RFVC1822

LOW NOISE MMIC VCO WITH BUFFER AMPLIFIER

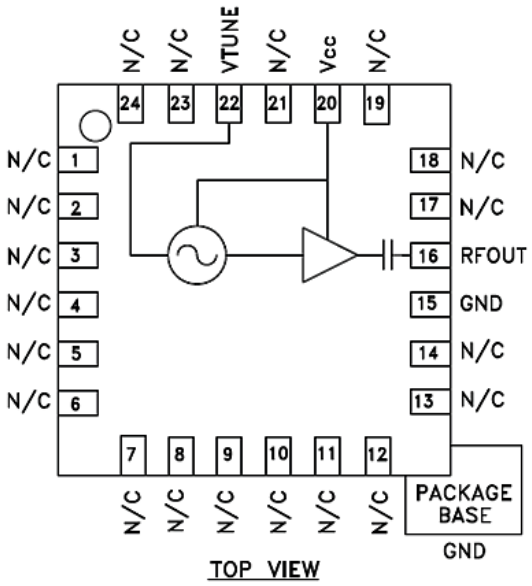
Package: QFN, 24 Pin, 4mm x 4mm

Features

- 5.0GHz to 5.5GHz Operation
- 103dBc/Hz Phase Noise at 100kHz offset
- +9.0dBm P_{OUT}
- No external resonator or elements needed
- 4mmx4mm QFN package
- 3V V_{CC} operation

Applications

- Instrumentation
- Military
- Aerospace
- Point-to-Point Radio
- Test Equipment
- VSAT
- CATV



Functional Block Diagram

Product Description

RFMD's RFVC1822 is a 3V InGaP MMIC VCO with an integrated buffer amplifier operating over a frequency range of 5.0GHz to 5.5GHz. Its monolithic tuning structure provides excellent temperature, shock, and vibration performance while its integrated buffer amplifier provides an output power of +9dBm from a 3V supply. Phase noise is -103dBc/Hz at 100kHz offset. The RFVC1822 is avalable in a low cost leadless ceramic 4mmx4mm surface mount QFN outline.

Ordering Information

RFVC1822S2	2 piece sample bag
RFVC1822PCK-410	PCBA with 2 piece sample bag
RFVC1822SB	5 piece bag
RFVC1822SQ	25 piece bag
RFVC1822SR	100 pieces on 7" reel
RFVC1822TR7	750 pieces on 7"reel

Optimum Technology Matching® Applied

☐ GaAs HBT	☐ SiGe BiCMOS	☐ GaAs pHEMT	☐ GaN HEMT
☐ GaAs MESFET	☐ Si BiCMOS	☐ Si CMOS	☐ BiFET HBT
☑ InGaP HBT	☐ SiGe HBT	☐ Si BJT	☐ LDMOS

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Absolute Maximum Ratings

Parameter	Rating	Unit
Bias Voltage (V_{DD})	+3.25	V_{DC}
V_{TUNE}	14	V_{DC}
Operating Junction Temperature (T_J)	99	°C
Continuous Power Dissipation (T=+85°C)	200	mW
Thermal Resistance (Pad to Die Bottom)	10	°C/W
Storage Temperature	-40 to +150	°C
Operating Temperature	-40 to +85°C	°C
ESD JESD22-A114 Human Body Model (HBM)	Class 0, 150V	

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).

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Electrical Specifications					T_A=+25 °C, V_{CC}=+3.0V_{DC}
Operating Frequency	5.0		5.5	GHz	
V_{TUNE}	0		12	V	
V_{TUNE} Leakage Current		0.34	1.0	uA	At V_{TUNE}=10V
Output Power	5	9		dBm	At V_{TUNE}=5V
Phase Noise at 10kHz Offset		-80		dBc/Hz	At V_{TUNE}=5V
Phase Noise at 100kHz Offset		-103		dBc/Hz	At V_{TUNE}=5V
Harmonics					
2nd		-14		dBc	At V_{TUNE}=5V
3rd		-37		dBc	
Output Spurious			-70	dBc	
Output Return Loss		10		dB	
Supply Current		45	50	mA	At V_{TUNE}=5V
Pulling		2.2		MHz	VSWR 2.5:1 all phases
Pushing		50		MHz/V	At V_{TUNE}=5V
Frequency Drift		-0.3		MHz/C	At V_{TUNE}=5V

