



Product Description

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 0 to +13V Vtune for frequency control. The RFVC1800 is in an RoHS Compliant, compact QFN 4mmx4mm package that offers low phase noise and low power consumption.

Features

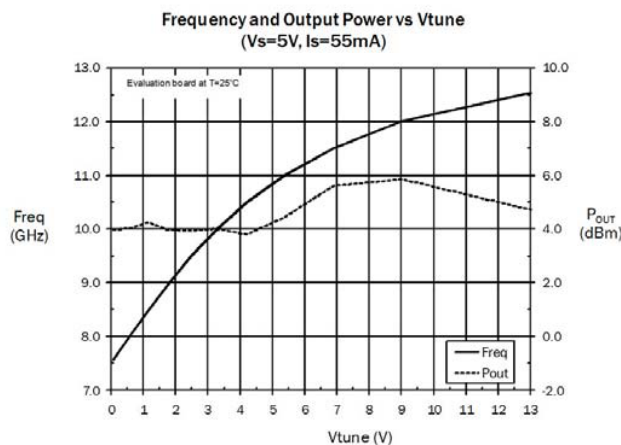
- Wideband Performance
- P_{OUT} +4dBm Typ.
- External Resonator Not Required
- Single Bias Supply: +5V at 55mA
- Output Phase Noise: -93dBc/Hz at 100kHz
- Low Profile 4mmx4mm QFN Package

Applications

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

Optimum Technology Matching® Applied

- GaAs HBT
- GaAs MESFET
- InGaP HBT
- SiGe BiCMOS
- Si BiCMOS
- SiGe HBT
- GaAs pHEMT
- Si CMOS
- Si BJT
- GaN HEMT
- InP HBT
- RF MEMS
- LDMOS



Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
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/°C	
Vtune port input capacitance		4		pF	
Thermal Resistance		75		°C/W	junction to paddle

Test Conditions: V_S=5V, Freq=8GHz to 12GHz, T=25°C unless noted otherwise

Absolute Maximum Ratings

Parameter	Rating	Unit
Device Operating Voltage (V_S)	5.5	V
Vtune (V_t)	0 to +15	V
Power Dissipation at $T=85^\circ\text{C}$ (Derate $13.3\text{mW}/^\circ\text{C}$ 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	



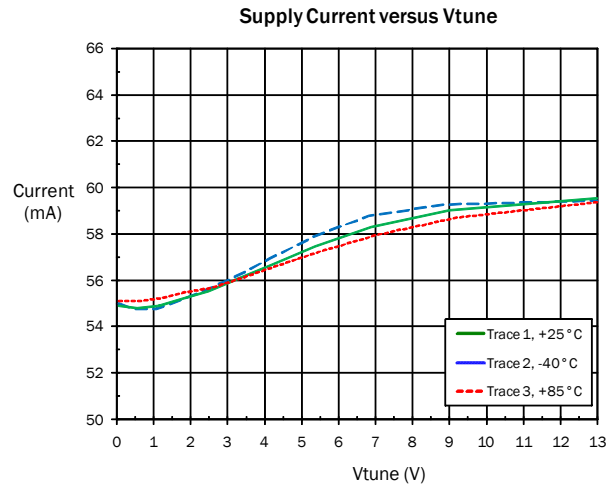
Caution! ESD sensitive device.

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.

