

# Double Oven Controlled Crystal Oscillator NI-10MHz-3000 Series

NI-10M-3000 Series in 36.3x27.2mm DIP package

NI-10M-3000 Series oscillators are designed for applications where exceptional frequency stability and timing is required. The NI-10M-3000 units have both excellent temperature performance and short term stability. These characteristics make the NI-10M-3000 Series an excellent choice for timing applications requiring holdover of < 10  $\mu$ S for 24 hours. A choice of quartz resonators offers a variety of performance versus cost options to fit most applications.



RoHS Compliant Standard

## ELECTRICAL SPECIFICATIONS

### 1. OUTPUT (PIN = "R.F. OUTPUT")

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
1.1.	Frequency	10.000000			MHz	
1.2.	Initial Accuracy	-0.1		+0.1	ppm	@ +25 $\pm$ 1 $^{\circ}$ C after turn on power 30 $\pm$ 5 minutes $\leq$ 90 days following date code VCO Input at Center Voltage $\pm$ 0.001V
1.3.	Waveform	Rectangular				
1.4.	Level	HCMOS				
	"1" level	+2.4			V	
	"0" level			+0.3	V	
1.5.	Load		15		pF	
1.6.	Duty cycle	45	50	55	%	@ +1.65V
1.7.	Spurious			-60	dBc	

### 2. FREQUENCY STABILITY

	Parameter	Min.	Typ.	Max.	Unit	Test Condition	
2.1.	Ambient	$\pm$ 0.2, $\pm$ 0.5			ppb	Refer to Table 1 : Ordering Information	
		0 ~ +70 -30 ~ +70			$^{\circ}$ C		
2.2.	Aging					Refer to Table 1 : Ordering Information	
	Daily	$\pm$ 0.1, $\pm$ 0.3			ppb		per day, at time of shipment
	Yearly	$\pm$ 0.1, $\pm$ 0.3			ppb		after 30 days
	10 Years	$\pm$ 20, $\pm$ 50			ppb		
2.3.	Voltage	-0.2		+0.2	ppb	$\pm$ 5% change	
2.4.	Short term			0.007	ppb/s	root Allan variance	
				0.01	ppb/10s		
2.5.	Warm-up	-20		+20	ppb	in 5 minutes @ +25 $\pm$ 1 $^{\circ}$ C referenced to 1 hour	

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
2.6.	Phase Noise			-90	dBc/Hz	@ 1Hz
				-120	dBc/Hz	@ 10Hz
				-138	dBc/Hz	@ 100Hz
				-148	dBc/Hz	@ 1KHz
				-155	dBc/Hz	@ 10KHz
				-158	dBc/Hz	@ 100KHz
2.7.	Retrace	-5		+5	ppb	After 60 minutes from turn on, following 24 hours minimum on time, and 24 hours maximum off time. At constant temperature and voltage. Referenced to frequency at off time

### 3. ELECTRICAL FREQUENCY ADJUSTMENT (PIN = "VCO INPUT")

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
3.1.	Tuning Range	-0.8		-0.35	ppm	VCO @ Min. Voltage
		+0.35		+0.8	ppm	VCO @ Max. Voltage
3.2.	Control Voltage	0		+2.8	V	Referenced to frequency at nominal Center Voltage
3.3.	Slope	Positive				
3.4.	Center Voltage		+1.4		V	When not connected, VCO INPUT is internally held at this voltage
3.5.	Linearity	-10		+10	%	
3.6.	Input Impedance	50			kΩ	

### 4. INPUT POWER (PIN = "+VDC")

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
4.1.	Voltage	+3.135	+3.3	+3.465	V	
4.2.	Current			2.5	A	@ turn on
4.3.	Steady State			2.5	W	@ +25°C

### 5. REFERENCE VOLTAGE (PIN = "REFERENCE VOLTAGE")

	Parameter	Min.	Typ.	Max.	Units	Test Condition
5.1.	Voltage	+2.66	+2.8	+2.94	V	Over temperature range in 2.1
5.2.	Load	9			kΩ	
5.3.	Temperature stability	-0.0005		+0.0005	V	