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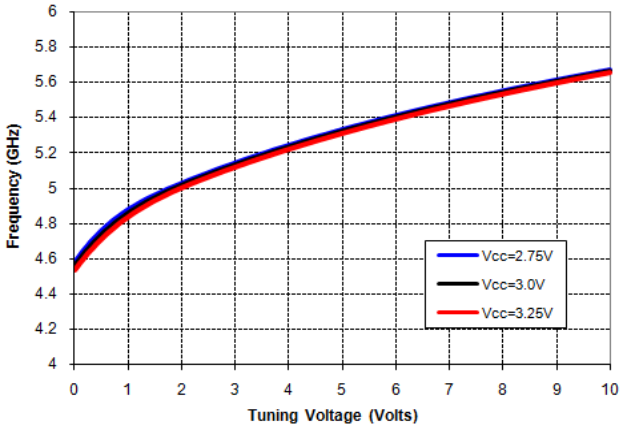
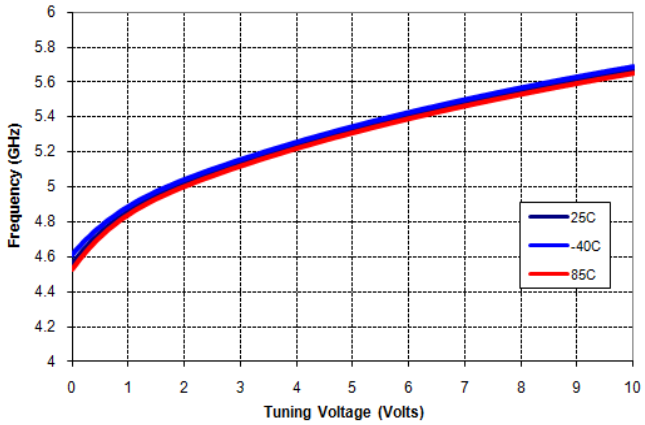
Typical Electrical Performance

