

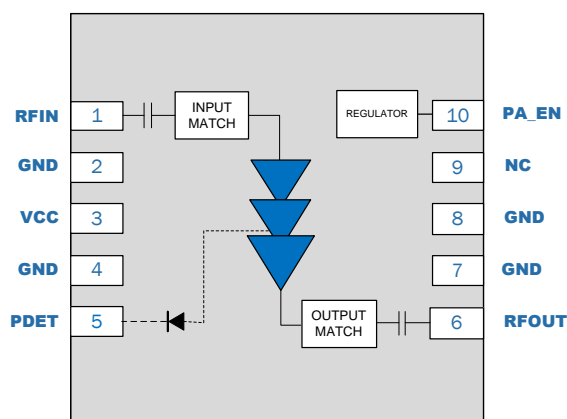
## General Description

The RFPA5208 is a three-stage power amplifier (PA) designed for WiFi 802.11b/g/n/ac systems. The integrated input and output 50Ω match and integrated regulator minimizes layout area in the customer's application, reduces the bill of materials and manufacturability cost. Performance is focused on a balance of efficiency and linear power that increases the range of connection. The RFPA5208 integrates the Power Amplifier (PA), regulator and a power detector coupler for improved accuracy. The device is provided in a 4mm x 4mm x 1.05mm, 10-pin laminate package.



Package: Laminate, 10-pin,  
4mm x 4mm x 1.05mm max

## Functional Block Diagram



Functional Block Diagram

## Product Features

- $P_{OUT} = +28\text{dBm}$ , 802.11n, 20MHz MCS7 at -30dB Dynamic EVM
- $P_{OUT} = +26\text{dBm}$ , 802.11ac, 20MHz MCS8 at -35dB Dynamic EVM
- 40dB Typical Gain
- High efficiency
- Input and Output Matched to 50Ω
- Integrated 2GHz PA, Regulator and  $P_{DET}$

## Applications

- Wireless Access Points
- Gateways
- Routers
- Microcells
- Consumer Premise Equipment

## Ordering Information

Part Number	Description
RFPA5208SB	Sample bag with 5 pieces
RFPA5208SQ	Sample bag with 25 pieces
RFPA5208SR	7" Reel with 100 pieces
RFPA5208TR13	13" Reel with 2500 pieces
RFPA5208PCK-410	Evaluation Board plus 5 loose pcs

## Absolute Maximum Ratings

Parameter	Rating	Unit
DC Supply Voltage (No RF Applied)	-0.5 to +6.0	V <sub>DC</sub>
PA Enable Voltage	-0.5 to 5	V <sub>DC</sub>
DC Supply Current	1000	mA
Operating Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C
Input RF Power into 50Ω Load for 11b/g/n/ac (No Damage)	+5	dBm
Moisture Sensitivity Level	MSL3	

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.

## Nominal Operating Parameters

Parameter	Min	Typ	Max	Unit	Condition
<b>Compliance</b>					<b>802.11a, 802.11n, 802.11ac</b>
Operating Frequency	2.412		2.484	GHz	
Extended Frequency	2.4		2.5	GHz	Functional with reduced performance
Power Supply (V <sub>CC</sub> )	4.75	5	5.25	V	
Control Voltage (High)	2.9	3	3.1	V	PA_EN
Control Voltage (Low)		0	0.20	V	PA_EN

<b>High Power Mode</b>					<b>V<sub>CC</sub> = 5V; PA_EN = 3V; Temp = 25°C; Freq=2412-2484MHz; unless otherwise noted</b>
P <sub>SAT</sub>		35		dBm	CW signal.
Linear Output Power					
11n 20MHz	26	28		dBm	
11n 40MHz	25	27			
11ac 20MHz		26			With input shunt capacitor
11ac 40MHz		25			With input shunt capacitor
Dynamic EVM					
11n 20MHz and 40MHz		-30		dB	MCS7
11ac 20MHz and 40MHz		-35		dB	MCS8, MCS9
Gain		40		dB	
Gain Flatness Across the Band	-1.5		1.5	dB	
Input Return Loss	10	15		dB	
Output Return Loss	8	10		dB	
20MHz 802.11n Operating Current		530	650	mA	P <sub>OUT</sub> = +27dBm

