RFPA5218

Wi-Fi Power Amplifier

Product Overview

The Qorvo® RFPA5218 is a three-stage power amplifier (PA) designed for Wi-Fi. The compact form factor and integrated matching minimizes layout area in the application.

Performance is focused on optimizing for power consumption while maintaining the highest linear output power and leading edge throughput that leads to greater ranges.

The design significantly minimizes external component needs leading to a simplified board implementation and more consistent performance at a system level over a variety of conditions

The RFPA5218 integrates a 2 GHz power amplifier (PA), regulator and a power detector for improved accuracy.

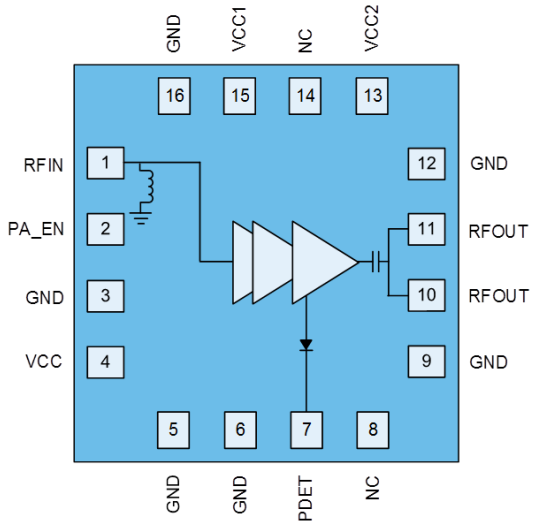


16 Pin 3x3 mm Laminate Package

Key Features

- 2400-2500 MHz
- P_{OUT} = +24dBm MCS8/9 VHT20/40 -35dB Dynamic EVM
- P_{OUT} = +25dBm MCS7 HT20 -30dB Dynamic EVM
- P_{OUT} = +26dBm 802.11g -28dB Dynamic EVM
- P_{OUT} = +28.5dBm 802.11b @ Spectral Mask Compliance
- Optimized for +5 V Operation
- 32 dB Tx Gain
- Integrated DC Power Detector
- MCS11 Capable

Functional Block Diagram



Top View

Applications

- Access Points
- Wireless Routers
- Client Equipment
- Customer Premise Equipment
- Internet of Things

Ordering Information

Part Number	Description
RFPA5218SB	Sample bag with 5 pieces
RFPA5218SQ	Sample bag with 25 pieces
RFPA5218SR	7” reel with 100 pieces
RFPA5218TR7	7” reel with 2500 pieces
RFPA5218TR13	13” reel with 5000 pieces
RFPA5218PCK401	Evaluation Board with 5 loose pieces

Absolute Maximum Ratings

Parameter	Conditions	Rating
DC Supply Voltage		-0.5 to +6 V
PA Enable Voltage		-0.5 to V_{CC}
Storage Temperature		-40 to 150 °C
RF Input Power at RFIN	Into 50 Ω Load for 802.11a/n/ac (No Damage), Transmit Mode	+12 dBm

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.

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Frequency	2412		2484	MHz
Extended Operating Frequency	2400		2500	MHz
Device Voltage (V_{CC})	+4.5	+5	+5.5	V
PA Enable Voltage – High	+1.7	+3	V_{CC}	V
PA Enable Voltage - Low	0		+0.5	V
$T_{OPERATING}$	-40		+85	°C

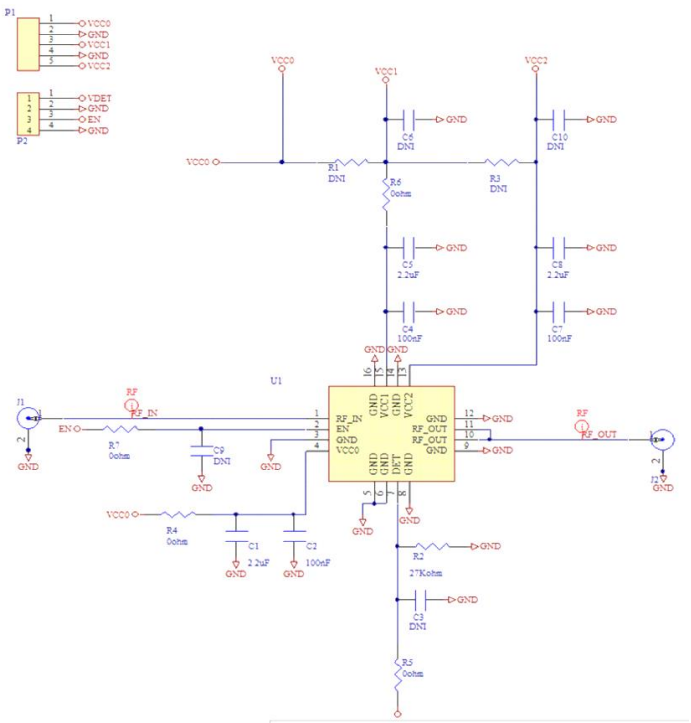
Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Electrical Specifications

