

HSO13

The Rakon “Ground USO” HSO13 has a short-term stability (Allan Standard Deviation) of 8.10^{-14} , is in the 10^{-11} stability class over the temperature range of 0°C to +50°C and is available at 5 and 10 MHz. Its close-in phase noise @1 Hz is below -130 dBc/Hz for the 5 MHz product.

The ‘Ground USO’ HSO13 is specially designed to meet the request of the calibration and metrology laboratories that have high stability frequency standards but also the applications that require high performance reference oscillators like the ground stations.

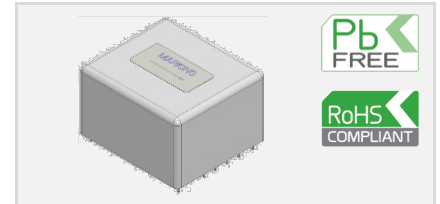
Features

- Frequency: 5 or 10 MHz
- Short-term stability: 8×10^{-14} at 5 and 10 MHz
- Frequency stability: $\pm 5 \times 10^{-11}$ over 0 to +50°C
- Supply voltage: 24 V (12 V available on request)
- Ageing: $\pm 5 \times 10^{-11}$ (± 50 ppt) per day

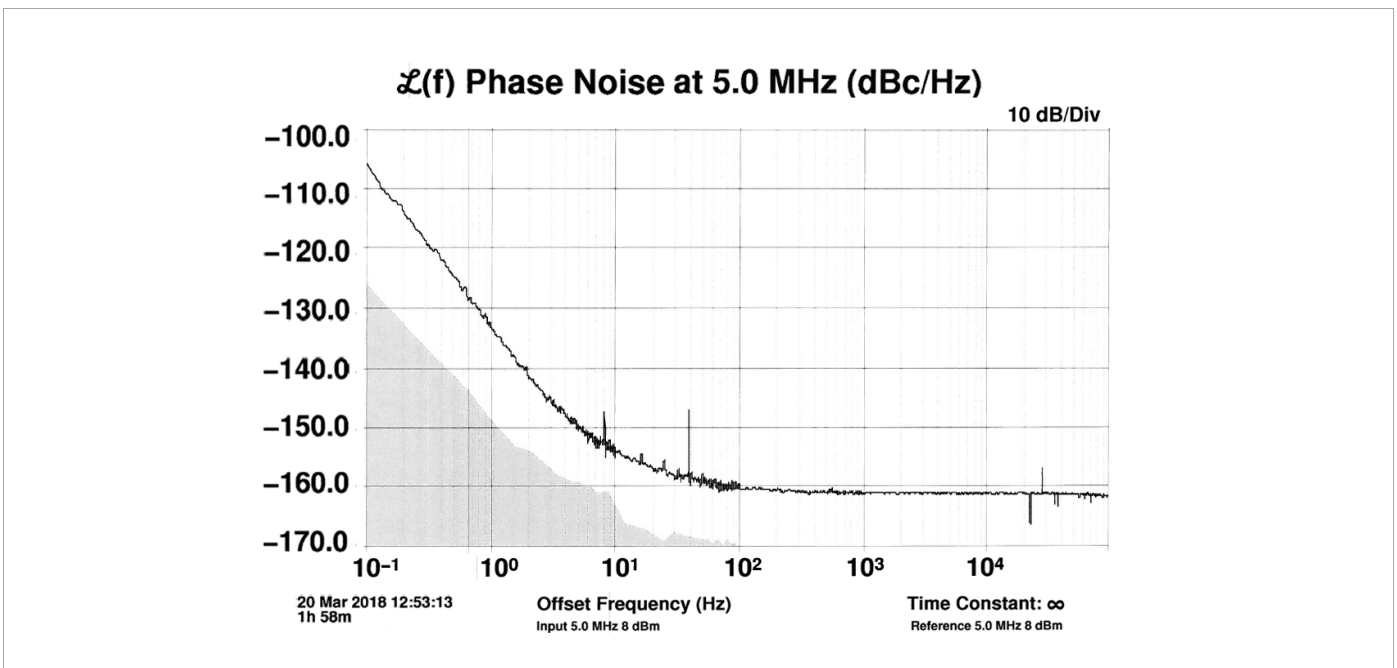
Applications

- Reference oscillator for laboratories
- Master clocks
- Ground stations

PTH1: 67 x 60 x 40 mm / 350g



Highlights – Phase Noise Performance at 5 MHz



1. Environmental Conditions

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Operating temperature	0	25	50	°C	Max. 1°C/hour
Non-operating temperature	0	25	50	°C	-
Storage temperature	0	-	50	°C	-
Frequency stability after mechanical shocks	-	-	± 10	ppb	Half sine 30g/11ms
Frequency stability after sine vibrations	-	-	± 5	ppb	10 – 500Hz 10g acceleration

