

Specific request can be addressed to RAKON hirel@rakon.com

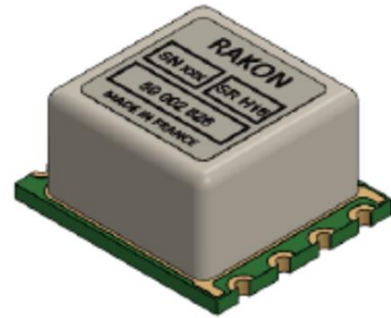
Product Description

LNO1000E1 is a low noise and low power OCVCSO (Oven Controlled, Voltage controlled, SAW Oscillator) at 1GHz, powered by a low voltage +5V power supply.

It is designed for lab environment (test equipment, shelter, ground based military equipment, etc.).

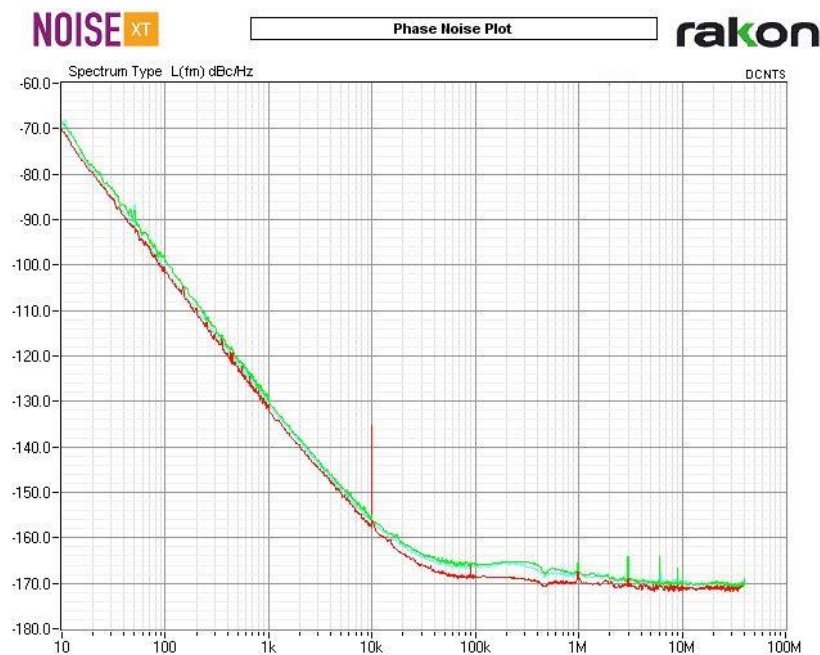
The 1GHz signal is generated from a 500MHz fundamental frequency, followed by a low noise frequency doubler.

LNO1000E1 is available in a tiny 25.4 x 22 x 12.7 mm³ SMD package, specially designed to be soldered through reflow process.



Features

- Excellent phase noise performance (typical values) :
 - - 128dBc/Hz @ 1 kHz offset
 - - 156dBc/Hz @ 10 kHz offset
 - - 168dBc/Hz noise floor



- Broadband jitter < 10 fs (offset frequencies from 10 kHz to 40 MHz)

Applications

- Instrumentation (test equipment, simulator)
- Ground based military equipment as per MIL-PRF-28800F, Class 3

Specifications

1.0 Environmental conditions

Line	Parameter	Test Condition	Typ. Value	Guaranteed	Unit
1.1	Operating temperature range	Standard	0 to +50		°C
1.2	Storage temperature range		-40 to +85		°C
1.3	Shock	As per MIL-PRF-28800F, Class 3, test equipment			
1.4	Random vibration	As per MIL-PRF-28800F, Class 3, test equipment			
1.5	G-sensitivity	On each axis	1	<2	ppb/g

2.0 Electrical interface

Line	Parameter	Test Condition	Typ. Value	Guaranteed	Unit
2.1	Power supply voltage	Pin 7 - Operating range - Absolute maximum		+5 ± 0.25 < +6	V
2.2	Load impedance	Pin 1, 50Ω all phases		<1.3:1	VSWR
2.3	Control input voltage	Pin 6		0.5 to +4.5	V
2.4	Control input impedance	Pin 6	-	> 6.8	kΩ
2.5	Control input capacitance	Pin 6	1.5	-	nF

3.0 Performances

Line	Parameter	Test Condition	Typ. Value	Guaranteed	Unit
3.1	Nominal frequency	Definition	1000		MHz
3.2	Frequency calibration	Initial calibration @ 25°C	±0.5	< ±1	ppm
3.3	Frequency stability	On operating temperature range	-	< ±2	ppm
3.4	Long term stability	1 st year	-	< ±1	ppm
		10 years	-	< ±6	ppm
3.5	Power consumption	- At warm-up	2.2	< 2.5	W
		- Steady state, at 25°C	1	< 1.5	W
3.6	Warm-up time	@25°C : ±1 ppm with reference to frequency reached after 1 hour of continuous operation	-	< 2	minutes
3.7	Frequency tuning	Monotone	±10	> ±6	ppm
3.8	Slope	Positive slope	5	> 3	ppm/V
3.9	Output power	Sine wave into 50 Ω load	-	+8±2	dBm
3.10	Output impedance	At 1GHz ± 1MHz		<2.0:1	VSWR

