

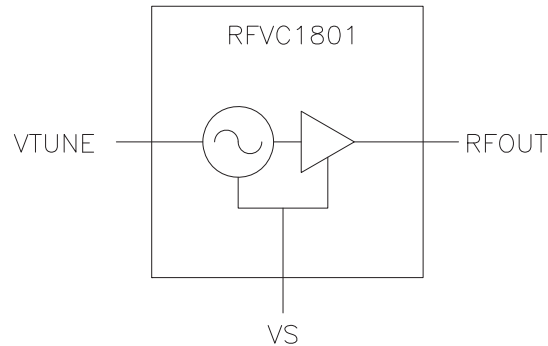


Features

- Wideband Performance
- P_{OUT} = +3dBm Typical
- External Resonator Not Required
- Single Bias Supply: +5V at 52 mA
- Output Phase Noise: -96dBc/Hz at 100kHz
- Low Profile 4mmx4mm QFN

Applications

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



Functional Block Diagram

Product Description

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 a RoHS Compliant, compact QFN, 4mmx4mm package that offers low phase noise and low power consumption.

Ordering Information

RFVC1801S2	2 piece sample bag
RFVC1801SB	5 piece bag
RFVC1801SQ	25 piece bag
RFVC1801SR	100 pieces on 7" reel
RFVC1801TR7	750 pieces on 7" reel
RFVC1801TR13	2500 pieces on 13" reel
RFVC1801PCK-410	Populated Evaluation Board with 2 piece sample bag

Optimum Technology Matching® Applied

- | | | | |
|---|--------------------------------------|-------------------------------------|------------------------------------|
| <input type="checkbox"/> GaAs HBT | <input type="checkbox"/> SiGe BiCMOS | <input type="checkbox"/> GaAs pHEMT | <input type="checkbox"/> GaN HEMT |
| <input type="checkbox"/> GaAs MESFET | <input type="checkbox"/> Si BiCMOS | <input type="checkbox"/> Si CMOS | <input type="checkbox"/> BiFET HBT |
| <input checked="" type="checkbox"/> InGaP HBT | <input type="checkbox"/> SiGe HBT | <input type="checkbox"/> Si BJT | <input type="checkbox"/> LDMOS |

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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.

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.

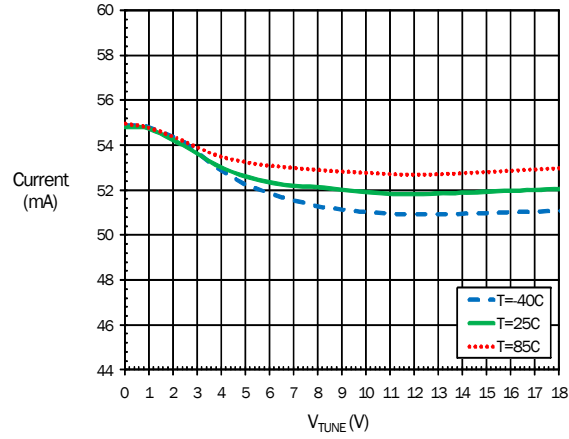
RoHS status based on EUDirective2002/95/EC (at time of this document revision).

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall					$V_S = 5V$, 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

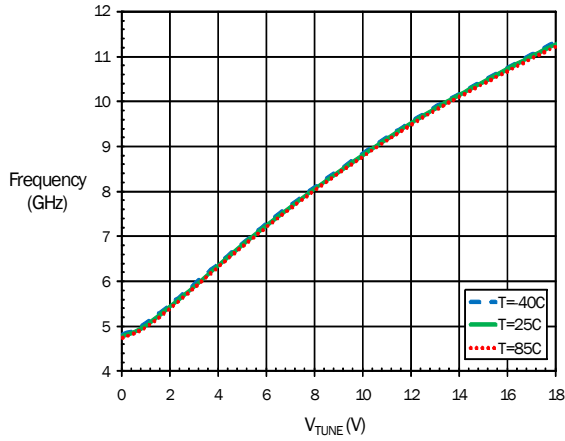
Typical Evaluation Board Performance ($V_S=5.0V$ unless otherwise noted)

Supply Current versus V_{TUNE}

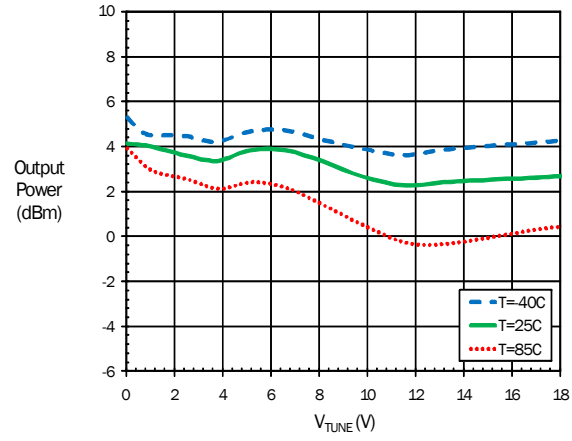


Typical Evaluation Board Performance ($V_S = 5.0V$ unless otherwise noted)

