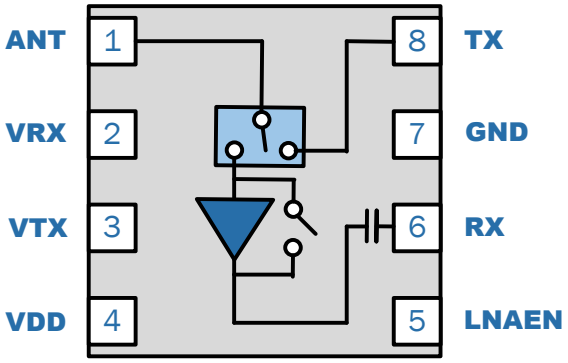
RFMD + TriQuint = Qorvo

RFFM4555

Wi-Fi Integrated Front End Module
4.9GHz to 5.925GHz

The RFFM4555 is a front end module (FEM) designed for 802.11a/n/ac applications. The integrated single-pole double throw switch and low noise amplifier with bypass greatly reduces the layout area, bill of materials and manufacturability cost in the customer application. The RFFM4555 is optimized to pair with Wi-Fi power amplifiers such as the RFPA5512/RFPA5522/RFPA5542 to create a complete Tx and Rx solution. The device is provided in a 1.5mm x 1.5mm x 0.455mm DFN package that meets or exceeds the power requirements of IEEE802.11a/n/ac Wi-Fi RF systems.



Functional Block Diagram

Package: DFN, 8-pin,
1.5mm x 1.5mm x 0.455mm

Features

- 13dB LNA Gain
- 6dB Bypass Loss
- 2.6dB Noise Figure
- TX to ANT path loss of 0.6dB
- Max Power at TX Input of 33dBm
- 2.4GHz Rejection
- Input and Output Matched to 50Ω
- Optimized to pair with the RFPA55X2 Family Power Amplifiers

Applications

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

Ordering Information

RFFM4555SB	Standard 5-piece Sample Bag
RFFM4555SQ	Standard 25-piece Sample Bag
RFFM4555SR	Standard 100-piece Reel
RFFM4555TR7	Standard 2500-piece Reel
RFFM4555PCK-410	Fully Assembled Evaluation Board + 5 pieces
RFPA5512PCK-411	Integrated RFPA5512+RFFM4555 EVB + 5 pieces
RFPA5522PCK-411	Integrated RFPA5522+RFFM4555 EVB + 5 pieces

Absolute Maximum Ratings

Parameter	Rating	Unit
DC Supply Voltage (No RF applied)	-0.5 to +6	V_{DC}
DC Supply Current	100	mA
Operating Case Temperature	-40 to +85	ºC
Storage Temperature	-40 to +150	ºC
Maximum TX Input Power into 50Ω Load for 11a/n/ac (No Damage)	+33	dBm
Maximum RX Input Power (No Damage)	+12	dBm
Bypass Mode Maximum RX Input Power (No Damage)	+25	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.

Nominal Operating Parameters

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
Compliance					**IEEEE802.11a/n/ac**
Operating Frequency	5.180		5.925	GHz	
Extended Operating Frequency	4.900		5.925	GHz	Functional with reduced performance
Operating Temperature	-40	+25	+85	ºC	
Power Supply V_{DD}	3.3	5.0		V	LNA supply voltage only
Control Voltage - High	2.8	3.1	V_{DD}	V	VTX, VRX and LNAEN should not exceed V_{DD}
Control Voltage – Low		0	0.2	V	VTX, VRX and LNAEN
Transmit Performance (TX-ANT)					**T=+25ºC, V_{DD}=3.3-5V, VTX=High, LNAEN & VRX=Low, CW Signal; Unless otherwise noted**
Insertion Loss		0.6	1.2	dB	
Linear output Power		23		dBm	
11ac 80MHz Dynamic EVM		-45	-40	dB	
		0.6	1	%	
TX Port Return Loss	20	35		dB	
ANT Port Return Loss	20	35		dB	
2nd Harmonics		-50	-45	dBm/MHz	P_{OUT} = 28dBm 802.11a 6MBps
3rd Harmonics		-50	-40	dBm/MHz	P_{OUT} = 28dBm 802.11a 6MBps
Input $P_{0.1dB}$	30		33	dBm	
ANT-RX Isolation	25	35			TX Mode: TX enabled and maximum power
Receive Performance (ANT-RX) – LNA On					**T=+25ºC, V_{DD}=3.3-5V, VTX=Low, LNAEN & VRX=High, CW Signal; Unless otherwise noted**
Gain	10.5	13		dB	
Small Signal Gain 2400-2500MHz		-15	-12	dB	
Noise Figure		2.6	3	dB	
RX Port Return Loss	5	10		dB	
ANT Port Return Loss	3	7		dB	
Input P1dB	-10	-5		dBm	
Current Consumption	8	13	20	mA	

