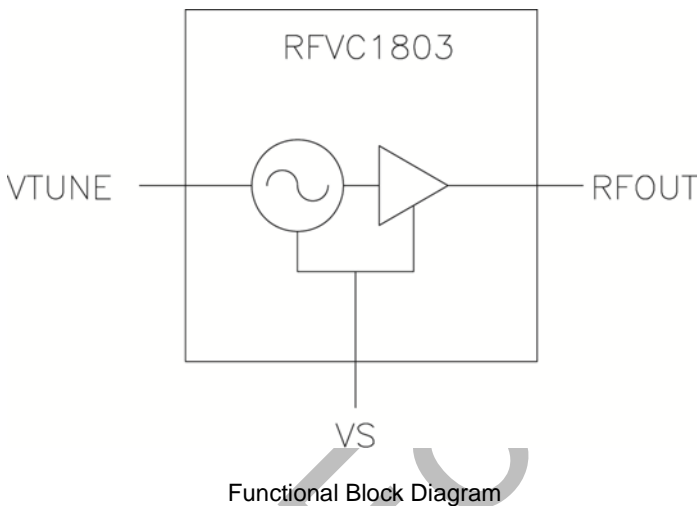


RFVC1803

Wideband MMIC VCO with Buffer Amplifier
6GHz to 9GHz

RFMD's RFVC1803 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 +15V V_{TUNE} for frequency control. The RFVC1803 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} +3.5dBm Typ.
- External Resonator Not Required
- Single Bias Supply: +5V at 53mA
- Output Phase Noise: -97dBc/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

| | |
|-----------------|--|
| RFVC1803S2 | Sample bag with 2 pieces |
| RFVC1803SB | Bag with 5 pieces |
| RFVC1803SQ | Bag with 25 pieces |
| RFVC1803SR | 7" Reel with 100 pieces |
| RFVC1803TR7 | 7" Reel with 750 pieces |
| RFVC1803TR13 | 13" Reel with 2500 pieces |
| RFVC1803PCK-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.



