

RFPO40

The RFPO40 is from the world's smallest and first ASIC-based OCXO product family and utilises Rakon's patented Mercury™ ASIC technology. It delivers temperature stability as low as ± 10 ppb (over -20 to 70°C) and is capable of short term aging typically less than ± 2 ppb per day.

With a highly integrated oven included, the RFPO40 ensures short warm-up times and consumes very low power – only 350mW at room temperature. The ASIC architecture delivers a 1000x reliability improvement when compared to traditional discrete OCXOs.

Features

- Small form factor
- Frequency stability over temperature as low as ± 10 ppb over -20 to 70°C
- Low power consumption
- High reliability

Applications

- Small Cells
- Switches and Routers
- Time & Frequency References
- SyncE and IEEE 1588

9.7 x 7.5 x 4.3 mm



Standard Specifications

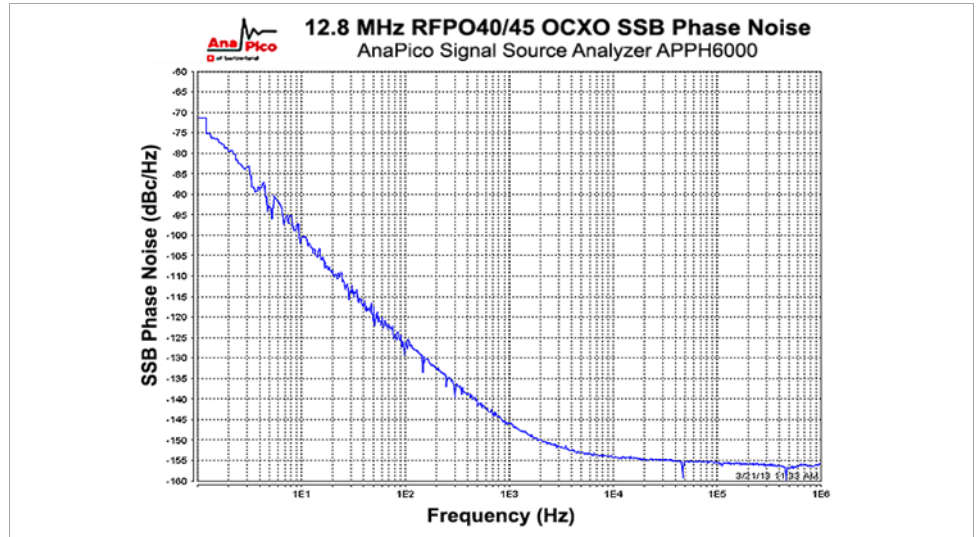
| Parameter | Min. | Typ. | Max. | Unit | Test Condition / Description |
|---|------|--------------|--------------------|-----------------------|---|
| Nominal frequency | | 5 – 50 | | MHz | Standard frequencies: 10, 12.8, 19.2, 19.44, 20, 24.576, 25, 26, 30.72 and 40MHz |
| Frequency calibration | | | ± 0.5 | ppm | Initial accuracy at 25°C $\pm 2^\circ\text{C}$ |
| Reflow shift | | | ± 1 | ppm | Pre to post reflow ΔF (measured ≥ 60 minutes after reflow) |
| Frequency stability over temperature in still air | | | $\pm 10 - \pm 100$ | ppb | Reference to $(F_{\text{MAX}} + F_{\text{MIN}})/2$ |
| Frequency slope $\Delta F/\Delta T$ in still air | | | $\pm 0.5 - \pm 2$ | ppb/ $^\circ\text{C}$ | Temperature ramp $\leq 1^\circ\text{C}/\text{minute}$ |
| Operating temperature range | -40 | | 85 | $^\circ\text{C}$ | |
| Supply voltage stability | | ± 10 | | ppb | $\pm 5\%$ variation, frequency ≤ 26 MHz |
| Load sensitivity | | ± 10 | | ppb | ± 5 pF / $\pm 10\%$ variation, frequency ≤ 26 MHz |
| Warm-up time | | < 3 | | minutes | The time needed for the frequency to be within ± 20 ppb of the frequency after 1 hour, at 25°C. This parameter is frequency, assembly and operating history dependent |
| Acceleration sensitivity | | < 2 | | ppb/g | Gamma vector of all 3 axes, 30 to 1500Hz |
| Long term stability (aging) | | $< \pm 2$ | ± 1 ± 3 | ppb ppm ppm | Per day (after 30 days of continuous operation) First year 10 years |
| Root Allan Variance (20MHz) | | 7.10^{-11} | | | $\tau = 1.0\text{s}$ |
| Supply voltage (Vcc) | | 2.7 – 5.5 | | V | $\pm 5\%$ |
| Input power (warm up) | | 1000 800 | | mW mW | -40 to 85°C devices -20 to 70°C devices |
| Input power (steady state in still air at 25°C) | | | 400 350 | mW mW | -40 to 85°C devices -20 to 70°C devices |
| Control voltage (Vc) | | 0.5 – 2.5 | | V | The GND of Vc needs to be connected directly to pin 2 as ground lead impedance may cause performance degradation |
| Frequency tuning | | ± 5 | | ppm | Reference to frequency at $V_c = 1.5\text{V}$ |
| Slope | | +8 | | ppm/V | |
| Linearity ¹ | | | 1 | % | |
| Port input impedance | 80 | | | k Ω | |
| Modulation bandwidth | | 3.5 | | kHz | |
| Oscillator output – C/Sinewave | 0.8 | 1.1 | | Vpk-pk | At minimum supply voltage, 10k Ω //10pF load |

