

Specific request can be addressed to RAKON [hirel@rakon.com](mailto:hirel@rakon.com)

#### Product Description

The Rakon HSO13 is available with an Allan Standard Deviation of  $5.10^{-13}$  down to  $2.10^{-13}$  @5&10MHz. It is in the  $10^{-11}$  stability class over the temperature range of 0°C to +50°C and is available at 5MHz, 10MHz and around these two frequencies. The 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

- High Stability Oscillator (HSO), Oven Controlled Crystal Oscillator (OCXO)
- Frequency: 5 or 10 MHz
- Short-term stability: down to  $2.10^{-13}$  @5&10MHz
- Stability over 0°C to +50°C:  $\pm 5.10^{-11}$
- Supply Voltage: +12V
- Package: pin-through-hole (67x60x40mm)
- Ageing:  $\pm 5.10^{-11}$  per day

#### Applications

- Reference oscillator for laboratories
- Master clocks
- GPS receivers
- Ground stations

#### Specifications

##### 1. Environmental conditions

Parameters	Conditions/remarks	Min	Nom	Max	Unit
Operating Temperature	Max. 1°C / hour	0	25	50	°C
Non-Operating Temperature		0	25	50	°C
Storage Temperature		0		50	°C
Frequency stability after mechanical shocks	Half sine 30g/11 ms			$\pm 1E-8$	
Frequency stability after sine vibrations	10 to 500Hz 10g acceleration			$\pm 5E-9$	

##### 2. Electrical interface

Parameters	Conditions/remarks	Min	Nom	Max	Unit
Power supply		11.40	12	12.60	V
Load Impedance		47.5	50	52.5	$\Omega$

**3. Performance data**

**3.1. Performance @ 5 MHz**

Parameters	Conditions/Remarks	Min	Typ	Max	Unit
Nominal Frequency (Fn)			5		MHz
Relative pulling frequency range	With internal potentiometer	± 50		± 100	ppb
	Frequency tuning with Vc input from 0V to 10V	± 20			ppb
Steady state supply current	Typical @ 25°C			3	W
Warm up supply current	Frequency achievement 5mn after start up @ 25°C			10	W
Frequency warm up time	For frequency in the range Fn +/- 1 ppm			5	mn
	For full performance	1		28	day
Frequency stability vs temperature				± 5E-11	
Frequency variation vs. supply voltage	Vcc ±1% @25°C			± 1E-11	
Frequency variation vs. load	For ±10% variation of load			± 2E-11	
Frequency ageing after 30 days of continuous operation	per day			± 5E-11	
	per month			± 1.5E-9	
	per year			± 1E-8	
	10 years cumulated			± 5E-8	
G-sensitivity				± 1	ppb/G
Output waveform		Sine			
Output level		4			dBm
Harmonics level				-40	dBc
Spurious level				-70	dBc

**3.2. Performance @ 10 MHz**

Parameters	Conditions/Remarks	Min	Typ	Max	Unit
Nominal Frequency (Fn)			10		MHz
Relative pulling frequency range	With internal potentiometer	± 50		± 100	ppb
	Frequency tuning with Vc input from 0V to 10V	± 20		70	ppb
Steady state supply current	Typical @ 25°C			3	W
Warm up supply current	Frequency achievement 5mn after start up @ 25°C			10	W
Frequency warm up time	For frequency in the range Fn +/- 1 ppm			5	mn
	For full performance	1		28	day
Frequency stability vs temperature				± 5E-11	
Frequency variation vs. supply voltage	Vcc ±1% @25°C			± 1E-11	
Frequency variation vs. load	For ±10% variation of load			± 2E-11	
Frequency ageing after 30 days of continuous operation	per day			± 5E-11	
	per month			± 1.5E-9	
	per year			± 1E-8	
	10 years cumulated			± 5E-8	
G-sensitivity				± 1	ppb/G
Output waveform		Sine			
Output level		4			dBm
Harmonics level	Subharmonics			-40	dBc
Spurious level				-70	dBc