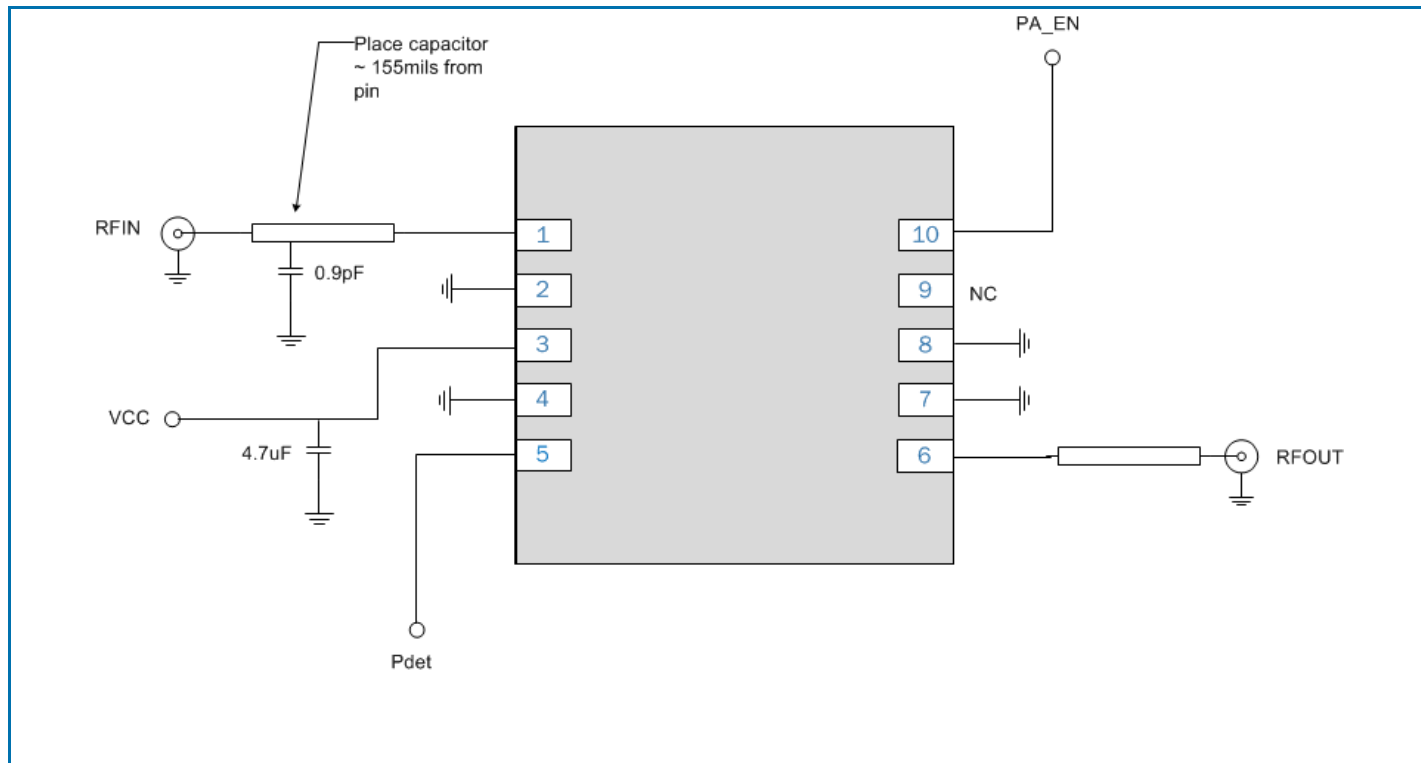
Parameter	Min	Typ	Max	Unit	Condition
<b>Compliance</b>					<b>802.11a, 802.11n, 802.11ac</b>
20MHz 802.11n Operating Current		590	700	mA	P <sub>OUT</sub> = +28dBm
Quiescent Current		225		mA	
2 <sup>nd</sup> Harmonics		-30	-27	dBm/MHz	P <sub>OUT</sub> = +28dBm
3 <sup>rd</sup> Harmonics		-45	-44	dBm/MHz	P <sub>OUT</sub> = +28dBm
Margin to 802.11b Spectral Mask		2		dBc	P <sub>OUT</sub> = +28dBm; 11Mbps; CCK signal
Margin to 802.11n Spectral Mask		4	0	dBc	P <sub>OUT</sub> = +28dBm; HT20
Margin to 802.11n Spectral Mask		4	0	dBc	P <sub>OUT</sub> = +26dBm; HT40

<b>High Power Mode</b>					<b>V<sub>CC</sub> = 5V; PA_EN = 3V; Temp = 25°C; Freq=2412-2484MHz; unless otherwise noted</b>
Power Detector Voltage		0.15		V	P <sub>OUT</sub> = +11dBm
Power Detector Voltage		0.45		V	P <sub>OUT</sub> = +28dBm
P <sub>DET</sub> Variation Across Band	-0.5		0.5	dB	
P <sub>DET</sub> Variation Over Temperature	-1.5		1.5	dB	

