

RK300NS [PRELIMINARY]

The RK300NS is a cost-effective and low power TCXO developed for the NewSpace market such as smallsats and constellations. This NewSpace OCXO is ideal for applications requiring high tolerance to Total Ionizing Dose (TID), very low power consumption, high stability, and good phase noise. It is designed for missions up to 7 years. The product can be adapted for longer missions.

The standard frequencies of the RK300NS are 80 MHz and 100 MHz. Custom frequencies are available from 60 to 120 MHz. As a part of Rakon's NewSpace Low Noise & Low Power Oscillators offering, the RK300NS TCXO is available in a 25 x 25 x 13 mm low profile Pin Through Hole (PTH) package.

Features

- Standard frequency: 80, 100 MHz
- Supply voltage: 5 V
- Voltage control function
- Steady state consumption: 150 mW
- Low profile PTH: 25 x 25 x 13 mm
- Output wave form: Sine
- TID limit: 50 krad
- Latch-up free up to LET: 43 MeV/mg/cm²

Applications

- Frequency converters
- Synthesizers

25 x 25 x 13 mm



Environmental Conditions

| Parameter | Condition / Remarks | Min. | Typ. | Max. | Unit |
|---------------------------|---|------|------|------|------|
| Operating temperature | T _{OP} | -40 | 25 | 85 | °C |
| Switch-on temperature | T _{SO} | -40 | - | 85 | °C |
| Non-operating temperature | T _{NOP} | -40 | - | 85 | °C |
| Random vibration | 50 to 1000 Hz: +6 dB/oct 100 to 1000 Hz: 0.6 g ² /Hz 1000 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 ms | | | | |
| Radiation | Total Ionizing Dose (TID) of 30 krad, low dose rate (36 to 360rad/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} / Maxing rating at 6.5 V | 4.75 | 5 | 5.25 | V |
| Load impedance | Sine wave | 45 | 50 | 55 | Ω |

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 @ 100 MHz

| Parameter | Condition / Remarks | Min. | Typ. | Max. | Unit |
|-----------------------------------|---|------|-------|-----------------------------|--------|
| Nominal frequency | - | - | 100 | - | MHz |
| Initial frequency accuracy | Vacuum, at time of shipment, Rakon provides the value of an adjusted resistor | - | - | ±1 | ppm |
| Freq. stability vs temperature | Referenced to +25°C | - | ±2 | ±4 | ppm |
| Freq. stability vs supply voltage | - | - | ±0.1 | ±0.5 | ppm |
| Freq. stability vs load | For ±10% variation of load | - | ±0.05 | ±0.2 | ppm |
| Freq. stability vs pressure | Atm to vacuum | - | - | ±0.5 | ppm |
| Freq. ageing | 1 st year 7 years | - | - | ±1.5 ±4 | ppm |
| Allan standard deviation | Tau = 1s @25°C | - | - | 5E-11 | - |
| Phase noise | 10 Hz offset 100 Hz offset 1 kHz offset 10 kHz offset | - | - | -80 -110 -130 -140 | dBc/Hz |
| Output waveform | - | Sine | | | - |
| Output power | 50 Ω | 0 | - | 4 | dBm |
| Harmonics | DC to 1 GHz | - | - | -30 | dBc |
| Spurious | DC to 5 GHz | - | - | -80 | dBc |
| Steady-state supply power | @ 5 V | - | 100 | 150 | mW |

Model Outline and Pin Connections

| Parameter | Package | Pin # | Connections |
|--------------|---|-------|-------------------------------------|
| Package type | Pin through-hole Size: 25 x 25 x 13 mm | 1 | F _{OUT} Frequency output |
| | | 2 | GND Electrical & Mechanical ground |
| | | 3 | RCTRL Resistor Frequency Adjustment |
| | | 4 | DNC Do Not Connect |
| | | 4 | V _{ref} Reference voltage |
| | | 5 | V _{CC} Supply voltage |
| | | 6 – 9 | DNC Do Not Connect |

Model outline