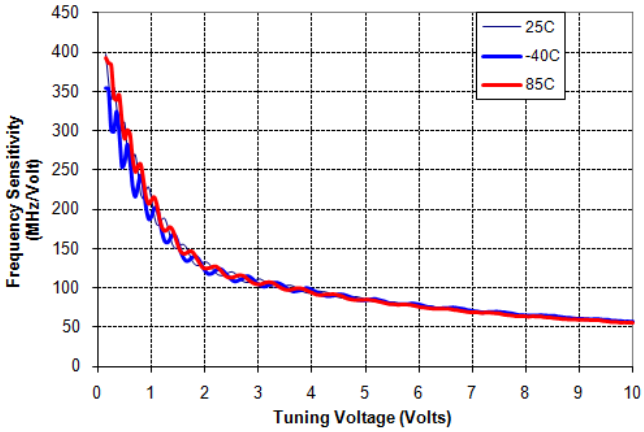
Frequency vs. Tuning Voltage
T=25C



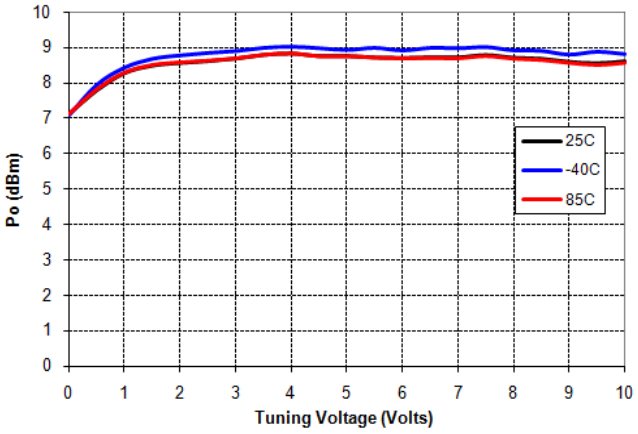
Frequency vs. Tuning Voltage
Vcc=+3V



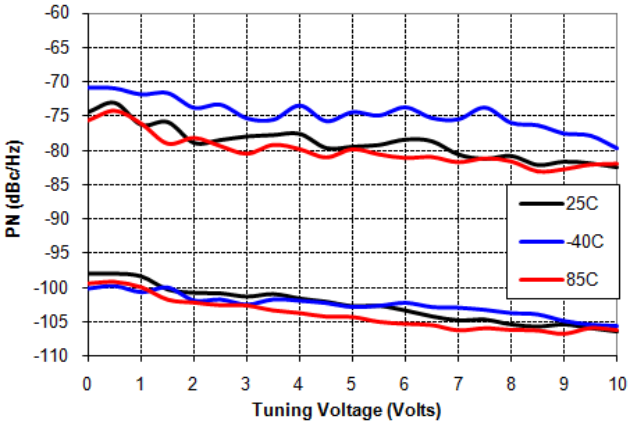
Sensitivity vs. Tuning Voltage
Vcc=+3V



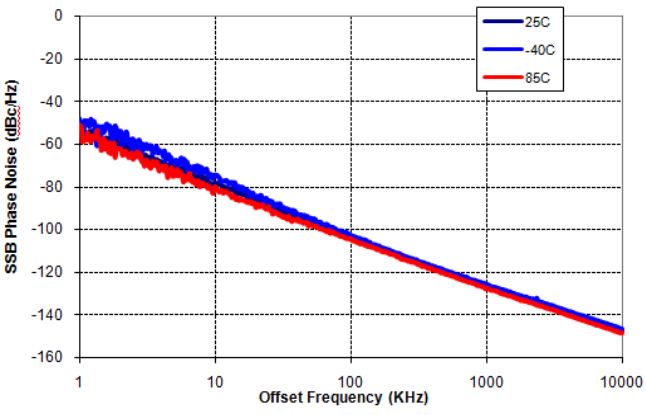
Output Power vs Tuning Voltage
Vcc=+3V



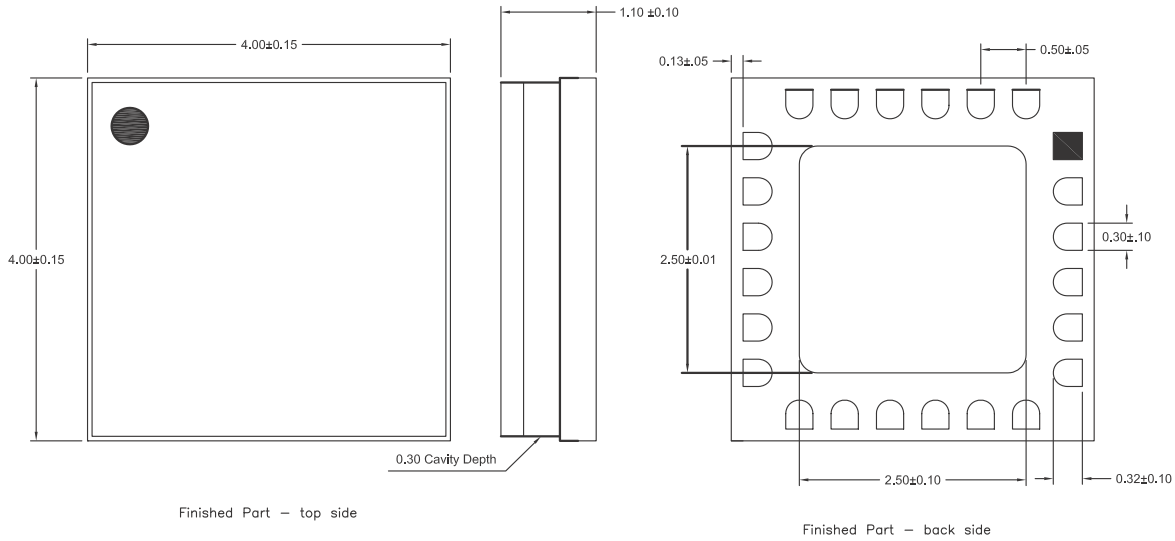
Phase Noise
10KHz and 100KHz Offset vs. Tuning Voltage



