



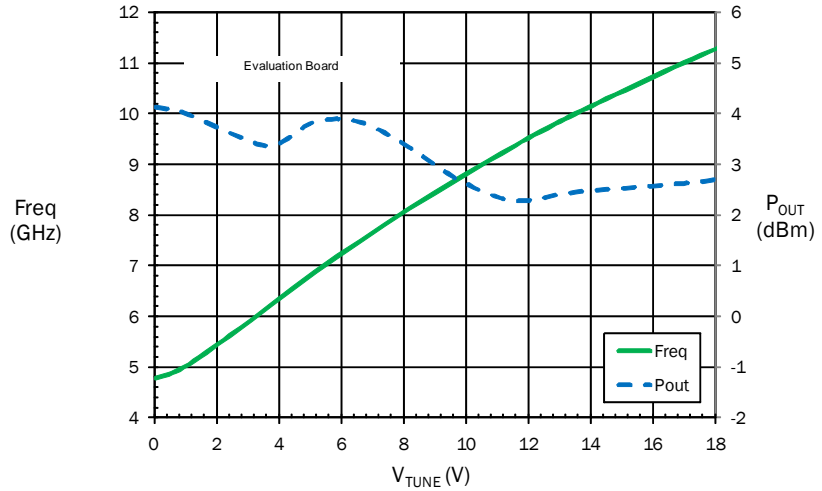
Features

- 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
- RoHS Compliant

Applications

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

Frequency and Output Power versus V_{TUNE}
(V_S=5V, T=25 °C)



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 pc Sample Bag |
| RFVC1801PCK-410 | Fully Assembled Evaluation Board |
| RFVC1801 | 5 pcs or more |

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"/> LDMS |

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.

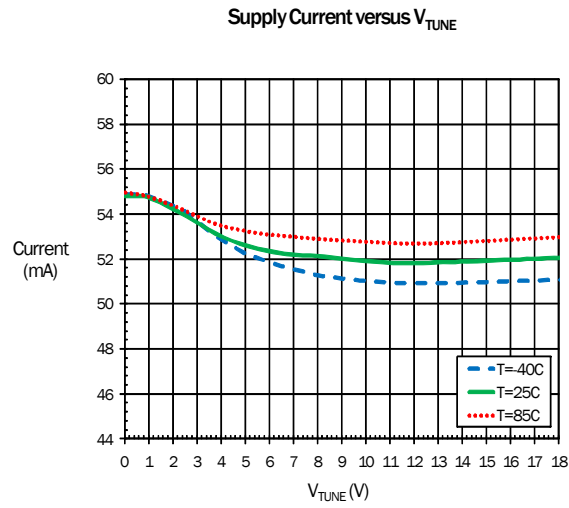
Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

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

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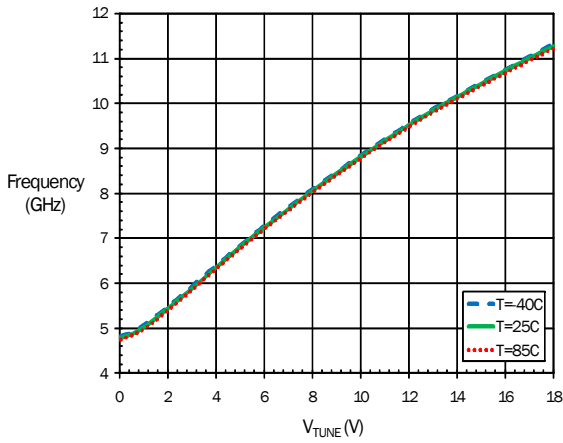
| Parameter | Specification | | | Unit | Condition |
|-----------------------------------|---------------|------|------|--------|---|
| | Min. | Typ. | Max. | | |
| Overall | | | | | $V_S = 5V$, Freq = 5GHz to 10GHz, $T = 25^\circ C$ unless noted otherwise. |
| Frequency of Operation | 5.0 | | 10.0 | 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)