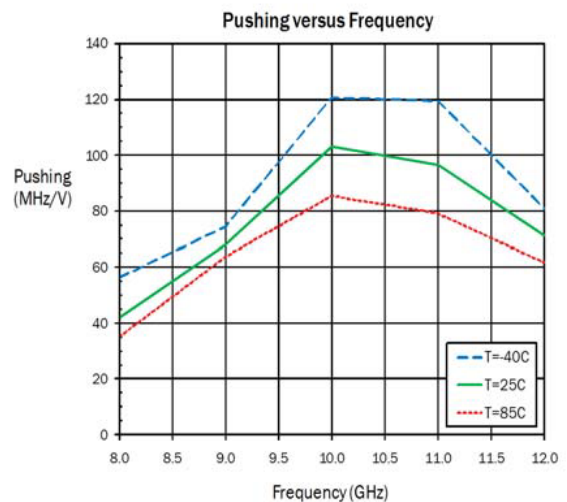
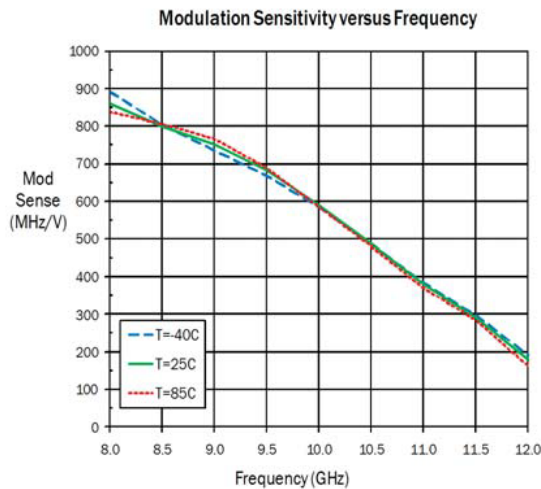
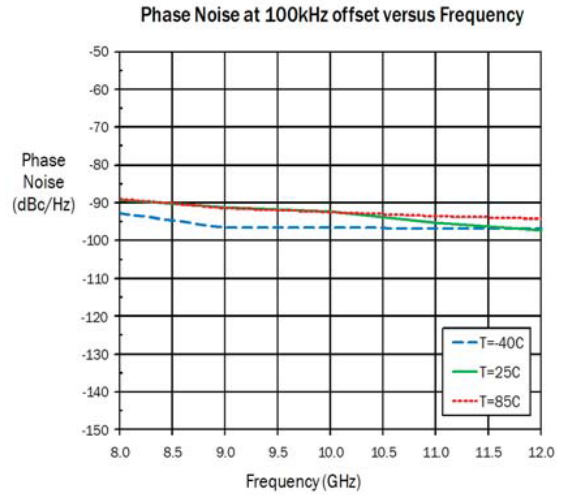
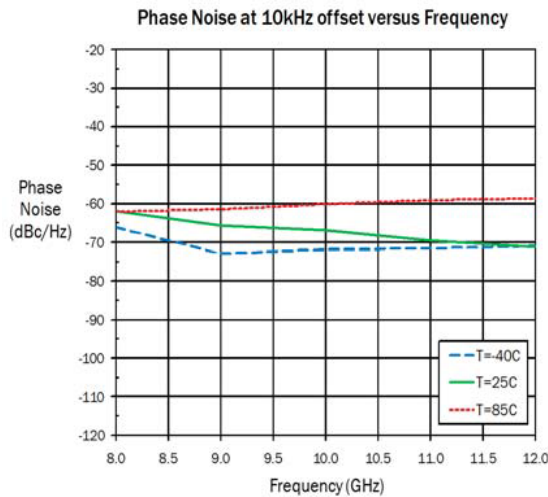
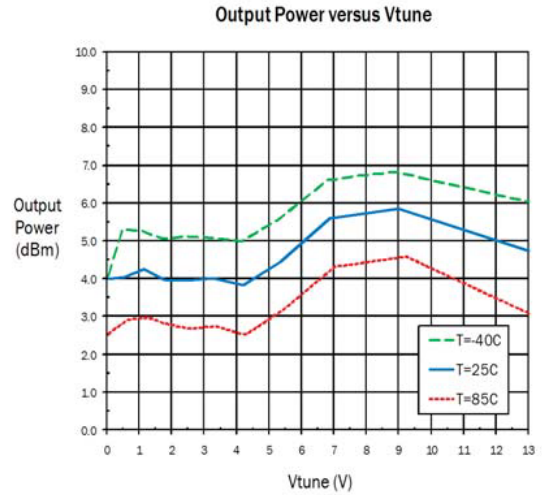
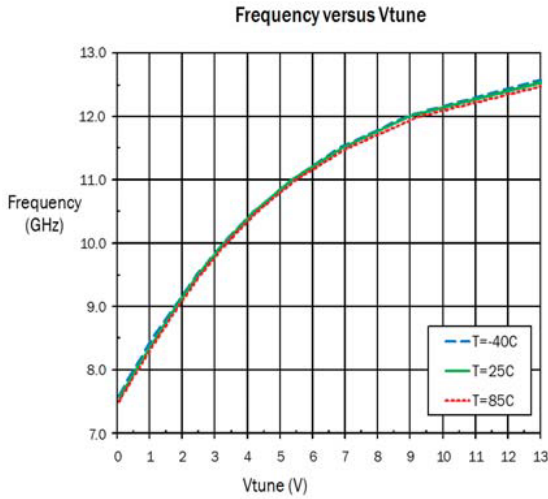
RoHS status based on EUDirective2002/95/EC (at time of this document revision).

