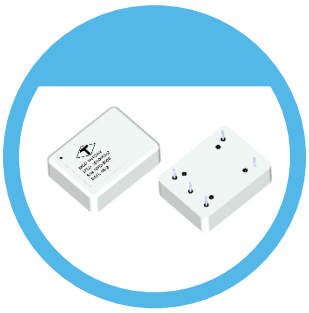
TAITIEN
Our Performance, Your Reputation

NI-10M-3500 Series

Double Oven Controlled Crystal Oscillator



RoHS Compliant

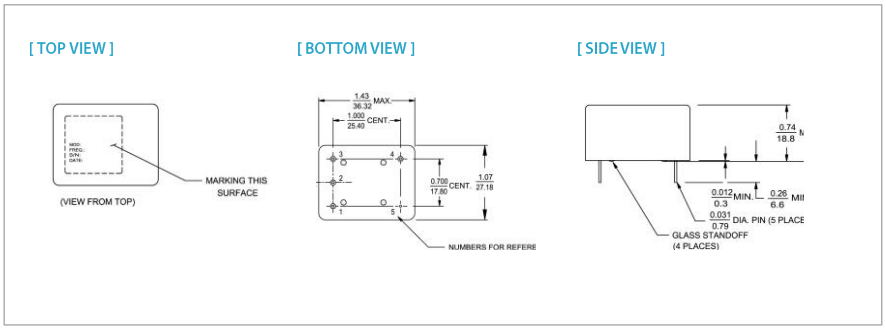
FEATURES

- Design for Application of Exceptional Frequency Stability and Timing
- Aging Performance
  - ±0.05 ppb/day
  - ±10 ppb/Year
  - ±50 ppb/10 Years

TYPICAL APPLICATION

- Instrument Reference
- Data Communication
- Test & Measurement
- Telecom Systems
- GPS

DIMENSION (mm)



PIN FUNCTION

PIN	FUNCTION
1 (See Note 1)	VCO INPUT Or NOT CONNECTED
2 (See Note 1)	REFERENCE VOLTAGE Or OVEN MONITOR Or NOT CONNECTED
3	+VDC
4	R.F.OUTPUT
5	0 VOLTS & CASE

Note 1. If the specification does not specify parameters for either PIN1 or PIN2 then that respective PIN is NOT Internally CONNECTED.

ELECTRICAL SPECIFICATION

Parameter	OUTPUT (PIN="R.F. OUTPUT")				Test Condition
	Min.	Typ.	Max.	Unit	
Frequency		10.000000		MHz	
Initial Accuracy	-0.1		+0.1	ppm	@ +25 ±1°C after turn on power 30 ±5 minutes ≦90 days following date code VCO input at Center Voltage ±0.001V
Waveform		Rectangular			
Level		CMOS			
"1" level	+2.4			V	
"0" level			+0.3	V	
Load		15		pF	
Duty Cycle	45	50	55	%	@ +2.5V
Spurious			-60	dBc	

Parameter	ELECTRICAL FREQUENCY ADJUSTMENT (PIN="VCO INPUT")				Test Condition	
	Min.	Typ.	Max.	Unit		
Tuning Range	-0.25		-0.15	ppm	VCO @ Min. Voltage	Referenced to frequency at nominal Center Voltage
	+0.15		+0.25	ppm	VCO @ Max. Voltage	
Control Voltage	0		+2.8	V		
Slope		Positive				
Center Voltage		+1.4		V	When not connected, VCO INPUT is internally held at this voltage	
Linearity	-10		+10	%		
Input Impedance	50			kΩ		

Note: not all combination of options are available. Other specifications may be available upon request.

Specifications subject to change without notice.