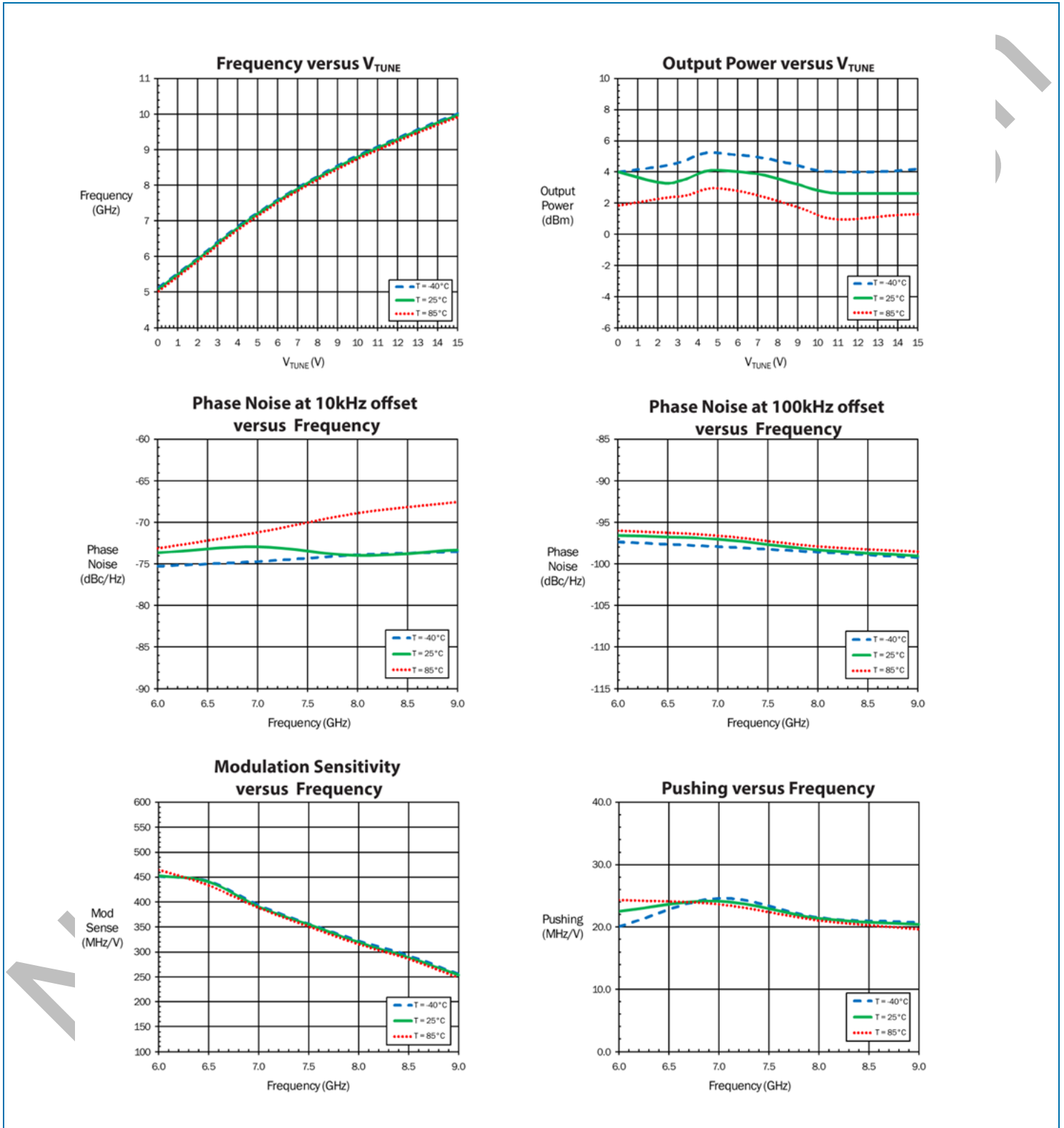
RFMD Green: RoHS compliant per EU Directive 2011/65/EU, halogen free per IEC 61249-2-21, <1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony solder.

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.