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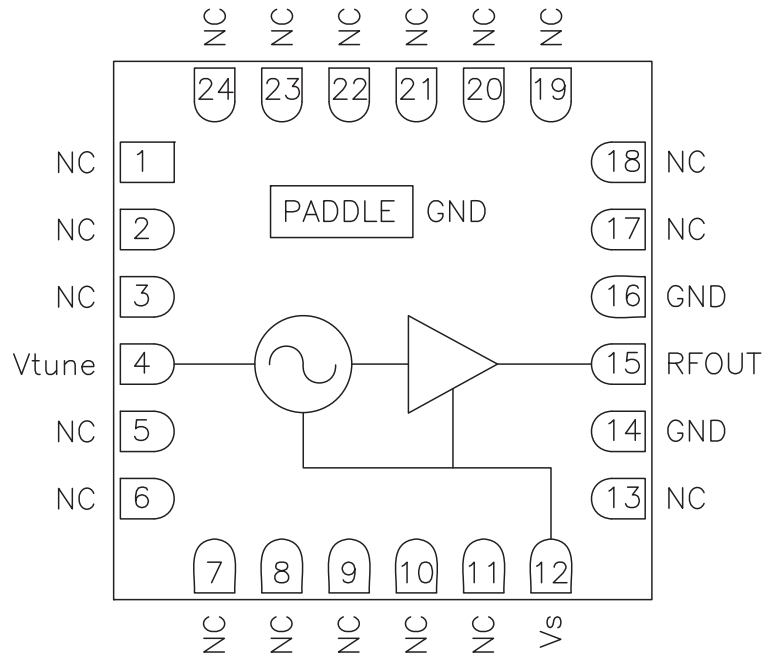
Typical Evaluation Board Performance ($V_S=5.0\text{V}$ unless otherwise noted)



