

100MHz Low Noise OCXO

NJ-100M-6800 Series

6800 Series in 25.4x22mm SMD package

NJ-100-6800 series is a 100.000 MHz high performance (VC)OCXO offering low phase noise(LPN) and tight frequency stability down to ± 50 ppb(-20°C to $+70^{\circ}\text{C}$). The part comes in a small SMD package which makes it suitable for reflow soldering during pick and place assembly



FEATURES

- **Low Phase Noise**
- Small SMD Package
- Tight Frequency Stability
- Low Power Consumption
- Fast Warm-up Time
- Electrical Frequency Tuning Input
- Reference Voltage Output
- RoHS-Compliant (lead-free)

APPLICATIONS

- Instrument Reference
- Microwave Communication
- Clock Reference for Microwave Signal Source
- Test & Measurement
- Telecom Systems
- Radar Systems
- Satellite Communication

RoHS Compliant Standard

ELECTRICAL SPECIFICATIONS

Test conditions: $V_{DC} = +12\text{ V}$; $V_{CO} = +5\text{ V}$; at $+25 \pm 3^{\circ}\text{C}$ unless otherwise identified

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

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
1.1.	Frequency (Fo)	100.000000			MHz	
1.2.	Initial Accuracy	-0.3		+0.3	ppm	@ $+25 \pm 1^{\circ}\text{C}$ after turn on power 60 minutes $V_{CO}=+5\text{V}$
1.3.	Waveform	Sine wave				
1.4.	Level	+10			dBm	
1.5.	Load		50		Ω	
1.6.	Harmonics			-30	dBc	
1.7.	Spurious			-100	dBc	

2. FREQUENCY STABILITY

	Parameter	Min.	Typ.	Max.	Unit	Test Condition		
2.1.	Ambient	±20, ±50, ±100			ppb	referenced to 25°C	Refer to Table 1 : Ordering Information	
		-20°C ~ +70°C -40°C ~ +85°C			°C			
2.2.	Aging							
	Daily	-5		+5	ppb	after 30 days		
	Yearly	-500		+500	ppb			
	10 Years	-2		+2	ppm			
2.3.	Voltage	-5		+5	ppb	±5% change		
2.4.	Short term			0.05	ppb	root Allan variance for τ=1 sec		
2.5.	Load	-5		+5	ppb	±10% change		
2.6.	Warm-up	-50		+50	ppb	in 5 minutes @ +25 ±1°C	referenced to 1 hour	
2.7.	Phase Noise (Max.)	Option A	Option B	Option C		Refer to Table 1 : Ordering Information		
		-93	-97	-100	dBc/Hz	@ 10Hz		
		-125	-130	-135	dBc/Hz	@ 100Hz		
		-154	-157	-160	dBc/Hz	@ 1KHz		
		-173	-173	-170	dBc/Hz	@ 10KHz		
		-177	-175	-172	dBc/Hz	@ 100KHz		
		-180	-178	-175	dBc/Hz	@ 1MHz		

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

	Parameter	Min.	Typ.	Max.	Unit	Test Condition	
3.1.	Tuning Range			-3	ppm	VCO @ Min. Voltage	Referenced to frequency at nominal Center Voltage
		+3			ppm	VCO @ Max. Voltage	
3.2.	Control Voltage	0		+10.0	V		
3.3.	Slope	Positive					
3.4.	Center Voltage		+5		V		
3.5.	Linearity	-10		+10	%		

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

	Parameter	Min.	Typ.	Max.	Unit	Test Condition	
4.1.	Voltage	+11.4	+12	+12.6	V		
4.2.	Current						
	Steady State			2.1	W		
	During Warm-Up			380	mA		