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Parameter		FREQUENCY STABILITY				Test Condition	
		Min.	Typ.	Max.	Unit		
Ambient		±0.05, ±0.1, ±0.2, ±0.5			ppb	Refer to Table 1 : Ordering Information	
		-10℃ ~ +70℃ -40℃ ~ +85℃			℃		
Aging	Daily	±0.05, ±0.1, ±0.2			ppb	after 30 days	Refer to Table 1 : Ordering Information
	Yearly	±10, ±20, ±40			ppb		
	10 Years	±50, ±100, ±200			ppb		
Voltage		-0.1		+0.1	ppb	±5% change	
Short Term				0.005	ppb/s	root Allan variance	
				0.01	ppb/10s		
Warm-up		-20		+20	ppb	In 5 minutes @ +25 ±1℃	Referenced to 1hour
Phase Noise				-90	dBc/Hz	@ 1Hz	
				-120	dBc/Hz	@ 10Hz	
				-135	dBc/Hz	@ 100Hz	
				-145	dBc/Hz	@ 1KHz	
				-155	dBc/Hz	@ 10KHz	
				-160	dBc/Hz	@ 100KHz	
Retrace		-5		+5	ppb	After 60 minutes from on, following 24 hours minimum on time, and 24 hours maximum off time. At constant temperature and voltage. Referenced to frequency at off time.	

Parameter		INPUT POWER (PIN="+VDC")				Test Condition
		Min.	Typ.	Max.	Unit	
Voltage		+4.75	+5.0	+5.25	V	
Current	Steady Stage			2.5	W	@ +25℃
	During Warm-up			1.75	A	@ trun on

Parameter	REFERENCE VOLTAGE (PIN="REFERENCE VOLTAGE")				Test Condition
	Min.	Typ.	Max.	Unit	
Voltage	+2.716	+2.8	+2.884	V	Over Operating temperature range
Load	9			kΩ	
Temperature Stability	-0.5		+0.5	mV	

Parameter	ENVIRONMENTAL	Test Condition
	Reference Std.	
Storage Temperature	-40℃ ~ +85℃	
Vibration (non-operating)	MIL-STD-202, Method 201	0.06" Total p-p, 10 to 55 Hz
Shock (non-operating)	MIL-STD-202, Method 213, Test Condition J	30g, 11ms, half-sine

Table 1 : ORDERING INFORMATION

Temp.(℃) \ Ambient / Aging		Aging Performance		
		± 0.05 ppb/day ± 10 ppb/year ± 50 ppb/10 years	± 0.1 ppb/day ± 20 ppb/year ± 100 ppb/10 years	± 0.2 ppb/day ± 40 ppb/year ± 200 ppb/10 years
-40℃~+85℃	± 0.1 ppb	NI-10M-3500	NI-10M-3501	NI-10M-3502
	± 0.2 ppb	NI-10M-3510	NI-10M-3511	NI-10M-3512
	± 0.3 ppb	NI-10M-3520	NI-10M-3521	NI-10M-3522
	± 0.5 ppb	NI-10M-3530	NI-10M-3531	NI-10M-3532
-10℃~+70℃	± 0.05 ppb	NI-10M-3550	NI-10M-3551	NI-10M-3552
	± 0.1 ppb	NI-10M-3560	NI-10M-3561	NI-10M-3562
	± 0.2 ppb	NI-10M-3570	NI-10M-3571	NI-10M-3572
	± 0.3 ppb	NI-10M-3580	NI-10M-3581	NI-10M-3582