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

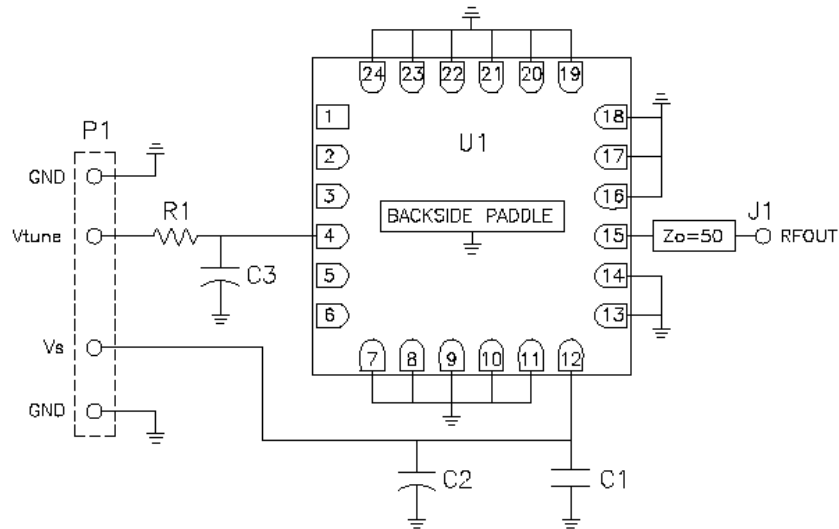


Pin Out



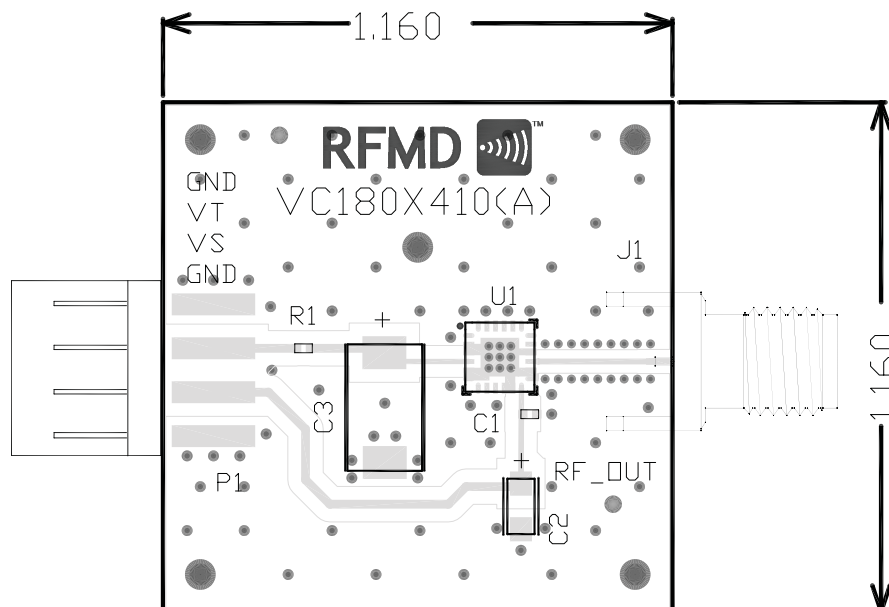
Pin	Function	Description
1-3, 5-11, 13, 17-24	NC	No internal connection. Connect to PCB ground.
4	VTUNE	VCO control voltage input.
12	VS	Supply voltage input for the VCO and Buffer stage.
14, 16	GND	Pin internally bonded to package paddle. Connect to PCB ground.
15	RFOUT	VCO RF output. Pin is internally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

Evaluation Board

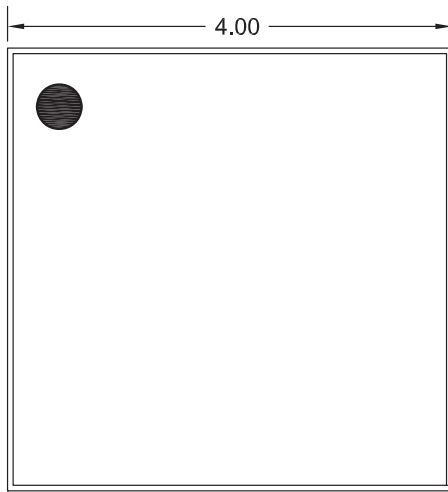


Item	Description
U1	RFVC1800
C1	CAP, 1000pF, 0402
C2	CAP, 4.7uF, TANT-A
C3	CAP, 22uF, TANT-D
R1	Jumper, 0 Ω, 0402
P1	CONN, HDR, ST, PLRZD, 4-Pin, 0.100"
J1	CONN, SMA, END LAUNCH