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

	Parameter	Min.	Typ.	Max.	Units	Test Condition	
5.1.	Voltage	+9.5	+10	+10.5	V		

6. ENVIRONMENTAL

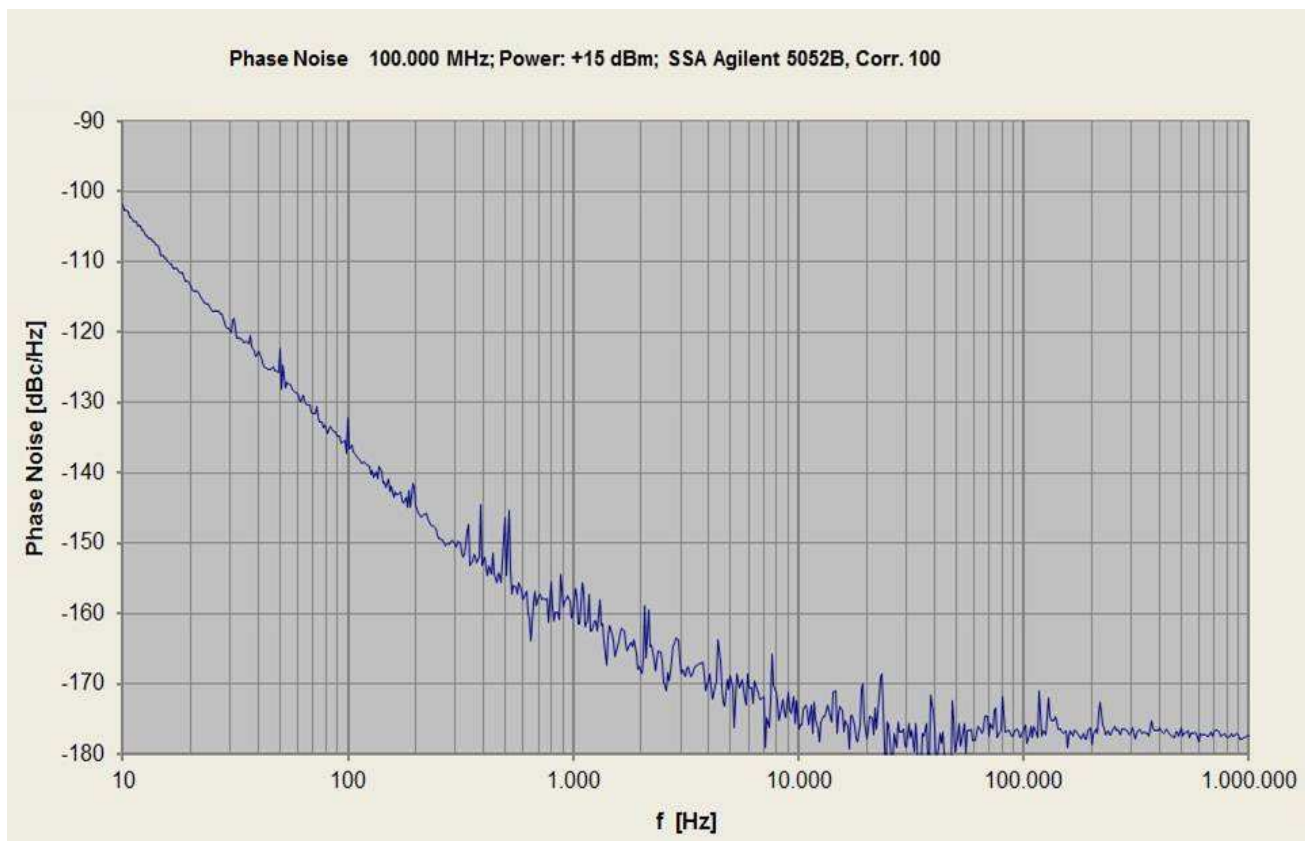
	Parameter	Reference Std.	Test Condition
6.1.	Operating Temperature	-40°C to +85°C	Note 1
6.2.	Storage Temperature	-55°C to +105°C	
6.3.	Humidity	MIL-STD-202, Method 103 Test Condition A	95% RH @ +40°C, non-condensing, 240 hours
6.4.	Vibration (non-operating)	MIL-STD-202, Method 201	0.06" Total p-p, 10 to 55 Hz
6.5.	Shock (non-operating)	MIL-STD-202, Method 213, Test Condition J	30g, 11ms, half-sine

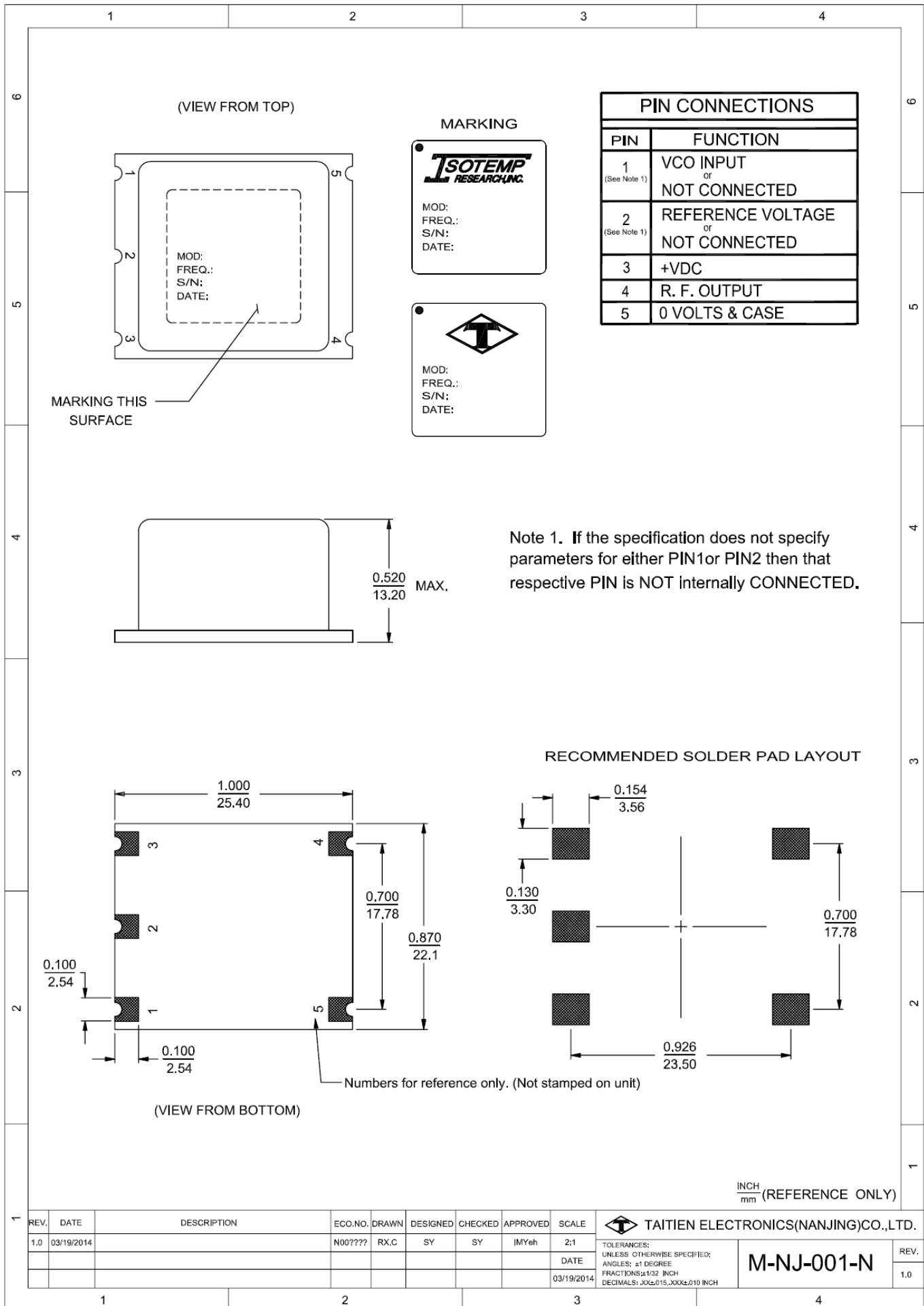
Note 1 : Output maintained over this temperature range. Other requirements of this specification may not be met when operating outside the temperature range in 2.1.