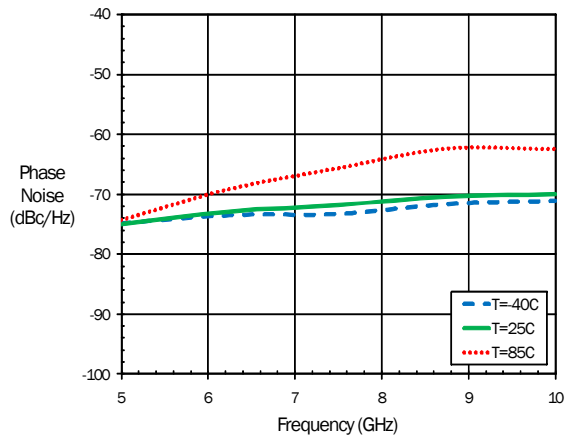
Frequency versus V_{TUNE}



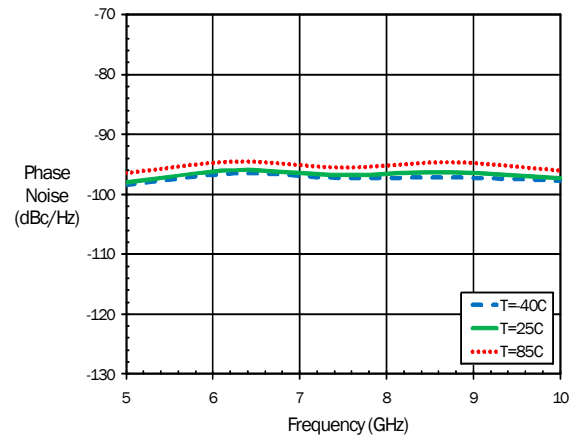
Output Power versus V_{TUNE}



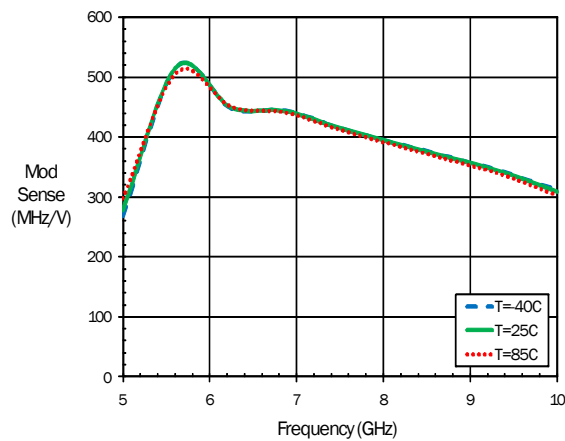
Phase Noise at 10kHz Offset versus Frequency



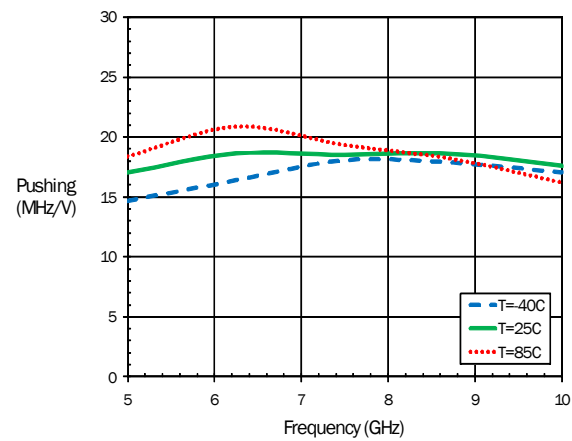
Phase Noise at 100kHz Offset versus Frequency



