

ROM1490PA

The ROM1490PA utilises market-leading proprietary Mercury+™ technology delivering the world’s first ASIC-based OCXO for Radio applications. This product family achieves ± 20 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/ $^\circ\text{C}$. Extended operating temperature options are available on request. Using Rakon’s innovative high-Q quartz crystals, ROM1490PA 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 form factor and few discrete components, a ROM1490PA consumes only 0.4W at room temperature and has faster warm up times than traditional OCXOs.

Features

- Superior close-in phase noise with high-Q SC-cut crystal
- $< 1\%$ VCO linearity
- Patented tilt compensation for lifetime performance
- Fast warm up time
- 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

14.3 x 9.1 x 5.9 mm



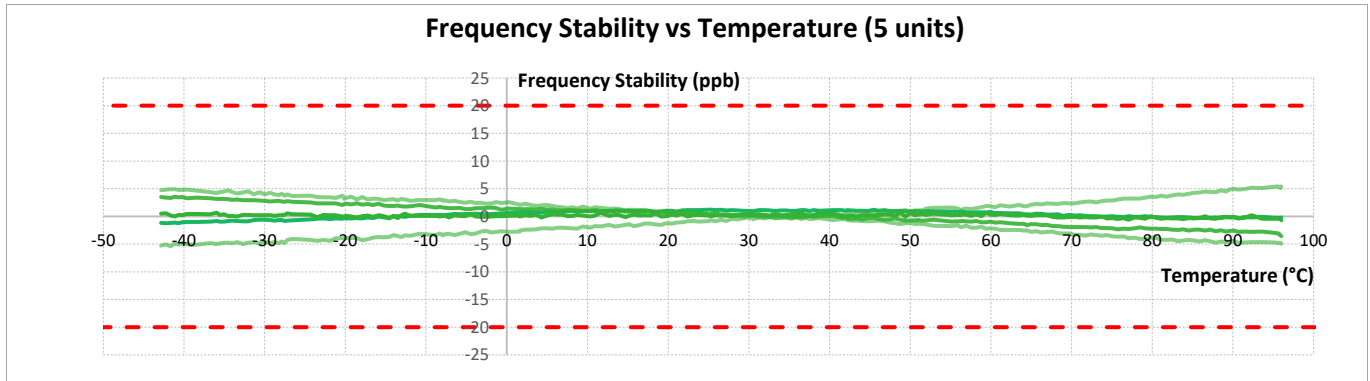
Standard Specifications

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Nominal frequency (Fn)		10 – 50		MHz	Standard frequencies: 10, 19.2, 20, 25, 30.72, 38.4, 50 MHz
Frequency calibration			± 0.2	ppm	Initial accuracy at $25^\circ\text{C} \pm 2^\circ\text{C}$
Reflow shift			± 0.2	ppm	Pre to post reflow ΔF (measured ≥ 60 minutes after reflow)
Operating temperature range	-40		+95	$^\circ\text{C}$	Operating temperatures up to 105°C are available on request
Frequency stability temperature			± 20 ± 10	ppb	In still air. Reference to $(F_{\text{MAX}} + F_{\text{MIN}})/2$ Vc: ± 20 ppb; Fixed frequency: ± 10 ppb
Frequency slope $\Delta F/\Delta T$ in still air		± 0.1	± 0.5	ppb/ $^\circ\text{C}$	Temperature ramp $\leq 1^\circ\text{C}/\text{minute}$
Supply voltage stability		± 5		ppb	$\pm 2\%$ variation, reference to frequency at 3.3V
Load sensitivity		± 5		ppb	$\pm 10\%$ variation, reference to frequency at 15pF
Warm-up time		15	60	sec	Time needed for frequency to be within ± 20 ppb 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	$\pm 5\%$
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=1.25V
Linearity			1	%	Deviation from straight line curve fit
Oscillator output	Regulated CMOS output (1.0, 1.8, 2.5V) or standard CMOS (options)				

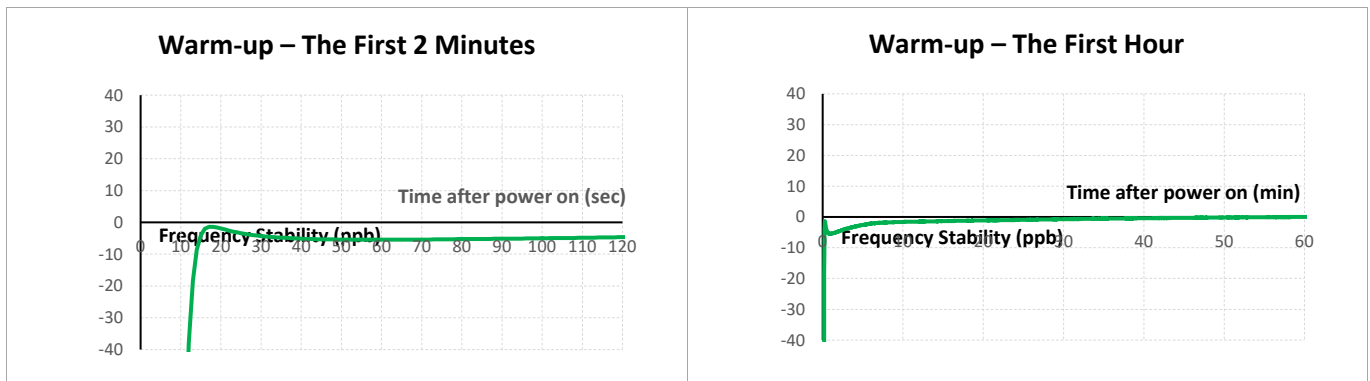
¹ The GND of the control voltage (Vc) needs to be connected directly to pin 2 (GND) as ground lead impedance may cause performance degradation.

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		
	38.4 MHz	-70	-102	-132	-150	-155	-157		

Frequency Stability over Temperature @ 30.72 MHz



Warm-up Time @ 19.2 MHz



Model Outline and Recommended Pad Layout

Pin	Connections
1	Control Voltage (Vc) / Do not connect (GND optional)*
2	Vc_GND / Do not connect (GND optional)*
3	GND
4	Output
5	NC
6	Supply Voltage (Vcc) <i>for correct operation decouple the supply voltage with a 10 µF capacitor close to the oscillator</i>

* Depending on detail specification

RECOMMENDED PAD LAYOUT - TOP VIEW

NOTE

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