ROM9070PA

The ROM9070PA uses Rakon's market-leading proprietary Mercury+™ technology, delivering the world's smallest and lowest power OCXO for Radio applications. This product family achieves ±10 ppb frequency stability over -40 to 95°C, with short term ageing less than 1 ppb/day and frequency slope as low as 0.1 ppb/°C. Low-g sensitivity and extended operating temperature options are available on request. Using Rakon's innovative high-Q quartz crystals, ROM9070PA offers superior close-in phase noise performance, enabling Remote Radio Head PLLs to use a single reference clock to meet both network synchronisation requirements and air interface requirements.

Mercury+™ ASIC-OCXOs enable lower Total Cost of Ownership of customer equipment through improved reliability. With a small 9 x 7 mm form factor and few discrete components, a ROM9070PA consumes only 0.4W at room temperature and has faster warm up times than traditional OCXOs.

Features

- Miniature SC-cut OCXO with fast warm up time
- Superior close-in phase noise with high-Q crystal
- < 1% VCO linearity
- Patented tilt compensation for lifetime performance
- Ultra-reliable OTP memory programming
- Lower customer Total Cost of Ownership through VLSI ASIC-integration

Applications

- Base Stations
- 5G RRH
- Small Cells
- Microwave transmission **systems**

9.7 x 7.5 x 3.9 mm

Standard Specifications

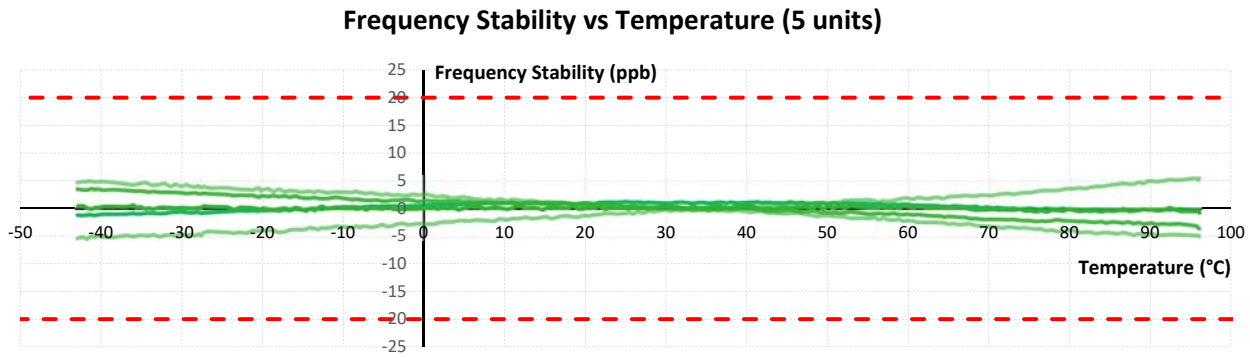
Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Nominal frequency		10 – 50		MHz	Standard frequencies: 10, 19.2, 20, 25, 25.6, 30.72, 38.4, 50 MHz
Frequency calibration			±0.2	ppm	Initial accuracy at 25°C ±2°C
Reflow shift			±0.2	ppm	Pre to post reflow ΔF (measured ≥ 60 minutes after reflow)
Operating temperature range	-40		+95	°C	Operating temperatures up to 105°C are available on request
Frequency stability temperature			±20 ±10	ppb	In still air. Reference to (FMAX + FMIN)/2 ±20 ppb (Vc), ±10 ppb (Fixed frequency)
Frequency slope ΔF/ΔT in still air		±0.1	±0.5	ppb/°C	Temperature ramp ≤ 1°C/minute
Supply voltage stability		±5		ppb	±2% variation, reference to frequency at 3.3V
Load sensitivity		±5		ppb	±10% variation, reference to frequency at 15pF
Warm-up time		15	60	sec	Time needed for frequency to be within ±20ppb reference to frequency after 1 hour, at 25°C. Parameter is frequency, assembly and operating history dependent
Long term stability (Ageing)		1	 0.3 1.5	ppb ppm ppm	Per day, after 30 days of continuous operation First year 10 years
Supply voltage (Vcc)		2.7 – 5		V	±5%
Input power		1200 400	1500 440	mW	Warm up Steady state in still air at 25°C
Control voltage (Vc) [1]	0.25	1.25	2.25	V	
Frequency tuning	±1.9		±3.3	ppm	Reference to frequency at Vc=1.25 V
Linearity			1	%	Deviation from straight line curve fit
Oscillator output	Regulated CMOS output (1.0, 1.8, 2.5V) or standard CMOS (options)				

