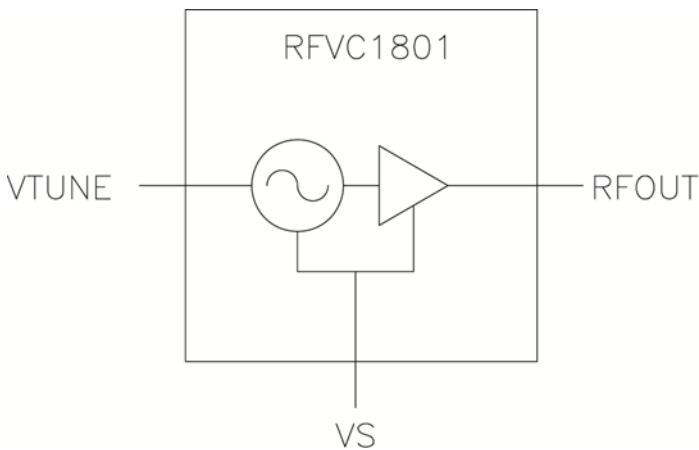


RFVC1801

Wideband MMIC VCO with Buffer Amplifier
5GHz to 10GHz

RFMD's RFVC1801 wideband voltage controlled oscillator is a GaAs InGaP HBT MMIC with integrated VCO core and RF output buffer. The part operates from a single +5V supply for circuit bias and 0V to +18V V_{TUNE} for frequency control. The RFVC1801 is an RoHS compliant, compact QFN, 4mm x 4mm package that offers low phase noise and low power consumption.



Functional Block Diagram



Package: QFN,
4mm x 4mm x 1.1mm

Features

- Wideband Performance
- P_{OUT} +3dBm Typ.
- External Resonator Not Required
- Single Bias Supply: +5V at 52mA
- Output Phase Noise: -96dBc/Hz at 100kHz
- Low Profile 4mm x 4mm QFN Package

Applications

- Military - Radar, Communications, ECM/IED
- Satcomm - Communication Modems
- Test Instrumentation
- Industrial/Medical Equipment

Ordering Information

RFVC1801S2	Sample bag with 2 pieces
RFVC1801SB	Bag with 5 pieces
RFVC1801SQ	Bag with 25 pieces
RFVC1801SR	7" Reel with 100 pieces
RFVC1801TR7	7" Reel with 750 pieces
RFVC1801TR13	13" Reel with 2500 pieces
RFVC1801PCK-410	Populated evaluation board with 2 piece sample bag

Absolute Maximum Ratings

Parameter	Rating	Unit
Device Operating Voltage (V_S)	5.5	V
V_{TUNE} (V_T)	0 to +20	V
Device Operating Current	80	mA
Operating Temperature Range	-40 to +85	°C
Storage Temperature Range	-65 to +150	°C
Operating Junction Temperature (T_J)	+140	°C
ESD Rating - Human Body Model (HBM)	Class 0	



Caution! ESD sensitive device.