Typical SSB Phase Noise
Vtune= +5V



Package Drawing



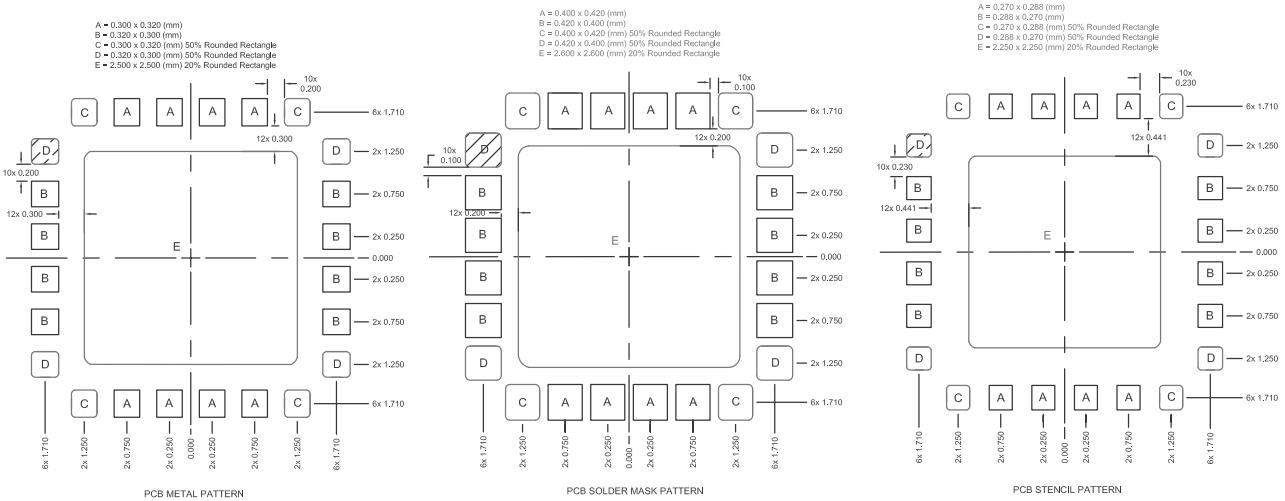
Finished Part – top side

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.

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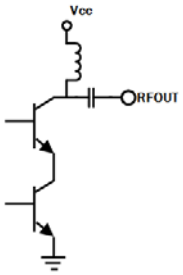
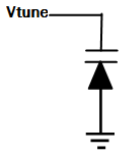
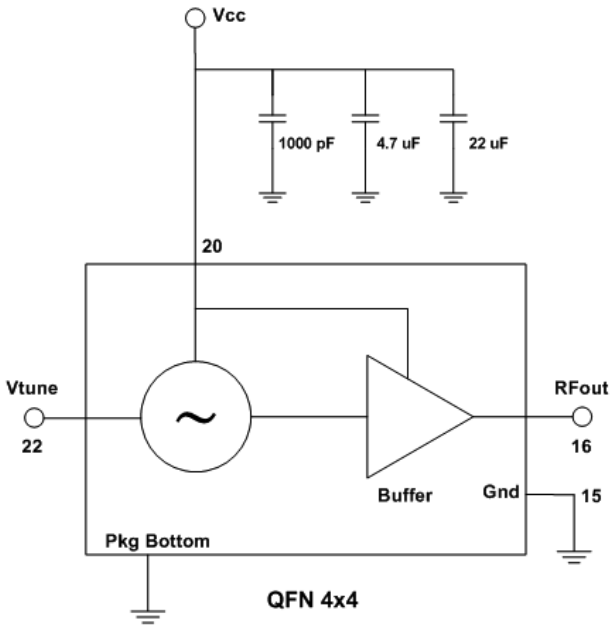
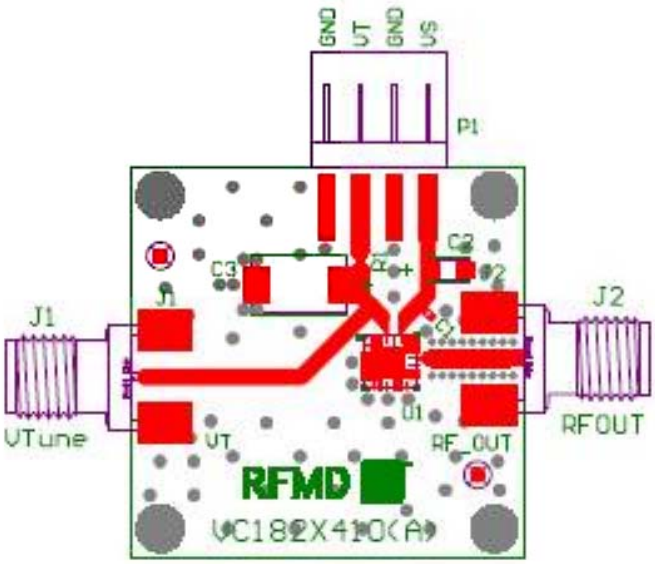
Pin	Function	Description	Interface Schematic
15	GND	Connect directly to PCB ground for best performance.	
16	RFOUT	RF out. This pad is AC coupled and matched for optimum P_{OUT}. A 50Ω termination is recommended for this pin.	
20	VCC	Connect 3V to power both the oscillator core and the buffer amplifier.	
22	VTUNE	Direct connection to the varactor diodes used to vary the frequency of oscillation.	
Pkg Base	GND	Ground connection. Solder package bottom directly to ground plane for best performance.	

Application Circuit Block Diagram



Evaluation Board Layout



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