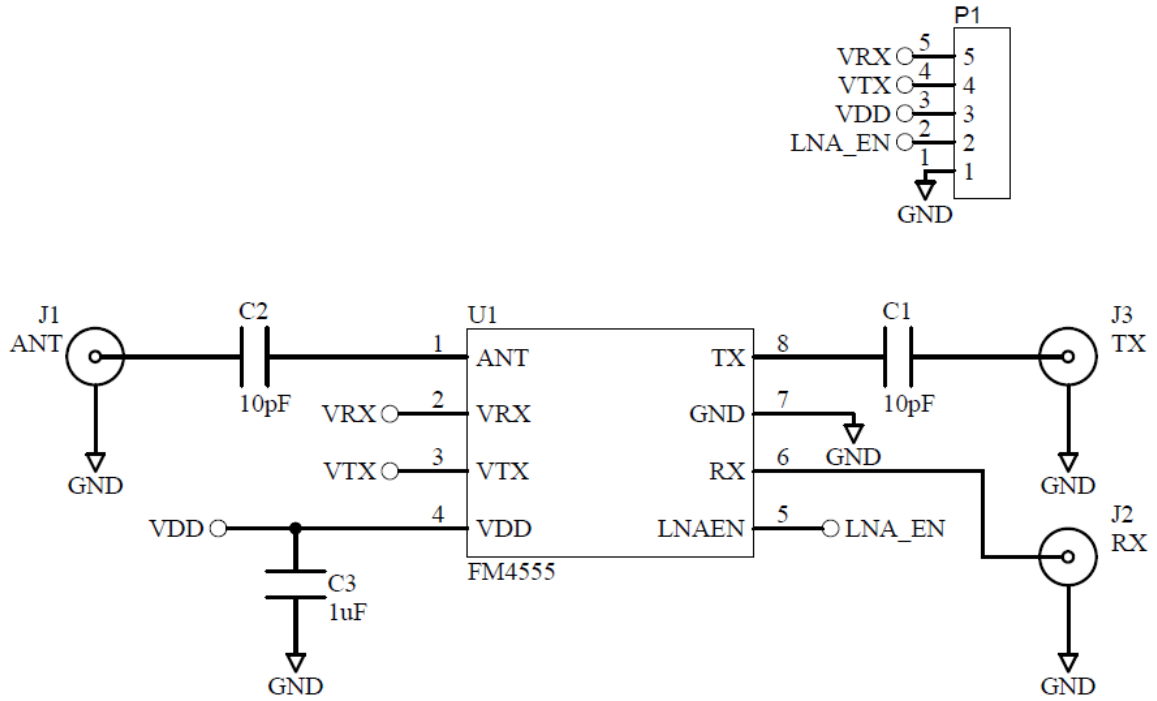
Parameter	Specification			Unit	Condition
	Min	Typ	Max		
Receive Performance (ANT-RX) – Bypass Mode					**T=+25ºC, V_{DD}=3.3-5V, VTX & LNAEN=Low, VRX=High, CW Signal; Unless otherwise noted**
Insertion Loss		6		dB	
RX Port Return Loss	10	15		dB	
ANT Port Return Loss	10	15		dB	
Input P1dB	17	20		dBm	
General Specifications					**T=+25ºC, V_{DD}=3.3-5V, Unless otherwise noted**
Leakage Current		0.2	2	µA	
LNAEN Control Current		140	280	µA	
LNA Turn On Time		400	600	nS	$V_{CONTROL}$ = 3.1V
Switch Control Current – High		0.2	5	µA	Each line
Switch Control Current - Low		0.1	1	µA	Each line
Switch Speed		100	300	nS	
ESD – Human Body Model	1000			V	EIA/JESD22-114A; All pins
ESD – Charge Device Model	1000			V	JESD22-C101C; All pins

Control Logic Truth Table

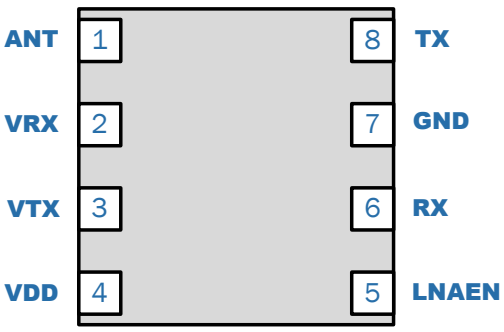
Operating Mode	VTX	LNAEN	VRX
Standby	Low	Low	Low
802.11a/n/ac TX Mode	High	Low	Low
802.11a/n/ac RX Gain	Low	High	High
802.11a/n/ac RX Bypass	Low	Low	High

Note: High = 2.8 to V_{CC}. Low = 0V to 0.2V.