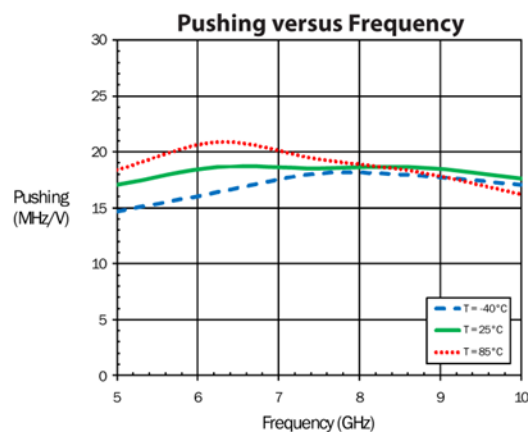
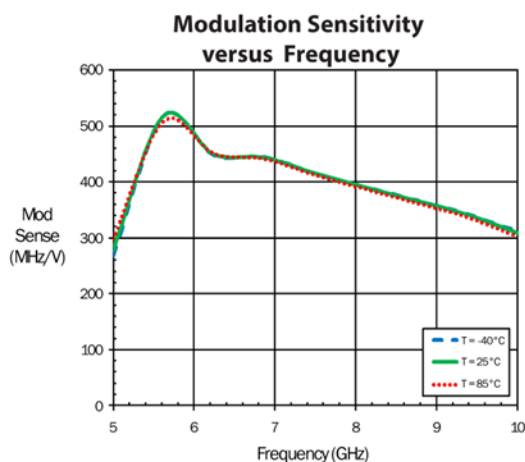
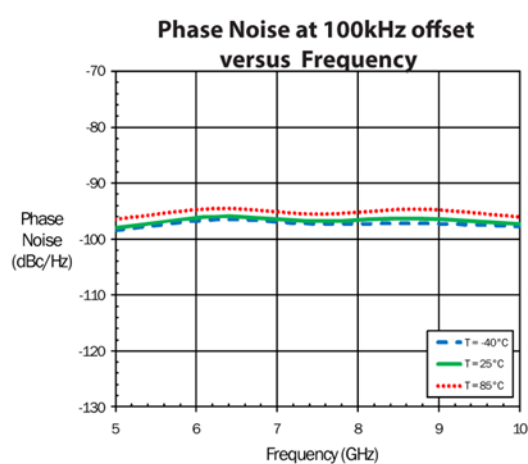
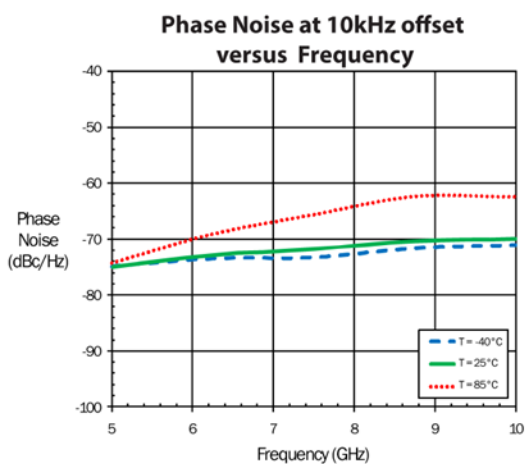
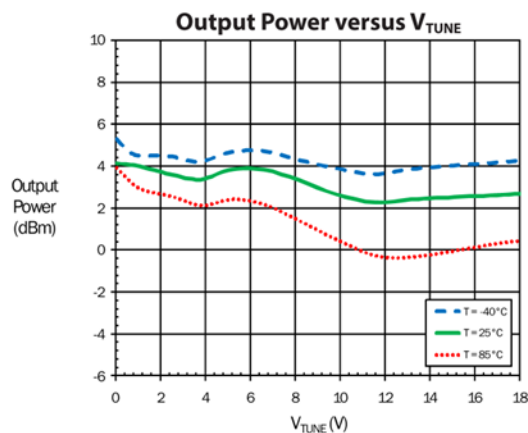
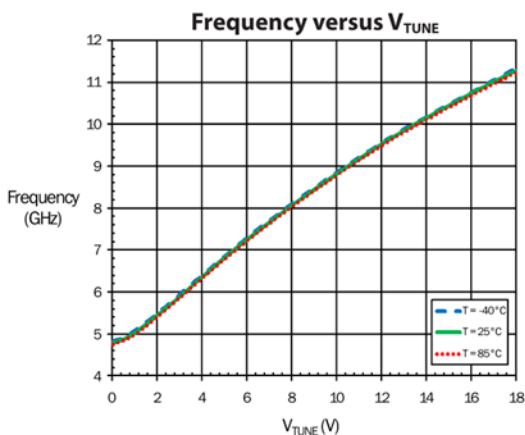
RFMD Green: RoHS compliant per EU Directive 2011/65/EU, halogen free per IEC 61249-2-21, <1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony solder.

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.