4.0 Single side band phase noise (PN) and time jitter

Line	Parameter	Test Condition	Typ. Value	Guaranteed	Unit
4.1	PN power density @ 1 kHz offset	Static conditions, at 25°C (guaranteed values on full temperature range)	-128	< -124	dBc/Hz
4.2	PN power density @ 10 kHz offset		-156	< -152	dBc/Hz
4.3	PN power density @ 1 MHz offset		-168	< -165	dBc/Hz
4.4	Harmonic distortion	All sub-harmonics, 2 nd and 3 rd harmonics	-35	< -25	dBc
4.5	Spurious	Non-harmonics	-	< -80	dBc
4.6	Full offset range	From 10 Hz to 100 MHz	150	< 400	fs
4.7	Broadband	From 10 kHz to 40 MHz	-	< 10	fs

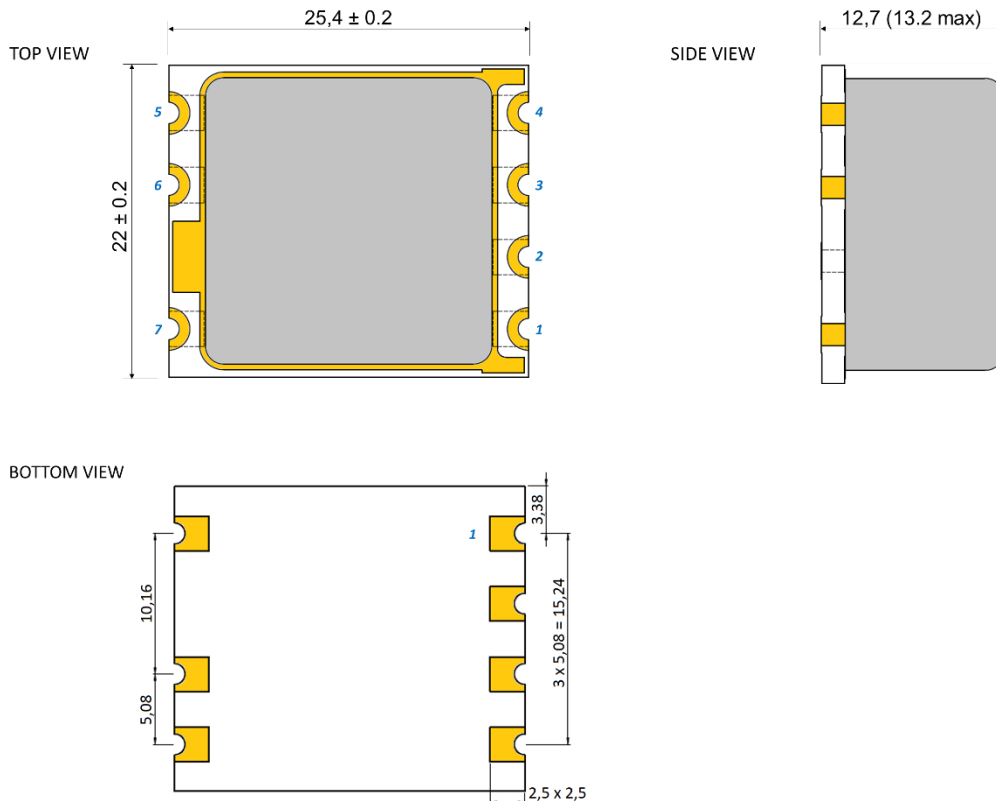
5.0 MTBF

Line	Parameter	Calculation Condition	Typ. Value	Unit
5.1	FIT1	MIL-HDBK-217F, Ground fixed, at 25°C	6018	fails / 10 ⁹ h
5.2	MTBF1		19	years

6.0 Mechanical features

6.1 Outline

All dimensions are in mm and typical unless otherwise specified.

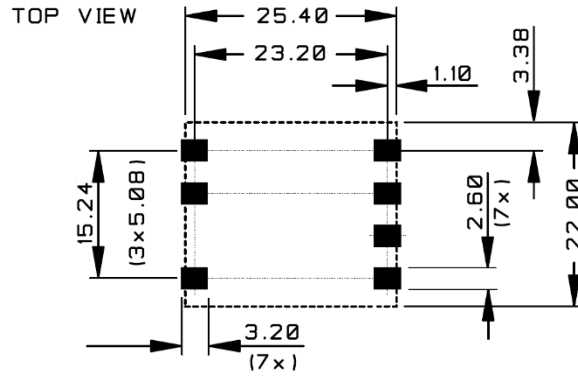


6.2 Pin description

Line	Pin number	Name	Description
6.2.1	1	RF OUT	RF output signal
6.2.2	2	GND	Mechanical and electrical ground (-)
6.2.3	3	-	Do not connect
6.2.4	4	-	Do not connect
6.2.5	5	GND	Mechanical and electrical ground (-)
6.2.6	6	VCTL	Control input
6.2.7	7	VCC	Power supply (+)

6.3 Recommended pad layout and assembly process

6.3.1 - Recommended pad layout



6.3.2 - Recommended assembly process

The assembly of this SMD module must be performed through a “Pb-free” reflow process and according to recommended standards defined in IPC/JEDEC J-STD-020. Manual soldering is not recommended.

