

LNMO

ULTRA-HIGH-PERFORMANCE, SPACE-QUALIFIED MASTER CRYSTAL OSCILLATOR



The LNMO is a cost-effective, high-performance master crystal oscillator. It's designed with long- lifetime, high-reliability technology for advanced space applications.

Key Features

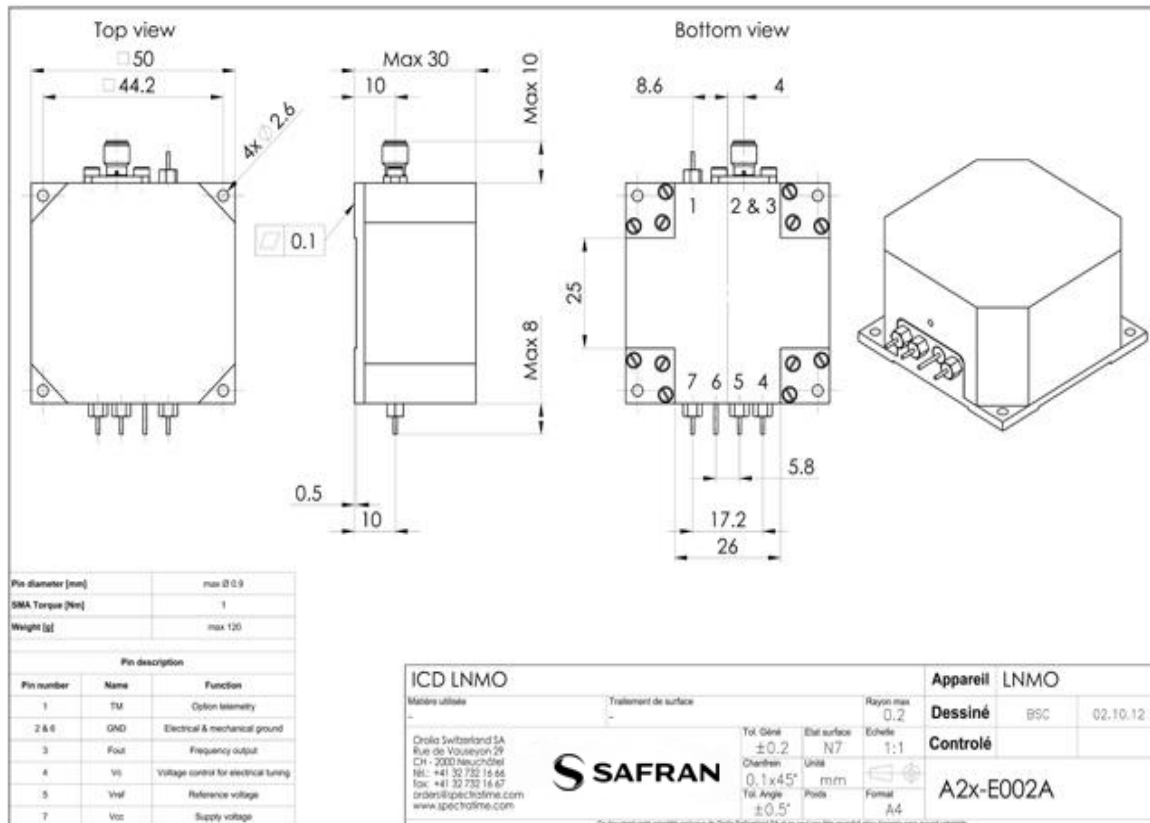
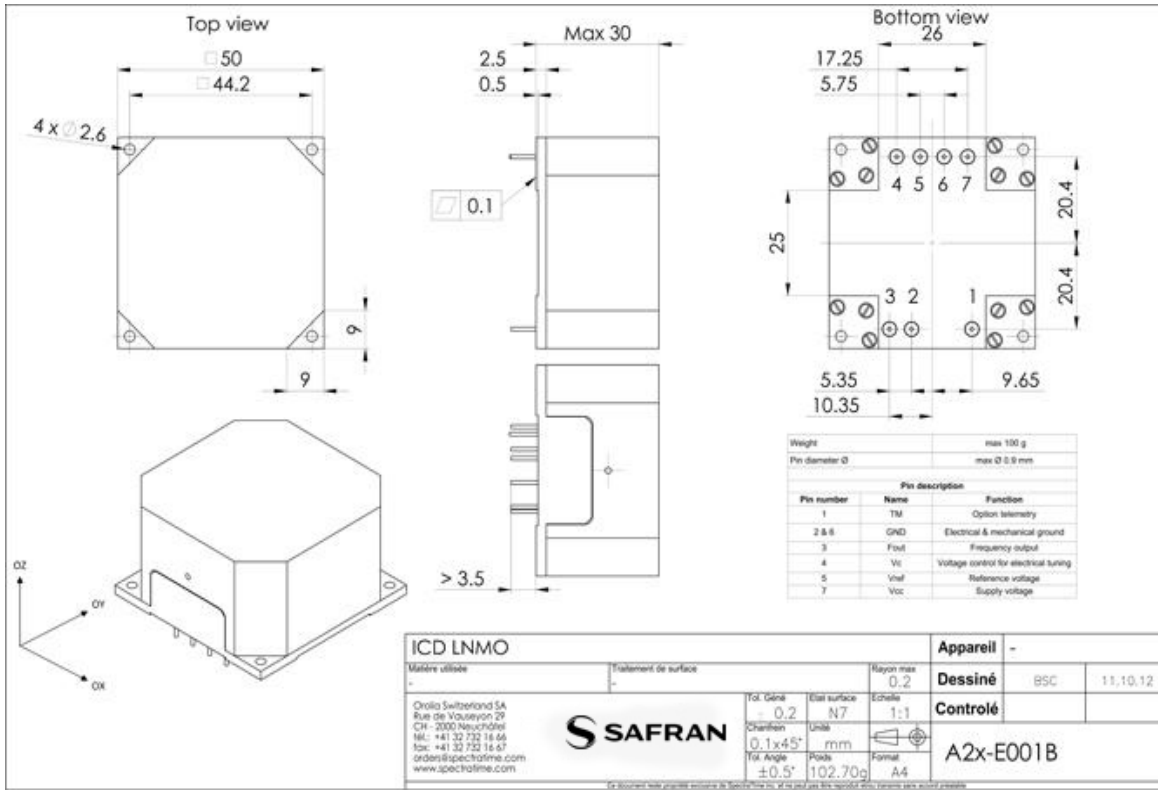
- Very small mass and volume
- Low noise
- Low power consumption
- Low temperature sensitivity
- Excellent short and long term stability
- Fast warm-up
- Wide operating temperature
- Pre-adjusted frequency and/or voltage controlled
- Frequency Range: 5MHz to 40MHz
- Supply voltage: 12V or 15V
- Rad tolerant up to 100krad

