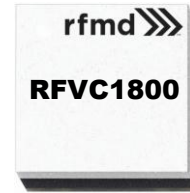


# RFVC1800

Wideband MMIC VCO with Buffer Amplifier  
8GHz to 12GHz

RFMD's RFVC1800 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 +13V  $V_{TUNE}$  for frequency control. The RFVC1800 is a RoHS compliant, compact QFN, 4mm x 4mm package that offers low phase noise and low power consumption.



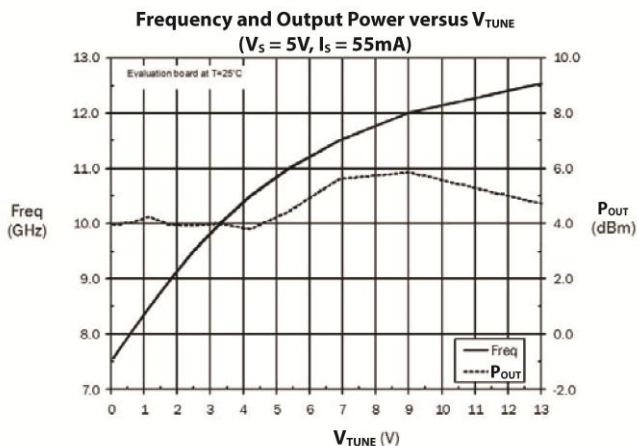
Package: QFN,  
4mm x 4mm x 1.1mm

## Features

- Wideband Performance
- $P_{OUT}$  +4dBm Typ.
- External Resonator Not Required
- Single Bias Supply: +5V at 55mA
- Output Phase Noise: -93dBc/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

RFVC1800S2	Sample bag with 2 pieces
RFVC1800SB	Bag with 5 pieces
RFVC1800SQ	Bag with 25 pieces
RFVC1800SR	7" Reel with 100 pieces
RFVC1800TR7	7" Reel with 750 pieces
RFVC1800TR13	13" Reel with 2500 pieces
RFVC1800PCK-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 +15	V
Power Dissipation at $T = 85^\circ\text{C}$ (Derate 13.3 mW/ $^\circ\text{C}$ above $T = 85^\circ\text{C}$ )	730	mW
Operating Temperature Range	-40 to +85	$^\circ\text{C}$
Storage Temperature Range	-65 to +150	$^\circ\text{C}$
Operating Junction Temperature ( $T_J$ )	+140	$^\circ\text{C}$
ESD Rating - Human Body Model (HBM)	Class 1A	



