

ISSUE 3; March 2018

Description

- The IQRB-1 rubidium oscillator is a sub-miniature atomic clock exhibiting normal rubidium oscillator performance in a 65cc OCXO style package.

This rubidium oscillator has 100 times less drift than OCXOs and with short term stability of 0.008ppb/s at 100s this rubidium oscillator provides significant improvements in performance over OCXOs.

FEATURES:

- 10MHz output
- 2" x 2" x 1" form factor
- 95dBc/Hz at 10Hz
- 0.05ppb accuracy
- 0.008ppb/s @ 100s
- Atomic accuracy
- Low power consumption
- 100 times less drift than OCXOs

APPLICATIONS:

- Stand-alone (free-run) stable frequency source for UMTS and LTE.
- Extended holdover for CDMA, WiMAX and LTE base stations.
- Stability for various other communication and transmission applications.

Frequency Parameters

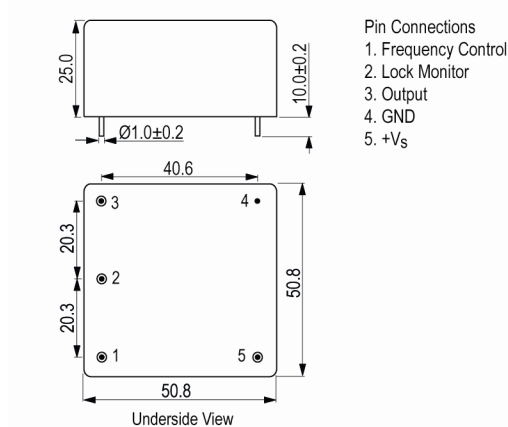
- Frequency 10.0MHz
- Frequency Tolerance ± 0.05 ppb
- Tolerance Condition @ 25°C
- Short Term Stability (AVAR):
 - 1s 0.08ppb
 - 10s 0.03ppb
 - 100s 0.008ppb
- Ageing:
 - Day 0.005ppb
 - Month 0.05ppb
- Magnetic Field Sensitivity, DC (± 2 Gauss): ± 0.04 ppb/Gauss max
- Temperature Coefficient (ambient): 5×10^{-10} (0 to 50°C)
- Retrace: ± 0.02 ppb max

Electrical Parameters

- Supply Voltage 12.0V
- Note: The device will operate over the Supply Voltage Range 12V to 18V.
- Input Power (@ 25°C): 6W @ 12V, 1.2A max.
- Start-Up Current (at room temperature): 1.5A for 10s max
- Warm Up Time: 5mins to lock @ 25°C.
- Lock Monitor: Pin 2 is high (5V) when out of lock and low (0V) when locked.



Outline (mm)



- Pin Connections
1. Frequency Control
 2. Lock Monitor
 3. Output
 4. GND
 5. +V_S

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Frequency Adjustment

- Pulling $\pm 5\text{ppb min}$
- Control Voltage $2.5\text{V} \pm 2.5\text{V}$
- Input Impedance $10\text{k}\Omega \text{ min}$
- Control Voltage Input Current (Pin 1 swept from 0V to 5V):
 $40\mu\text{A typ}$
- Control Voltage Input Capacitance (Pin 1): 5pF typ
- Note: The oscillator will detect if no control voltage is applied to Pin 1 and will automatically set the control voltage internally to 2.5V. Further when the oscillator is locked Pin 1 (frequency control) is set to internal default voltage 2.5V. However if a voltage is applied (even GND) to Pin 1 then the oscillator will switch to accept an external control voltage input.

Operating Temperature Ranges

- $-30 \text{ to } 60^\circ\text{C}$

Output Details

- Output Compatibility Sine
- Drive Capability 50Ω
- Output Levels: $7\text{dBm min, } 9.5\text{dBm typ, } 13\text{dBm max}$

Noise Parameters

- Phase Noise (typ):
 - 67dBc/Hz @ 1Hz
 - 95dBc/Hz @ 10Hz
 - 127dBc/Hz @ 100Hz
 - 140dBc/Hz @ 1kHz
- Harmonics: -40dBc max

Environmental Parameters

- Storage Temperature Range: $-55 \text{ to } 85^\circ\text{C}$
- Base Plate Temperature: $-30 \text{ to } 85^\circ\text{C}$
- Case Temperature (after 1hr, ambient temp 25°C , no ventilation): 45°C max
- Mechanical Shock: IEC 60068-2-27, Test Ea: Acceleration of 50G peak amplitude for 11ms duration.
- Vibration: IEC 60068-2-06, Test Fc: $10\text{Hz}-55\text{Hz}$ 1.5mm displacement, $55\text{Hz}-500\text{Hz}$ 10G acceleration.
- Atmospheric Pressure: $-60\text{m to } 4000\text{m: } 1 \times 10^{-13}\text{mbar max}$
- EMI: Compliant to FCC Part 15, Class B.

Manufacturing Details

- MTBF (Stationary): Approx 100000hrs
- Note: In regard to PCB layout; the oscillator base plate runs hot and it is not a good idea to place components on the opposite side of the PCB to the rubidium module as the base plate can be 85°C depending upon environmental conditions. We recommend leaving about a 5mm minimum gap around the rubidium module wherever possible.
- RoHS Terminations Pin material is Kovar with Au plating.

Compliance

- RoHS Status (2011/65/EU) Compliant
- REACH Status Non-Compliant
- MSL Rating (JDEC-STD-033): Not Applicable

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Packaging Details

- Pack Style: Bulk Bulk pack
Pack Size: 1

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