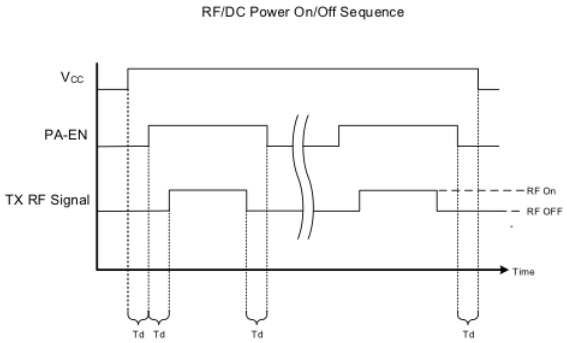
Parameter	Conditions	Min.	Typ.	Max.	Units
TRANSMIT (RFIN-RFOUT) MODE	**Unless otherwise noted: V_{CC}=5V, T=+25ºC, PA_EN=High**				
11ac VHT20/40 Output Power	MCS8/9 256QAM	23	24		dBm
				-35	dB
11n HT20 Output Power	MCS7 64QAM	23.5	25		dBm
Dynamic EVM				-30	dB
11g Output Power	OFDM 54MBps	24.5	26		dBm
Dynamic EVM				-28	dB
Margin to VHT40 Spectral Mask	P_{OUT} = +25.5 dBm, 11ac MCS0		3	0	dBc
Margin to HT20 Spectral Mask	P_{OUT} = +26 dBm, 11n MCS0		3	0	dBc
Margin to 802.11g Spectral Mask	P_{OUT} = +27 dBm, OFDM 54MBps		3	0	dBc
Margin to 802.11b Spectral Mask	P_{OUT} = +28.5 dBm, 1 MBps		3	0	dBc
Gain		30	32		dB
Gain Flatness	Across any 40 MHz Channel	-0.35		+0.35	dB
RFIN Port Return Loss		10	17		dB
RFOUT Port Return Loss		7	9		dB
Quiescent Current	RF Off		210	250	mA
Operating Current	P_{OUT} = +24 dBm		335	390	mA
	P_{OUT} = +28.5 dBm		500	600	mA
2nd Harmonics	P_{OUT} = +28.5 dBm 802.11b 1 MBps		-35	-30	dBm/MHz
3rd Harmonics	P_{OUT} = +28.5 dBm 802.11b 1 MBps		-60	-50	dBm/MHz

Parameter	Conditions	Min.	Typ.	Max.	Units
DC Power Detect Voltage	RF Off		0.14		V
	P_{OUT} = +24 dBm		0.46		V
	P_{OUT} = +26 dBm		0.55		V
	P_{OUT} = +28.5 dBm		0.74		V
GENERAL SPECIFICATIONS	**Unless otherwise noted: V_{CC}=5V, T=+25ºC**				
Leakage Current			0.1	0.5	µA
Control Current - Low			0.1		µA
TX Output P_{1dB}	CW		+32		dBm
Ramp ON/OFF Time	10<->90% Ref from Control Voltage to RF Power		300		nS
PA Stability - Output VSWR	CW No Spurious above -50dBm/MHz		4:1		
Output Power Range		0		28.5	dBm
Thermal Resistance, θ_{jc}	Junction to case		40		°C/W

Evaluation Board Schematic



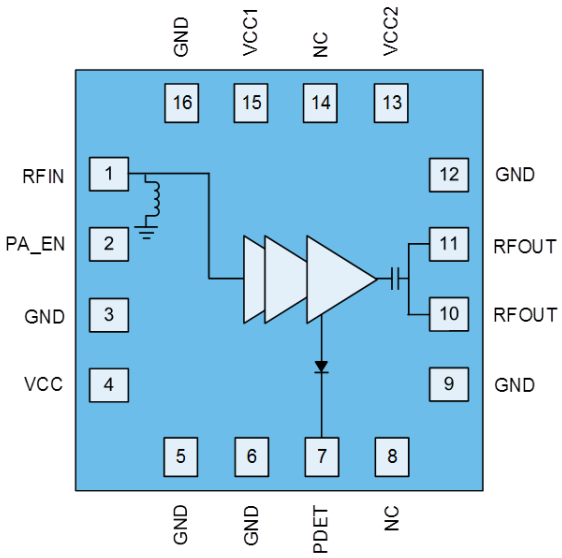
Timing Diagram



Note: Observe the timing sequence shown in the diagram above and described below.
DC and RF signal levels per data sheet specification

- Apply V_{CC} prior to turning on or pulsing PA enable.
- Turn off PA enable prior to turning off V_{CC}.
- Turn on PA enable prior to applying RF signal.
- Turn off RF signal prior to turning off PA enable.