Table 1 : ORDERING INFORMATION

Ambient Temp. (°C)	Option	Phase Noise Option		
		A	B	C
-20°C ~ +70°C	±100 ppb	NJ-100M-6805	NJ-100M-6806	NJ-100M-6807
	±50 ppb	NJ-100M-6815	NJ-100M-6816	NJ-100M-6817
	±20 ppb	NJ-100M-6835	NJ-100M-6836	NJ-100M-6837
-40°C ~ +85°C	±100 ppb	NJ-100M-6825	NJ-100M-6826	NJ-100M-6827

Phase Noise Test Data





10MHz Low Noise OCXO

NJ-10M-6800 series

NJ-10M-6800 Series in 25.4x22mm SMD package

NJ-10M-6800 series is a 10.000 MHz high performance (VC)OCXO with low phase noise(LPN). It has excellent temperature versus frequency stability with many available options. The part comes in a small SMD package which makes it suitable for reflow soldering during pick and place assembly



RoHS Compliant Standard

FEATURES

- **Low Phase Noise**
- Small SMD Package
- Tight Frequency Stability
- Low Power Consumption
- Fast Warm-up Time
- Electrical Frequency Tuning Input
- Reference Voltage Output
- RoHS-Compliant (lead-free)

APPLICATIONS

- Instrument Reference
- Microwave Communication
- Clock Reference for Microwave Signal Source
- Test & Measurement
- Telecom Systems
- Radar Systems

ELECTRICAL SPECIFICATIONS

Test conditions: VDC = +12 V; VCO = +5 V; at +25 ± 3°C unless otherwise identified

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

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
1.1.	Frequency (Fo)	10.000000			MHz	
1.2.	Initial Accuracy	-0.1		+0.1	ppm	@ +25 ±1°C after turn on power 60 minutes Vco=+5V
1.3.	Waveform	Sine wave				
1.4.	Level	+8	+10	+12	dBm	
1.5.	Load		50		Ω	
1.6.	Harmonics			-30	dBc	
1.7.	Spurious			-80	dBc	10Hz to 1MHz from carrier

2. FREQUENCY STABILITY

	Parameter	Min.	Typ.	Max.	Unit	Test Condition		
2.1.	Ambient	±5, ±10, ±20, ±30, ±50, ±100			ppb	referenced to 25°C	Refer to Table 1 : Ordering Information	
		-20°C ~ +70°C -40°C ~ +85°C			°C			
2.2.	Aging					after 30 days of continuous operation.		
	Daily	-0.5		+0.5	ppb			
	Yearly	-50		+50	ppb			
	10 Years	-0.3		+0.3	ppm			
2.3.	Voltage	-1		+1	ppb	±5% change		
2.4.	Short term		0.002		ppb	root Allan variance for τ=1 sec		
2.5.	Load	-1		+1	ppb	±5% change		
2.6.	Warm-up	-50		+50	ppb	in 5 minutes @ +25 ±1°C	referenced to 1 hour	
2.7.	Phase Noise (Max.)	Option A	Option B	Option C		Refer to Table 1 : Ordering Information		
		-105	-110	-115	dBc/Hz	@ 1Hz		
		-135	-140	-142	dBc/Hz	@ 10Hz		
		-155	-155	-155	dBc/Hz	@ 100Hz		
		-165	-165	-165	dBc/Hz	@ 1KHz		
		-170	-170	-170	dBc/Hz	@ 10KHz		
		-170	-170	-170	dBc/Hz	@ 100KHz		
		-170	-170	-170	dBc/Hz	@ 1MHz		

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

	Parameter	Min.	Typ.	Max.	Unit	Test Condition	
3.1.	Tuning Range	±0.4*			ppm	Referenced to frequency at nominal Center Voltage	
3.2.	Control Voltage	0.5		+9.5	V		
3.3.	Slope	Positive					
3.4.	Center Voltage		+5.0		V		
3.5.	Linearity	-10		+10	%		

* Sufficient to adjust the oscillator to nominal frequency for 10 years. Some unit will have ±0.7ppm tuning range.

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

	Parameter	Min.	Typ.	Max.	Unit	Test Condition	
4.1.	Voltage	+11.4	+12	+12.6	V		
4.2.	Current						
	Steady State			2.0	W	@ +25°C, operating -20°C ~ +70°C	Refer to Table 1 : Ordering Information
				2.3		@ +25°C, operating -40°C ~ +85°C	
	During Warm-Up			400	mA	@ +25°C, operating -20°C ~ +70°C	
				500		@ +25°C, operating -40°C ~ +85°C	

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

	Parameter	Min.	Typ.	Max.	Units	Test Condition	
5.1.	Voltage	+9.25	+9.5	+9.75	V		
5.2.	Source Resistance			100	Ohm		
5.3.	Load Impedance	10			Kohm		

