

RK409AVNS

The RK409AVNS is a compact NewSpace Ultra-Stable Oscillator (USO) that delivers 10⁻⁹ class frequency stability. Its Allan Variance (AV) achieves a short-term stability of 2.5E-13 at tau 1 s, providing exceptionally high performance. The frequency stability is ±0.2 ppb (over operating temperature -10 to 60 °C under vacuum).

The superior short-term stability makes the RK409AVNS well-suited for telecommunications, Low Earth Orbit (LEO), Global Navigation Satellite Systems (GNSS) and Precision Navigation and Timing (PNT) payload requirements.

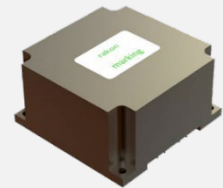
Features

- Frequency: 10 and 10.23 MHz
- Allan Variance: 2.5E-13 @ 1 s
- Warm-up consumption: 8 W max.
- Frequency stability vs. temperature: ±0.2 ppb typ. under vacuum
- Ageing: ±150 ppb max over 10 years at 10 MHz
- Quick delivery time
- Supply voltage: 12 V
- Output waveform: sine 50 Ω
- Output level from 4 to 8 dBm
- Weight: 250 g
- TID Limit: 30 krad
- Latch-up free up to LET: 43 MeV.cm²/mg