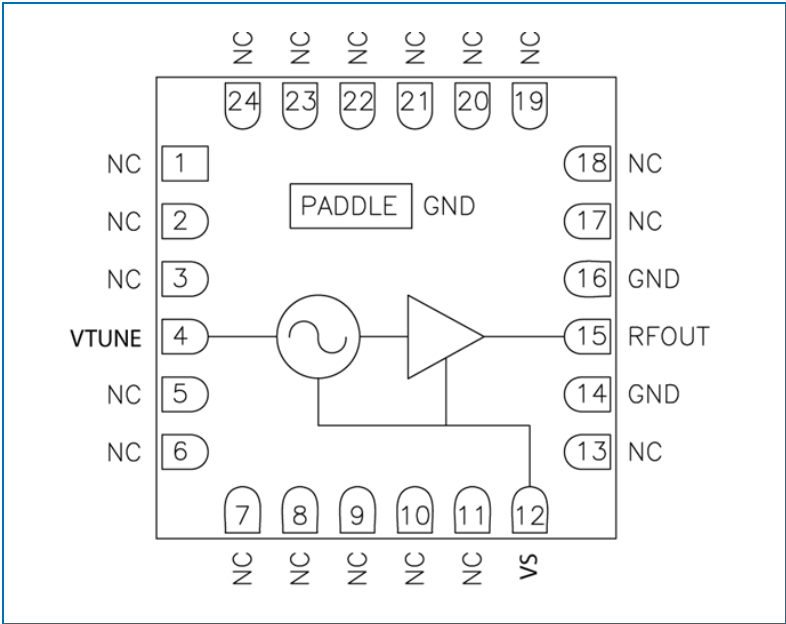
Nominal Operating Parameters

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
General Performance					$V_S = 5V$, Freq = 5GHz to 10GHz, $T = 25^\circ C$ unless noted otherwise.
Frequency of Operation	5.0		10.0	GHz	
Supply Voltage (V_S)	4.75	5.00	5.25	V	Recommended operating range.
Supply Current	40	52	70	mA	
Tuning Voltage (V_{TUNE})	0		18	V	
Tuning Sensitivity		390		MHz/V	
Output Power		3		dBm	
Output Phase Noise at 10kHz		-72		dBc/Hz	
Output Phase Noise at 100kHz		-96		dBc/Hz	
2nd Harmonic		-20		dBc	
Frequency Pushing		18		MHz/V	
Frequency Pulling (2:1 VSWR)		5		MHz pp	
RF Output Return Loss		9		dB	
Frequency Drift Rate		-0.7		MHz/°C	
V_{TUNE} Port Input Capacitance		4		pF	
Thermal Resistance		45		°C/W	Junction to paddle

Typical Evaluation Board Performance: ($V_S = 5.0V$, unless noted)