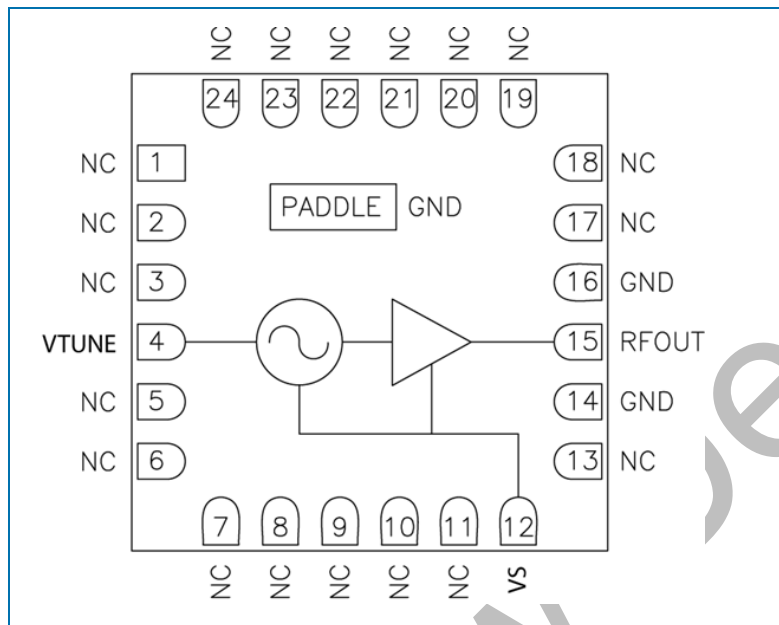
Nominal Operating Parameters

| Parameter | Specification | | | Unit | Condition |
|-----------------------------------|---------------|------|------|--------|--|
| | Min | Typ | Max | | |
| General Performance | | | | | $V_s = 5V$, Freq = 6GHz to 9GHz, $T = 25^\circ\text{C}$ unless noted otherwise. |
| Frequency of Operation | 6.0 | | 9.0 | GHz | |
| Supply Voltage (V_s) | 4.75 | 5.00 | 5.25 | V | Recommended operating range. |
| Supply Current | 40 | 53 | 70 | mA | |
| Tuning Voltage (V_{TUNE}) | 0 | | 15 | V | |
| Tuning Sensitivity | | 360 | | MHz/V | |
| Output Power | | 3.5 | | dBm | |
| Output Phase Noise at 10kHz | | -73 | | dBc/Hz | |
| Output Phase Noise at 100kHz | | -97 | | dBc/Hz | |
| 2nd Harmonic | | -20 | | dBc | |
| Frequency Pushing | | 24 | | MHz/V | |
| Frequency Pulling (2:1 VSWR) | | 2.5 | | MHz pp | |
| RF Output Return Loss | | 9 | | dB | |
| Frequency Drift Rate | | -0.8 | | 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)