2. Performance Data

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Nominal frequency (Fn)	-	5, 10	-	MHz	-
Relative pulling frequency range	± 20		± 50	ppb	With Vc tuning from 0 to 10 V
Power supply	Steady state	2.4	3	W	Typical 25°C
	Warm-up	-	10		Achieving 15 minutes after startup @ 25°C
Frequency warm-up time	-	-	15	mn	For frequency in the range Fn \pm 1 ppm
	1	-	28	day	For full performance
Frequency stability vs. temperature	-	-	± 50	ppt	-
Frequency variation vs. supply voltage (Vcc)	-	-	± 10	ppt	Vcc $\pm 1\%$ at 25°C
Frequency variation vs. load	-	-	± 20	ppt	For $\pm 10\%$ of load variation
Ageing	-	-	± 50	ppt/day	After a minimum of 21 days of continuous operation Ageing according to the MIL-PRF-55310 version C
	-	-	± 1.5	ppb/month	
	-	-	± 10	ppb/year	
	-	-	± 50	ppb/10 years	
<i>g</i> -sensitivity ⁽¹⁾	-	-	± 1	ppb/ <i>g</i>	Quadratic sum
Output level	4	-	6	dBm	Output waveform: Sinewave
Harmonics	-	-	-40	dBc	From DC to 1GHz
Spurious	-	-	-70	dBc	From DC to 5GHz

(1) Measurement according to MIL-PRF-55310, method 2g tip over

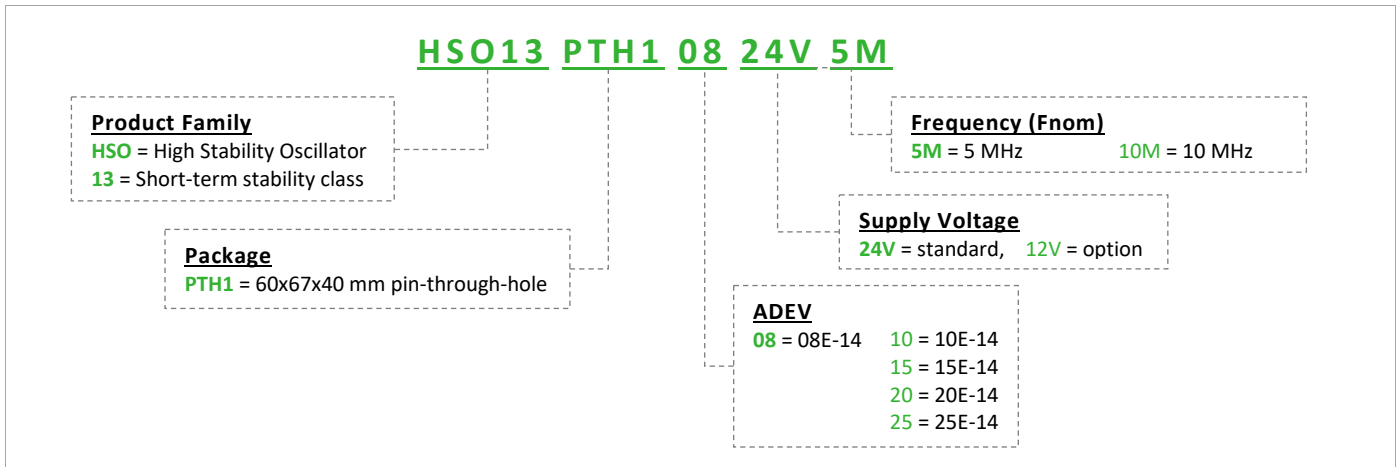
3. Electrical Interface

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Power supply	24 V	22.80	24	25.20	V
	12 V (available on request)	11.40	12	12.60	
Load impedance		47.5	50	52.5	Ω
Reference voltage (Vref)	Output current: 0 to 1 mA max.	-	8	-	V

4. Short-term Stability Options and Phase Noise

ADEV Option	Remarks	Tau=1s	Tau= 3s – 30s	Frequency	1Hz	10Hz	100Hz	1kHz	10kHz
08	ADEV = 08E-14	1E-13	8E-14	5 MHz	-130	-150	-157	-160	-160
				10 MHz	-123	-141	-143	-143	-143
10	ADEV = 10E-14	1E-13	1E-13	5 MHz	-128	-148	-155	-160	-160
				10 MHz	-121	-141	-143	-143	-143
15	ADEV = 15E-14	1.5E-13	1.5E-13	5 MHz					
				10 MHz					
20	ADEV = 20E-14	2E-13	2E-13	5 MHz					
				10 MHz					
25	ADEV = 25E-14	2.5E-13	2.5E-13	5 MHz					
				10 MHz					

5. Ordering Part Example



6. Model Outline and Pin Connections – PTH1 (pin-through-hole) Package

