

VFOV200

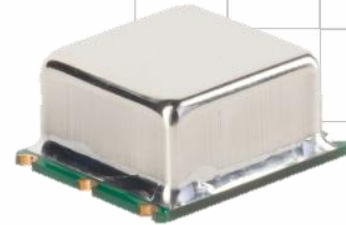
OCXO – Ultra Low Noise, Ultra Stable

Features

- 5 to 250 MHz Frequency Range
- High stability (to 5 ppb over -40°C to +85°C)
- Sine wave or HCMOS output

Applications

- PLL reference for telecommunications systems
- Stratum 3E Clock Systems
- Base Station reference source
- GPS holdover
- Instrumentation / test and measurement



Dimensions: 25.4 × 22 x 11 mm

Ordering Information – Table 1

Model	Stability	Temperature Range	Supply Voltage	Aging	Output	Frequency, MHz
<u>VFOV200</u>	— <u>18</u>	<u>D</u>	<u>E</u>	<u>C</u>	<u>H</u>	— <u>xxxMxxx</u>

Code	Stability
17	1x10 ⁻⁷
58	5x10 ⁻⁸
28	2x10 ⁻⁸
18	1x10 ⁻⁸
59	5x10 ⁻⁹

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
G	-40 to 85°C

Code	Supply
D	5.0V ±5%
E	3.3V ±5%
B	12V ±5%

Code	Output
H	HCMOS
S	Sine wave

Code	Per day	Per year	Freq Range
A	5 ppb	0.5 ppm	≤250 MHz
F	3 ppb	0.3 ppm	
B	2 ppb	0.2 ppm	
I	1.5 ppb	0.15 ppm	≤200MHz
C	1 ppb	0.1 ppm	
D	0.5 ppb	0.05 ppm	≤100MHz
G	0.2 ppb	0.02 ppm	≤50MHz
H	0.1 ppb	0.015 ppm	

Available Frequency Stabilities over Operating Temperature Ranges **

Code	Temperature Range	Stability				
		17 ±1x10 ⁻⁷	58 ±5x10 ⁻⁸	28 ±2x10 ⁻⁸	18 ±1x10 ⁻⁸	59 ±5x10 ⁻⁹
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	*	*	*	*	◇
G	-40 to 85°C	*	*	*	*	◇

* = Available for all frequencies, ◇ = Available only for frequencies ≤ 30 MHz

** Not all combinations are available. Consult factory for the right configurations that will meet your requirements.

Part Number Example: VFOV200-18DECH-10M000



Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	T _{OP} (See table 1 options)	-40	-	85	°C
Supply Voltage	V _{CC}	11.4	12.0	12.6	Vdc
		4.75	5.0	5.25	
		3.15	3.3	3.45	
Power Consumption	Steady State; T _A = 25°C	-	1.0	1.2	W
	Start-up	-	3.2	3.5	
Load	HCMOS (10 MHz)	10 kΩ // 15pF			Ω
	HCMOS (100 MHz)	10 kΩ // 5pF			
	Sine wave	50			
Frequency Stability					
Frequency	F _{NOM}	5	-	250	MHz
Freq. vs Temperature (See table 1 options)	Ref to 25°C, air flow 0.5 m/s max	-	-	±5	ppb
Freq. vs Supply Voltage	V _{CC} ±5%	-	±1	-	ppb
Freq. vs Time (Aging) (See table 1 options)	After 30 days of operation	-	-	±0.5	ppb/day
		-	-	±50	ppb/year
G-Sensitivity	Worst direction	-	±1	-	ppb/g
Allan Variance	1 sec	-	0.01	-	ppb
Retrace	After 30 minutes	-	-	±20	ppb
Warm-up time	@ 25°C, to within ±0.1 ppm referenced to the freq after 15 minutes on	-	2	3	min
Output Parameters					
HCMOS Output Levels (Option H)	V _{CC} = 5.0 or 12V V _{CC} = 3.3V	V _{OL}	-	0.4	Vdc
			-	0.4	
		V _{OH}	3.8 2.4	- -	
Rise/Fall Times	10 MHz	-	-	10	ns
	100 MHz	-	-	3	
Duty Cycle	@50% of output signal	45	50	55	%
Sine Wave Output Levels (Option S)	V _{CC} = 5.0 or 12V	+6	-	+11	dBm
	V _{CC} = 3.3V	+3	-	+9	
Harmonics		-	-	-25	dBc
Sub-harmonics (Note 1)	Frequency < 30 MHz	-	None	-	dBc
	Frequency > 30 MHz (Sine)	-	-	-40	
	Frequency > 30 MHz (HCMOS)	-	-	-35	
Phase Noise	Offset	10 MHz (typical)		100 MHz (typical)	
	1 Hz	-100		-	
	10 Hz	-125		-100	
	100 Hz	-145		-125	
	1 kHz	-160		-140	
	10 kHz	-165		-150	
	100 kHz	-168		-150	
For additional phase noise performance options, consult factory.					