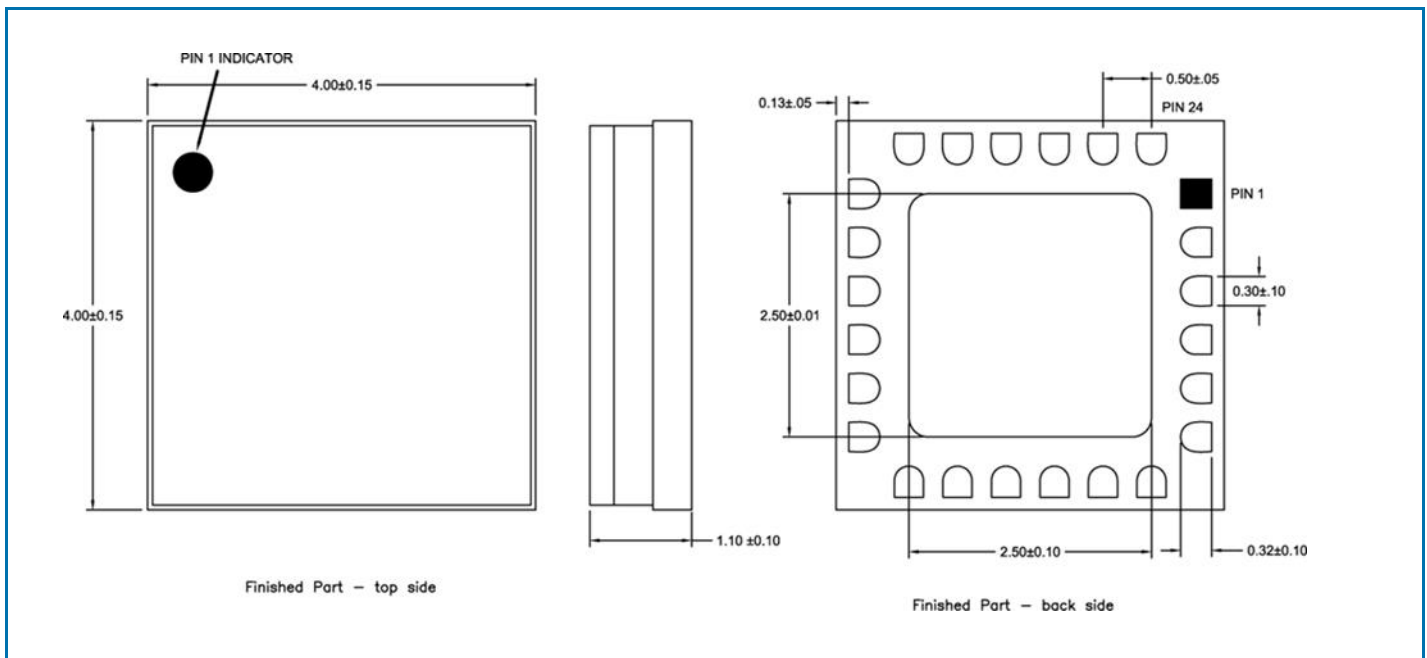
Pin Out



Pin Names and Descriptions

Pin	Name	Description
1-3	N/C	No internal connection. Connect to PCB ground.
4	VTUNE	VCO control voltage input.
5-11	N/C	No internal connection. Connect to PCB ground.
12	VS	Supply voltage input for the VCO and Buffer stage.
13	N/C	No internal connection. Connect to PCB ground.
14	GND	Pin internally bonded to package paddle. Connect to PCB ground.
15	RFOUT	VCO RF output. Pin is internally DC-blocked.
16	GND	Pin internally bonded to package paddle. Connect to PCB ground.
17-24	N/C	No internal connection. Connect to PCB ground.
PADDLE	GND	Exposed paddle on backside needs to be soldered to PCB ground.

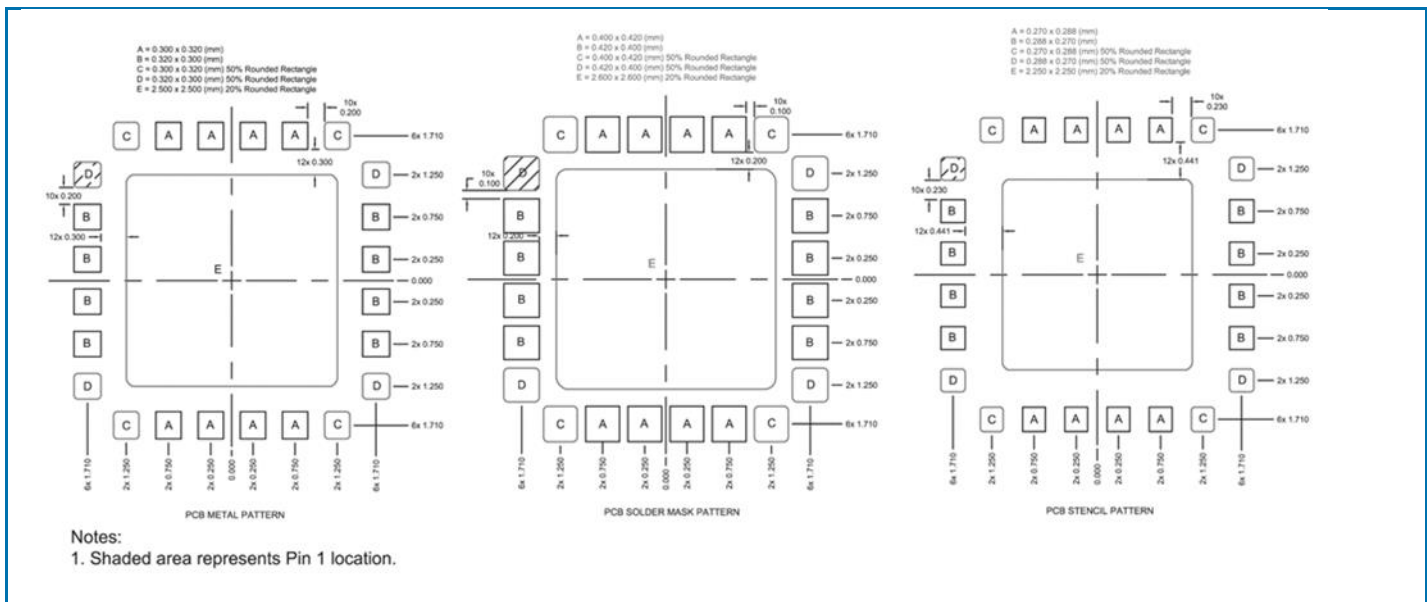
Package Drawing (Dimensions in millimeters)



