

LNMO

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



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

Key Features

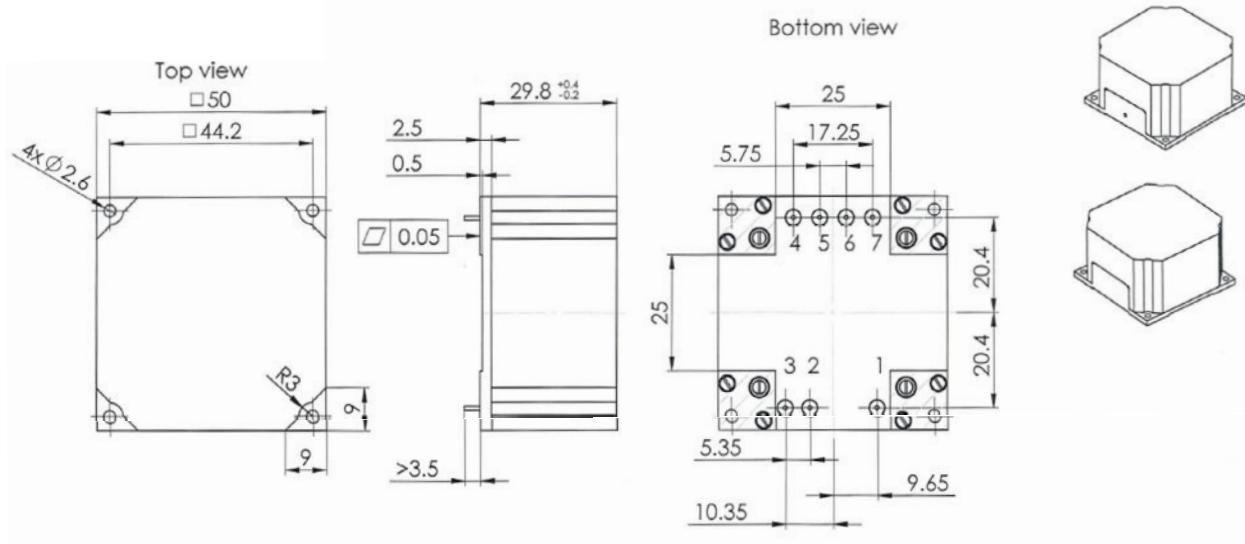
- Very small mass and volume
- Low noise
- Low power consumption
- Low temperature sensitivity
- Excellent short and long term stability
- Fast warm-up
- Wide operating temperature
- Pre-adjusted frequency and/or voltage controlled
- Frequency Range: 5MHz to 40MHz
- Supply voltage: 12V or 15V
- Rad tolerant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

Applications

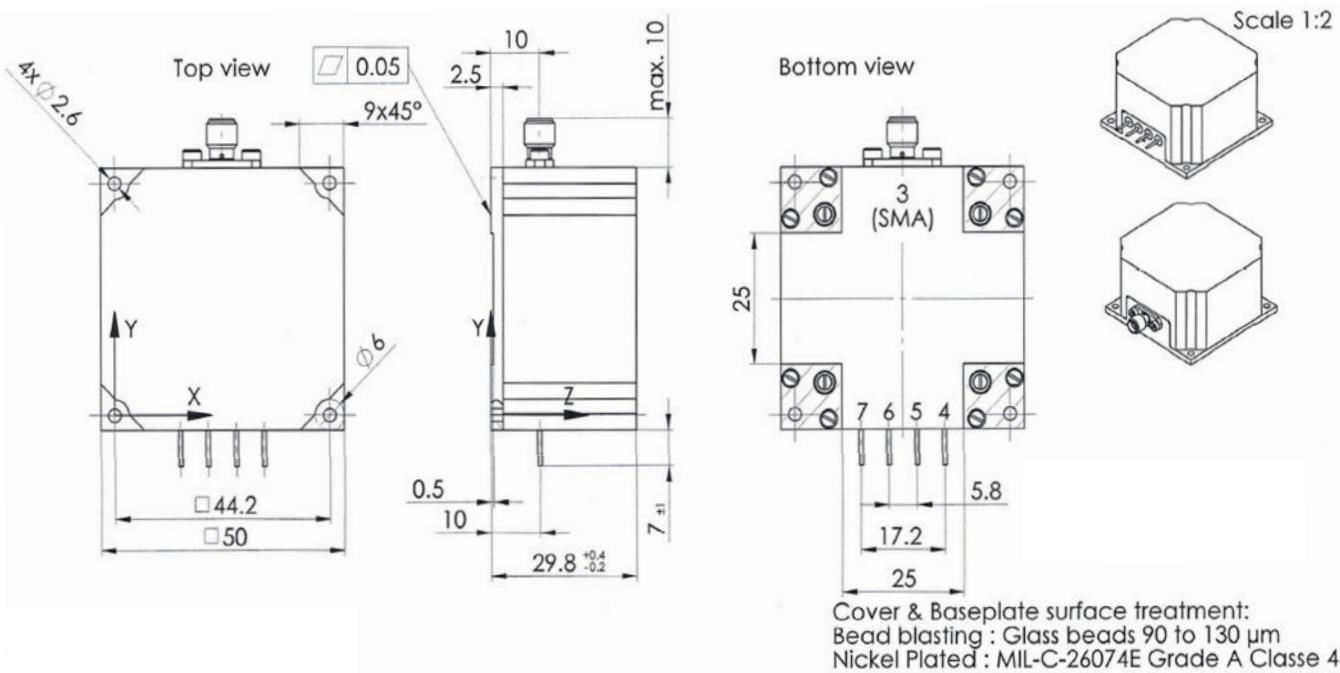
- LEO, MEO, GEO, Deep Space
- Earth Orbit / Altimeter
- SAR
- GNSS
- Telecommunications (civil & defense)
- Science

