

HSO14

The HSO14 is a Ground USO that delivers a short-term stability (Allan Standard Deviation) of $8 \cdot 10^{-14}$. This USO is a 10^{-11} stability class OCXO with a temperature range of 0°C to $+50^{\circ}\text{C}$. It is available in two standard frequencies: 5 and 10 MHz. The product features excellent close-in phase noise, e.g. for the 5 MHz frequency the @1 Hz is below -130 dBc/Hz. Products with a short-term stability below $7 \cdot 10^{-14}$ are available on request.

This HSO14 is a high-performance reference oscillator specially designed to meet the requirements of calibration and metrology laboratories – applications where high and precise frequency stability and superior Allan Deviation performance is critical.

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

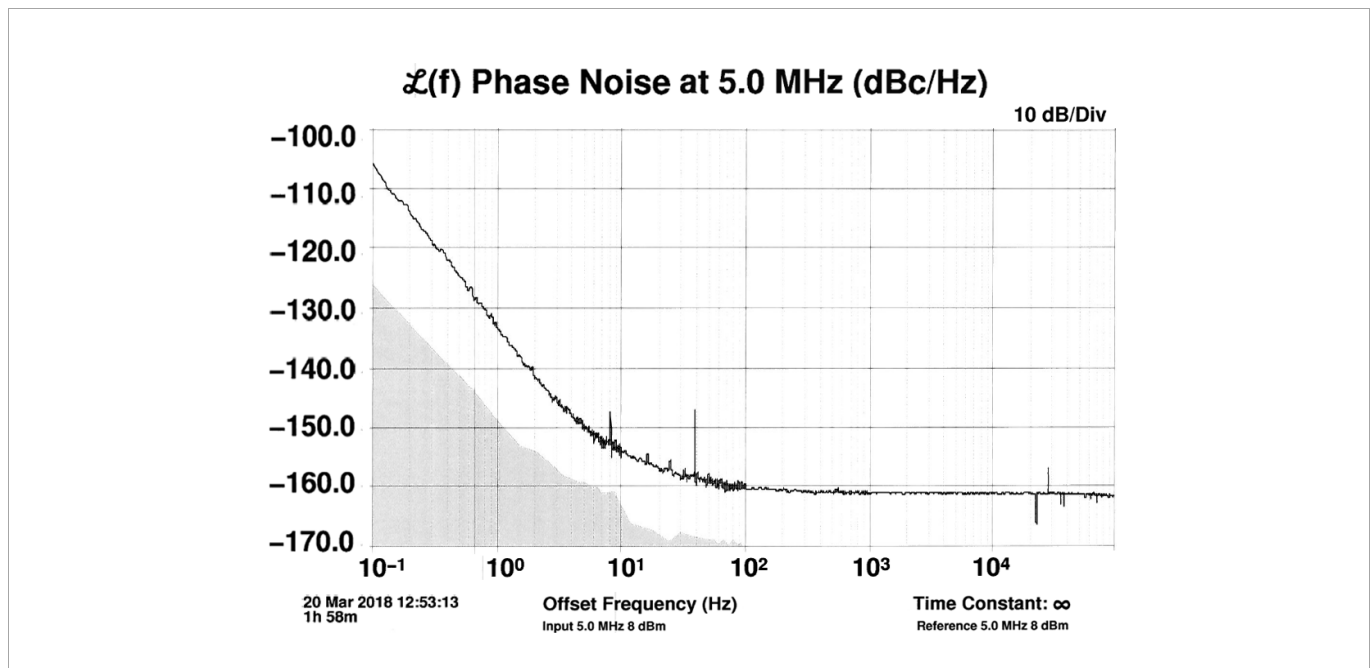
Applications

- 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	- -	15 28	mn day	For frequency in the range Fn \pm 1 ppm @25°C 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
g-sensitivity ¹	-	-	± 1	ppb/g	Quadratic sum
Output level	7	8	9	dBm	Output waveform: Sinewave
Harmonics	-	-	-40	dBc	From DC to 10xFn
Spurious	-	-	-80	dBc	From 100 Hz to 3GHz @25°C

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	-	-	-	-	-

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

5. Ordering Part Example

HSO14 SMA1 08 5M

Product Family
HSO = High Stability Oscillator
14 = Short-term stability class

Frequency (Fnom)
5M = 5 MHz **10M** = 10 MHz

ADEV
06* = 06E-14 **10** = 10E-14
08 = 08E-14 **15** = 15E-14
20 = 20E-14
25 = 25E-14

Package
SMA1 = 73x135x84 mm SMA+DE-9P

* For ADEV at 06E-14, a specific shortform will be written.

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

TOP VIEW
 Dimensions: 100 mm width, 41 mm height.

FRONT VIEW
 Dimensions: 76.3 mm height, 72.6±1 mm width. Features SMA connectors J1, J2, J3 and SUB D 9P connector. Marking area is indicated.

SIDE VIEW
 Dimensions: 135.5±1 mm length, 84.4±1 mm height. Mounting holes are spaced 17.75 mm from the ends.

BOTTOM VIEW
 Shows the underside of the unit with a frequency adjustment screw (Freq. Adj.) of diameter 3 mm.

PIN CONNECTIONS

Connector	REP	Description
SMA	J1	RF Output 1
SMA	J2	RF Output 2
DE_9P	J3	SUB D Connector
	J3/1	NC
	J3/2	0V (GND) Power supply
	J3/3	GND VCF
	J3/4	CCW Ext. Potentiometer
	J3/5	VCF Input (Output Ext. Potentiometer)
	J3/6	NC
	J3/7	+24V Power supply
	J3/8	NC
	J3/9	Vref Output (CW Ext. Potentiometer)

NOTE:

- Outline unit is mm.
- Tolerance is ±0.3 mm if it has not been indicated.