

RK406NS

The RK406NS is a cost-effective, low power consumption OCXO developed for NewSpace applications such as mini-satellites and satellite constellations. The small footprint of 25.4 x 25.4 mm of this NewSpace OCXO is ideal for missions of up to 5 years where tolerance to TID (Total Ionizing Dose), low power consumption, and good phase noise are required. The product can be customised for a longer lifetime of up to 12 years.

The standard frequencies of the RK406NS are 10 MHz and 100 MHz. Other frequencies from 10 to 125 MHz can be developed on request.

Features

- Frequency: 10 to 125 MHz
- Supply voltage: 5 V
- Voltage control function
- Steady state consumption: 450 mW
- 25.4 x 25.4 x 13 mm pin-through hole package
- Weight: 20g max
- Overall frequency stability: ± 600 ppb
- ADEV (1s): $< 2E-11$ @ 10 MHz
- Output wave form: sine 50 Ω or square
- TID limit: 30 krad
- Latch-up free up to LET: 43 MeV/mg/cm²

Applications

- Frequency converters
- GNSS receivers
- Synthesizers

25.4 x 25.4 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
Random 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 shocks as per MIL-STD-202, Method 213 Half sine with a peak acceleration of 2000 g for a duration of 0.5 ms				
Radiation	Total Ionizing Dose (TID) of 30 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		4.75	5	5.25	V
Load impedance ¹	Sine wave	45	50	55	Ω
	Square	-	10	-	k Ω

¹ Value of the capacitor in parallel to the resistive load depends of the frequency

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	✓	✓

Performances @ 10 MHz

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Nominal frequency	-	-	10	-	MHz
Initial frequency accuracy	Vacuum, at time of shipment	-	-	± 200	ppb
Overall frequency drift	Initial, temp. range, EOL (5y)	-	-	± 500	ppb
Pull range	Sufficient for 5 years	± 500	-	-	ppb
Freq. stability vs temperature	Referenced to +25°C	-	-	± 100	ppb
Freq. stability vs supply voltage	-	-	-	± 50	ppb
Freq. stability vs load	-	-	-	± 50	ppb
Freq. stability vs pressure	Atm to vacuum	-	-	± 50	ppb
Freq. ageing	1 day	-	-	± 1	ppb
Allan standard deviation	Tau = 1s @ 25°C	-	-	2E-11	-
Frequency warm up	@ 25°C	-	-	10	mn
Phase noise (Achieved after 10 mn warm-up, @ 25°C)	1 Hz offset	-	-	-85	dBc/Hz
	10 Hz offset	-	-	-115	
	100 Hz offset	-	-	-135	
	1 kHz offset	-	-	-150	
	10 kHz offset	-	-	-163	
	100 kHz offset	-	-	-163	
Output waveform	Sine	-	-	-	-
Output level (Standard)	-	0	-	4	dBm
Harmonics level	From DC to 1GHz	-	-	-25	dBc
Spurious level	100 Hz to 5 GHz	-	-	-80	dBc
Warm-up supply power	-	-	1.6	2	W
Steady state supply power	@ -20°C vacuum	-	-	800	mW
	@ +25°C vacuum	-	450	500	mW

Performances @ 100 MHz

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Nominal frequency	-	-	100	-	MHz
Initial frequency accuracy	Vacuum, at time of shipment	-	-	± 300	ppb
Overall frequency drift	Initial, temp. range, EOL (5y)	-	-	± 1.2	ppm
Pull range	Sufficient for 5 years	± 1.2	-	-	ppm
Freq. stability vs temperature	Referenced to +25°C	-	-	± 300	ppb
Freq. stability vs supply voltage	-	-	-	± 50	ppb
Freq. stability vs load	-	-	-	± 50	ppb
Freq. stability vs pressure	Atm to vacuum	-	-	± 200	ppb
Freq. ageing	1 day	-	-	± 10	ppb
Allan standard deviation	Tau = 1s @ 25°C	-	-	1E-10	-
Frequency warm-up	@ 25°C	-	-	10	mn
Phase noise (Achieved after 10 mn warm-up, @ 25°C)	1 Hz offset 10 Hz offset 100 Hz offset 1 kHz offset 10 kHz offset 100 kHz offset	-	-	-55 -85 -115 -145 -150 -155	dBc/Hz
Output waveform	Sine	-	-	-	-
Output level (Standard)	-	0	-	4	dBm
Harmonics level	From DC to 2GHz	-	-	-25	dBc
Spurious level	100 Hz to 5 GHz	-	-	-80	dBc
Warm-up supply power	-	-	1.6	2	W
Steady state supply power	@ -20°C vacuum	-	-	800	mW
	@ +25°C vacuum	-	450	500	mW

Model Outline and Pin Connections

Parameter	Package	Pin #	Connections
Package type	Pin through-hole Size: 25.4 x 25.4 x 13 mm	1	Fout (Frequency output)
		2	GND (Ground)
		3	Vc (Control voltage)
		4	Vref (Reference voltage output)
		5	Vcc (Supply voltage)