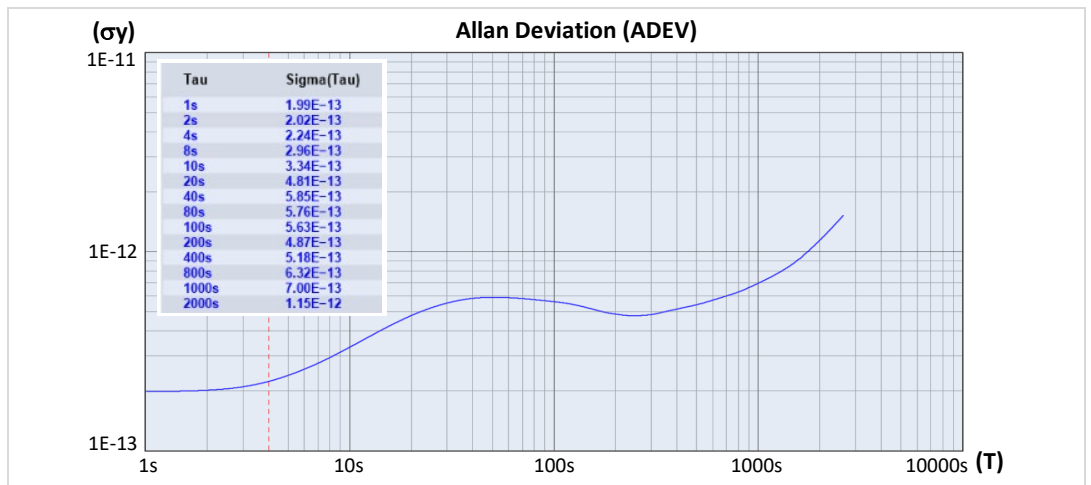
Applications

- PNT
- GNSS
- Earth Observation
- Navigation
- Compact reference for MRO/FGU

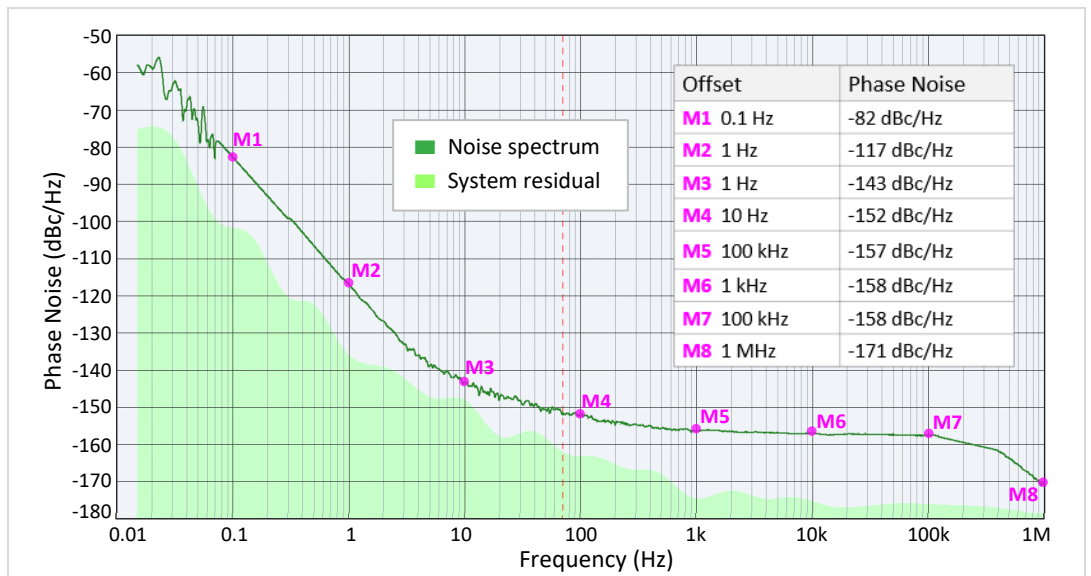
60 x 60 x 32 mm



Allan Deviation (ADEV)



Phase Noise



Environmental Conditions

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Operating temperature (T _{OP})	-	-10	25	+60	°C
Switch-on temperature (T _{SO})	-	-25	-	+65	°C
Non-operating temperature (T _{NOP})	-	-30	-	+70	°C
Random vibration	MIL-STD-202 Method 214, conditions: 20 – 100 Hz +3 dB/oct, 100 – 400 Hz 0.7 g ² /Hz 400 – 2000 Hz -3 dB/oct, duration: 60 s/axis				
Sine vibration	MIL-STD-202 Method 214, conditions: 5 – 21 Hz 11 mm peak, 21 – 100 Hz 20 g Sweep rate: 2 oct/mn up and down, 3 axis				
Mechanical shock	Level as per MIL-STD-202, Method 213, conditions: half sine with a peak acceleration of 600 g for a duration of 0.3 ms				
Radiation	Total Ionizing Dose (TID) is 30 krad, with a low dose rate. No SEL up to LET = 43 MeV.cm ² /mg				

Electrical Interface

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Power supply	-	11.4	12	12.6	V
Load impedance	VSWR 1.1	45	50	55	Ω
Reference voltage (V _{REF})	-	7.5	8	8.5	V
Control voltage (V _{CTRL})	When V _{CTRL} option is selected	0	-	V _{REF}	V