**Caution!** ESD sensitive device.



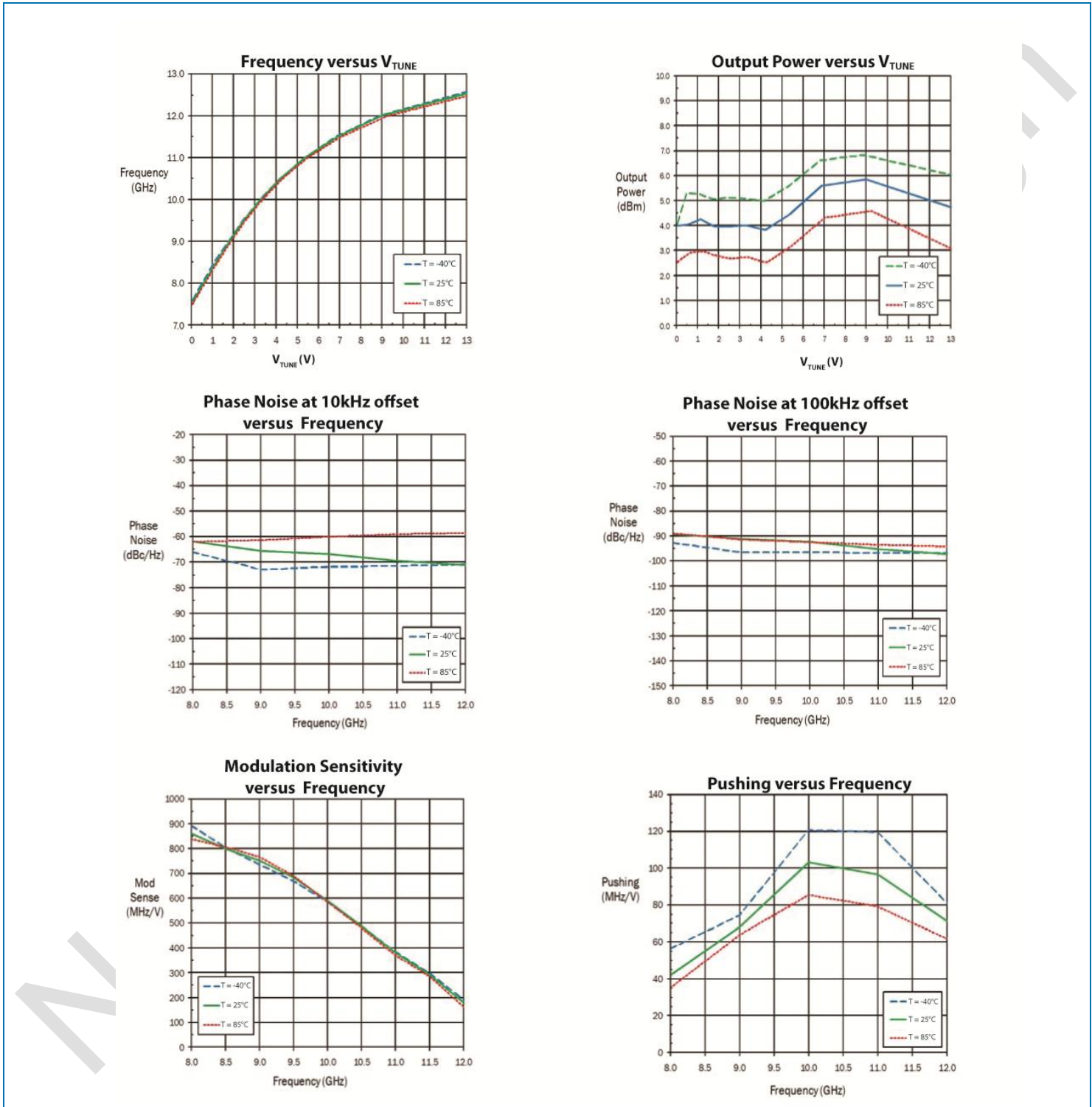
RFMD Green: RoHS compliant per EU Directive 2011/65/EU, halogen free per IEC 61249-2-21, <1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony solder.

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.