6. ENVIRONMENTAL

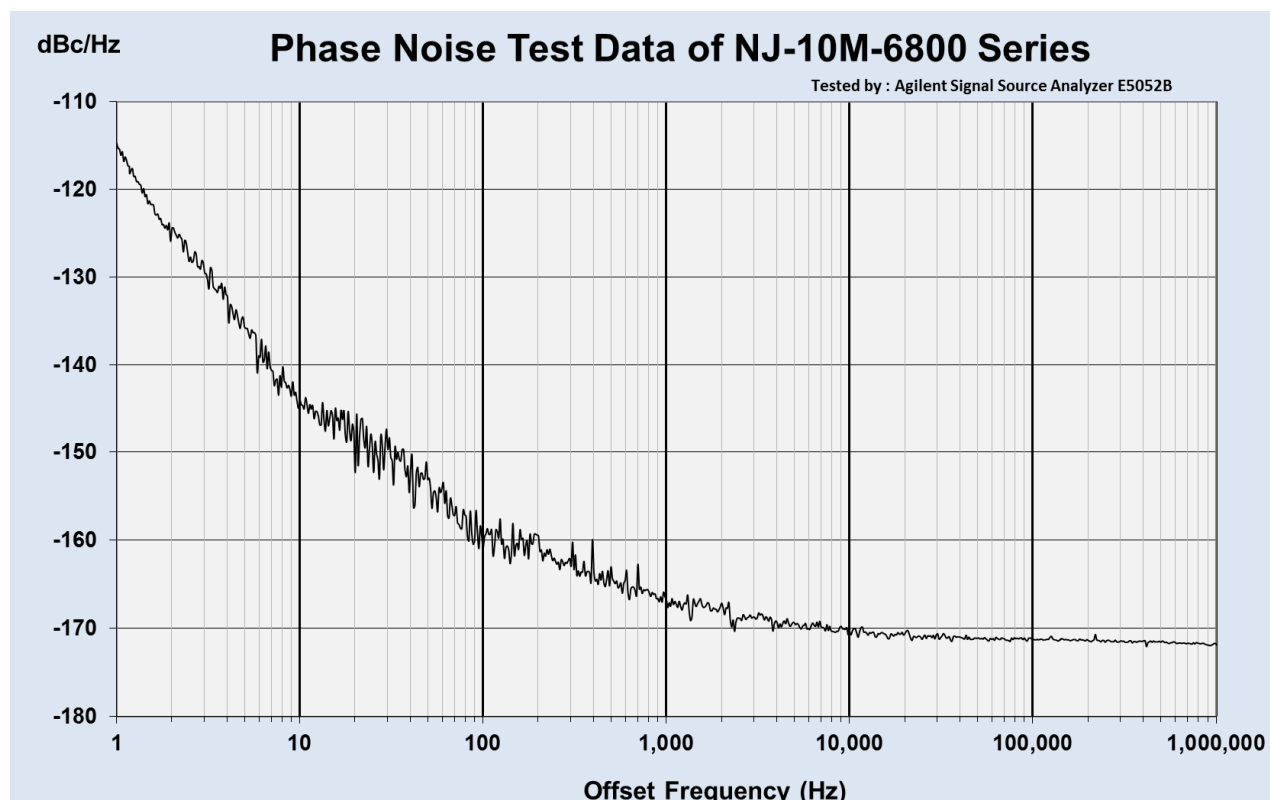
	Parameter	Reference Std.	Test Condition
6.1.	Operable Temperature	-45°C to +90°C	Note 1
6.2.	Storage Temperature	-50°C to +95°C	
6.3.	Humidity	MIL-STD-202, Method 103 Test Condition A	95% RH @ +40°C, non-condensing, 240 hours
6.4.	Vibration (non-operating)	MIL-STD-202, Method 201	0.06" Total p-p, 10 to 55 Hz
6.5.	Shock (non-operating)	MIL-STD-202, Method 213, Test Condition J	30g, 11ms, half-sine

Note 1 : Output maintained over this temperature range. Other requirements of this specification may not be met when operating outside the temperature range in 2.1.