Electrical Specifications (Continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Electronic Frequency Control (EFC)					
EFC Control Voltage	V _{CC} = 5.0 or 12V	0.0	-	4.2	Volts
	V _{CC} = 3.3V	0.0	-	2.8	
Frequency Tuning Range	From F _{NOM} – sufficient for 10 years aging	±0.3	±1	-	ppm
Deviation Slope	Positive, monotonic	-	0.4	-	ppm/V
Reference Output	V _{CC} = 5.0 or 12V	4.0	4.2	4.3	Volts
	V _{CC} = 3.3V	2.7	2.8	2.9	

Note 1 – For output without sub-harmonics above 30 MHz, please refer to CTS Model VFOV100

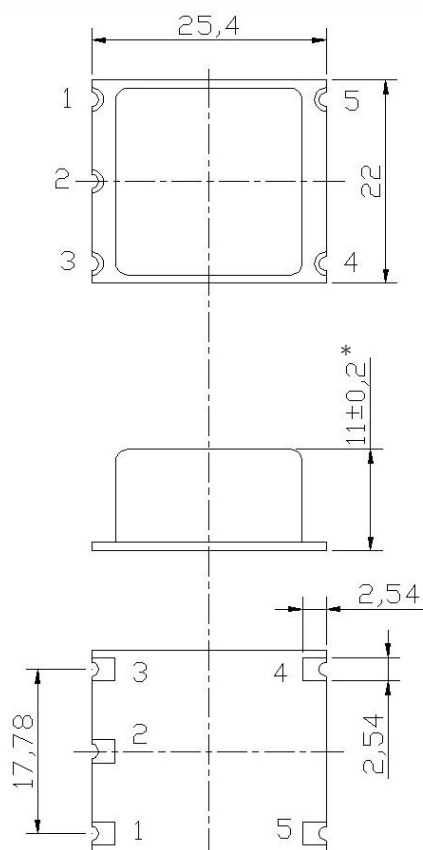
Absolute Ratings

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
Seal	Non hermetic – cleaning by liquid immersion is not recommended
Humidity	Non-condensing 95%
Mechanical Shock	MIL-STD-202G, meth 213B, 30g, 11ms, 1/2 sine pulse
Vibration	MIL-STD-202G, meth 204D, 1.5mm DA 10 to 55Hz, 10G pk sine to 500Hz
Soldering Conditions	Hand solder only – not reflow compatible. 260°C, 10 seconds.
Markings	Epoxy ink or laser engraved

Mechanical Specifications



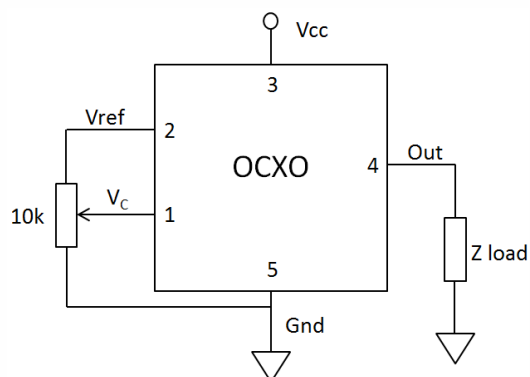
* 12.7 mm height is required for some high stability options. Consult factory.

All dimensions: mm

Pin Assignments

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

Connection Diagram



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