Not connected internally. It may be left floating or connected to ground.
9	NC	Not connected internally. It may be left floating or connected to ground.
10	PDET	Power detector. Provides an output voltage proportional to the RF output power level.
11	GND	Ground connection. This pin is not connected internally and can be left floating or connected to ground.
12	GND	Ground connection. This pin is not connected internally and can be left floating or connected to ground.
13	RFOUT	RF output, internally matched to 50Ω and DC shorted. External DC blocking capacitor required.
14	GND	Ground connection. This pin is not connected internally and can be left floating or connected to ground.
15	GND	Ground connection. This pin is not connected internally and can be left floating or connected to ground.
16	GND	Ground connection. This pin is not connected internally and can be left floating or connected to ground.
17	GND	Ground connection. This pin is not connected internally and can be left floating or connected to ground.
18	VCC3	Third stage supply voltage
19	VCC2	Second stage supply voltage.
20	VCC1	First stage supply voltage.
Pkg Base	GND	Ground connection. The back side of the package should be connected to the ground plan though as short of a connection as possible. PCB vias under the device are recommended.