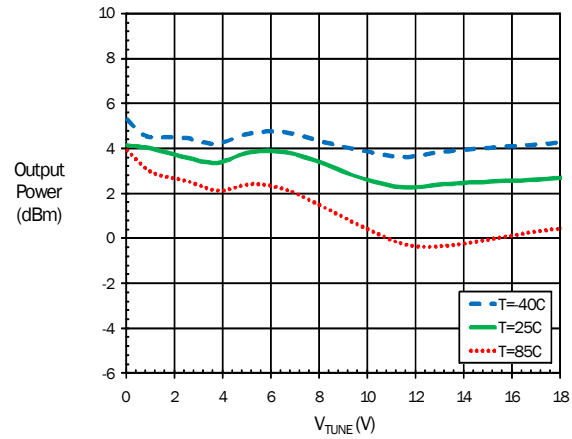


Typical Evaluation Board Performance ($V_S = 5.0V$ unless otherwise noted)

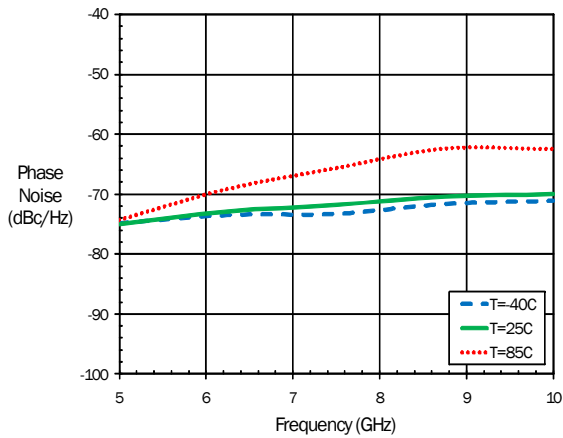
Frequency versus V_{TUNE}



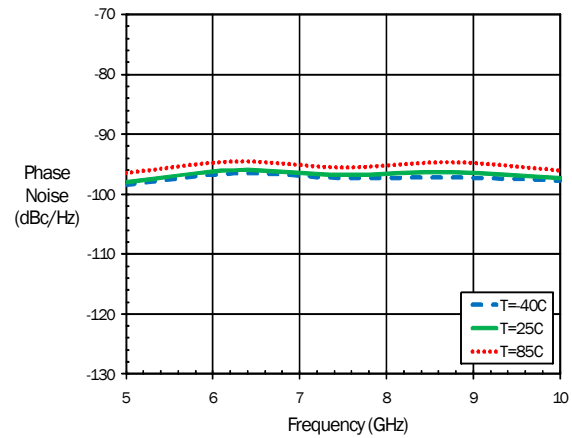
Output Power versus V_{TUNE}



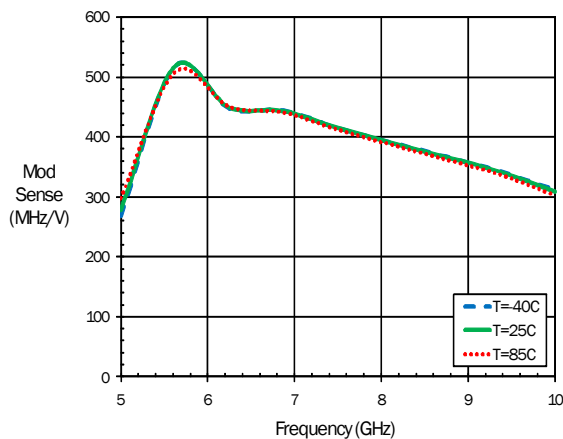
Phase Noise at 10kHz Offset versus Frequency



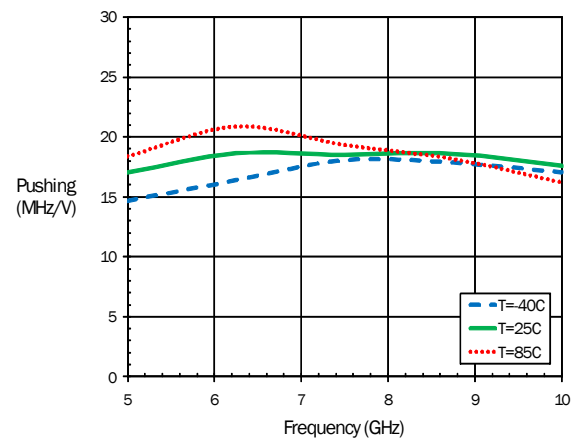
Phase Noise at 100kHz Offset versus Frequency