SSB Phase Noise (Typical value at 25°C)

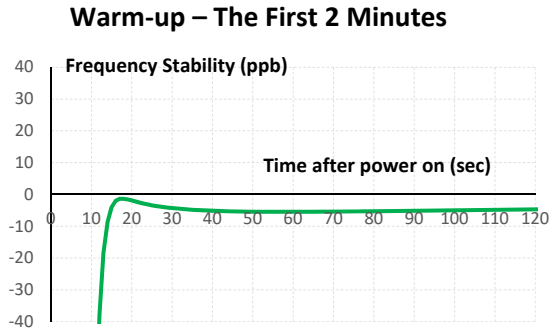
Frequency	1 Hz	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	Unit
19.2 MHz	-80	-110	-138	-154	-159	-160	-161	dBc/Hz
30.72 MHz	-73	-105	-133	-153	-158	-160	-161	
38.4 MHz	-70	-102	-132	-150	-155	-157	-159	

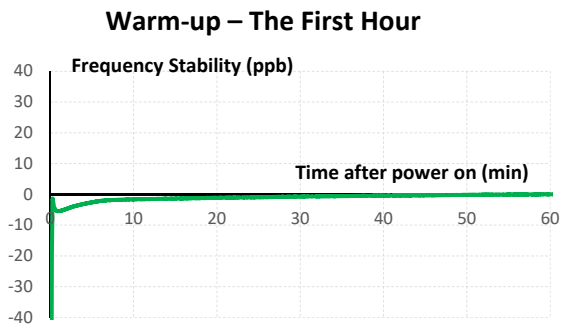
[1] The GND of the control voltage (Vc) needs to be connected directly to pin 2 (GND) as ground lead impedance may cause performance degradation.

Frequency Stability over Temperature @ 30.72 MHz

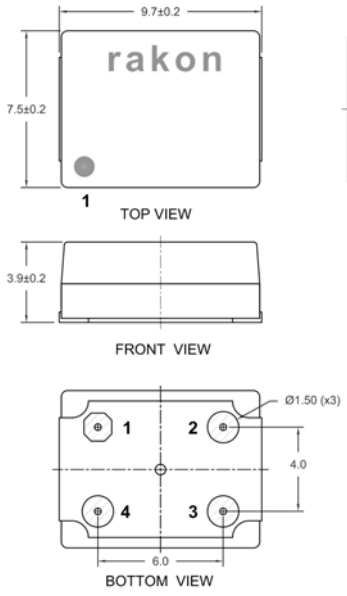


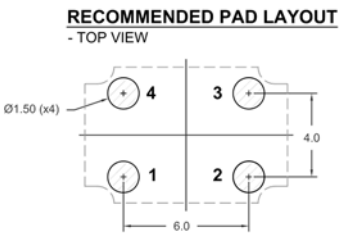
Warm-up Time @ 19.2 MHz





Model Outline and Recommended Pad Layout





NOTE

- Unit: mm
- Cover: plastic
- Base: FR4
- Finish: 0.05 ~ 0.13 µm Gold over 3 ~ 6 µm Nickel

Pin	Connections
1	Control Voltage (Vc) / Do not connect (GND optional)*
2	GND
3	Output
4	Supply Voltage (Vcc) *for correct operation decouple the supply voltage with a 10µF capacitor close to the oscillator*
	* Depending on detail specification