HSO14

The HSO14 is a Ground USO that delivers a short-term stability (Allan Standard Deviation) of 8 x 10^{-14}. This USO is a 10^{-11} stability class OCXO with a temperature range of 0 °C to +50 °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 7.10^{-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 x 10^{-14} at 5 and 10 MHz
- Frequency stability: ± 5 x 10^{-11} over 0 to +50 °C
- Supply voltage: 24 V
- Ageing: ±5 x 10^{-11} (±50 ppt) per day

Applications

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

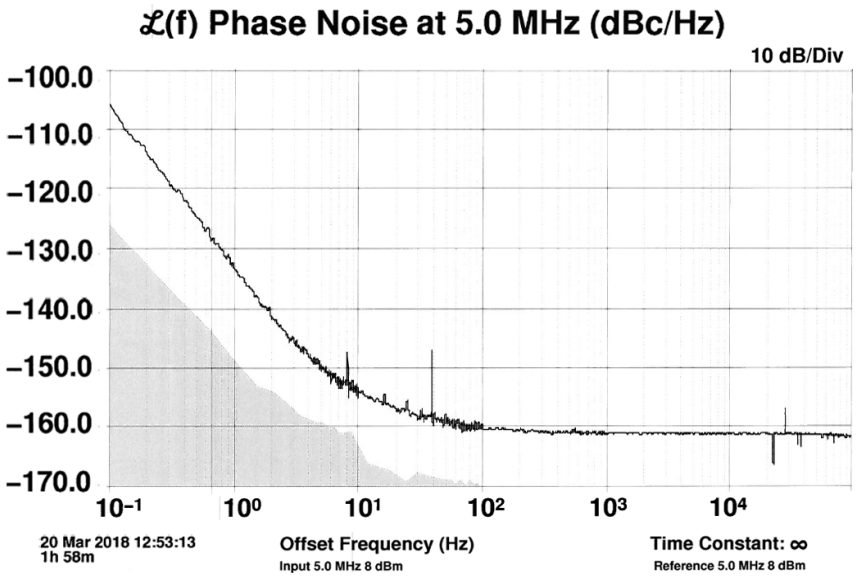
73 x 135 x 84 mm

SMA1

Pb FREE

RoHS COMPLIANT

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	-5	25	55	°C	-
Storage temperature	0	-	60	°C	-
Frequency stability after mechanical shocks	-	-	±10	ppb	Half sine 30 g / 11 ms
Frequency stability after sine vibrations	-	-	±5	ppb	10 – 500Hz 10 g acceleration

Issue: A5, 51001808.110, 4 October 2023

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 Warm-up	- -	2.4 -	3 10	W	Typical 25 °C Achieving 15 minutes after startup @ 25 °C
Frequency warm-up time	- 1	- -	15 28	mn day	For frequency in the range Fn ± 1 ppm @25 °C For full performance
Frequency stability vs. temperature	-	-	±50	ppt	-
Frequency variation vs. supply voltage (V_{CC})	-	-	±10	ppt	Vcc ± 1 % at 25 °C
Frequency variation vs. load	-	-	±20	ppt	At ±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 3 GHz @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 (V_{REF})	-	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

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

Frequency (Fn)
5M = 5 MHz, 10M = 10 MHz

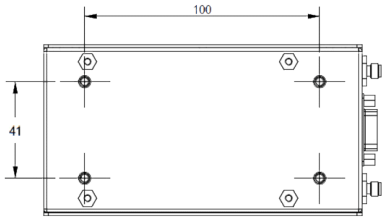
ADEV
06* = 06E-14; 08 = 08E-14
10 = 10E-14; 15 = 15E-14; 20 = 20E-14; 25 = 25E-14

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

6. Model Outline and Pin Connections

Parameter	Remarks
Package size	73 x 135 x 84 mm. SMA1 (SMA + DE-9P) package
Net weight	1100 g typ.
STEP file	HSO14 3D model *To open or view the STP file, you will need to import it into one of the following software programs: Autodesk Fusion 360, CATIA, SolidWorks, Solid Edge, TurboCAD, Kubotek KeyCreator, FreeCAD, ABViewer, ShareCAD, or eMachineShop.*

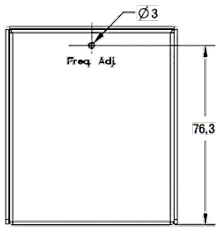
Model outline



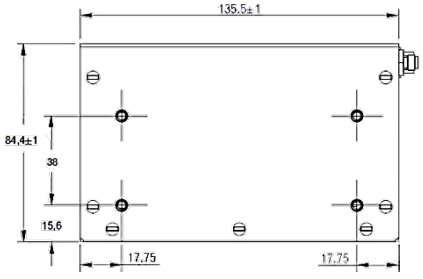
TOP VIEW

PIN CONNECTIONS

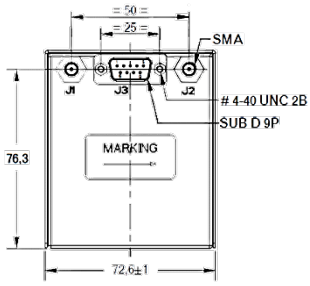
Connector	REP	Description
SMA	J1	RF Output 1
SMA	J2	RF Output 2
DE_9P	J3	SUB D Connector
	J3/1	NC
	J3/2	0V (GND) Power supply
	J3/3	GND VCF
	J3/4	CCW Ext. Potentiometer
	J3/5	VCF Input (Output Ext. Potentiometer)
	J3/6	NC
	J3/7	+24V Power supply
	J3/8	NC
	J3/9	Vref Output (CW Ext. Potentiometer)



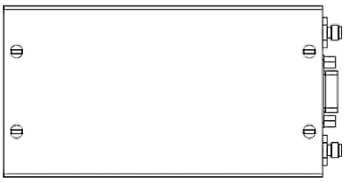
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



BOTTOM VIEW

NOTE:
Unit is mm.
General tolerance ±0.2 mm.