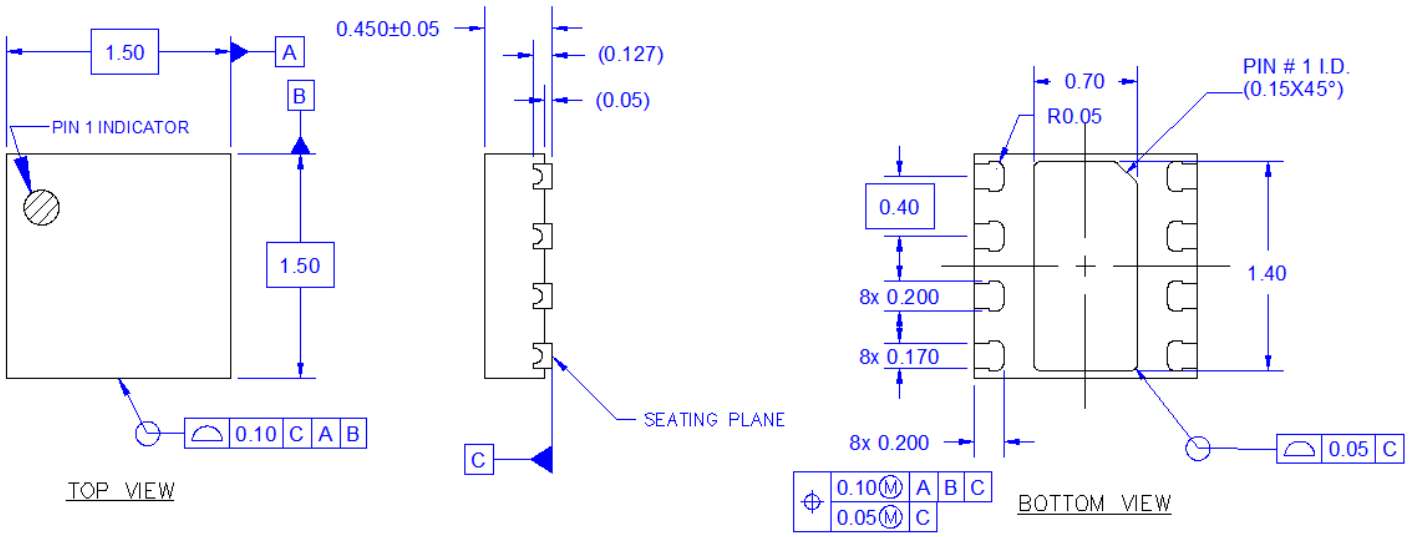
Applications Schematic



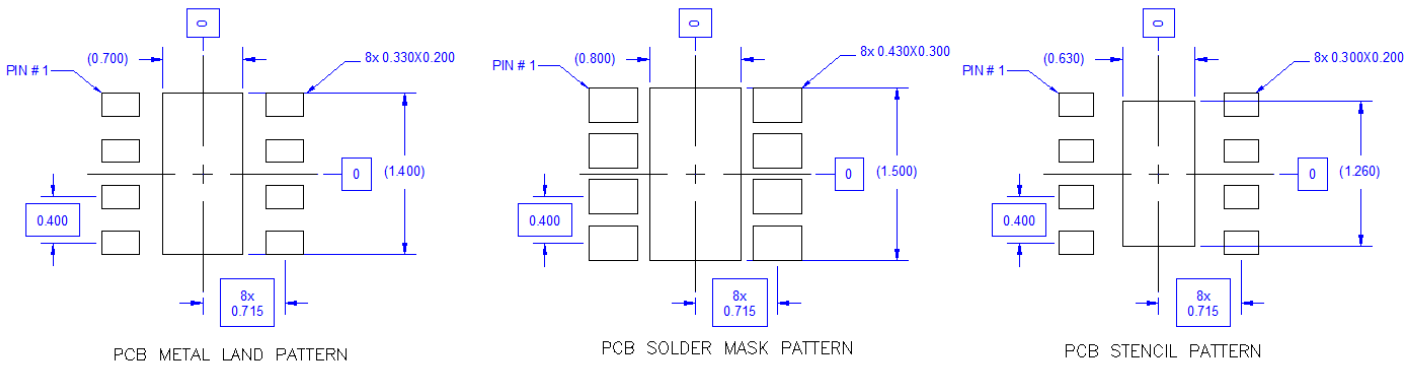
Pin Out



Package Drawing



PCB Patterns



Thermal vias for center slug should be incorporated into the PCB design. The number and size of thermal vias will depend on the application, the power dissipation, and the electrical requirements. Example of the number and size of vias can be found on the RFMD evaluation board layout.

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Pin Names and Descriptions

Pin	Name	Description
1	ANT	RF bidirectional antenna port matched to 50Ω. An external DC block is required.
2	VRX	Control pin for the Receive switch. See truth table for proper voltage level.
3	VTX	Control pin for the Transmit switch. See truth table for proper voltage level.
4	VDD	Supply voltage for the LNA. See applications schematic for bypassing components.
5	LNAEN	Control pin for Rx LNA and Rx Bypass modes. See truth table for proper voltage level.
6	RX	RF output port for the Rx LNA and Bypass modes. This port is matched to 50Ω and DC blocked internally
7	GND	Ground connection
8	TX	RF input port for the TX throw of the T/R switch. An external DC block is required
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.

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