Pin Configuration and Description

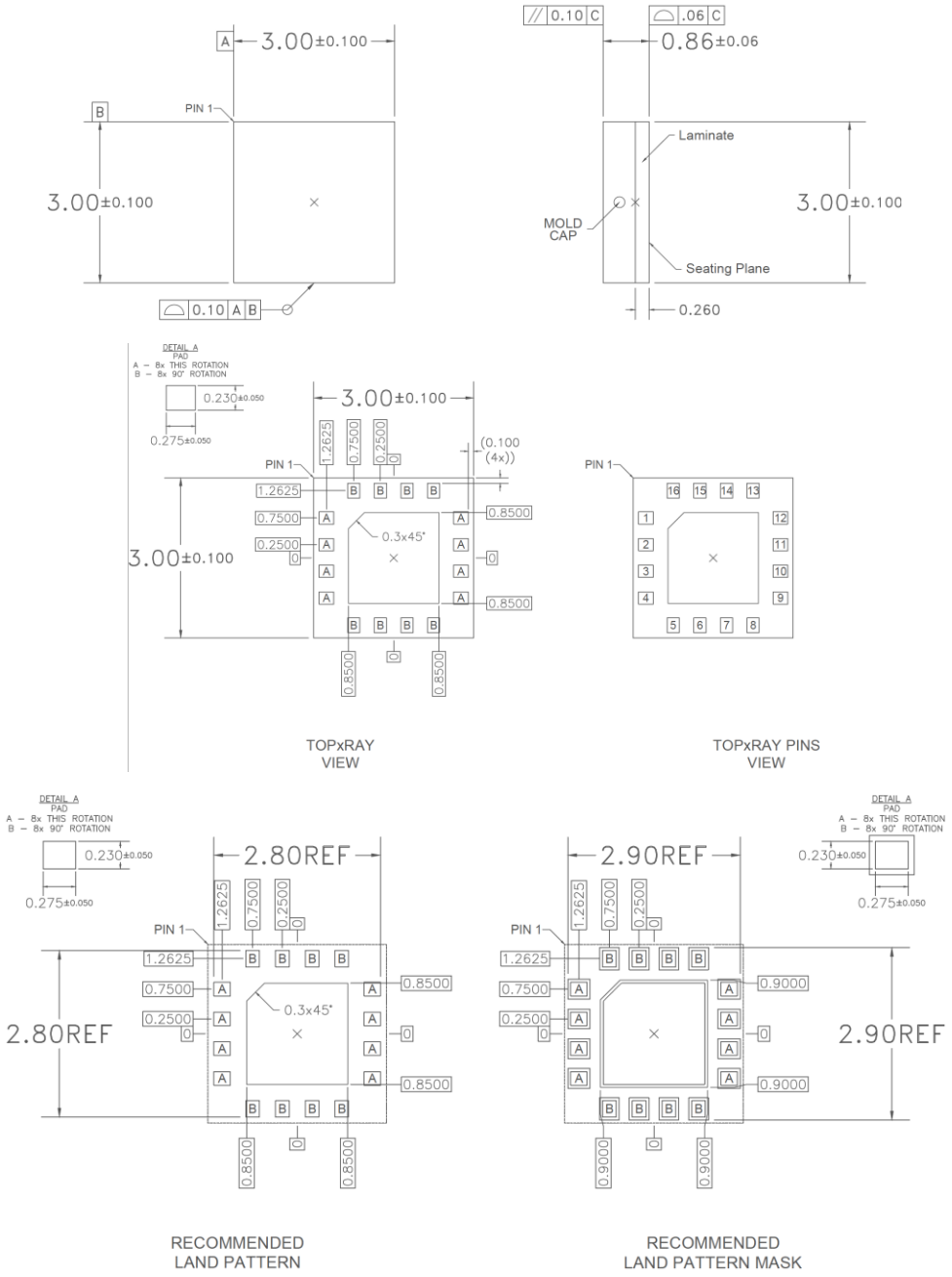


Top View

Pin Number	Label	Description
1	RFIN	RF input port for the PA. This port is matched to 50Ω and DC shorted internally.
2	PA_EN	Control voltage.
3	GND	Ground connection.
4	VCC	Supply voltage. See applications schematic for biasing and bypassing components.
5	GND	Ground connection.
6	GND	Ground connection.
7	PDET	Power Detector voltage for the PA. May need external series R/shunt C to adjust voltage level and to filter RF noise.
8	NC	No connect. This pin is not connected internally and can be left floating or connected to ground.
9	GND	Ground connection
10	RFOUT	RF output port. This port is matched to 50Ω and DC blocked internally.
11	RFOUT	RF output port. This port is matched to 50Ω and DC blocked internally.
12	GND	Ground connection
13	VCC2	Supply voltage. See applications schematic for biasing and bypassing components.
14	NC	No connect. This pin is not connected internally and can be left floating or connected to ground.
15	VCC1	Supply voltage. See applications schematic for biasing and bypassing components.
16	GND	Ground connection
Backside Paddle	GND	RF/DC ground. Use recommended via pattern to minimize inductance and thermal resistance. See PCB Mounting Pattern for suggested footprint.

Mechanical Information

Dimensions and PCB Mounting Pattern



Notes:
1. All dimensions are in mm. Angles are in degrees.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1C	ANSI/ESD/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3	ANSI/ESD/JEDEC JS-002
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020



Caution!

ESD sensitive device

Solderability

Compatible with both lead-free (260 °C max. reflow temperature) and tin/lead (245 °C max. reflow temperature) soldering processes.

Package lead plating: Electrolytic plated Au over Ni

RoHS Compliance

This part is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Lead free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- SVHC Free

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

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