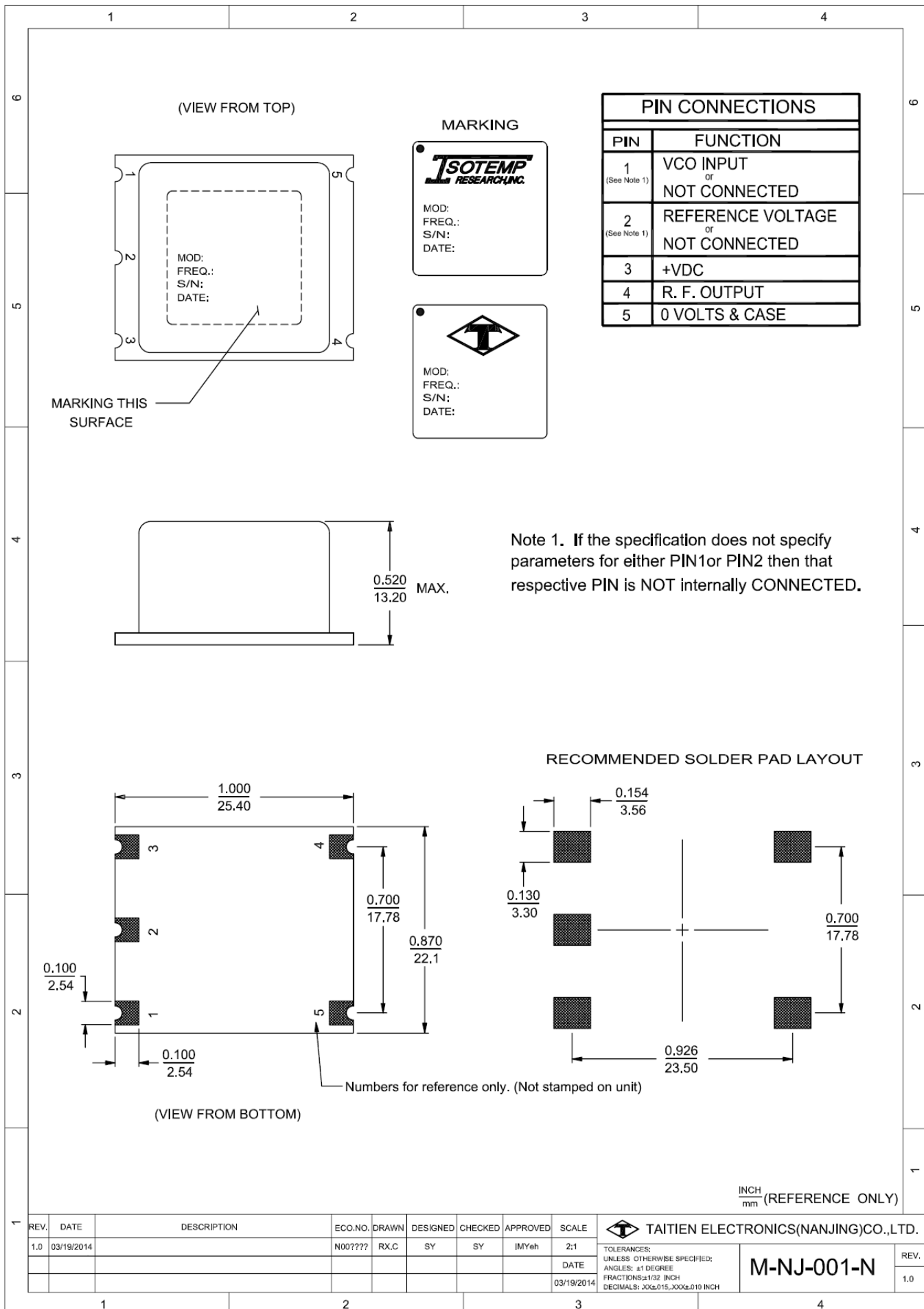
Table 1 : ORDERING INFORMATION

Ambient Temp. (°C)	Option	Phase Noise Option		
		A	B	C
-20°C ~ +70°C	±30 ppb	NJ-10M-6815	NJ-10M-6816	NJ-10M-6817
	±20 ppb	NJ-10M-6825	NJ-10M-6826	NJ-10M-6827
	±10 ppb	NJ-10M-6835	NJ-10M-6836	NJ-10M-6837
	±5 ppb	NJ-10M-6845	NJ-10M-6846	NJ-10M-6847
-40°C ~ +85°C	±100 ppb	NJ-10M-6865	NJ-10M-6866	-
	±50 ppb	NJ-10M-6875	NJ-10M-6876	-
	±30 ppb	NJ-10M-6885	NJ-10M-6886	-
	±20 ppb	NJ-10M-6895	NJ-10M-6896	-

Phase Noise Test Data



OUTLINE DRAWING



100MHz Low Noise/Low G-Sensitivity OCXO

NA-100M-6800 series

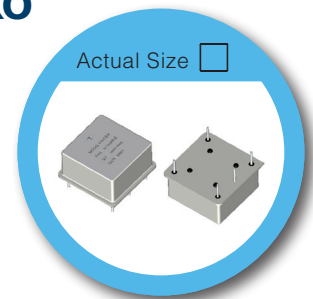
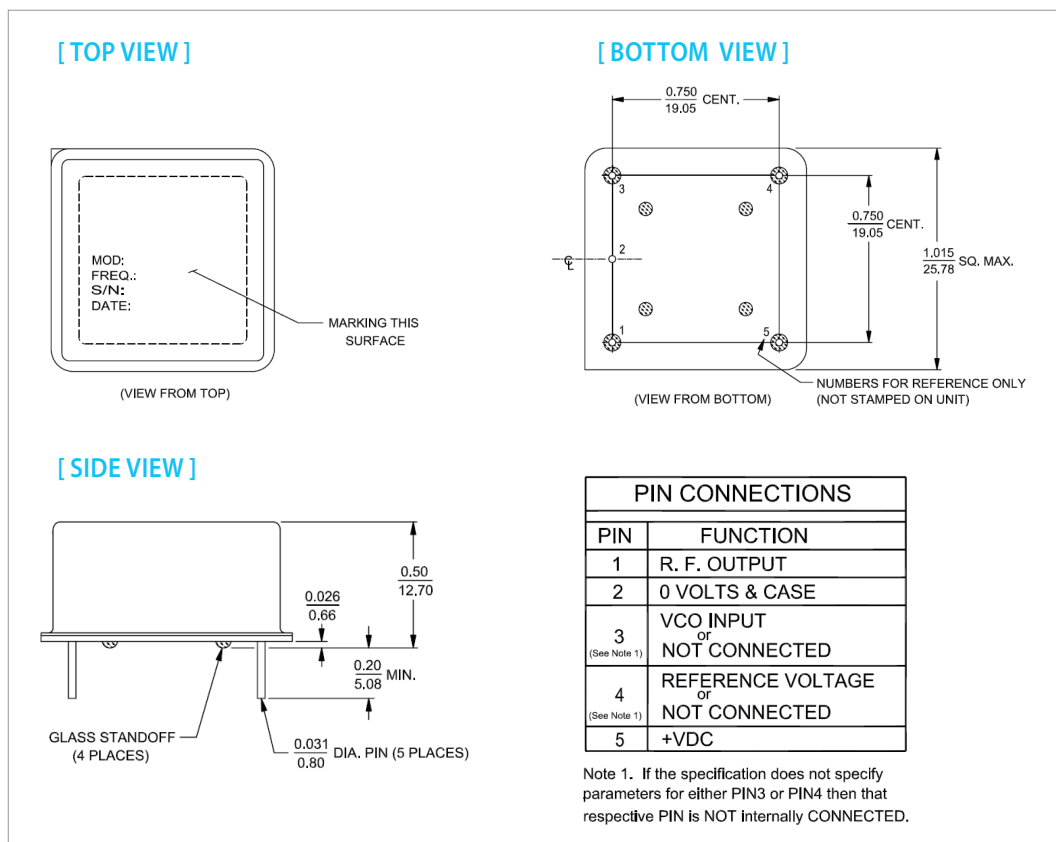
FEATURE

- Low Phase Noise & Low G-Sensitivity
- Small Hermetically Sealed Package
- Tight Frequency Stability
- Low Power Consumption
- Fast Warm-up Time
- Electrical Frequency Tuning Input
- Reference Voltage Output
- RoHS-Compliant (lead-free)

TYPICAL APPLICATION

- Instrument Reference
- Microwave Communication
- Clock Reference for Microwave Signal Source
- Test & Measurement
- Telecom Systems
- Radar Systems

