# RK408 MS1

The RK408 MS1 platform is a Space OCXO generating an ultra-low noise signal at low and high frequencies. This frequency source is featured by a remarkable frequency stability vs. temperature range down to ±20 ppb under vacuum and a noise floor down to -165 dBc/Hz.

The RK408 MS1 can be screened following the guidance of MIL-PRF-55310 (Class 1, type 4, level S) or to an optimised and shorter flow. This product platform is ideal for navigation, positioning and SAR systems.

## Features

- Frequency: 10 to 125 MHz
- Short lead time for 10, 20, 40, 50, 80, 100 and 120 MHz frequencies
- FvT: ± 20 ppb under Vacuum
- Low phase noise
- Steady state consumption:
  *2 W under vacuum*
  *3 W under atmospheric pressure*
- Supply voltage: +12 V
- Warm up consumption: 5 W max
- Ageing ±300 ppb max over 18 years at 10 MHz
- Output wave form: sine 50 Ω
- Output level: 10 to 12 dBm
- Component selected as per ECSS-Q-ST-70-08C and ECSS-Q-ST-70-38C
- Materials selected as per ECSS-Q-ST-70

## Applications

- SAR systems
- GNSS receivers
- Navigation
- Low noise synthesizers
- Frequency generator unit (FGU)

## 40 x 50 x 20 mm

Micro D + SMA

## Environmental Conditions

| Parameter | Condition / Remarks | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Operating temperature ($TO_P$) | Option A<br>Option B<br>Option C | -5<br>-20<br>-40 | 25<br>25<br>25 | 60<br>70<br>70 | °C |
| Switch-on temperature | $TS_O$ | -40 | | 85 | °C |
| Non-operating temperature | $TNO_P$ | -40 | | 85 | °C |
| Random vibration | MIL-STD-202 Method 214, conduction K (46.3 grms) | | | | |
| Sine vibration | MIL-STD-202 Method 204, Condition D (20G) | | | | |
| Mechanical shock | MIL-STD-202, Method 213, conduction F: Half sine with a peak acceleration of 1500*g* for duration of 0.5ms | | | | |
| Radiation | Total Ionizing Dose (TID) of 100 kRad, low dose rate (36 to 360 rad/h), No SEL up to LET=60 MeV/mg/cm² | | | | |

## Electrical Interface

| Parameter | Condition / Remarks | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Power supply | Option 2 (12 V) | 11 | 12 | 13 | V |
| Load impedance | | 45 | 50 | 55 | Ω |
| Supply voltage (Vs) | Option 2 (12 V) | 6.75 | 7.25 | 7.75 | V |
| Control voltage (Vc) | When Vc option is selected | 0 | | Vref | V |

## Phase Noise

| Parameter | Condition / Remarks | @ 10 MHz | @ 100 MHz | @ 120 MHz | Unit |
|---|---|---|---|---|---|
| Phase noise (max.) | 1 Hz offset | -100 | -70 | -65 | dBc |
| | 10 Hz offset | -130 | -100 | -95 | dBc |
| | 100 Hz offset | -150 | -130 | -125 | dBc |
| | 1 kHz offset | -160 | -152 | -150 | dBc |
| | 10 kHz offset | -165 | -162 | -162 | dBc |
| | 100 kHz offset | -165 | -165 | -165 | dBc |
| | Note: Products with better phase noise performance can be delivered if required | | | | |

## Frequency Characteristics

| Parameter | Condition / Remarks | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Nominal frequency | Standard frequencies: 10, 100, 120 MHz | | 10 – 120 | | MHz |
| Steady state input current power | Vacuum @ -20°C | | | 3 | W |
| Warm up supply power | Vacuum, End of Life (EOL) | | | 5 | W |
| Initial frequency accuracy | Frequency pulling option 1<br>Frequency pulling option 2 | | | ±0.1 | ppm |
| Allan variance | tau = 1s | | $5*10^{-12}$ | $1*10^{-11}$ | |
| Frequency warm up | Time needed to reach the initial frequency accuracy (1h ref.) | | | 10 | mn |
| Output waveform | Sine | | | | |
| Output level | Beginning of Life (BOL); Option 2 | 10 | | 12 | dBm |
| Harmonics level | | | | -30 | dBc |
| Non harmonics level | | | | -85 | dBc |
| Frequency adjustment (Positive slope, option 2) | 10 MHz typ.<br>100 MHz typ.<br>120 MHz typ. | ±0.4<br>±1.1<br>±1.3 | | | ppm |

| Parameter | Condition / Remarks | 10 MHz | 100 MHz | 120 MHz | Unit |
|---|---|---|---|---|---|
| Frequency stability vs. Temperature (FvT) | $TO_P$ option A, max value<br>$TO_P$ option B, max value<br>$TO_P$ option C, max value | ±10<br>±20<br>±30 | ±20<br>±40<br>±60 | ±20<br>±40<br>±60 | ppb |
| Supply voltage sensitivity | Over operating temperature, max value. | ±1 | ±2 | ±2 | ppb |
| Load sensitivity | Over operating temperature, max value. | ±25 | ±50 | ±50 | ppb |
| Pressure | Over operating temperature, max value. | ±100 | ±200 | ±200 | ppb |
| Ageing over 1 day | Over operating temperature, max value. | ±100 | ±300 | ±500 | ppb |
| Ageing over 18 years | Over operating temperature, max value. | ±300 | ±1000 | ±1200 | ppb |

## Ordering Part Example