

RFPO45

The RFPO45 is from the world's smallest and first ASIC-based OCXO and utilizes Rakon's patented Mercury™ ASIC technology. This Stratum 3 compliant oscillator 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 RFPO45 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

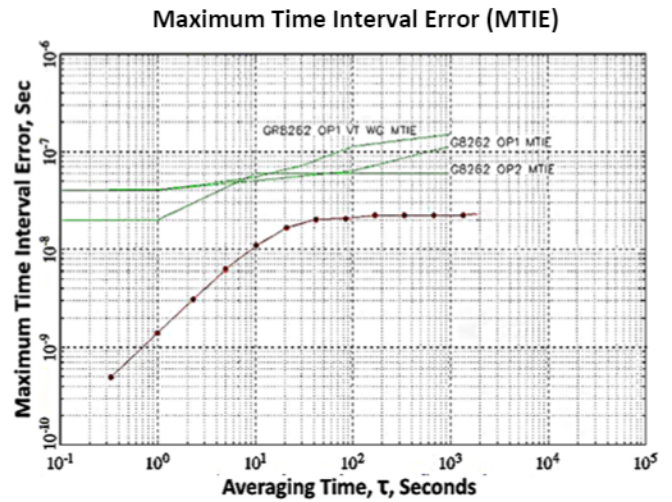
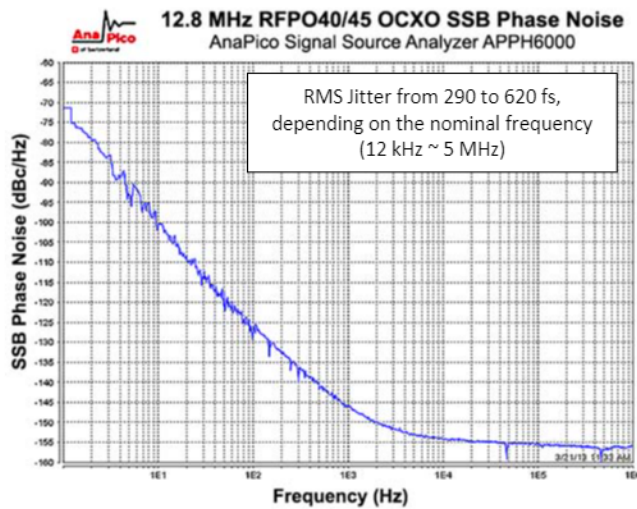
- Stratum 3
- Small Cells
- Switches and Routers
- Time & Frequency References
- SyncE and IEEE 1588

9.7 x 7.5 x 4.3 mm

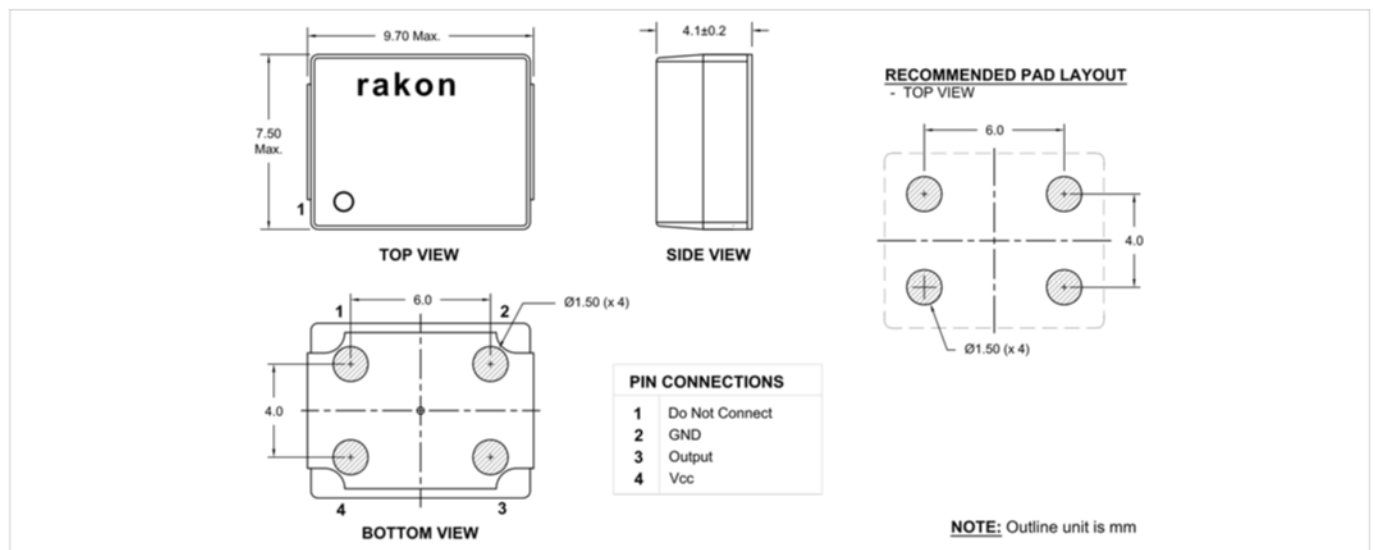

Standard Specifications

| Parameter | Min. | Typ. | Max. | Unit | Test Condition / Description |
|---|---------|-----------------|--------------------|-------------------|---|
| Nominal frequency | | 10 – 26 | | MHz | Standard frequencies: 10, 12.8, 19.2, 19.44, 20, 24.576, 25 and 26MHz |
| 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/°C | Temperature ramp $\leq 1^\circ\text{C}/\text{minute}$ |
| Operating temperature range | -40 | | 85 | °C | |
| Supply voltage stability | | ± 10 | | ppb | $\pm 5\%$ variation, frequency $\leq 26\text{MHz}$ |
| Load sensitivity | | ± 10 | | ppb | $\pm 5\text{pF} / \pm 10\%$ variation, frequency $\leq 26\text{MHz}$ |
| 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 |
| Holdover drift | | $< \pm 2.5 - 4$ | | ppb | 24 hours, temperature variation $\leq \pm 1^\circ\text{C}$. After 30 days of continuous operation |
| Free-run accuracy | | ± 4.6 | | ppm | All causes, 20 years life, reference to nominal frequency |
| Loop bandwidth for wander generation compliance | 3 | | | mHz | MTIE compliant with GR-1244 Fig 5-5 & G.812 Type III Fig1 (≤ 100 ns), TDEV compliant with GR-1244 Fig 5-4 & G.812 Type III Fig2 (≤ 10 ns), oscillator stabilised 24 hours at Constant temperature ($\pm 1^\circ\text{C}$, still air), data collected over 100,000 seconds at 1 second intervals (-3dB cut-off, 2nd order high pass loop filter) |
| Long term stability (ageing) | | $< \pm 2$ | ± 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 | | mW | -40 to 85°C devices |
| Input power (steady state in still air, 25°C) | | | 400 | mW | -40 to 85°C devices |
| Oscillator output – HCMOS | | | | | |
| Output voltage level high (V_{OH}) | | | 10% Vcc | V | |
| Output voltage level high (V_{OL}) | | | | V | |
| Duty cycle | 90% Vcc | | 55 | % | At 50% level |
| Rise and fall times | 45 | | 4 | ns | 10 to 90% |
| Load | 0 | 15 | 30 | pF | |

SSB Phase Noise (Typical Value at 25°C) and MTIE



Model Outline and Recommended Pad Layout



Model Code Builder

