RK600NS [PRELIMINARY]

The RK600NS is a cost-effective, low power consumption Voltage Controlled SAW Oscillator (VCSO) designed for smallsats and constellations. This high-frequency VCSO is developed with advanced Surface Acoustic Wave (SAW) technology enabling excellent phase noise performance.

The low power consumption VCSO RK600NS is proposed in a 25 x 25 x 13 mm pin-through hole (PTH) package. It is an integrated solution of SAW technology and Phase-Locked Loop (PLL) circuit design.

The standard frequency of the RK600NS series is 800 MHz. Custom frequencies from 600 MHz to 1.2 GHz are available on request.

Features

- Frequency: 600 MHz to 1.2 GHz
- Supply voltage: 5V
- Steady-state consumption: 150 mW
- 25 x 25 x 13mm pin-through hole (PTH) package
- Phase noise @10 kHz offset : -135 dBc/Hz
- Output waveform: sinus
- TID limit: 50 kRads
- Latch-up free up to LET: 43MeV/mg/cm^2

Applications

- Frequency converters
- Signal generation
- Synthesizers

25 x 25 x 13 mm

Environmental Conditions

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Operating temperature	T_{OP}	-20	25	70	°C
Switch-on temperature	T_{SO}	-40	-	85	°C
Non-operating temperature	T_{NOP}	-40	-	85	°C
Sine vibration	20 to 50 Hz: +6 dB/oct 50 to 350 Hz: 0.8 g^2/Hz 350 to 2000 Hz: -6 dB/oct				
Shocks	Mechanical shock as per MIL-STD-202, Method 213 Half sine with a peak acceleration of 2000g for duration of 0.5 ms.				
Radiation	Total Ionizing Dose (TID) of 50 krad, low dose rate (36 to 360 rad/h) Latch up free up to LET = 43 MeV/mg/cm^2				

Electrical Interface

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Power supply	V_{CC}	4.75	5	5.25	V
Load impedance	F_{OUT}			1.3:1	VSWR
Control Voltage	V_{CTRL}	0	-	3.3	V

Screening Options

Parameter	Condition / Remarks	EM Option	FM Option
Ageing	@ max operating temperature range	–	✓
Random acceleration	Level as per MIL-STD-202, Method 214, Condition I-D	–	✓
Thermal shocks	MIL-STD-202, Method 107, Condition A1	–	✓
Final measurement	MIL-STD-883, Method 2020, Condition B	✓	✓
External visual inspection	MIL-STD-883, Method 2009	✓	✓

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Performances @ 800 MHz

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Nominal frequency	-	-	800	-	MHz
Initial frequency accuracy	Vacuum, at time of shipment, @25°C	-	±50	-	ppm
Overall frequency drift	Initial, temperature range, EOL (12-year)	-	-	±150	ppm
Pulling range	Cover the overall frequency drift	±180	-	-	ppm
Input tuning voltage	V_{CTRL} / positive slope	0.5	-	4.5	V
Modulation bandwidth	Tuning voltage input	10	-	-	kHz
Freq. stability vs temperature	Referenced to +25°C	-	±60	-	ppm
Freq. stability vs supply voltage	V_{CC} ±5% @25°C	-	±1	-	ppm
Freq. stability vs load	For ±10% variation of load	-	±1	-	ppm
Freq. stability vs pressure	Atm to vacuum	-	±1	-	ppm
Freq. ageing (after 30 days of continuous operation)	1st year 12 years	-	-	±5 ±20	ppm
Phase noise Static conditions, guaranteed values on full temperature range	1 kHz offset 10 kHz offset From 1 MHz to 40 MHz	- - -	-105 -135 -170	-100 -130 -165	dBc/Hz
Harmonic distortion	-	-	-	-30	dBc
Spurious	Non-harmonics	-	-	-80	dBc
Output waveform	-		Sinus		-
Output power	Into 50Ω load	+8	-	+12	dBm
Steady state supply current	@ +25°C / @5V	-	30	40	mA

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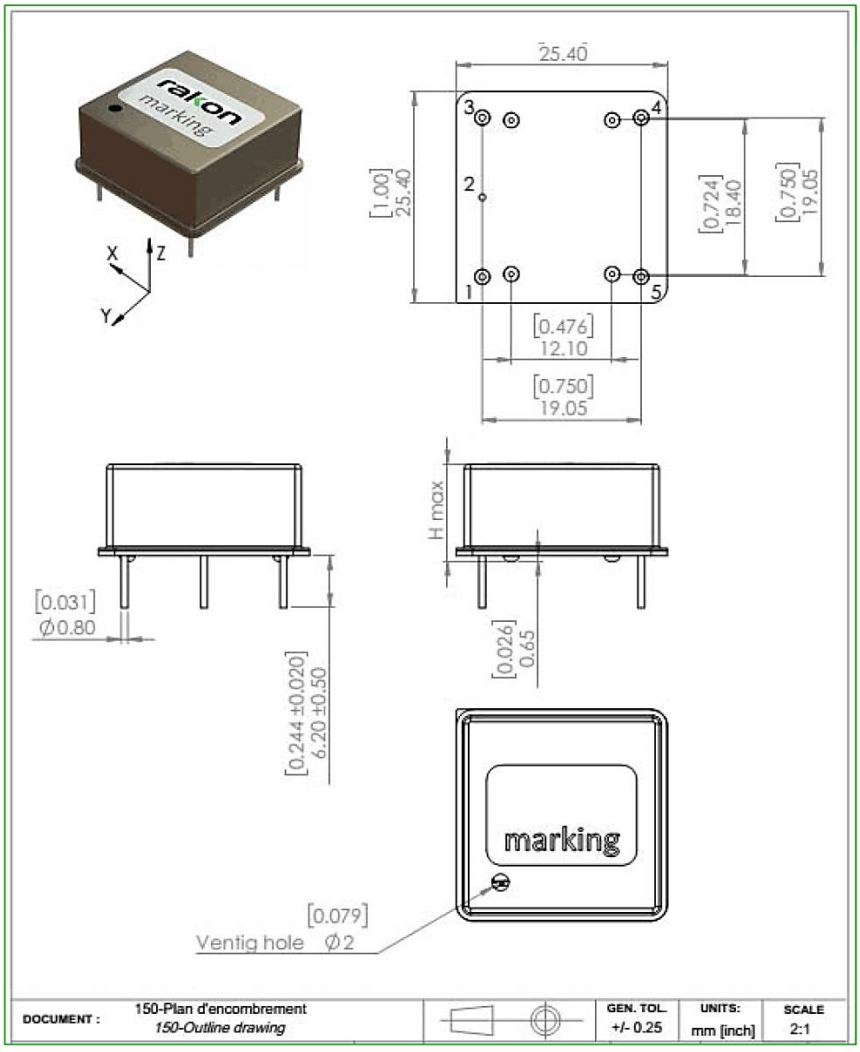
Model Outline and Pin Connections

Parameter	Package	Pin #	Connections
Package type	Pin through-hole Size: 25 x 25 x 13 mm	1	Fout (Frequency output)
		2	GND (Ground)
		3	V_{CTRL} (Voltage control)
		4	GND (Ground)
		5	V_{CC} (Supply voltage)
Model outline			

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