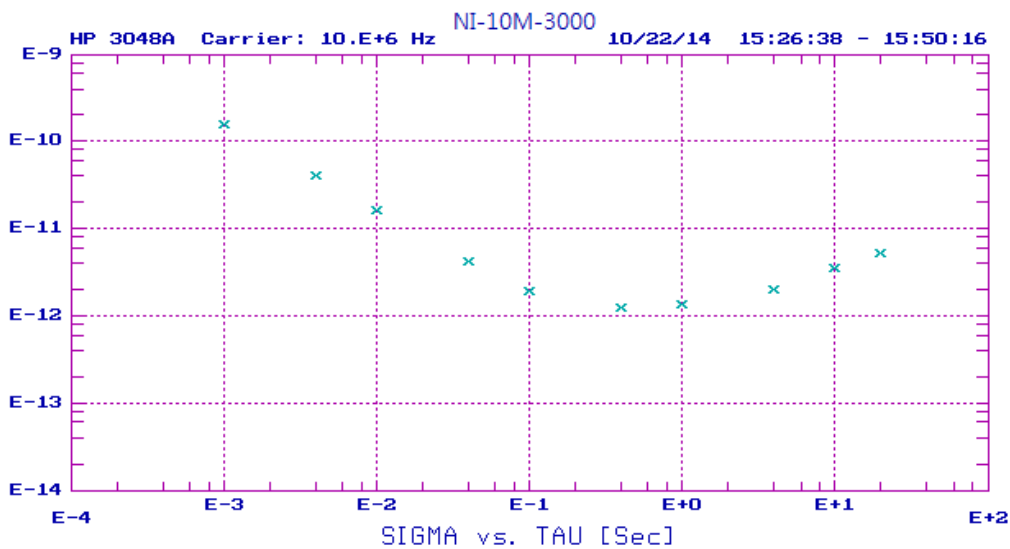
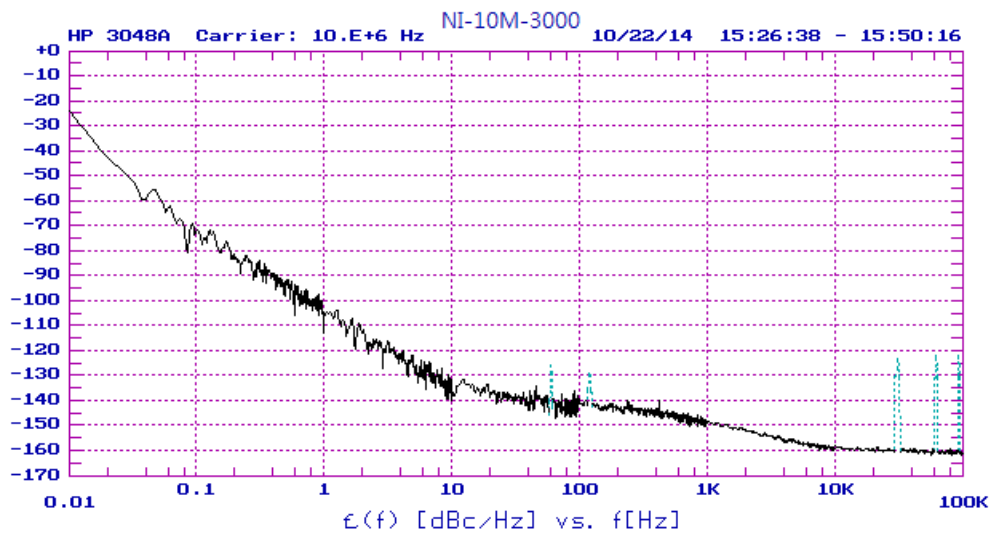
### 6. ENVIRONMENTAL