DIMENSION (mm)



RoHS Compliant

ELECTRICAL SPECIFICATION

Test conditions: VDC = +12 V; VCO = +5 V; at +25 ± 3°C unless otherwise identified

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

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Frequency (Fo)		100.000000		MHz	
Initial Accuracy	-0.3		+0.3	ppm	@ +25 ±1°C after turn on power 60 minutes Vco=+5V
Waveform		Sine wave			
Level	+10			dBm	
Load		50		Ω	
Harmonics			-30	dBc	
Spurious			-80	dBc	10Hz ~ 1KHz from carrier
			-100	dBc	1KHz ~ 1MHz from carrier

FREQUENCY STABILITY

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Ambient		±20, ±50, ±100, ±200		ppb	referred to 25°C Refer to Table 1 : Ordering Information
		-20°C ~ +70°C		°C	
		-40°C ~ +85°C			
Aging					
Daily	-5		+5	ppb	after 30 days
Yearly	-500		+500	ppb	
10 Years	-2		+2	ppm	
Voltage	-5		+5	ppb	±5% change
Short term			0.05	ppb	root Allan variance for τ=1 sec
Load	-5		+5	ppb	±5% change
Warm-up	-50		+50	ppb	in 5 minutes @ +25 ±1°C referred to 1 hour
G-Sensitivity (each axis)			1	ppb/g	
Phase Noise (Max.)	Option A	Option B	Option C	Option D	Refer to Table 1 : Ordering Information
	-93	-97	-100	-105	@ 10Hz
	-125	-130	-135	-138	@ 100Hz
	-157	-160	-162	-163	@ 1KHz
	-173	-173	-173	-172	@ 10KHz
	-177	-177	-176	-173	@ 100KHz
	-178	-178	-176	-174	@ 1MHz

ELECTRICAL FREQUENCY ADJUSTMENT (PIN = "VCO INPUT")

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Tuning Range	±3			ppm	Referenced to frequency at nominal Center Voltage
Control Voltage	0		+10.0	V	
Slope		Positive			
Center Voltage		+5		V	
Linearity	-10		+10	%	

INPUT POWER (PIN = "+VDC")

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Voltage	+11.4	+12	+12.6	V	
Current					
Steady State			2.0	W	
During Warm-Up			350	mA	

REFERENCE VOLTAGE (PIN = "REFERENCE VOLTAGE")

Parameter	Min.	Typ.	Max.	Units	Test Condition
Voltage	+9.5	+10	+10.5	V	

ENVIRONMENTAL

Parameter	Reference Std.	Test Condition
Operable Temperature	-40°C to +85°C	Note 1
Storage Temperature	-45°C to +90°C	
Humidity	MIL-STD-202, Method 103 Test Condition A	95% RH @ +40°C, non-condensing, 240 hours
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

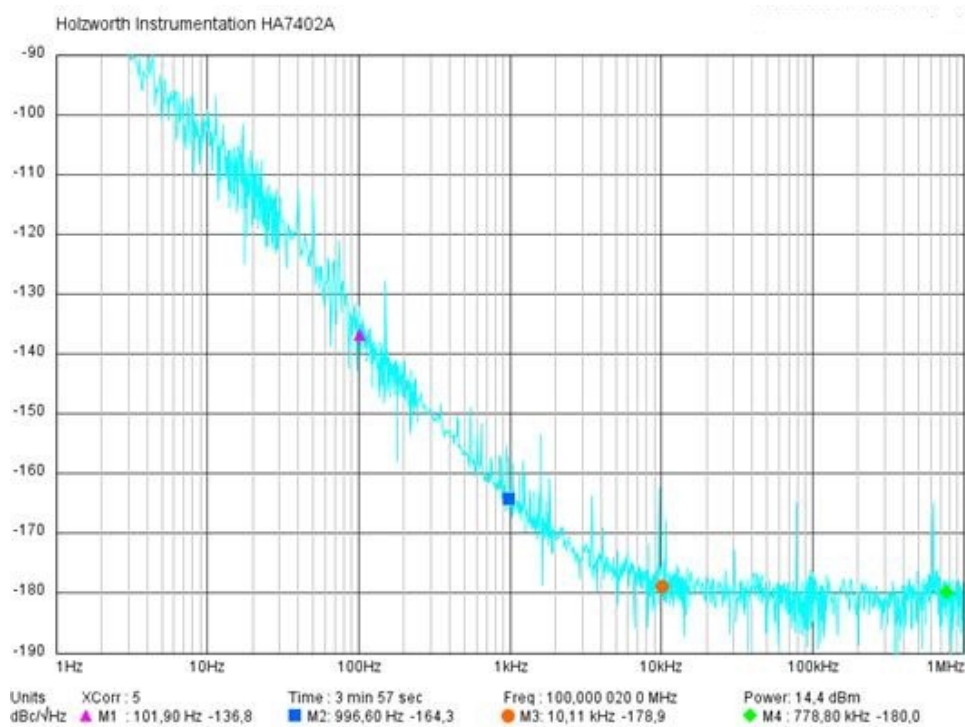
Note 1 : Output maintained over this temperature range. Other requirements of this specification may not be met when operating outside the temperature range in 2.1.

Table 1 : ORDERING INFORMATION

Temp. (°C)	Ambient Option	Phase Noise Option			
		A	B	C	D
-20°C ~ +70°C	±100 ppb	NA-100M-6800	NA-100M-6801	NA-100M-6802	NA-100M-6803
	±50 ppb	NA-100M-6810	NA-100M-6811	NA-100M-6812	NA-100M-6813
	±20 ppb	NA-100M-6830	NA-100M-6831	NA-100M-6832	NA-100M-6833
-40°C ~ +85°C	±200 ppb	NA-100M-6860	NA-100M-6861	NA-100M-6862	NA-100M-6863
	±100 ppb	NA-100M-6820	NA-100M-6821	NA-100M-6822	NA-100M-6823
	±50 ppb	NA-100M-6870	NA-100M-6871	NA-100M-6872	NA-100M-6873

Other specifications may be available upon request.