Modulation Sensitivity versus Frequency

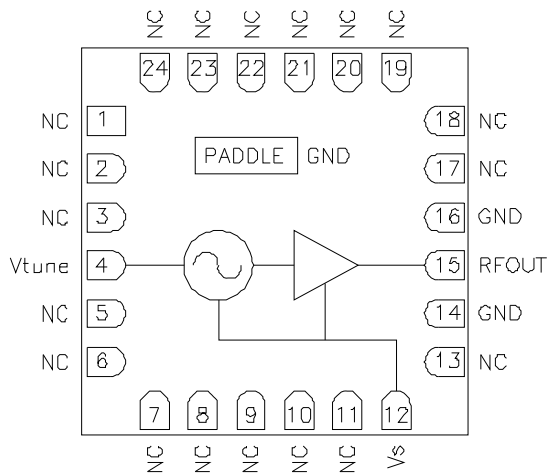


Pushing versus Frequency

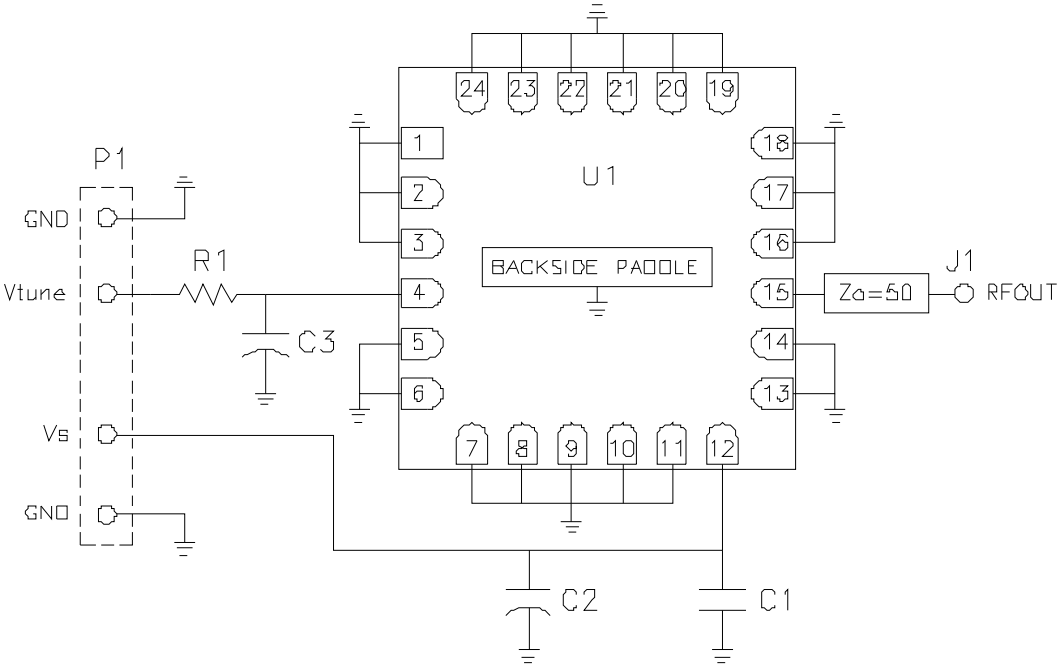


| Pin | Function | Description |
|---|--------------|---|
| 1-3, 5-11, 13, 17-24 | NC | No internal connection. Connect to PCB ground. |
| 4 | VTUNE | VCO control voltage input |
| 12 | VS | Supply voltage input for the VCO and Buffer stage. |
| 14,16 | GND | Pin internally bonded to package paddle. 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