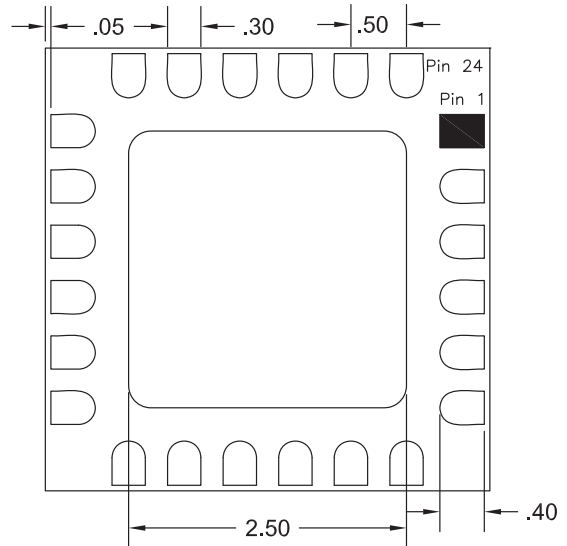
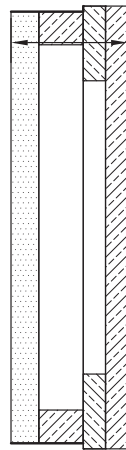
Evaluation Board Layout



Package Drawing.



Finished Part – top side

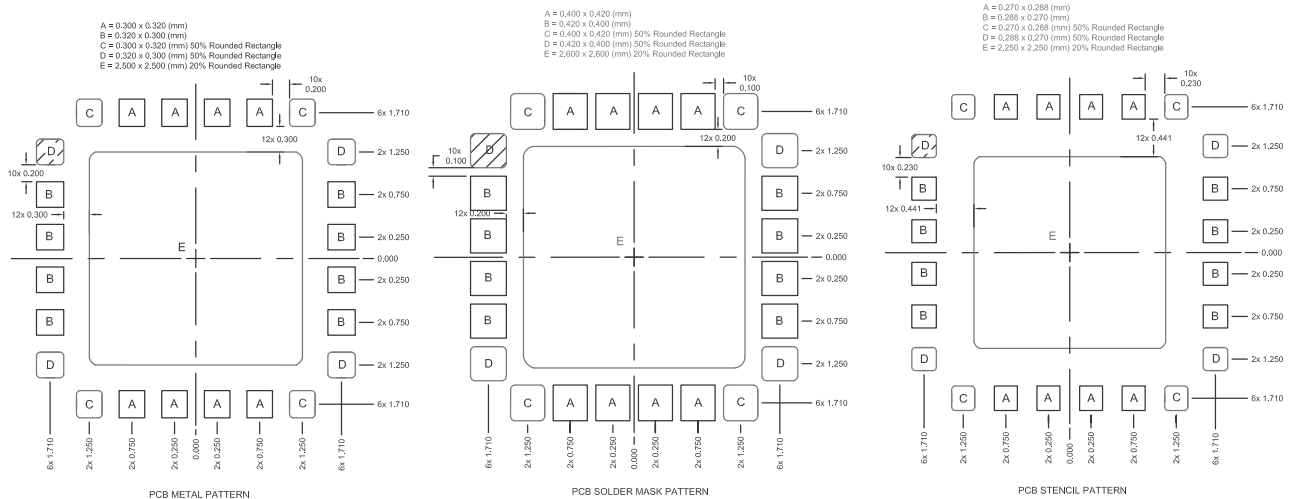


Finished Part – back side

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.

Ordering Information

Part Number	Description
RFVC1800S2	2 piece sample bag
RFVC1800SB	5 piece bag
RFVC1800SQ	25 piece bag
RFVC1800SR	100 pieces on 7" reel
RFVC1800TR7	750 pieces on 7" reel
RFVC1800TR13	2500 pieces on 13" reel
RFVC1800PCK-410	Populated evaluation board with 2 piece sample bag