Space Crystal Oscillator

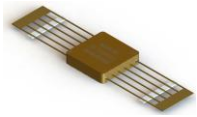
RK 115

According to MIL Level S

For this product, a full detailed specification can also be delivered on request.
Specific request can be addressed to RAKON info@rakon.fr

Product Description





This MIL-PRF-55310 level Space XO is designed for space applications and is based on hybrid technology.
The reference is resistant to shock and vibration environment.
Key advantages of this frequency source are low power consumption, its availability in different packages (J-lead, Flat Pack, DIL), its short lead time and its high resistance to heavy ions.
The availability of the enhanced J-lead package (2nd generation of J-lead package) makes its report easier.
This XO is manufactured in accordance with MIL-PRF-55310 (Class 2, type 1, level S).

Features

- ITAR-free
- Frequency Range: 10 kHz to 100 MHz
- AHCMOS output and ACMOS (above 80MHz only)
- Low consumption: 25 mA
- Supply Voltage: +3.3V or +5V
- Overall Frequency Stability over 18 years: ± 68ppm
- Manufacturing in accordance with:
  - MIL-PRF-55310 (Class 2, type 1, level S)
  - MIL-PRF-38534

Applications

- Digital cards
- FPGA clock

Specifications

1. Environmental conditions

Parameter	Conditions/remarks	Min	Nom	Max	Unit
Operating Temperature	Option A	-30	25	105	°C
	Option B	-55	25	125	°C
Switch-on Temperature	TSo	-55		125	°C
Non-Operating Temperature	TNOp	-55		125	°C
Random Vibration	Level as per MIL-STD-202, Method 214, Condition I-K (46,3 Grms)				
Shocks	Mechanical shock as per MIL-STD-202, Method 213 (half sine with a peak acceleration of 3 000g for duration of 0.3 msec)				
Acceleration	Acceleration as per MIL-STD-883, Method 2001, condition B (10 000g)				
Radiation	Total Ionizing Dose of 100 kRad, low dose rate as per ESCC22900 Latchup free up to LET = 100 MeV/mg/cm² with TILT of 53° Latchup free up to LET = 60 MeV/mg/cm² with TILT of 0°				

2. Electrical interface

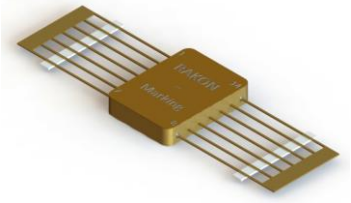
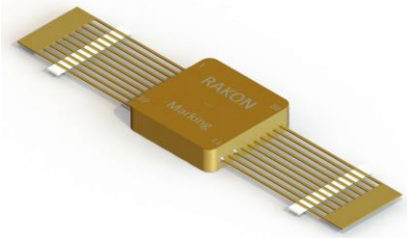
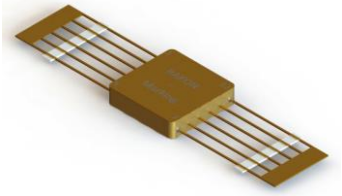
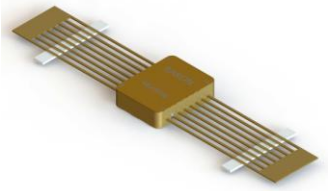
Parameters	Conditions/remarks	Min	Nom	Max	Unit
Power supply	Option 1 3.3 V	3.13	3.3	3.465	V
	Option 2 5 V	4.5	5	5.5	V
Load Impedance in parallel with 1kΩ	AHCMOS 3.3V 10 kHz ≤ Frequency < 80 MHz	13	15	18	pF
	AHCMOS 3.3V 80 MHz ≤ Frequency ≤ 100 MHz	9.1	10	11	pF
	AHCMOS 5V	13	15	18	pF
	ACMOS 3.3/5V 80 MHz ≤ Frequency ≤ 100 MHz	13	15	18	pF

3. Performances

Parameters	Conditions/Remarks	Min	Typ	Max	Unit
Nominal Frequency		0.01		100	MHz
Steady state input	AHCMOS/ACMOS Waveform		25		mA
Global Frequency stability (1)	Temperature option A (–30°C to +105°C)			± 68	ppm
	Temperature option B (–55°C to +125°C)			± 88	ppm
Initial frequency accuracy			± 10	± 15	ppm
Frequency-temperature stability	Temperature option A (–30°C to +105°C)			± 30	ppm
	Temperature option B (–55°C to +125°C)			± 50	ppm
Frequency variation vs. supply voltage	Over Operating Temperature			± 3	ppm
Frequency variation vs. load	Over Operating Temperature			± 5	ppm
Frequency ageing	Over 18 years			± 15	ppm
Start up time				10	ms
Output level	AHCMOS compatible	2.4		0.4	V
Duty cycle		45	50	55	%
Rise time	10%-90% of Vcc		5	10	ns
Fall time	90%-10% of Vcc		5	10	ns

Note 1: Including initial accuracy + freq temp stability + power supply stab + ageing over 18 years

4. Mechanical features

Package name	Description	Dimensions	
JL2	J-Lead 14x9 4Leads enhanced	14x9x3.8 mm	
FP1	Flat Pack 15x20 14 Leads	15x20x3.6 mm	
FP2	FP 16x16 20 Leads	16x16x3.8 mm	
FP3	Flat Pack 16x16 12 Leads	16x16x3.6 mm	
FP4	Flat Pack 13x10 16 Leads	13x10x3 mm	
DIL1	DIL 20x13 14 Leads	20x13x5 mm	

5. Model philosophy

Representativeness	EM	EQM	FM
Components	Passive commercial parts, Active parts from the same manufacturer of HiRel parts	Mil Grade parts procured from the same manufacturer of HiRel parts	HiRel Parts
Crystal material	Swept quartz	Swept quartz	ESCC3501 Swept quartz
Mechanical interface	Flight representative in form-fit-function	Flight representative in form-fit-function	Flight design
Electrical interface	Flight design	Flight design	Flight design
Tests	Acceptance testing	Qualification testing	Acceptance testing (including screening Group A & B)

6. Ordering part number definition

The part number breakdown is defined as follows:

RK 115 AC FP4 A 1 FM 24M000000

RAKON

Serie
XO (1xx)
According to MIL-S

Waveform
Blank = AHCMOS
AC = ACMOS*

Package
JL2 = J-Lead 14x9 / 4L enhanced
FP1 = FP 15x20 / 14 L
FP2 = FP 16x16 / 20 L
FP3 = FP 16x16 / 12 L
FP4 = FP 13x10 / 16 L
DIL1 = DIL 20x13 / 14 L

Temperature stability
A = –30°C to +105°C, ± 30 ppm
B = –55°C to +125°C, ± 50 ppm

Supply voltage
1 = 3.3V
2 = 5V

Model
EM = EM
EQM = EQM
FM = FM level S

Frequency, Fnom

*ACMOS: available from 80MHz only.