

Model 122

OCXO – High Frequency, High Stability

Features

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

Applications

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



Dimensions: 20.2 x 20.2 x 14.1 mm

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	Pin Diameter	Frequency, MHz
122	— T	D	E	G	H	8	10.000MHz

Code	Stability	Code	Temp range	Code	Supply	Code	Output	Code	Diameter
T	5×10^{-10}	A	0 to 50°C	D	5.0V $\pm 5\%$	H	HCMOS	8	0.8 mm (std)
U	2×10^{-10}	B	0 to 70°C	E	3.3V $\pm 5\%$	S	Sine wave	blank	0.5 mm
		C	-10 to 60°C						
		D	-20 to 70°C						
		E	-30 to 70°C						

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

Part Number Example:
122-TDEGH8-10.000MHz



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 _{OL}	- -	- -	0.4 0.4	Vdc
	V _{CC} = 3.3V	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 +4	- -	+11 +9	dBm	
Harmonics		-	-	-30	dBc	
Sub-harmonics (Note 1)	Frequency ≤ 25 MHz Frequency > 25 MHz only	None -	- -	- -40	dBc	
Phase Noise (Note 2)		<u>Offset</u>	<u>10 MHz (typical)</u>	<u>100 MHz (typical)</u>		
		1 Hz	-90	-		
		10 Hz	-120	-90		
		100 Hz	-140	-120		
		1 kHz	-155	-140	dBc/Hz	
		10 kHz	-165	-160		
	100 kHz	-165	-165			

Electrical Specifications (Continued)

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

Note 1 – Frequency multiplication above 25 MHz

Note 2 – For additional phase noise options, please consult factory

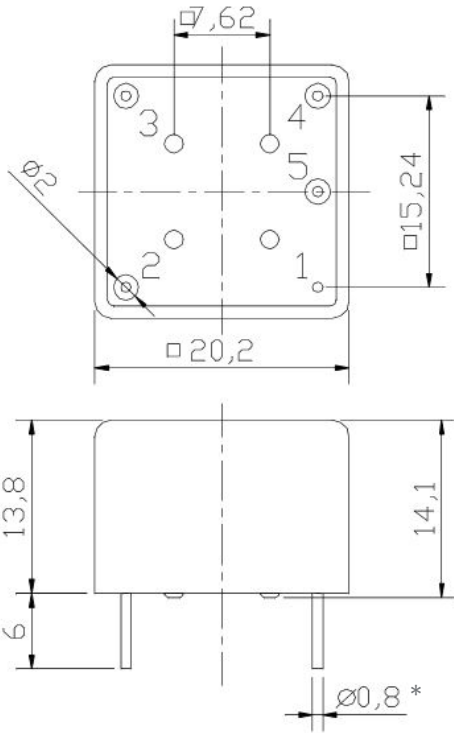
Absolute Ratings

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

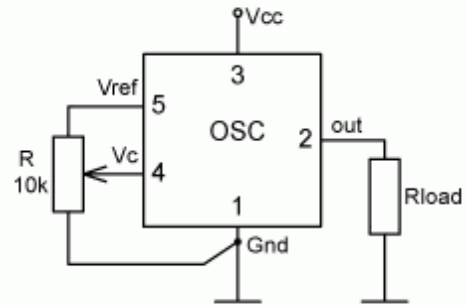
Parameter	Condition
Storage Temperature Range	-60°C to +90°C
Humidity	Hermetically sealed
Mechanical Shock	MIL-STD-202G, meth 213B, 30g, 11ms, 1/2 sine pulse
Vibration	MIL-STD-202G, meth 204D, - <u>Standard</u> : 1.5mm DA 10 to 55Hz, 10G pk sine to 2000Hz - <u>Option</u> (0.5mm lead diameter): 0.75 mm 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



Pin Assignments

Pin	Connection
1	Ground
2	Output
3	V _{CC}
4	V _C
5	V _{REF}



All dimensions: mm

* Terminal Diameter

- Standard: 0,8 mm diameter
- Option: 0,5 mm diameter. See “Mechanical and Environmental” table. Please consult factory when ordering.

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