¹ The difference between the measured tuning characteristic and an ideal straight line fitted through it, expressed as a percentage of the total tuning range.

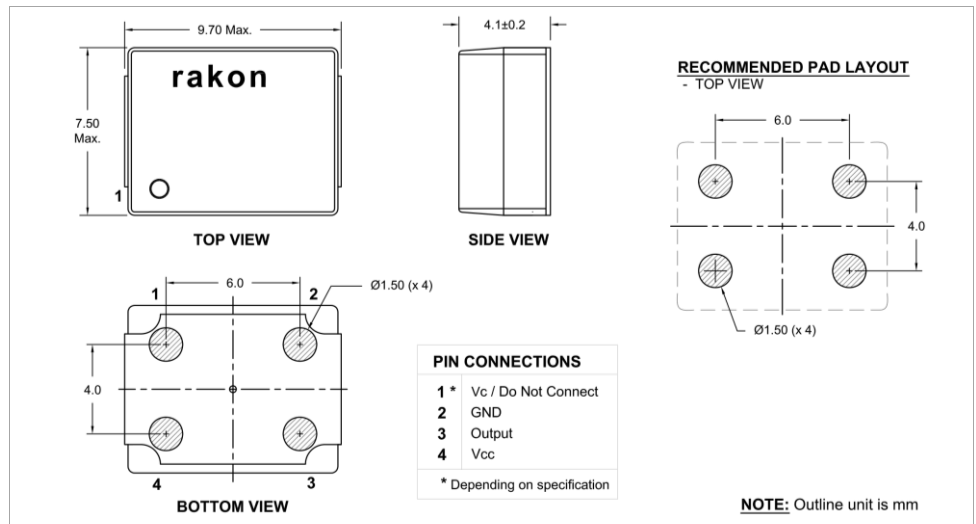
Parameter Min. Typ. Max. Unit Test Condition / Description

| | | | | | |
|--|---------------------|----|---------------------|----|--------------|
| Oscillator output – HCMOS | | | | | |
| Output voltage level high (V _{OH}) | | | 10% V _{CC} | V | |
| Output voltage level low (V _{OL}) | 90% V _{CC} | | | V | |
| Duty cycle | 45 | | 55 | % | At 50% level |
| Rise and fall times | | | 4 | ns | 10 to 90% |
| Load | 0 | 15 | 30 | pF | |

SSB Phase Noise (Typical Value at 25°C)



Model Outline and Recommended Pad Layout



Model Code Builder