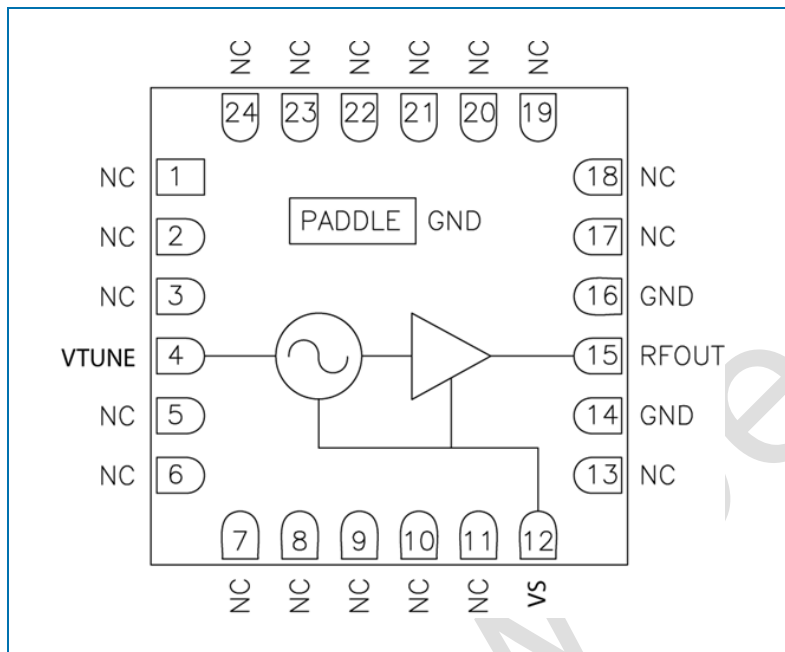
## Nominal Operating Parameters

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
<b>General Performance</b>					<b><math>V_S = 5\text{V}</math>, Freq = 8GHz to 12GHz, <math>T = 25^\circ\text{C}</math> unless noted otherwise.</b>
Frequency of Operation	8.0		12.0	GHz	
Supply Voltage ( $V_S$ )	4.75	5.00	5.25	V	Recommended operating range.
Supply Current	40	55	70	mA	
Tuning Voltage ( $V_{TUNE}$ )	0		13	V	
Tuning Sensitivity		565		MHz/V	
Output Power	2	4		dBm	
Output Phase Noise at 10kHz		-66		dBc/Hz	
Output Phase Noise at 100kHz		-93		dBc/Hz	
2nd Harmonic		-20		dBc	
Frequency Pushing		90		MHz/V	
Frequency Pulling (2:1 VSWR)		7		MHz pp	
RF Output Return Loss		8		dB	
Frequency Drift Rate		-0.7		MHz/ $^\circ\text{C}$	
$V_{TUNE}$ Port Input Capacitance		4		pF	
Thermal Resistance		75		$^\circ\text{C}/\text{W}$	Junction to paddle