Safran Electronics & Defense is with you every step of the way, building in the intelligence that gives you a critical advantage in observation, decision-making and guidance.

LNMO external dimensions (2 versions available)



Cover & Baseplate surface treatment:
 Bead blasting : Glass beads 90 to 130 μm
 Nickel Plated : MIL-C-26074E Grade A Classe 4



Scale 1:2
 Cover & Baseplate surface treatment:
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Technical Specifications

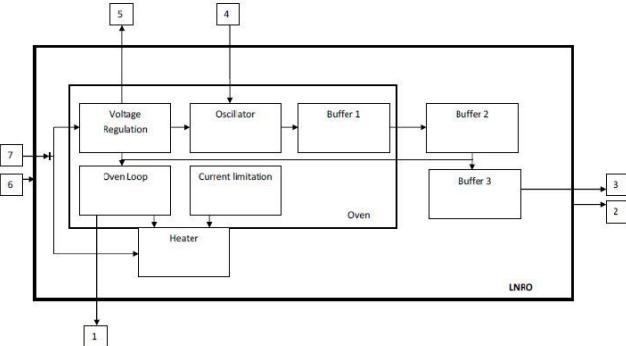
| Parameter | Value | | | | |
|---|--|--|----------|--|--|
| Dimensions | 50x50x30 mm | | | | |
| Output signal frequency | 10 MHz* | | | | |
| Frequency long term stability, 1st year | < $\pm 3 \times 10^{-8}$ / year | | | | |
| Average ageing per day after 1 month | < $\pm 1 \times 10^{-10}$ / day | | | | |
| 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 | < $\pm 1 \times 10^{-9}$ | | | | |
| Pressure sensitivity vacuum to atmosphere (thermal effect) | < $\pm 5 \times 10^{-8}$ @25°C | | | | |
| Frequency adjustment | > ± 2.5 Hz | | | | |
| SSB phase noise @10MHz [dBc/Hz] | ULN | LN | Standard | | |
| 1 Hz | < -107 | < -105 | < -100 | | |
| 10 Hz | < -140* | < -135* | < -130* | | |
| 100 Hz | < -150* | < -145 | < -140 | | |
| 1000 Hz | < -160 | < -155 | < -150 | | |
| 10000 Hz | < -165 | < -163 | < -160 | | |
| * Subject to export control (end user statement required) | | | | | |
| Output signal level | 7 dBm ± 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 4W | Fast 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 10 minutes | Fast 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 100- 500 Hz 500- 2000 Hz | +9dB/oct 1 (1.5) g ² /Hz** -6 dB/oct 60 (180) sec/axis** | | | |
| Duration | | | | | |
| Sinusoidal vibration | 5 - 20 Hz 20 - 100 Hz | 11 mm 0-peak 25 g 2(1) oct/min.** | | | |
| Sweep rate | | | | | |
| Life time / MTBF | 15 years/9 Mio hrs | | | | |
| Shock | 100Hz 270Hz 2000Hz 10000Hz | 50g 350g 2500g 2500g | | | |

* Other frequencies (5 MHz to 15 MHz) and related specifications available upon request.

** Values in brackets only applicable for qualification testing

*** Screw length not to exceed 5 mm length within case

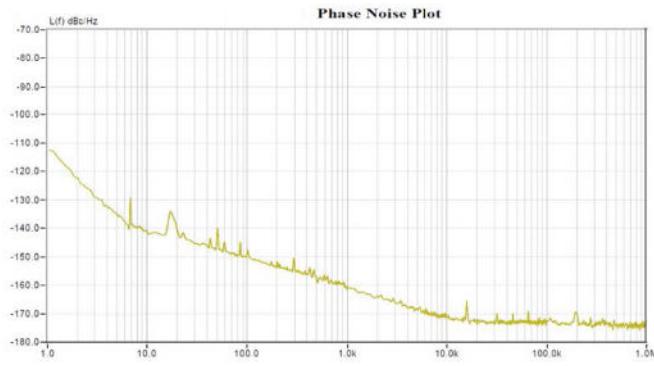
FUNCTIONAL BLOCK DIAGRAM OF THE LNMO



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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