RK200NS [PRELIMINARY]

The RK200NS is a cost-effective, low power consumption Space VCXO designed for NewSpace mini satellites and constellations. This VCXO is ideal for smallsats where tolerance to Total Ionizing Dose (TID), low power consumption, and good phase noise are required. It is designed for missions up to 12 years.

The standard frequencies of the RK200NS are 10 MHz and 100 MHz. Custom frequencies are available from 10 to 120 MHz. The RK200NS is a small form-factor, low profile NewSpace VCXO in a 25 x 25 x 13 mm Pin Through Hole (PTH) package.

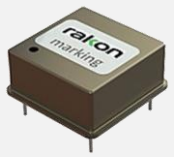
Features

- Frequency: 10 to 120 MHz
- Low profile PTH: 25 x 25 x13 mm
- Supply voltage: 5 V
- Voltage control function
- Stead state consumption: 150 mW
- Output waveform: Sinus
- TID limit: 40 kRads
- Latch-up free up to LET = 15 MeV/mg/cm^2

Applications

- Frequency converters
- 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 2000*g* for a duration of 0.5 msec.				
Radiation	Total Ionizing Dose (TID) of 40 krad, low dose rate (36 to 360 rad/h) Latch up free up to LET = 15 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	-	45	50	55	Ω
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	✓	✓

Issue: A0, xxx.110, 12 November 2021

sales@rakon.com

Performances @ 100 MHz

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Nominal frequency	-	-	100	-	MHz
Initial frequency accuracy	Vacuum, at time of shipment, @25°C	-	-	±3	ppm
Overall frequency drift	Initial, temperature range, EOL (12-year)	-	-	±20	ppm
Pulling range[1]	Cover the overall frequency drift	-	±20	-	ppm
Input tuning voltage	V_{CTRL} / positive slope	0	-	3.3	V
Modulation bandwidth	Tuning voltage input	150	-	1000	Hz
Freq. stability vs temperature	Referenced to +25°C	-	-	13	ppm
Freq. stability vs supply voltage	-	-	-		ppm
Freq. stability vs load	For ±10% variation of load	-		±0.5	ppm
Freq. stability vs pressure	Atm to vacuum	-	1	±0.5	ppm
Freq. ageing	1 year 12 years	-	-	±1 ±5	ppm
Phase noise (Achieved after 10 mn warm up). @ 25°C +3 dB max, variation in the temperature range -10 to +45°C	@10 Hz offset @100 Hz offset @1kHz offset @10 kHz offset @100 kHz offset From 1 MHz to 40 MHz	- - - - - -	- - - - - -	-90 -120 -140 -150 -155 -155	dBc/Hz
Output waveform	-	Sinus			
Output level	BOL	0	-	3	dBm
Harmonic level	DC to 1 GHz	-	-30	-25	dBc
Spurious level	Non-harmonics	-	-	-80	dBc
Steady-state supply power	@ 5 V	-	100	150	mW

[1] The value covers the overall frequency drifts. The requirement is to have a frequency pulling up to the overall stability.

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	Vref (Reference voltage output)
		5	V_{CC} (Supply voltage)
Model outline