Phase Noise Test Data



10MHz Low Noise/ Low G-Sensitivity OCXO NA-10M-6800 series

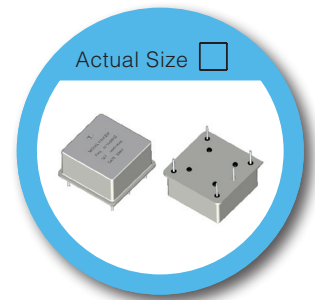
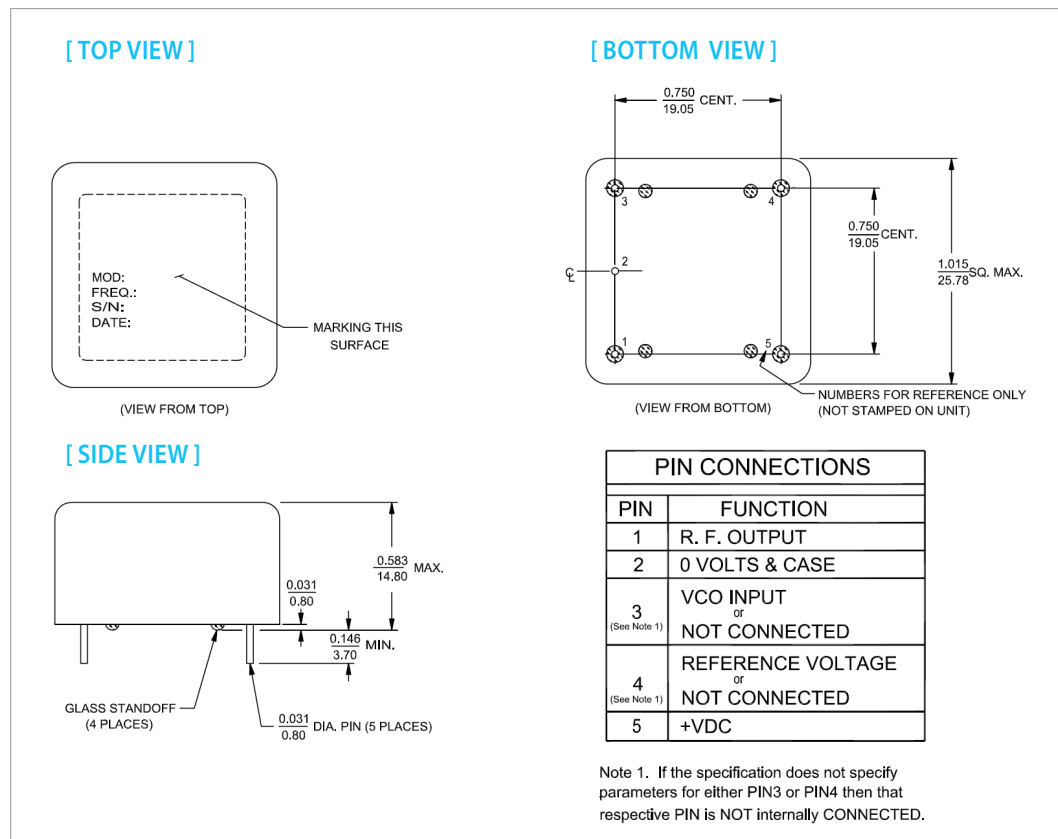
FEATURE

- Low Phase Noise
- Small Hermetically Sealed Package
- Tight Frequency Stability
- Low Power Consumption
- Fast Warm-up Time
- Electrical Frequency Tuning Input
- Reference Voltage Output
- RoHS-Compliant (lead-free)

TYPICAL APPLICATION

- Instrument Reference
- Microwave Communication
- Clock Reference for Microwave Signal Source
- Test & Measurement
- Telecom Systems
- Radar Systems

DIMENSION (mm)



RoHS Compliant

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

ELECTRICAL SPECIFICATION

Test conditions: VDC = +12 V; VCO = +5 V; at +25 ± 3°C unless otherwise identified

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

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Frequency (Fo)		10.000000		MHz	
Initial Accuracy	-0.1		+0.1	ppm	@ +25 ±1°C after turn on power 60 minutes Vco=+5V
Waveform		Sine wave			
Level	+8			dBm	
Load		50		Ω	
Harmonics			-30	dBc	
Spurious			-80	dBc	10Hz to 1MHz from carrier

FREQUENCY STABILITY

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Ambient	±5, ±10, ±20, ±30, ±50, ±100			ppb	referred to 25°C Refer to Table 1 : Ordering Information
	-20°C ~ +70°C -40°C ~ +85°C			°C	
Aging					
Daily	-0.5		+0.5	ppb	after 30 days
Yearly	-50		+50	ppb	
10 Years	-0.3		+0.3	ppm	
Voltage	-1		+1	ppb	±5% change
Short term		0.002		ppb	root Allan variance for τ=1 sec
Load	-1		+1	ppb	±5% change
Warm-up	-50		+50	ppb	in 5 minutes @ +25 ±1°C referred to 1 hour
G-Sensitivity (each axis)			1	ppb/g	Option, Refer to Table 1 : Ordering Information
Phase Noise (Max.)	Option A	Option B	Option C	Option D	Refer to Table 1 : Ordering Information
	-105	-110	-115	-118	dBc/Hz @ 1Hz
	-135	-140	-142	-146	dBc/Hz @ 10Hz
	-155	-155	-155	-160	dBc/Hz @ 100Hz
	-165	-165	-165	-166	dBc/Hz @ 1KHz
	-170	-170	-170	-169	dBc/Hz @ 10KHz
	-170	-170	-170	-170	dBc/Hz @ 100KHz
	-170	-170	-170	-170	dBc/Hz @ 1MHz

ELECTRICAL FREQUENCY ADJUSTMENT (PIN = "VCO INPUT")

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Tuning Range	±0.4*			ppm	Referenced to frequency at nominal Center Voltage
Control Voltage	0.5		+9.5	V	
Slope		Positive			
Center Voltage		+5.0		V	
Linearity	-10		+10	%	

* Sufficient to adjust the oscillator to nominal frequency for 10 years. Some unit will have ±0.7ppm tuning range.

