

HSO14

The Rakon “Ground USO” has a short-term stability (Allan Standard Deviation) of $8 \cdot 10^{-14}$, is in the 10^{-11} stability class over the temperature range of 0°C to $+50^{\circ}\text{C}$ and is available at 5 and 10 MHz. Its close-in phase noise @1 Hz is below -130 dBc/Hz for the 5 MHz “Ground USO”. Products with a short-term stability below $7 \cdot 10^{-14}$ or even $6 \cdot 10^{-14}$ can be provided on request.

The “Ground USO” 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.

Features

- Frequency: 5 or 10 MHz
- Short-term stability: 8×10^{-14} (ADEV)
- Frequency stability: $\pm 5 \times 10^{-11}$ over 0 to $+50^{\circ}\text{C}$
- Supply voltage: 24 V
- Ageing: $\pm 5 \times 10^{-11}$ (± 50 ppt) per day

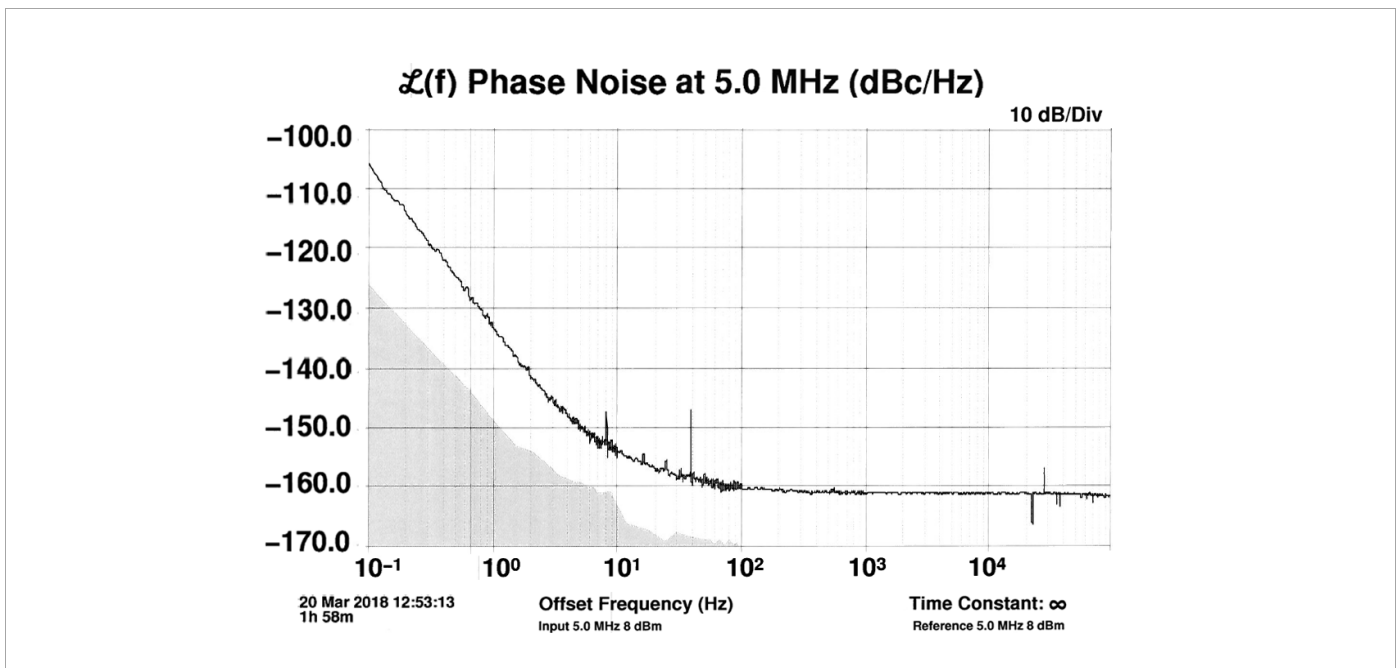
Applications

- Reference oscillator for laboratories
- Reference oscillator for Maser and Atomic fountains

SMA1: 73 x 135 x 84 mm / 1100g



Highlights – Phase Noise Performance at 5 MHz



1. Environmental Conditions

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Operating temperature	0	25	50	$^{\circ}\text{C}$	Max. $1^{\circ}\text{C}/\text{hour}$
Non-operating temperature	-5	25	55	$^{\circ}\text{C}$	-
Storage temperature	0	-	60	$^{\circ}\text{C}$	-
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	± 50 ± 20	-	± 100 -	ppb	With internal potentiometer Frequency tuning with Vc input 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	- 1	-	6 28	mn day	For frequency in the range $F_n \pm 1$ ppm 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	At $\pm 10\%$
Ageing	-	-	± 50 ± 1.5 ± 10 ± 50	ppt/day ppb/month ppb/year ppb/10 years	After a minimum of 21 days of continuous operation - - According to the MIL-PRF-55310 version C
<i>g</i> -sensitivity ⁽¹⁾	-	-	± 1	ppb/g	Quadratic sum
Output level	7	8	9	dBm	Output waveform: Sinewave
Harmonics	-	-	-40	dBc	-
Spurious	-	-	-80	dBc	-

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

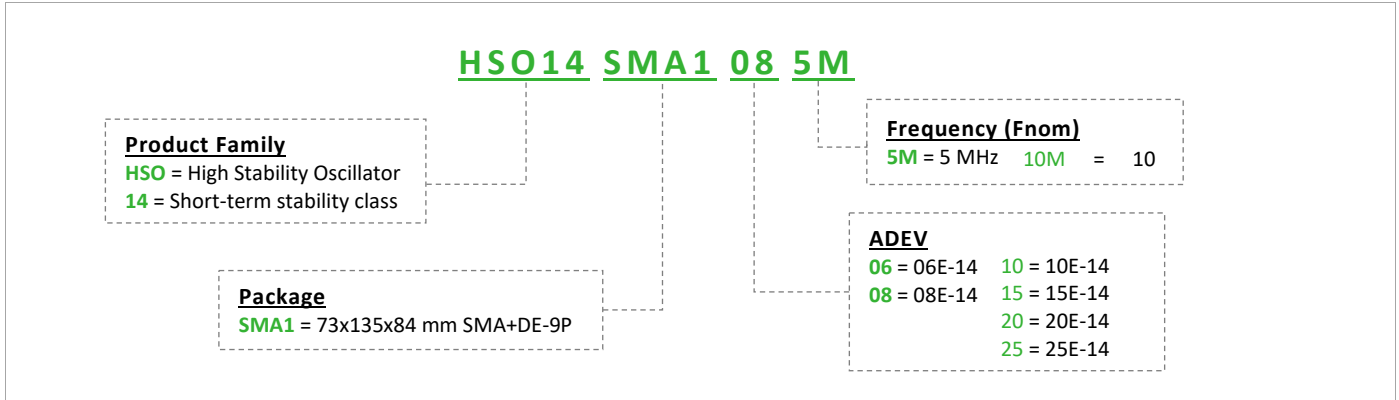
3. Electrical Interface

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Power supply	21.60	24	26.40	V	24 V
Load impedance	47.5	50	52.5	Ω	-
Reference voltage (Vref)	-	8	-	V	Output current: 0 to 1 mA max.

4. Short-term Stability Options and Phase Noise

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

5. Ordering Part Example



6. Ordering Model Outline and Pin Connections – SMA1 (SMA+DE-9P) Package