Modulation Sensitivity versus Frequency

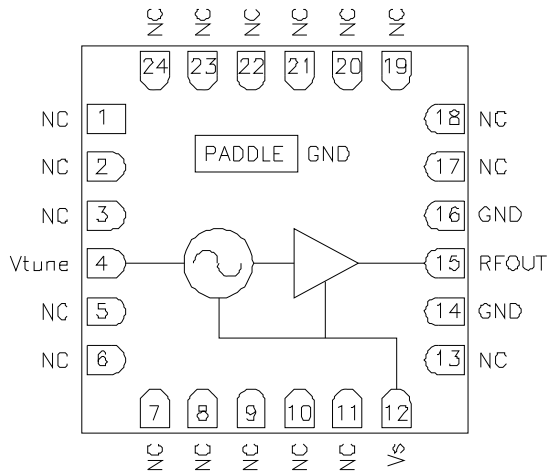


Pushing versus Frequency

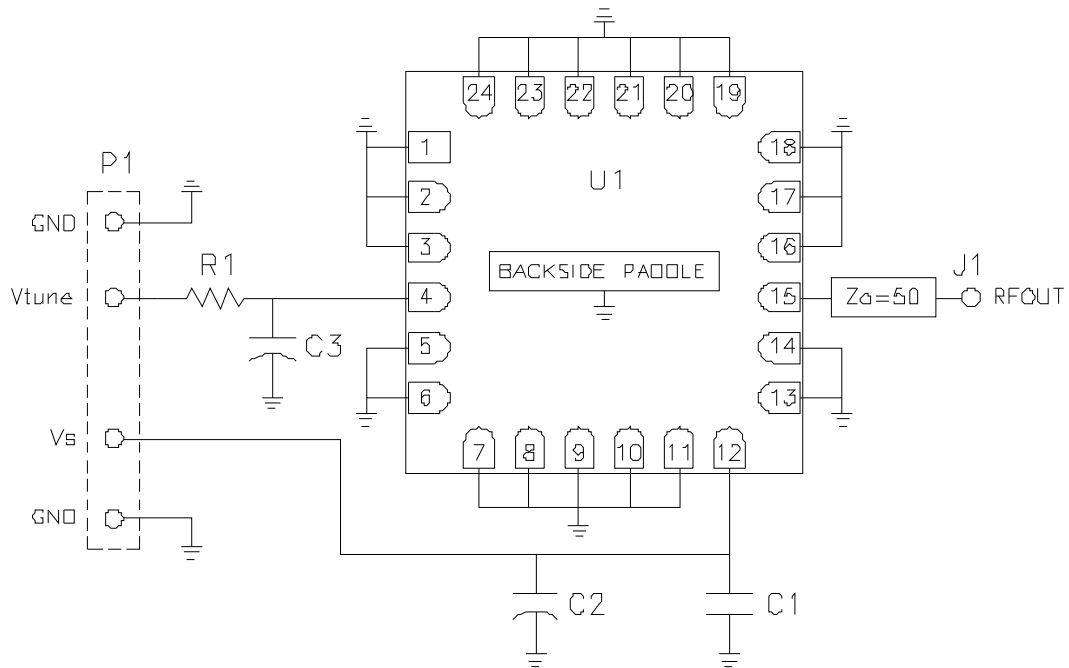


Pin	Function	Description
1-3, 5-11, 13, 17-24	NC	No internal connection. Connect to PCB ground.
4	VTUNE	VCO control voltage input
12	VS	Supply voltage input for the VCO and Buffer stage.
14,16	GND	Pin internally bonded to package paddle. Connect to PCB ground.
15	RFOUT	VCO RF output. Pin is internally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