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

INPUT POWER (PIN = "+VDC")

Parameter	Min.	Typ.	Max.	Unit	Test Condition	
Voltage	+11.4	+12	+12.6	V		
Current						
Steady State			2.0	W	@ +25°C, operating -20°C ~ +70°C	Refer to Table 1 : Ordering Information
			2.3		@ +25°C, operating -40°C ~ +85°C	
During Warm-Up			400	mA	@ +25°C, operating -20°C ~ +70°C	
			500		@ +25°C, operating -40°C ~ +85°C	

REFERENCE VOLTAGE (PIN = "REFERENCE VOLTAGE")

Parameter	Min.	Typ.	Max.	Units	Test Condition
Voltage	+9.25	+9.5	+9.75	V	
Source Resistance			100	Ohm	
Load Impedance	10			Kohm	

ENVIRONMENTAL

Parameter	Reference Std.	Test Condition
Operable Temperature	-45°C to +90°C	Note 1
Storage Temperature	-50°C to +95°C	
Humidity	MIL-STD-202, Method 103 Test Condition A	95% RH @ +40°C, non-condensing, 240 hours
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

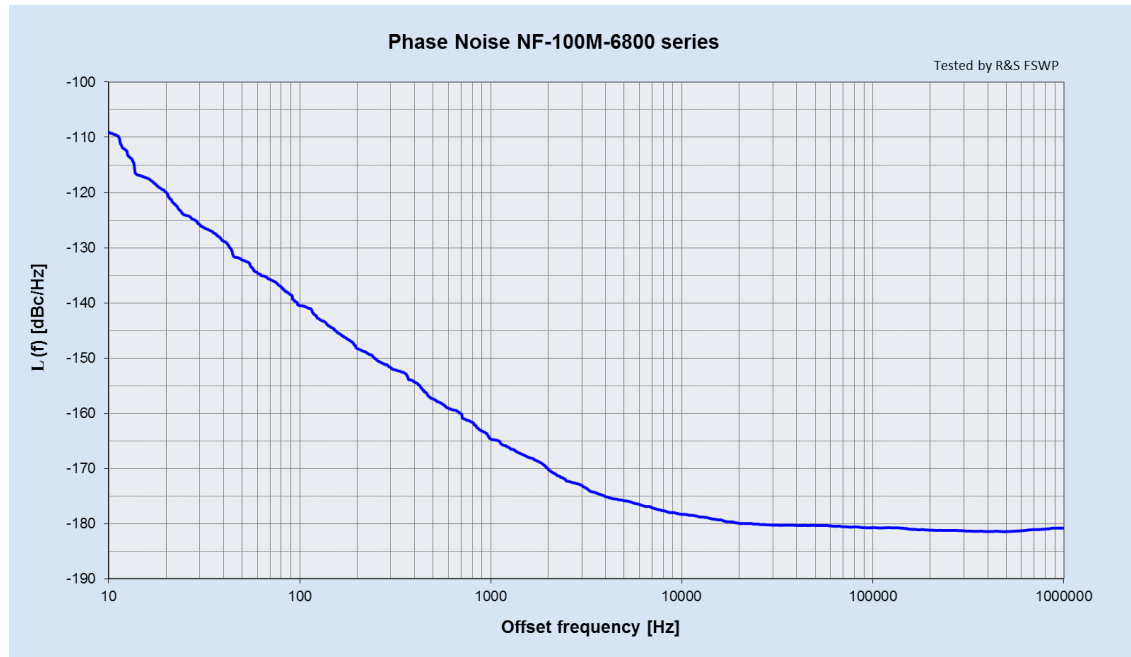
Note 1 : Output maintained over this temperature range. Other requirements of this specification may not be met when operating outside the temperature range in 2.1.

Table 1 : ORDERING INFORMATION

Temp. (°C)	Ambient	Option	Phase Noise Option				g-Sensitivity Option
			A	B	C	D	
-20°C ~ +70°C	±30 ppb		NA-10M-6810	NA-10M-6811	NA-10M-6812	NA-10M-6813	Y
			NA-10M-6815	NA-10M-6816	NA-10M-6817	-	N
	±20 ppb		NA-10M-6820	NA-10M-6821	NA-10M-6822	NA-10M-6823	Y
			NA-10M-6825	NA-10M-6826	NA-10M-6827	-	N
	±10 ppb		NA-10M-6830	NA-10M-6831	NA-10M-6832	NA-10M-6833	Y
			NA-10M-6835	NA-10M-6836	NA-10M-6837	-	N
	±5 ppb		NA-10M-6840	NA-10M-6841	NA-10M-6842	NA-10M-6843	Y
			NA-10M-6845	NA-10M-6846	NA-10M-6847	-	N
-40°C ~ +85°C	±100 ppb		NA-10M-6860	NA-10M-6861	NA-10M-6862	-	Y
			NA-10M-6865	NA-10M-6866	NA-10M-6867	-	N
	±50 ppb		NA-10M-6870	NA-10M-6871	NA-10M-6872	-	Y
			NA-10M-6875	NA-10M-6876	NA-10M-6877	-	N
	±30 ppb		NA-10M-6880	NA-10M-6881	NA-10M-6882	-	Y
			NA-10M-6885	NA-10M-6886	NA-10M-6887	-	N
	±20 ppb		NA-10M-6890	NA-10M-6891	NA-10M-6892	-	Y
			NA-10M-6895	NA-10M-6896	NA-10M-6897	-	N

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

Phase Noise Test Data



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