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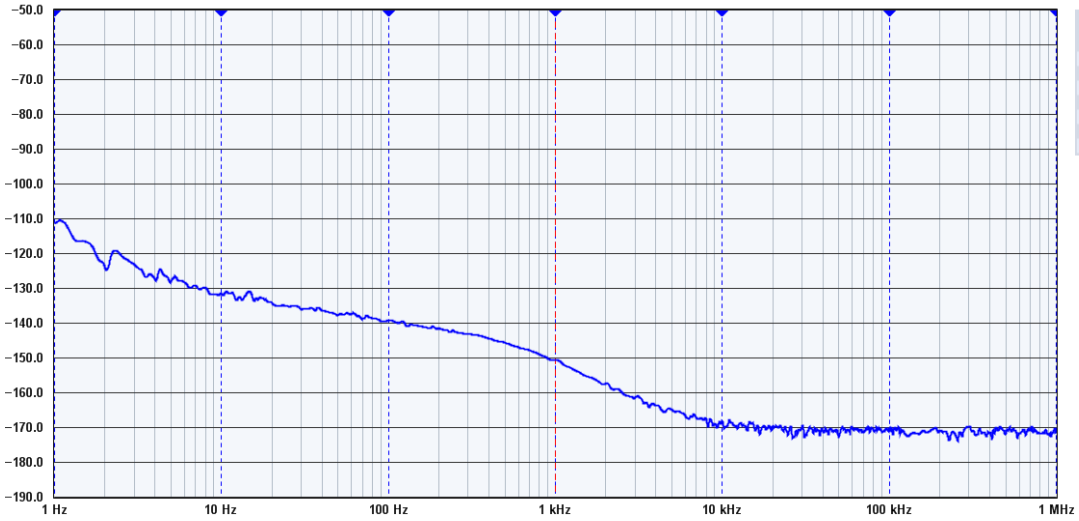
Phase Noise & Short Term Stability Test Data

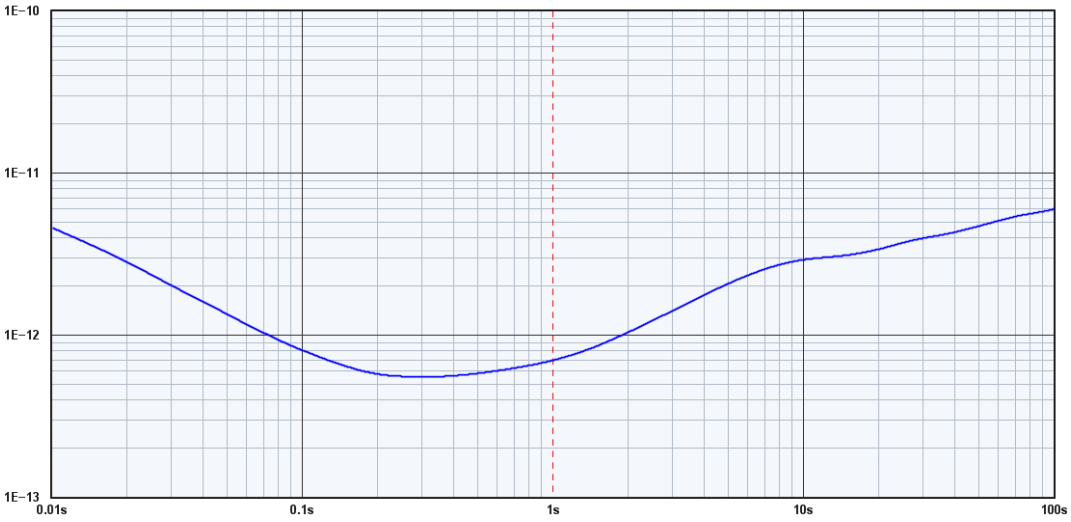
Phase Noise ℒ(f) in dBc/Hz



Noise Marker (Hz)	dBc/Hz
1 Hz	−111.3
10 Hz	−131.6
100 Hz	−139.2
1 kHz	−150.5
10 kHz	−168.6
100 kHz	−170.5
1 MHz	−171.6

Notes	Input Freq	Input Amplitude	dBc/Hz at 1 kHz	Duration	Elapsed	Instrument
NI-10M-3500	10.0 MHz	10 dBm	−150.5	5m 0s	5m 0s	Microchip 53100A

Allan Deviation $\sigma_y(\tau)$



Tau	Sigma(Tau)
1s	7.09E−13
2s	1.06E−12
4s	1.79E−12
8s	2.75E−12
10s	2.95E−12
20s	3.44E−12
40s	4.37E−12
80s	5.67E−12
100s	6.07E−12

Notes	Input Freq	Input Amplitude	ADEV at 1s	Instrument
NI-10M-3500	10.0 MHz	10 dBm	7.09E−13	Microchip 53100A

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