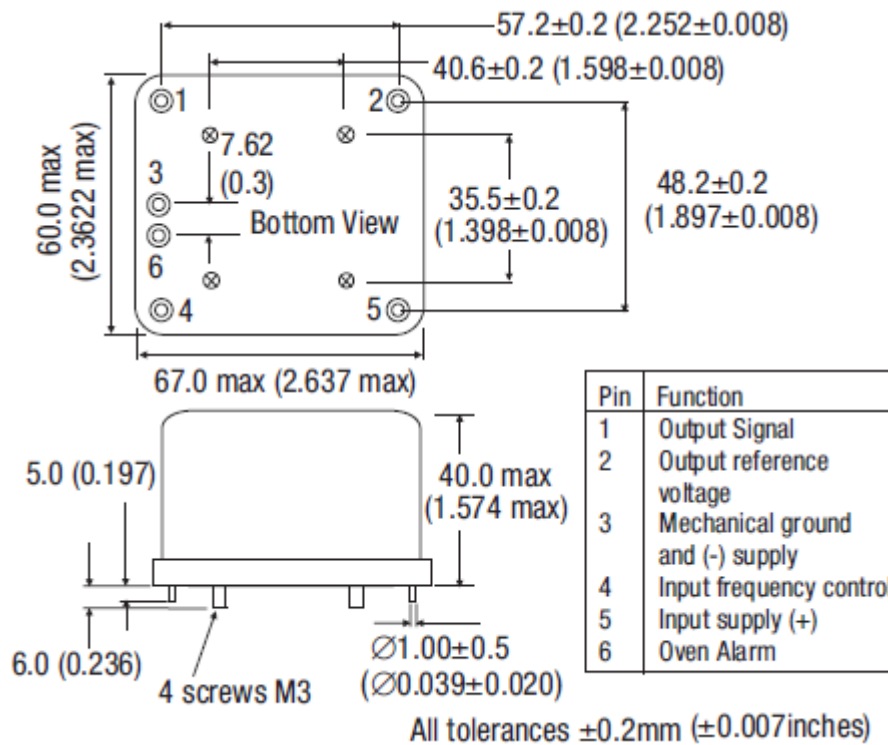
#### 4. Short-term stability options & phase noise

ADEV option	Conditions/Remarks	Tau = 1s - 30s	Frequency	1Hz	10Hz	100Hz	1kHz	10kHz
				Max/Typ.	Max/Typ.	Max/Typ.	Max/Typ.	Max/Typ.
20	ADEV= 20E-14	20E-14 (2E-13)	@5MHz	-125/-126	-135/-136	-147/-148	-147/-148	-147/-148
			@10MHz	-118/-119	-128/-129	-140/-142	-140/-142	-140/-142
25	ADEV= 25E-14	25E-14 (2.5E-13)	@5MHz	-123/-124	-135/-136	-147/-148	-147/-148	-147/-148
			@10MHz	-116/-117	-128/-129	-140/-142	-140/-142	-140/-142
50	ADEV= 50E-14	50E-14 (5E-13)	@5MHz	-117/-118	-132/-133	-147/-148	-147/-148	-147/-148
			@10MHz	-110/-111	-125/-126	-140/-142	-140/-142	-140/-142

#### 5. Mechanical features

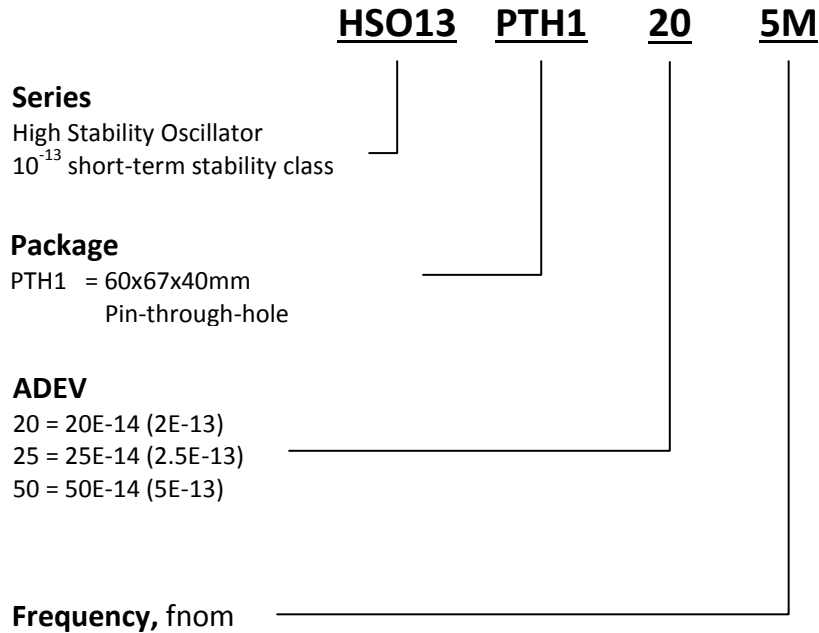
Package name	Description	Dimensions
PTH1	Pin-through-hole package	2.36"x2.63"x1.57" 60x67x40 mm

##### 5.1. Package PTH1 (Pin-through-hole)



## 6. Ordering part number definition

The part number breakdown is defined as follows:



Note: the standard frequencies are 5 and 10MHz. Please consult your sales office for any other frequency.