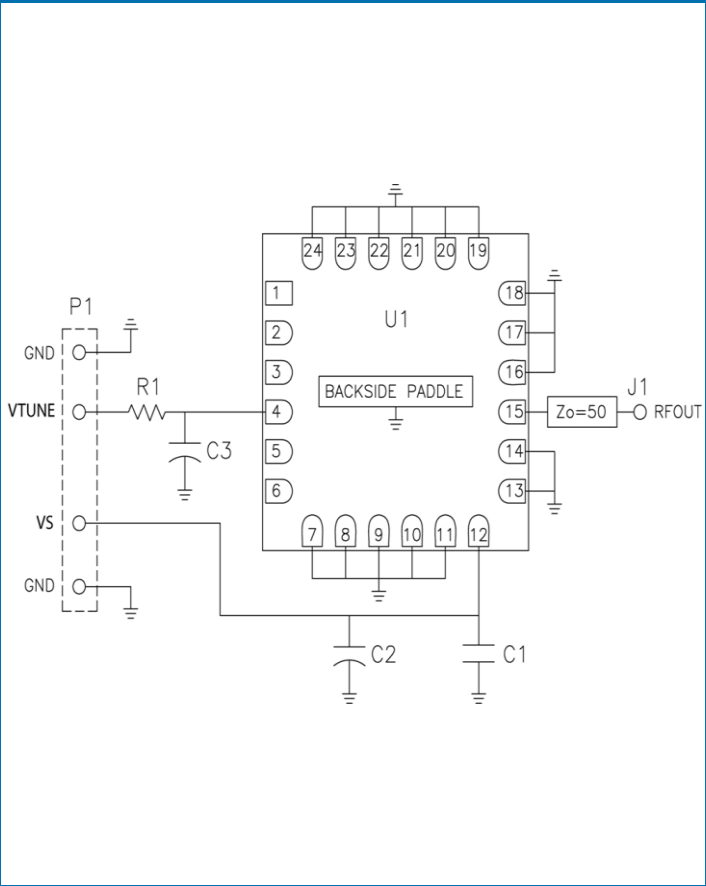
Notes:

1. Dimensions are for reference only.
2. Package body material: Alumina.
3. Lead and paddle plating: Au, 30µm minimum.

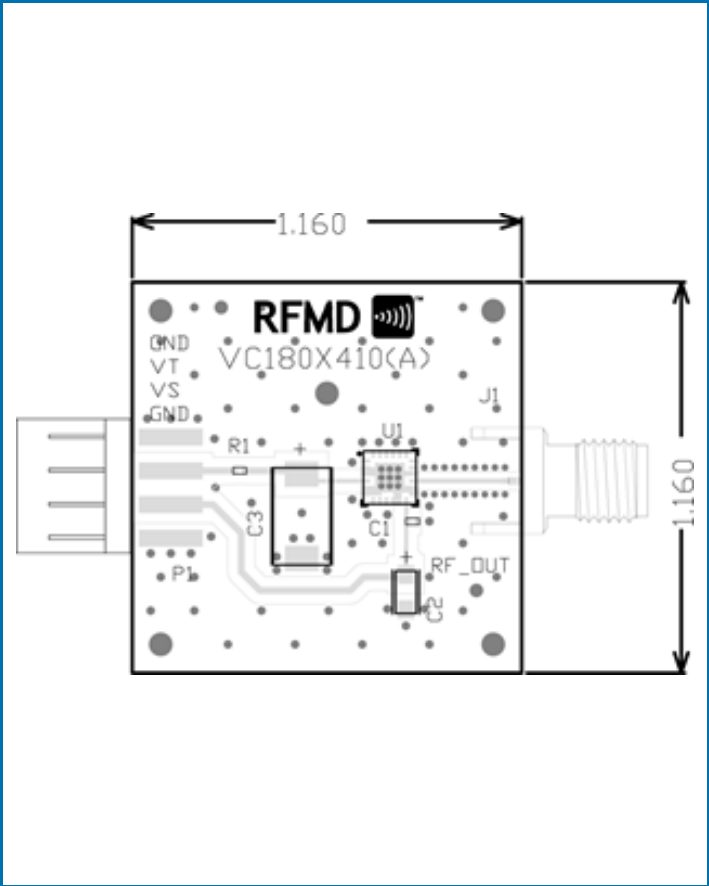
Recommended PCB Layout



Evaluation Board Schematic



Evaluation Board Layout



Evaluation Board Bill of Materials (BOM)

Item	Description
U1	RFVC1801
C1	CAP, 1000 pF, 0402
C2	CAP, 4.7μF, TANT-A
C3	CAP, 22μF, TANT-D
R1	Jumper, 0Ω, 0402
P1	CONN, HDR, ST, PLRZD, 4-Pin, 0.100"
J1	CONN, SMA, END LAUNCH