<b>General Specifications</b>					
Leakage Current		50	100	uA	V=5V; PA_EN = 0V
PA_EN Current		25	50	uA	PA_EN= 3.0V
PA_EN Current			10	uA	PA_EN = 0V
TX Turn On/Off Rise/Fall Time		0.4	0.8	us	
Ruggedness	4:1 (VSWR)				No damage; 11b/g/n/ac; Pin=+5dBm; 50% duty cycle
Stability	4:1 (VSWR)				CW; Non harmonically related spurs < -42dBm/MHz
ESD – Human Body Model					
ESD – Charge Device Model			1000	V	JESD22-C101C; Class 1C; All pins
Thermal Resistance (θ <sub>JC</sub> ) <sup>(Note 1)</sup>			22	°C/W	P <sub>OUT</sub> = 28dBm; Duty Cycle=85%; V <sub>CC</sub> = 5V
Junction Temperature (T <sub>J-max</sub> )			154	°C	P <sub>OUT</sub> = 28dBm; Duty Cycle=85%; V <sub>CC</sub> = 5V
Duty Cycle for Long Term Reliability			85	%	

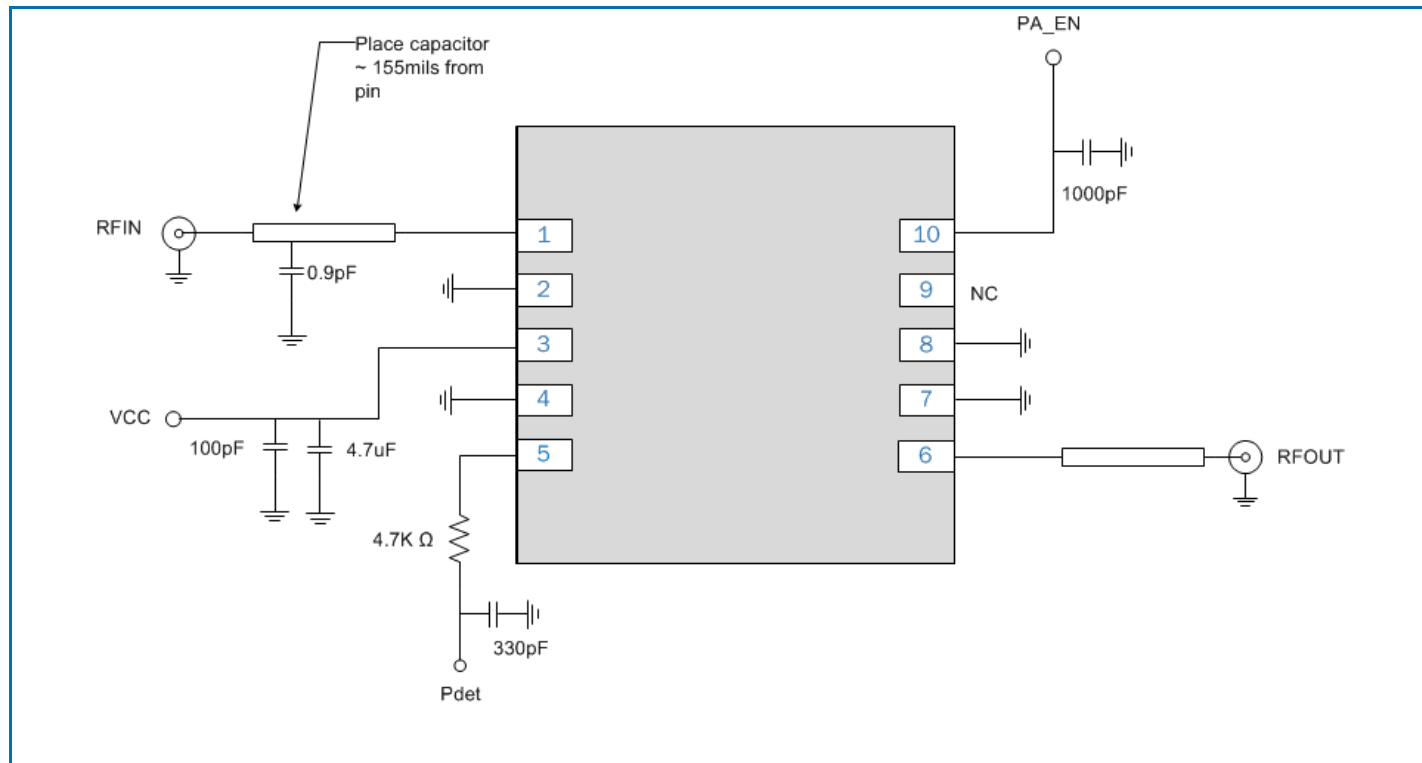
Note 1. Thermal resistance contribution of the eval board ~ 6 °C/W has been subtracted.