Applications

Navigation
GPS receivers
Down and Up Converters
Transponders
FGU
Board Calculator
Synthesizer
SAR

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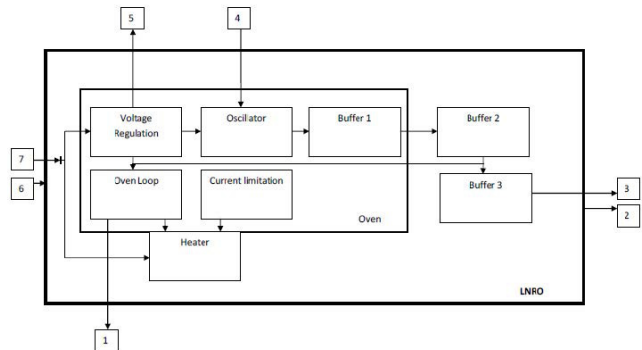
LNMO external dimensions (2 versions available)



Technical Specifications

Type		A2x-S001 at 10MHz						
Parameter	Value							
Dimensions	50x50x30 mm							
Output signal frequency	10 MHz*							
Frequency long term stability, 1st year	< $\pm 3 \times 10^{-8}$ / year							
Average ageing per day after 1 month	< $\pm 1 \times 10^{-10}$ / day							
Frequency long term stability, years after	< $\pm 1 \times 10^{-8}$ / year							
Frequency short term stability	< 1×10^{-12} (0.1-10 s)							
Frequency stability over full temp. range	< $\pm 1 \times 10^{-9}$							
Frequency adjustment	> ± 2.5 Hz							
SSB phase noise assuming 10MHz carrier		ULN (dBc/Hz)	LN (dBc/Hz)	Standard (dBc/Hz)				
					1 Hz	< -110	< -105	< -100
					10 Hz	< -140*	< -135*	< -130*
					100 Hz	< -150*	< -145	< -140
					1000 Hz	< -160	< -155	< -150
10000 Hz	< -168	< -165	< -160					
* Subject to export control (end user statement required)								
Output signal level	7 dBm \pm 1 Up to 10 dBm on request							
Output impedance	50 Ω \pm 10%							
Harmonics	-40 dBc							
Spurious signals	-120 dBc							
Power consumption during warm-up	Standard	Fast						
	4W	6W						
Nominal power consumption	1.5 W							
Maximum power consumption in operation	2.5 W							
Volume	< 75 cm ³							
Power supply	12 V	15V						
Warm-up time (accuracy < $\pm 2 \times 10^{-8}$ at 25°C)	Standard	Fast						
	10 minutes	5 minutes						
Mass	100 gr							
Connection: Power, RF Output, Control voltage, Ref Voltage, TM	7 solderable pins or 5 solderable pins +SMA							
Mechanical interface Mechanical fixation	flat base plate 4 x M2 screw							
Max. base plate operating temperature	70 °C	60 °C	50 °C					
Min. base plate operating temperature	-30 °C	-20 °C	0 °C					
Storage temperature	-40 to 85 °C							
First natural resonance	> 800 Hz							
Random Vibration tested, with axis perpendicular to the mounting plane.	20 - 100 Hz	+9dB/oct						
	100- 500 Hz	1 (1.5) g ² /Hz**						
Duration	60 (180) sec/axis**							
	20 - 1000 Hz	0.14(0.22) g ² /Hz**						
Random Vibration tested, with axis parallel to the mounting plane.	1000 - 2000 Hz	-6 dB/oct						
	Duration	60 (120) sec/axis**						
Sinusoidal vibration	5 - 20 Hz	11 mm 0-peak						
	20 - 100 Hz	25 g						
Sweep rate	2(1) oct/min.**							
Life time / MTBF	15 years/9 Mio hrs							
Pressure sensitivity vacuum to atmosphere (thermal effect)	< $\pm 5 \times 10^{-8}$ @25°C							

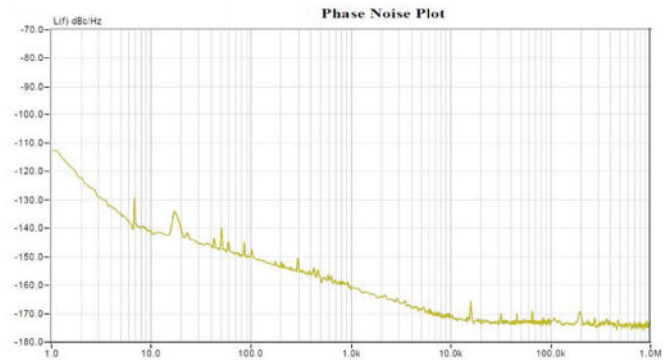
FUNCTIONAL BLOCK DIAGRAM OF THE LNMO



1. Optional telemetry output
2. RF GND output
3. RF output
4. Control voltage input
5. Voltage reference output
6. Supply GND input
7. Supply Voltage input

Typical LNMO Phase Noise

LNMO Phase noise at 10MHz



LNMO Phase noise at 5 MHz



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