LNO100SAC

The LNO100SAD is a high reliability, ultra low noise oven-controlled crystal oscillator (OCXO) available with output frequencies from 80 to 125 MHz. It is specifically designed and engineered for airborne, radar, military, and other vibration-sensitive applications that demand guaranteed phase noise performance. For example, at 100 MHz, the LNO100SAC achieves a phase noise floor as low as –178 dBc/Hz.

Leveraging Rakon's proprietary technologies, the LNO100SAC features an integrated shock absorber within a compact package, delivering excellent acceleration stability while minimising form factor and reducing power consumption. These optimisations result in a low *g*-sensitivity of ≤0.5 ppb/*g*, making it an ideal solution for missions involving random vibration, where performance and footprint are critical.

Features

- Frequency: 80 to 125 MHz
- Guaranteed low phase noise @100 MHz:
  1 kHz offset: -163 dBc/Hz
  100 kHz offset: -178 dBc/Hz
- Low *g*-sensitivity 0.5 ppb/*g*
- Supply voltage: 12 V
- Frequency stability vs temperature: ±0.5 ppm
- Ageing: ±1.8 ppm/10 years

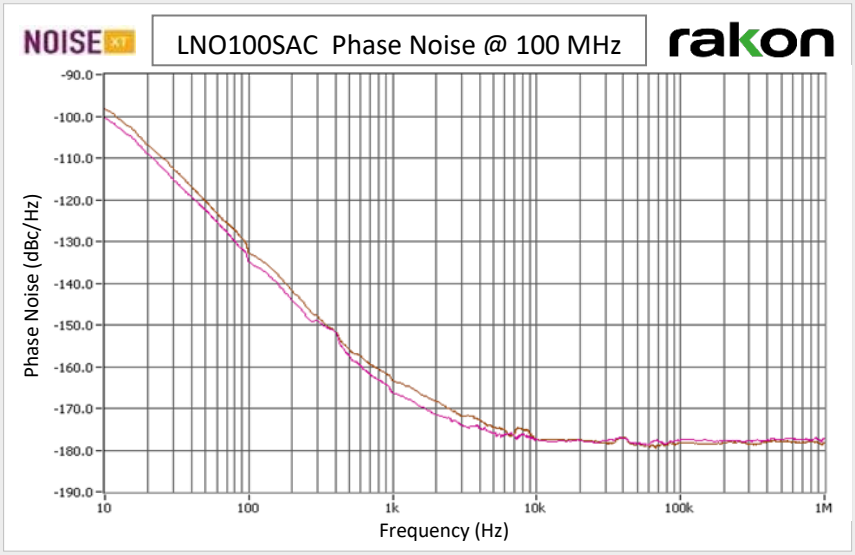
Applications

- Airborne military equipment
- Radar
- Military communications

Package / Weight

59.2 x 48.2 x 22 mm / 200 g

Phase Noise

Parameter	Condition / Remarks
LNO100SAC Phase Noise - Typical value @100 MHz	

Guaranteed
static phase noise (Min)

Frequency (MHz)	100 Hz	1 kHz	10 kHz	100 kHz	Unit
100	-130	-158	-170	-174	dBc/Hz

Guaranteed
dynamic phase noise (Min)

Frequency (MHz)	100 Hz	1 kHz	10 kHz	100 kHz	Unit
100	-85	-130	-145	-170	dBc/Hz

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Environmental Conditions

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Operating temperature (T_{OP})	Option A Option B Option C	0 -20 -40	25 25 25	70 70 85	°C
Switch-on temperature (T_{SO})	-	-40	-	85	°C
Non-operating temperature (T_{NOP})	-	-55	-	125	°C
Relative humidity	As defined by MIL-STD-810G Method 507 Procedure I				
Random vibration	Overall: 17 grms 15 Hz – 300 Hz: +6 dB/octave 300 Hz – 1 kHz: 0.2 g^2/Hz 1 kHz – 2 kHz: -6 dB/octave				
Shocks	As defined by MIL-STD-810G, Method 516.6, Procedure I (20g peak / 11ms / sawtooth)				

Electrical Interface

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Power supply (V_{CC})	-	11.4	12	12.6	V
Reference voltage (V_{REF})	I_{REFMAX} = 1 mA	9.5	10	10.5	V
Control voltage (V_{CTRL})	-	0	-	V_{REF}	V
Control voltage Input	-	10	-	-	kΩ
RF load impedance	-	45	50	55	Ω