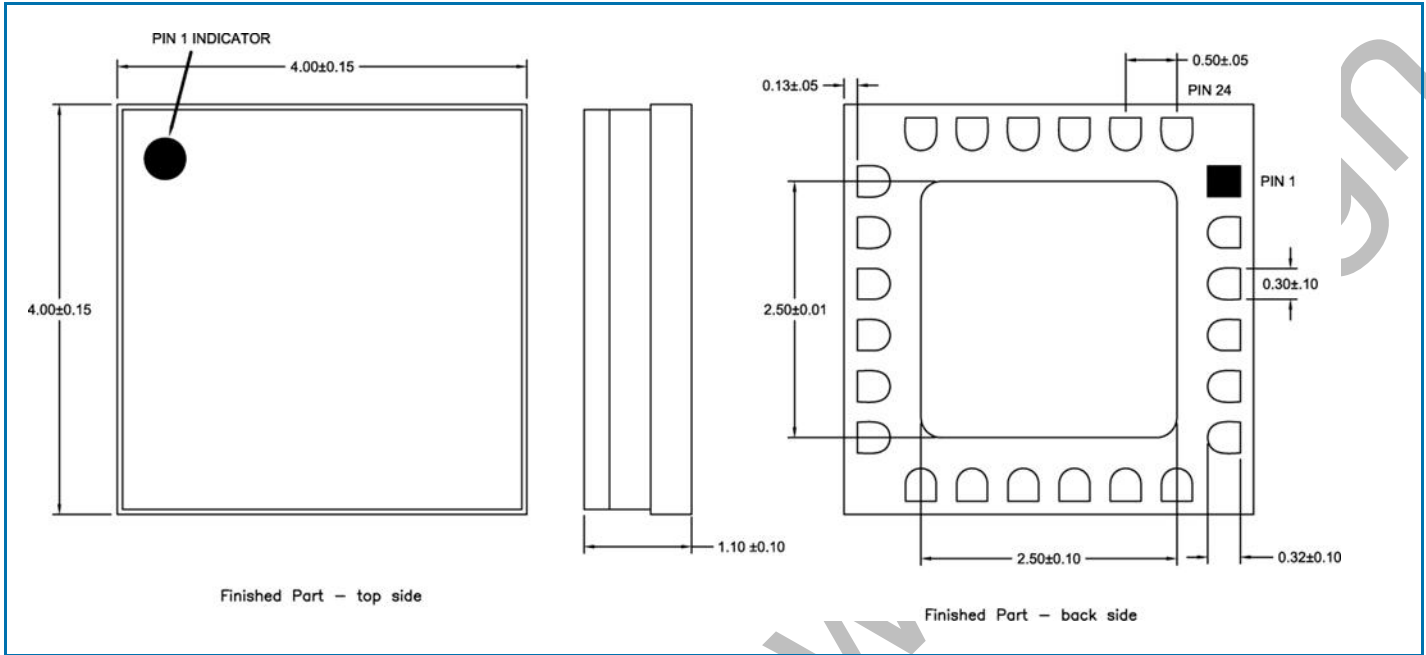
Pin Out



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. |

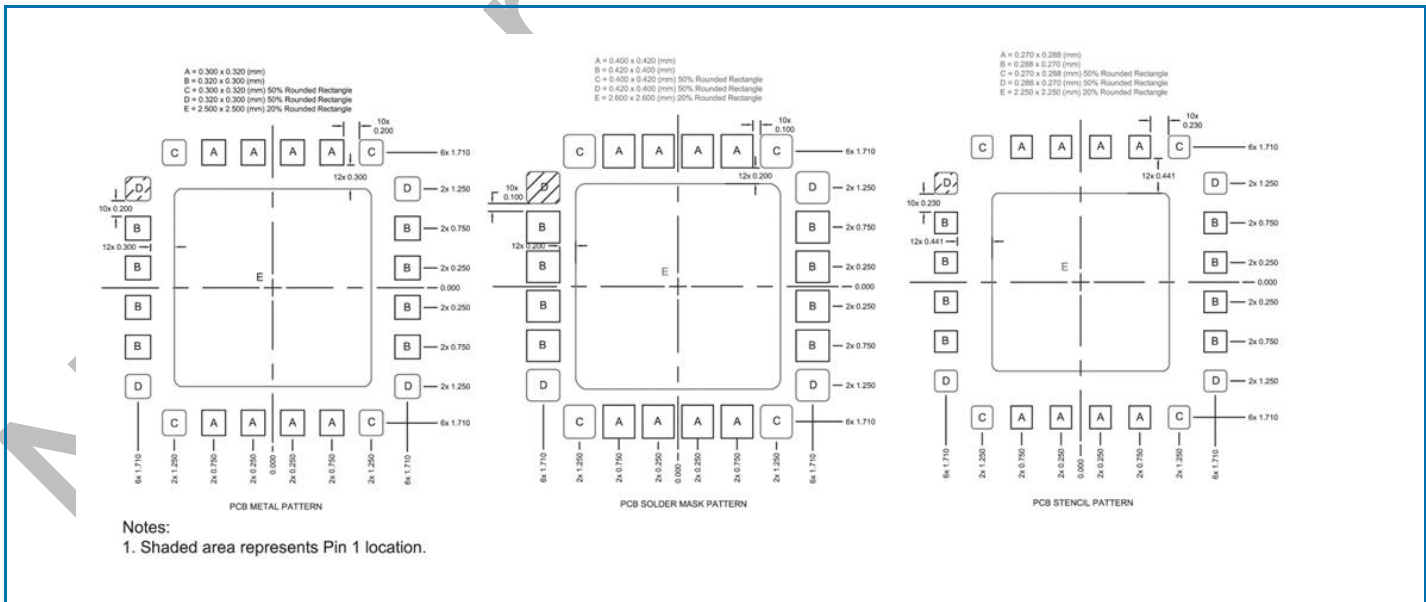
Package Drawing (Dimensions in millimeters)