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



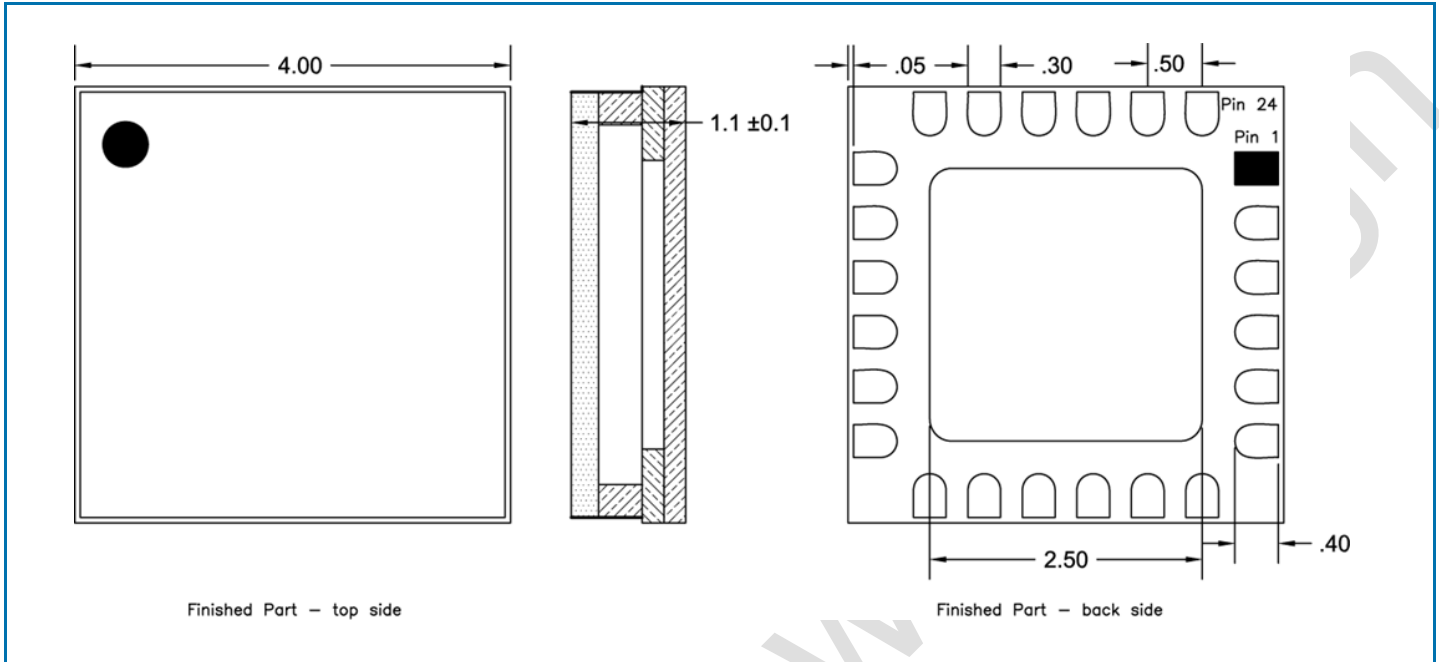
### Pin Out



### 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.

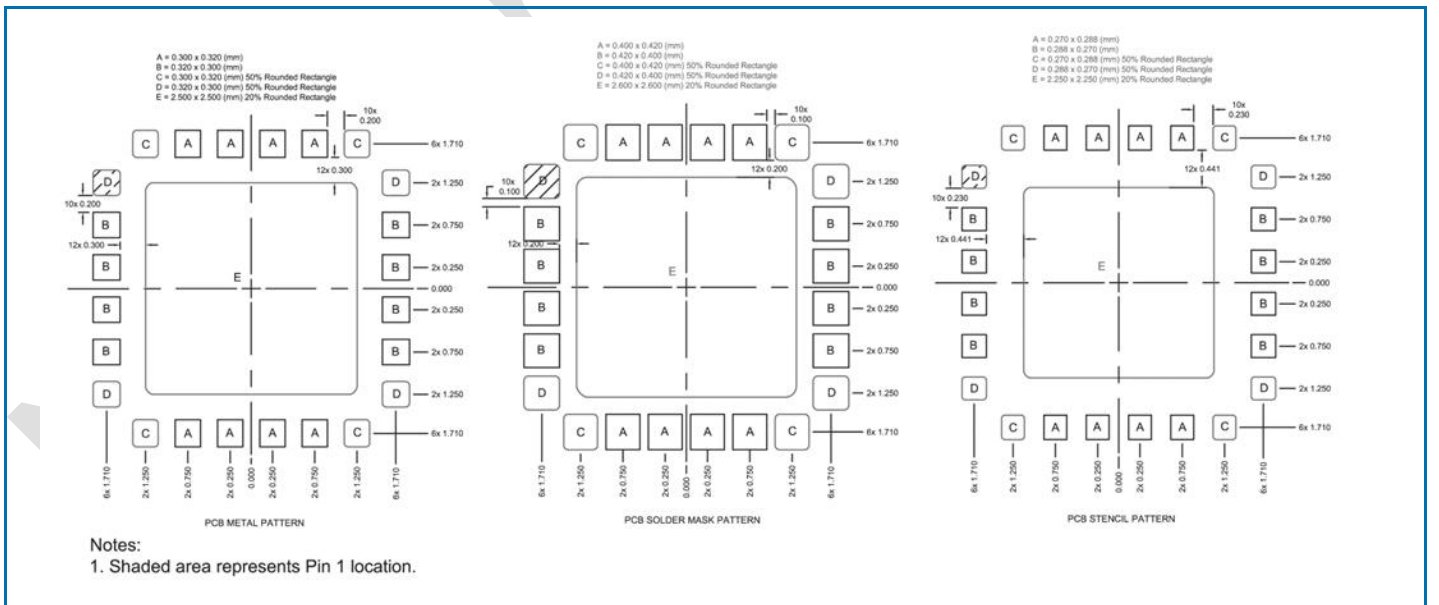
Package Drawing (Dimensions in millimeters)



