Model 122

OCXO – High Frequency, High Stability

Features

- 8 to 100 MHz Frequency Range
- High stability (±0.2 ppb over -10°C to +60°C)
- Low aging (to 0.2 ppb/day, 0.03 ppm/year)
- Low Allan Deviation (to $3x10^{-12}$ at 1s)
- Sine wave or HCMOS output

Dimensions: 20.2 × 20.2 x 14.1 mm

Applications

- Rubidium Standard replacement
- GPS disciplined frequency standard
- Instrumentation
- Communications systems

Description

The Model 122 series combines the advantage of the double-oven and internal heated resonator (IHR) technologies providing less than 1W power consumption at as high as 0.2 ppb temperature stability and 0.2ppb/day aging (for 10MHz frequency) in a 20 x 20 mm package. The Model 122 oscillators are excellent to use in high-end clock systems, instrumentation, and other applications where ultra high stability and miniature size are required.

Ordering Information – Table 1

Model		Stability	Temperature Range	Supply Voltage	Aging	Output		Frequency, MHz
122	—	T	D	E	G	H	—	xxxMxxx

Code	Stability
51	$5x10^{-10}$
21	$2x10^{-10}$

Code	Temp range
A	0 to 50°C
B	0 to 70°C
C	-10 to 60°C
D	-20 to 70°C
E	-30 to 70°C

Code	Supply
D	5.0V ±5%
E	3.3V ±5%

Code	Output
H	HCMOS
S	Sine wave

Code	Per day	Per year
J	0.5 ppb	0.05 ppm
G	0.2 ppb	0.03 ppm

Part Number Example: 122-51DEGH-10M000

Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	T_{OP} (See table 1 options)	-30	-	+70	°C
Supply Voltage	V_{CC}	4.75 3.14	5.0 3.3	5.25 3.47	Vdc
Power Consumption	Steady State; T_A = 25°C Start-up	- -	1.0 -	1.2 4.5	W
Load	HCMOS (10 MHz) HCMOS (100 MHz) Sine wave		10 kΩ // 15pF 10 kΩ // 5pF 50		Ω
Frequency Stability					
Frequency	F_{NOM}	8	-	100	MHz
Freq. vs Temperature	Ref to +25°C (See table 1 options)	-	-	±0.2	ppb
Freq. vs Supply Voltage	Referenced to V_{CC} typ.	-	-	±0.2	ppb
Freq. vs Time (Aging)	After 30 days of operation (See table 1 options)	- -	- -	±0.2 ±30	ppb/day ppb/year
Allan Deviation	1 sec (10 MHz)	-	0.01	-	ppb
Retrace	After 30 min following 24 hours off	-	-	±20	ppb
Warm-up time	@ 25°C, to within 0.1 ppm referenced to the freq after 30 minutes on	-	1	-	min
Output Parameters					
HCMOS Output Levels (Option H)	V_{CC} = 5.0V V_{CC} = 3.3V	V_{OL} V_{OL}	- -	- -	0.4 0.4	Vdc
		V_{OH} V_{OH}	3.8 2.4	- -	- -	
Rise/Fall Times	10 MHz 100 MHz		-	-	10 3	ns
Duty Cycle	@50% of output signal		45	50	55	%
Sine Wave Output Levels (Option S)	V_{CC} = 5.0V V_{CC} = 3.3V		+6 +3	- -	+11 +9	dBm
Harmonics			-	-	-30	dBc
Sub-harmonics (Note 1)	Frequency ≤ 25 MHz Frequency > 25 MHz only		None -	-	- -40	dBc
Phase Noise (Note 2)	Offset 1 Hz 10 Hz 100 Hz 1 kHz 10 kHz 100 kHz		10 MHz (typical) -100 -125 -145 -160 -165 -168		100 MHz (typical) - -100 -125 -140 -150 -150	dBc/Hz

Electrical Specifications (Continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Electronic Frequency Control - EFC					
EFC Control Voltage	V_{CC} = 5.0V V_{CC} = 3.3V	0.0 0.0	- -	4.3 2.9	Volts
Frequency Tuning Range	From F_{NOM}, sufficient range for 10 years aging	-	±0.5	-	ppm
Reference Output	V_{CC} = 5.0V V_{CC} = 3.3V	4.0 2.7	4.2 2.8	4.3 2.9	Volts

Note 1 – Frequency multiplication above 25 MHz
Note 2 – For additional phase noise options, please consult factory

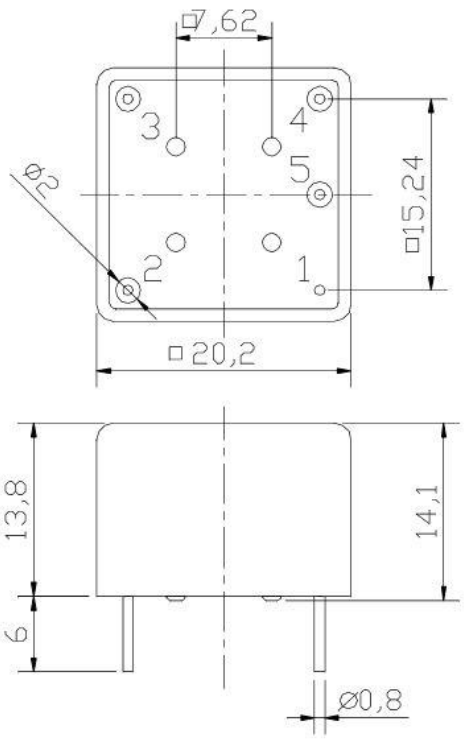
Absolute Ratings

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply breakdown voltage	V_{CC}		-0.5	-	V_{CC} + 20%	V	
Control Voltage	V_C		-1	-	+6	V	

Mechanical and Environmental

Parameter	Condition
Storage Temperature Range	-60°C to +90°C
Humidity	Hermetically sealed
Mechanical Shock	MIL-STD-202G, meth 213B, 30g, 11ms, 1/2 sine pulse
Vibration	MIL-STD-202G, meth 204D, - Standard: 1.5mm DA 10 to 55Hz, 10G pk sine to 2000Hz - Option (0.5mm lead diameter): 0.75 mm DA 10 to 55 Hz, 5G pk sine to 500Hz See "Mechanical Specifications"
Soldering Conditions	Hand solder only. 260°C, 10 seconds.
Markings	Epoxy ink or laser engraved

Mechanical Specifications



All dimensions: mm

Pin Assignments

Pin	Connection
1	Ground
2	Output
3	V_{CC}
4	V_C
5	V_{REF}

Connection Diagram