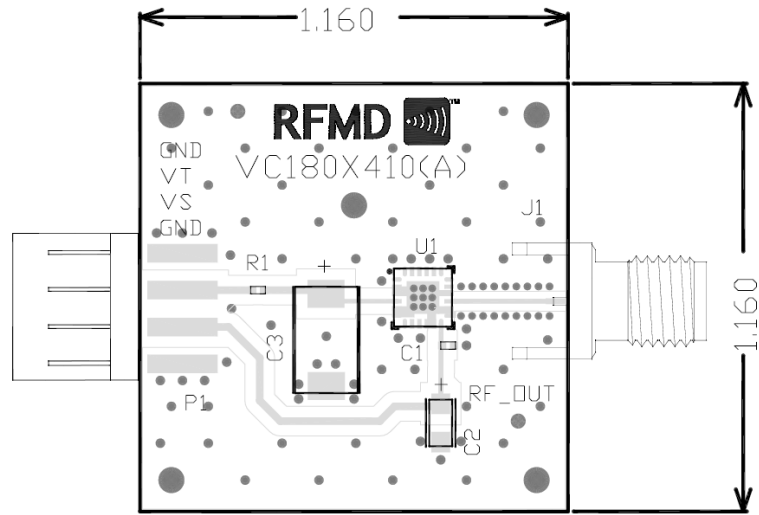


Evaluation Board Schematic

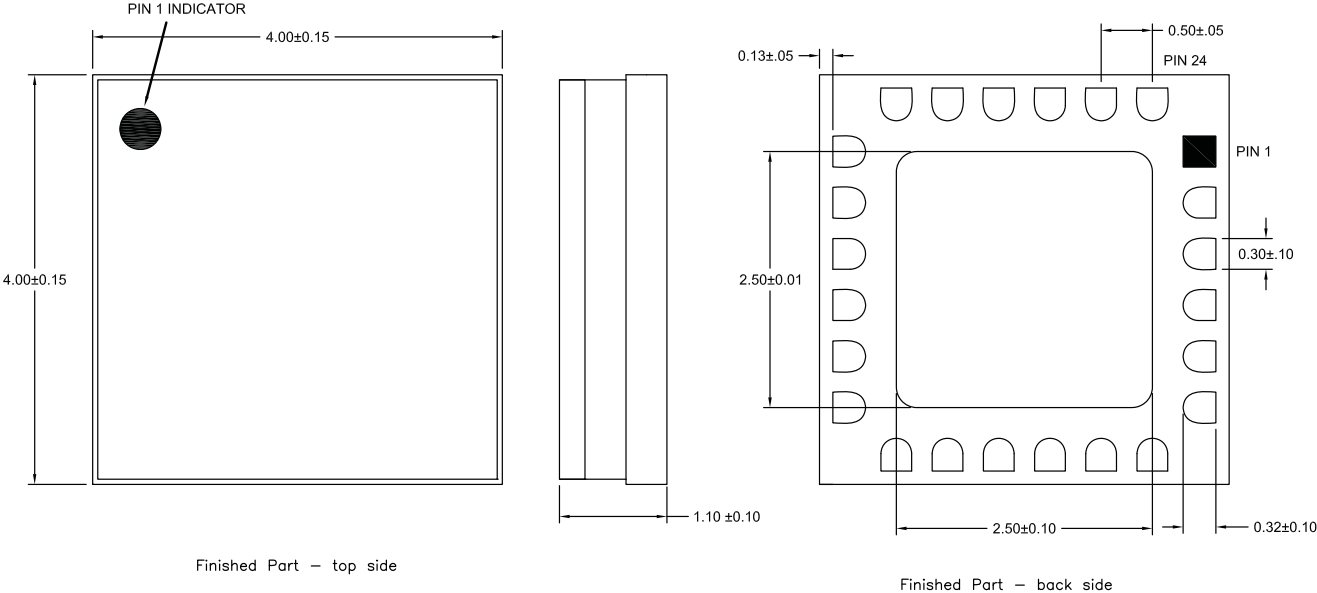


| Item | Description |
|------|-------------------------------------|
| U1 | RFVC1801 |
| C1 | CAP, 1000pF, 0402 |
| C2 | CAP, 4.7 uF, TANT-A |
| C3 | CAP, 22 uF, TANT-D |
| R1 | Jumper, 0Ω, 0402 |
| P1 | CONN, HDR, ST, PLRZD, 4-Pin, 0.100" |
| J1 | CONN, SMA, END Launch |

Evaluation Board Layout



Package Drawing



- Notes:
1. Dimensions in mm.
 2. Dimensions are for reference only.
 3. Package body material: Alumina.
 4. Lead and Paddle plating: Gold.