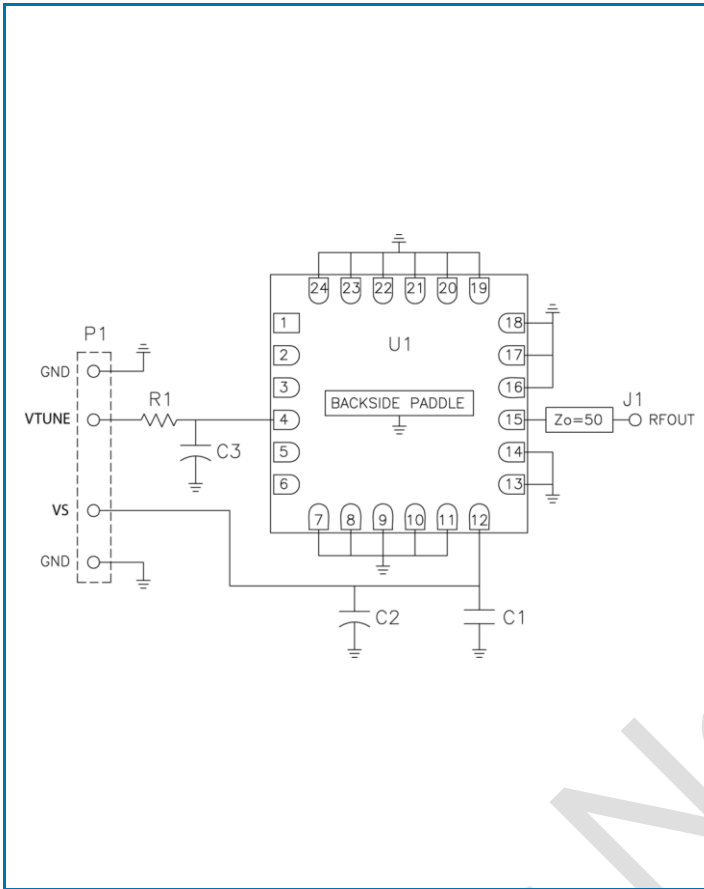
Notes:

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

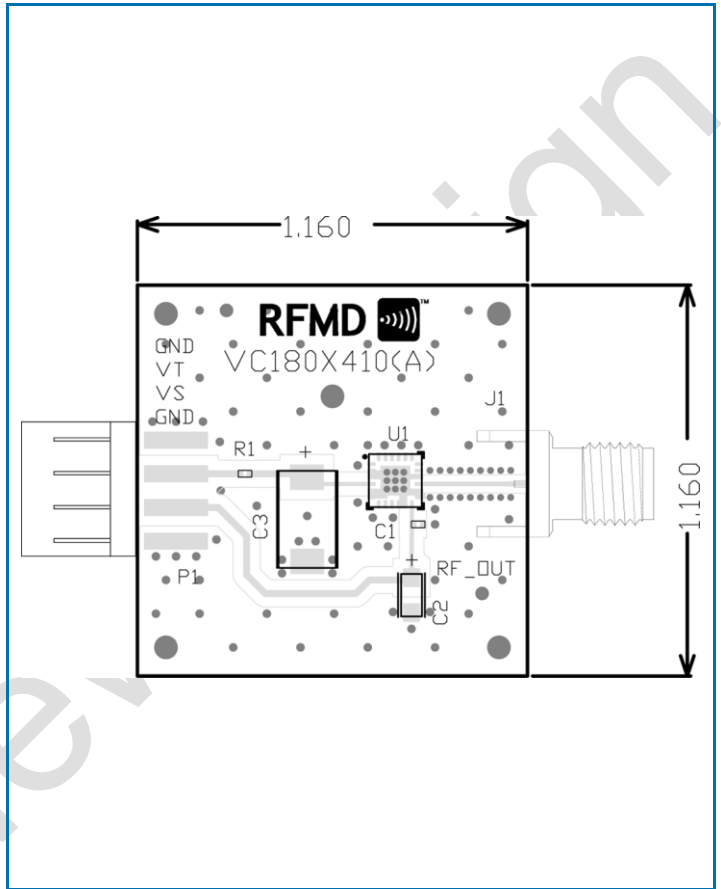
Recommended PCB Layout



### Evaluation Board Schematic



### Evaluation Board Layout



### Evaluation Board Bill of Materials (BOM)

Item	Description
U1	RFVC1800
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