Pin Out

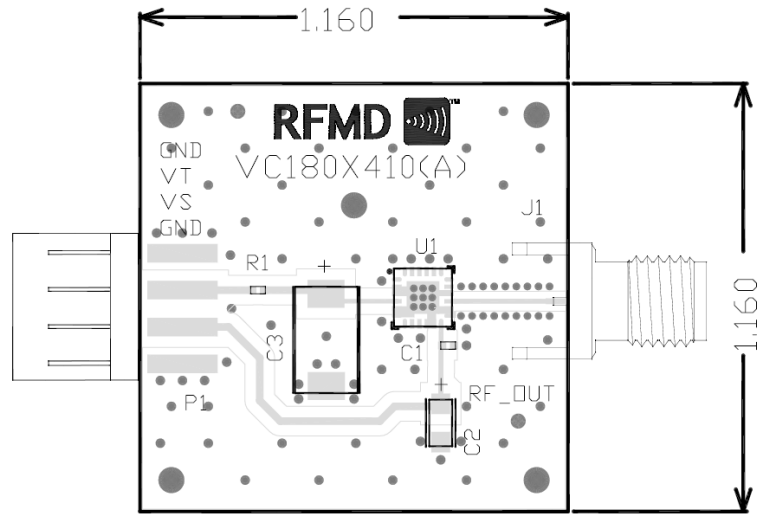


Evaluation Board Schematic

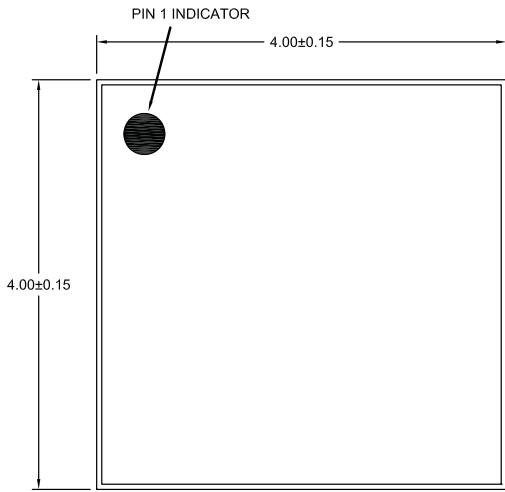


Item	Description
U1	RFVC1801
C1	CAP, 1000pF, 0402
C2	CAP, 4.7 uF, TANT-A
C3	CAP, 22 uF, TANT-D
R1	Jumper, 0Ω, 0402
P1	CONN, HDR, ST, PLRZD, 4-Pin, 0.100"
J1	CONN, SMA, END Launch

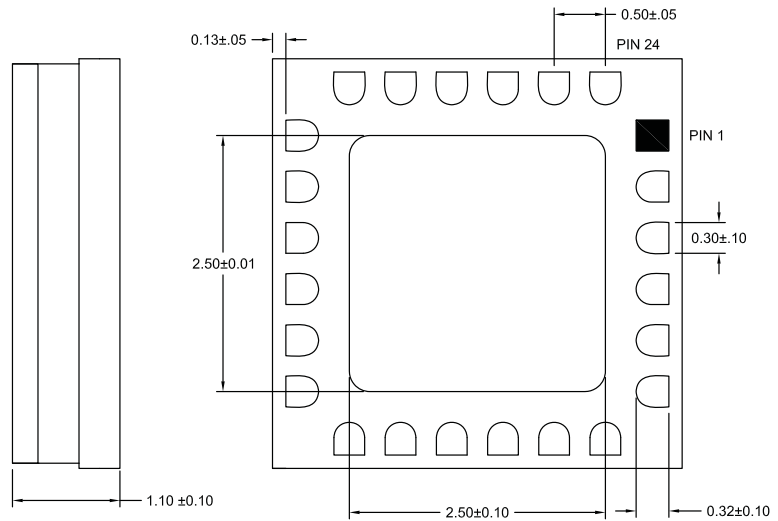
Evaluation Board Layout



Package Drawing



Finished Part – top side

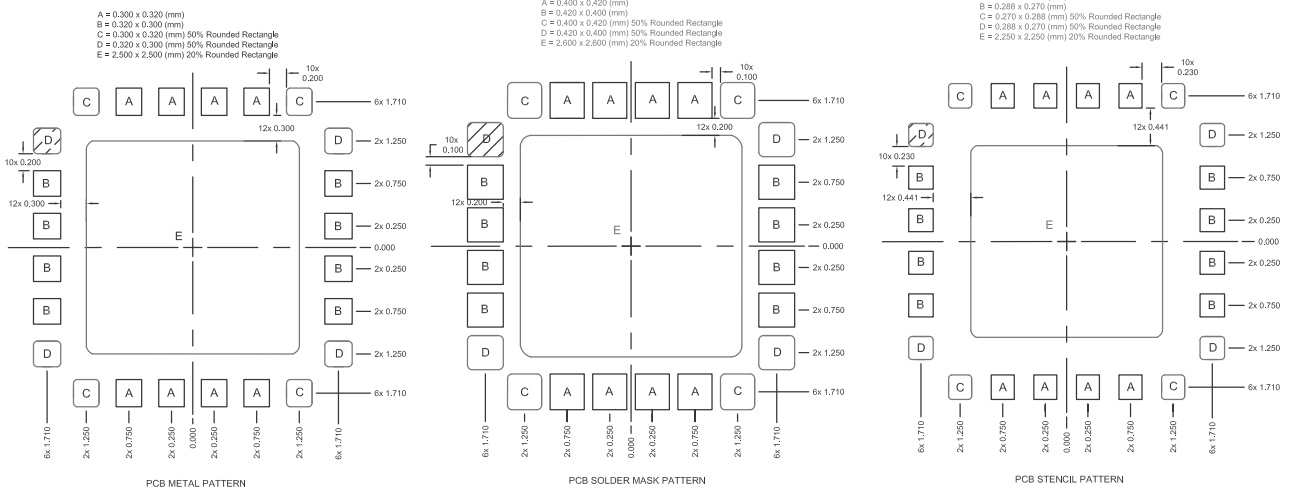


Finished Part – back side

Notes:

1. Dimensions in mm.
2. Dimensions are for reference only.
3. Package body material: Alumina.
4. Lead and paddle plating: Au, 30u" minimum.

Recommended PCB Layout



Notes:

1. Shaded area represents Pin 1 location.