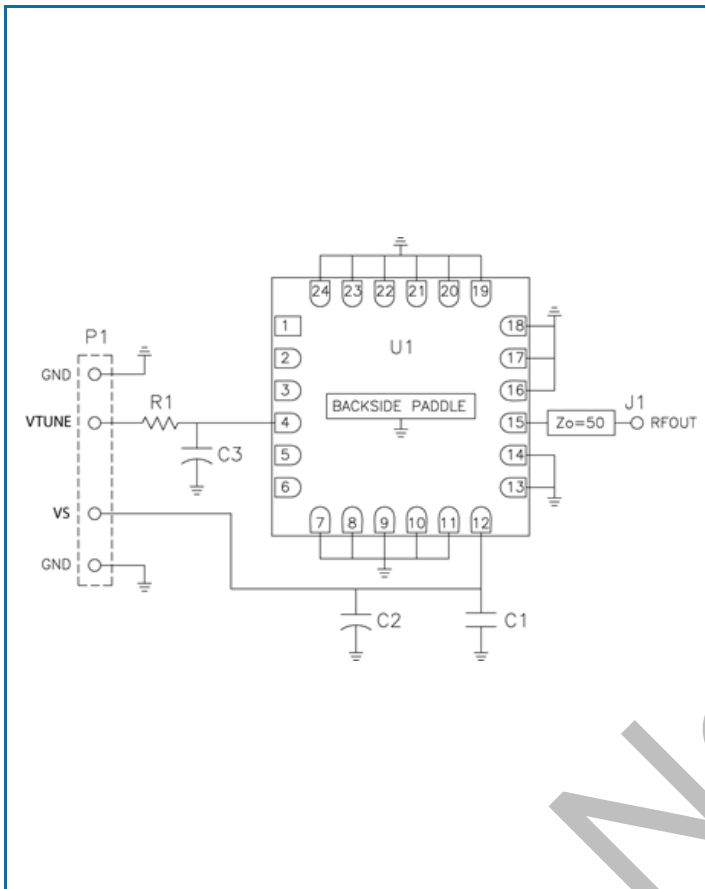
Notes:

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

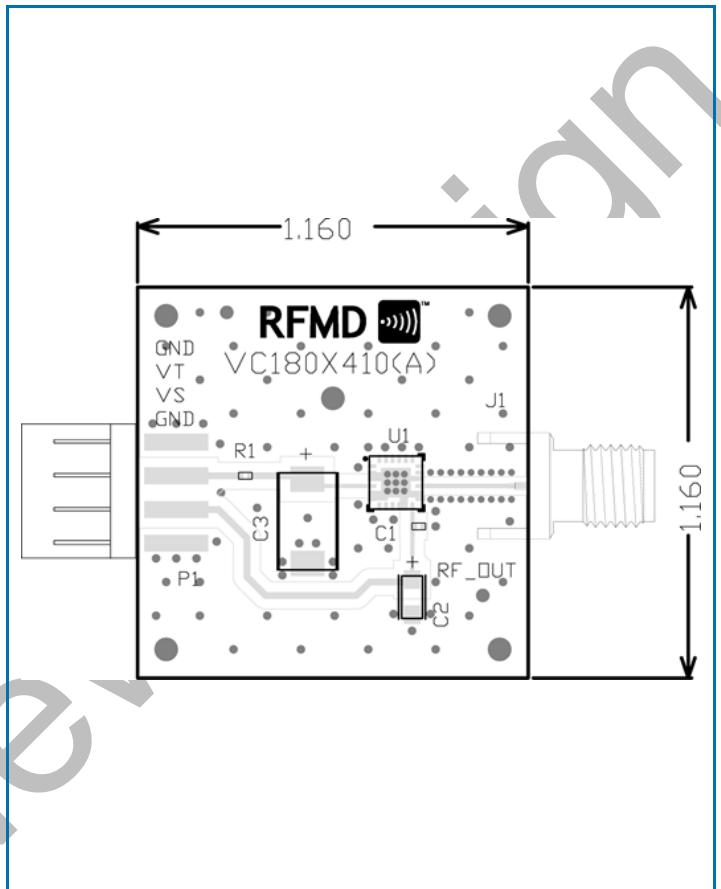
Recommended PCB Layout



Evaluation Board Schematic



Evaluation Board Layout



Evaluation Board Bill of Materials (BOM)

| Item | Description |
|------|-------------------------------------|
| U1 | RFVC1803 |
| 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 |