## Applications Schematic



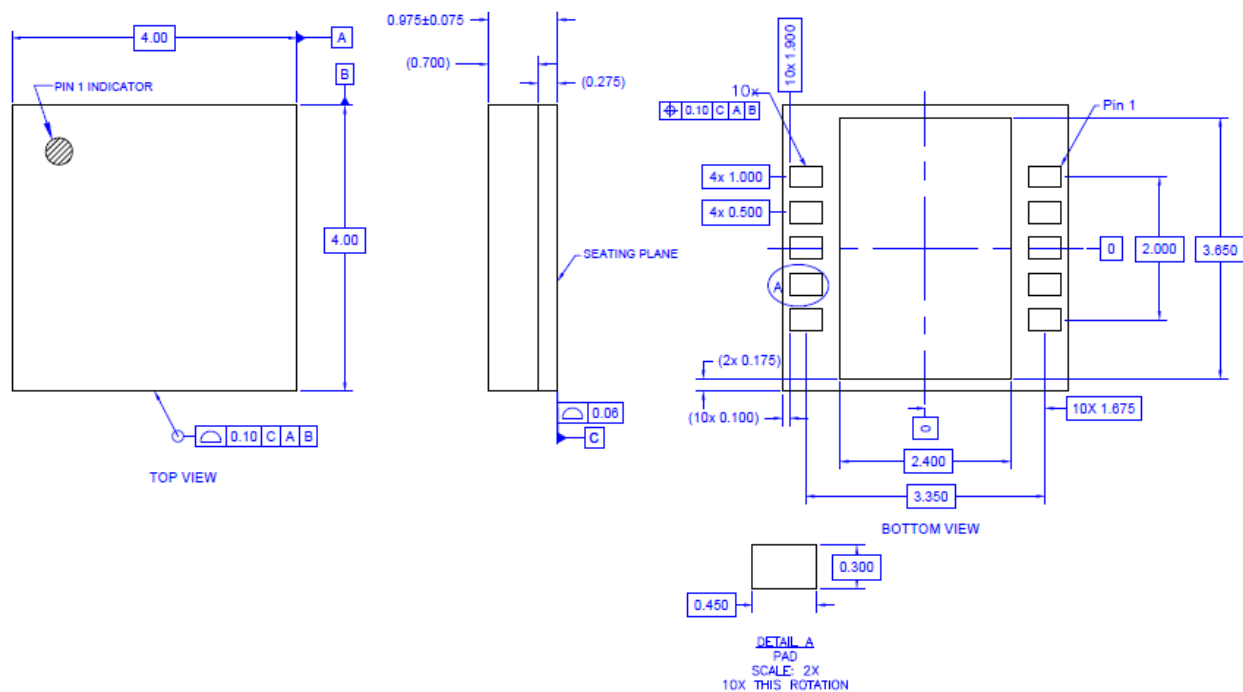
Note: Input shunt cap improves 11ac linear power @ EVM -35dB. Input cap not required for 11n.

## Evaluation Board Schematic



Note: Input shunt cap improves 11ac linear power. Input cap not required for 11n.

## Package Outline (Dimensions in millimeters)



## Pin Names and Descriptions

Pin	Name	Description
1	RFIN	RF input port is matched to 50Ω and DC blocked internally.
2	GND	Ground connection.
3	VCC	Voltage connected internally to the collectors of the RF device. To achieve specified performance, the layout of the pin should match the Recommended Land Pattern
4	GND	Ground connection.
5	PDET	Power detector provides an output voltage proportional to the RF output power level.
6	RFOUT	RF output is matched to 50Ω and DC blocked internally.
7	GND	Ground connection.
8	GND	Ground connection.
9	NC	No connect. Please ensure this pin is floating, do not connect.
10	PA_EN	PA Enable pin, apply <0.2Vdc to turn PA off. Apply 2.9Vdc to 3.1Vdc to enable PA.
Pkg Base	GND	Ground connection. The backside of the package should be connected to the ground plane through a short path, i.e., PCB vias under the device are recommended.



**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.