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

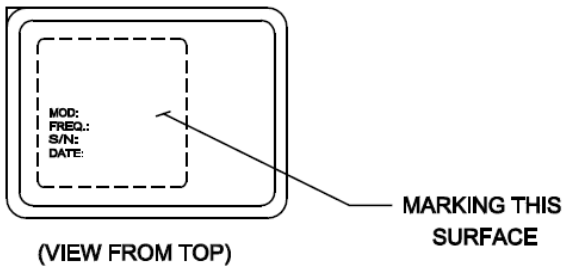
**Table 1 : ORDERING INFORMATION**

		Aging	
		Aging Performance	
Temp. (°C)	Ambient	±0.1 ppb/Day ±20 ppb/Year ±0.1 ppm/10 Years	±0.3 ppb/Day ±50 ppb/Year ±0.2 ppm/10 Years
		-30°C ~+70°C	±0.5 ppb
±0.2 ppb	NI-10M-3010		NI-10M-3011
0°C~+70°C	±0.5 ppb	NI-10M-3040	NI-10M-3041
	±0.2 ppb	NI-10M-3050	NI-10M-3051

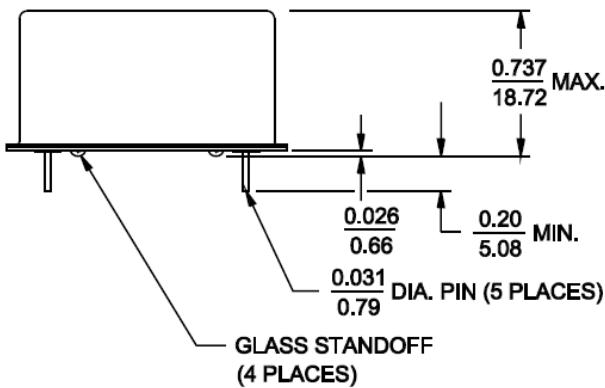
Other specifications may be available upon request.

**Phase Noise & Short Term Stability Test Data**


## OUTLINE DRAWING

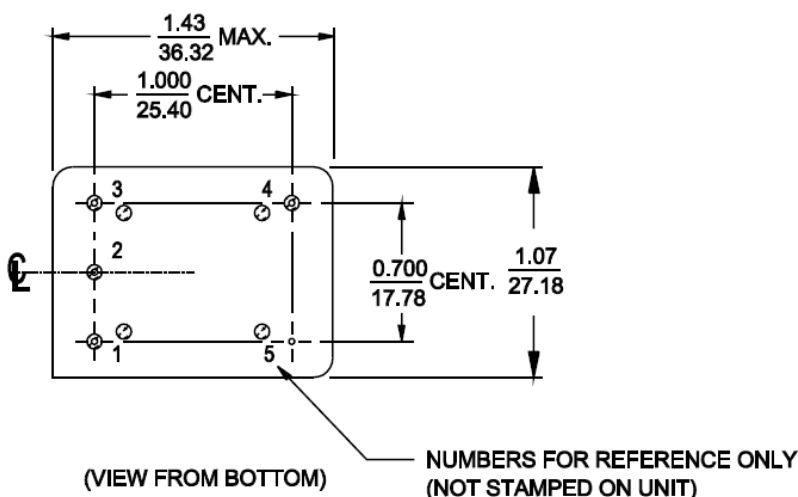
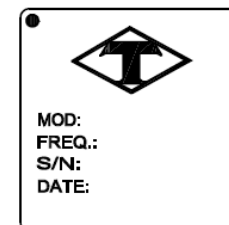
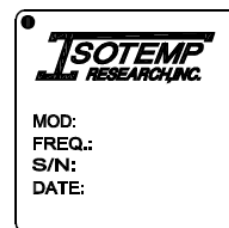


PIN CONNECTIONS	
PIN	FUNCTION
1 (See Note 1)	VCO INPUT or NOT CONNECTED
2 (See Note 1)	REFERENCE VOLTAGE or OVEN MONITOR or NOT CONNECTED
3	+VDC
4	R. F. OUTPUT
5	0 VOLTS & CASE



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

## MARKING



$\frac{\text{INCH}}{\text{mm}}$  (REFERENCE ONLY)