Performances

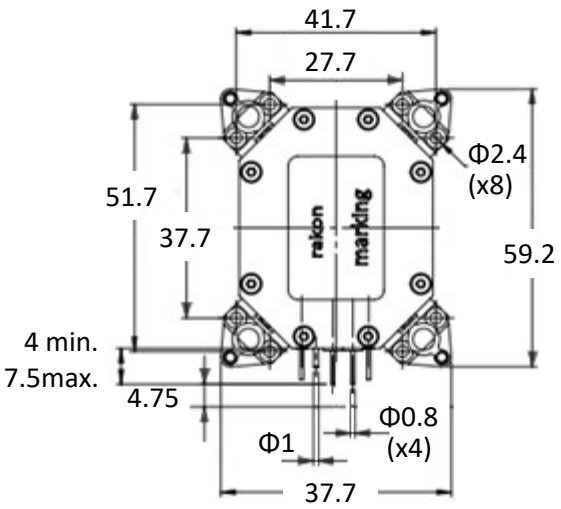
Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Nominal frequency (Fn)	Standard Fn: 80, 100, 120 MHz	80	100	125	MHz
Initial frequency accuracy	@25°C, the control voltage range is providing to reach the initial frequency accuracy at shipment	-	-	±0.5	ppm
Frequency pulling	Positive slope	±1.8	±2	-	ppm
Frequency stability vs temperature (FvT)	Temperature slope 1°C/min: Option A: 0°C to 70°C Option B: -20 to 85°C Option C: -40 to 85°C	- - -	±0.08 ±0.15 ±0.4	±0.1 ±0.2 ±0.5	ppm
Frequency variation vs supply voltage	@ V_{CC} ±5% / @ 25°C	-	±0.05	±0.1	ppm
Frequency stability vs load	@ ±10% variation of load / @25°C	-	-	±0.1	ppm
Frequency warm-up	Time to be within the initial frequency accuracy compared to the frequency after 1 hour	-	-	10	mn
Long-term stability (ageing)[1]	1st year 10 years	- -	±0.2 ±1	±0.5 ±1.6	ppm
Allan deviation	Tau = 1s Tau = 10s	- -	- -	5E-11 5E-10	-
Output level (Sinewave)	Option A Option B	10 17	- -	13 20	dBm
Voltage Standing Wave Ratio (VSWR)	Fn ±1 MHz	-	-	2:1	-
Hamonic level	Bandwidth from DC to 10 x Fn	-	-	-25	dBc
Non-harmonic level (spurious)	Bandwidth from DC to 5 GHz	-	-100	-90	dBc
Warm-up input power	-	-	6	8	W
Steady-state supply power	@ 25°C	-	2	3.5	W

[1] The projected change for 1 year or other periods is not calculated as per as MIL-PRF-55310. The fit calculation is based on measurement during a minimum of 30 days; the measurements obtained are fitted using the method of least squares to the function defined in MIL-PRF-55310. The projected total frequency change for one year is determined by using this.

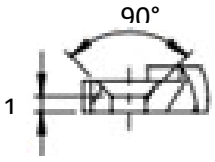
Model Outline and Pin Connections

Parameter	Package	Pin #	Connections	
Package and pin connection	PS1 Size: 59.2 x 48.2 x 22 mm	1	F_{OUT}	Frequency output
		2	GND	Electrical and mechanical ground
		3	V_{CTRL}	Frequency pulling voltage
		4	V_{CC}	Supply voltage
		5	V_{REF}	Reference voltage

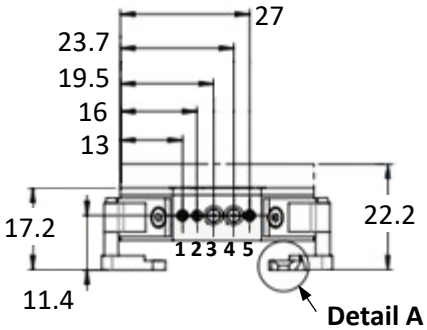
Model outline



TOP VIEW



DETAIL A



FRONT VIEW

NOTE:

- Units are in mm
- General tolerance is ±0.2 mm.

EP file

LNO100SAC 3D model

To open or view the STP file, you will need to import it into one of the following software programs: Autodesk Fusion 360, CATIA, SolidWorks, Solid Edge, TurboCAD, Kubotek KeyCreator, FreeCAD, ABViewer, ShareCAD, or eMachineShop.

Ordering Part Example