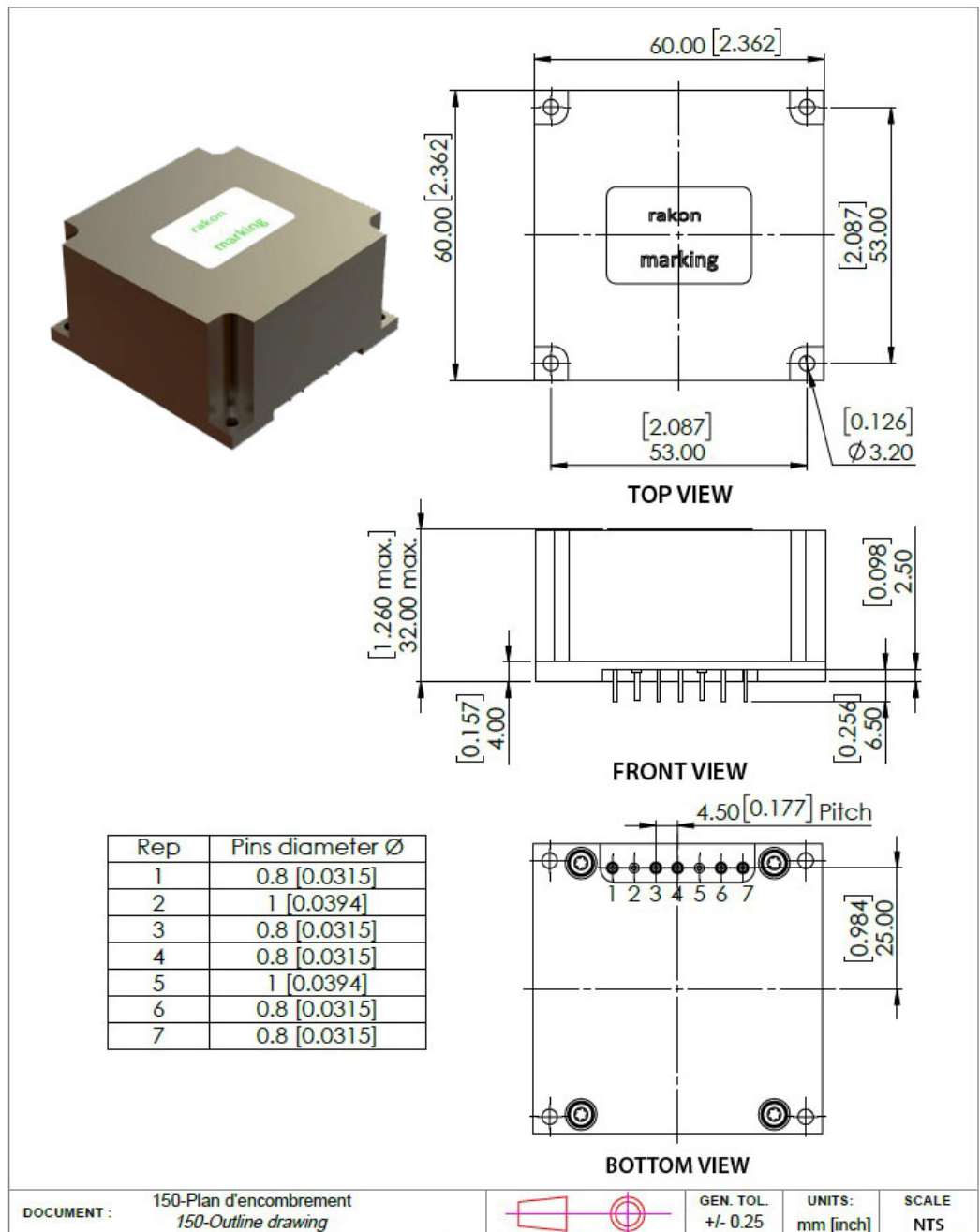
Frequency Characteristics

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Standard frequency	Custom option available on request	-	10, 10.23	-	MHz
Steady-state input current power	Vacuum @ -10°C	-	-	5	W
Warm-up supply power	-	-	-	8	W
Initial frequency accuracy	-	-	-	±100	ppb
Frequency adjustment	Positive slope	-	-	±500	ppb
Frequency stability over temperature	-	-	±0.5	±1	ppb
Supply voltage stability	Over operating temperature	-	-	±0.1	ppb
Load sensitivity	Over operating temperature	-	-	±0.1	ppb
Pressure	-	-	-	±40	ppb
Ageing	Over 1 year Over 10 years	-	-	±30 ±150	ppb
Allan variance (AV)	tau = 1 s tau = 10 s tau = 100 s	-	2.5 3.5 5	3 6 10	E-13
Frequency warm-up	Vacuum @ -10 °C	-	-	30	mn
Output waveform	Sine	-	-	-	-
Output level	EOL	4	-	8	dBm
Harmonics level	From DC to 500 MHz	-	-	-40	dBc
Non-harmonics level	From DC to 3 GHz	-	-	-85	dBc
Phase noise	1 Hz offset	-	-117	-115	dBc
	10 Hz offset	-	-152	-138	dBc
	100 Hz offset	-	-157	-145	dBc
	1 kHz offset	-	-158	-150	dBc
	10 kHz offset	-	-158	-155	dBc

Model Outline and Pin Connections package

Parameter	Package	Pin #	Connections
Package and pin connection	Pin-through hole (PTH) Size: 60 x 60 x 32 mm	1	SF RF output
		2	GND RF electrical & mechanical
		3	VCTRL Voltage control for electrical
		4	VREF Reference voltage
		5	GND Electrical & mechanical ground
		6	NC Not connected
		7	Vcc Supply voltage

Model outline



3D Step file

Parameter	Package
Net weight	Typical: 125 g Maximum: 135 g
STEP file	RK409AVNS 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

