

# VFOV201

## OCXO – High Frequency, High Stability

### 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 Timing (IEEE 1588)
- Base Station reference source
- GPS holdover
- Instrumentation / test and measurement



Dimensions: 20.2 × 20.2 x 12 mm

### Ordering Information – Table 1

Model	Stability	Temperature Range	Supply Voltage	Aging	Output	Pin Diameter	Frequency, MHz
VFOV201	W	D	E	C	H	8	10.000MHz

Code	Stability
R	±1x10 <sup>-7</sup>
T	±5x10 <sup>-8</sup>
U	±2x10 <sup>-8</sup>
V	±1x10 <sup>-8</sup>
W	±5x10 <sup>-9</sup>

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
I	1.5 ppb	0.15 ppm
C	1 ppb	0.1 ppm
D	0.5 ppb	50 ppb
G	0.2 ppb	30 ppb

Code	Diameter
8	0.8 mm (std)
blank	0.5 mm

### Available Frequency Stabilities over Operating Temperature Ranges \*\*

Code	Temperature Range	Stability				
		R	T	U	V	W
		±1x10 <sup>-7</sup>	±5x10 <sup>-8</sup>	±2x10 <sup>-8</sup>	±1x10 <sup>-8</sup>	±5x10 <sup>-9</sup>
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	*	*	*	*	◇

### Legend

- \* = 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:**  
VFOV201-WDECH8-10.000MHz



### Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit	
<b>Operating Conditions</b>						
Operating Temperature Range	T <sub>OP</sub> (See table 1 options)	-40	-	85	°C	
Supply Voltage	V <sub>CC</sub>	11.4	12.0	12.6	Vdc	
		4.75	5.0	5.25		
		3.15	3.3	3.45		
Power Consumption	Steady State; T <sub>A</sub> = 25°C	-	1.0	1.2	W	
	Start-up	-	3.2	3.5		
Load	HCMOS (10 MHz)	10 kΩ // 15pF				
	HCMOS (100 MHz)	10 kΩ // 5pF				
	Sine wave	50			Ω	
<b>Frequency Stability</b>						
Frequency	F <sub>NOM</sub>	5	-	250	MHz	
Freq. vs Temperature	(See table 1 options)	-	-	±5	ppb	
Freq. vs Supply Voltage	V <sub>CC</sub> ±5%	-	±1	-	ppb	
Freq. vs Time (Aging )	After 30 days of operation	-	-	±0.5	ppb/day	
	(See table 1 options)	-	-	±50	ppb/year	
G-Sensitivity	Worst direction	-	±1	-	ppb/g	
Allan Deviation	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	
<b>Output Parameters</b>						
HCMOS Output Levels (Option H)	V <sub>CC</sub> = 5.0 or 12V V <sub>CC</sub> = 3.3V	V <sub>OL</sub>	-	-	0.4	Vdc
			-	-	0.4	
		V <sub>OH</sub>	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 <sub>CC</sub> = 5.0 or 12V	+6	+8	+11	dBm	
	V <sub>CC</sub> = 3.3V	+4	+4	+9		
Harmonics		-	-	-25	dBc	
Sub-harmonics (Note 1)	Frequency < 30 MHz	None	-	-	dBc	
	Frequency > 30 MHz only	-	-	-40		
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		dBc/Hz	
	1 kHz	-155	-140			
	10 kHz	-165	-160			
	100 kHz	-168	-165			

## Electrical Specifications (Continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
<b>Electronic Frequency Control - EFC (Optional)</b>					
EFC Control Voltage	$V_{CC} = 5.0$ or $12V$	0.0	-	4.3	Volts
	$V_{CC} = 3.3V$	0.0	-	2.8	
Frequency Tuning Range	From $F_{NOM}$ sufficient range for 10 years aging	$\pm 0.5$	$\pm 1$	-	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 (up to 120 MHz), please refer to CTS Model VFOV101

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

## Absolute Ratings

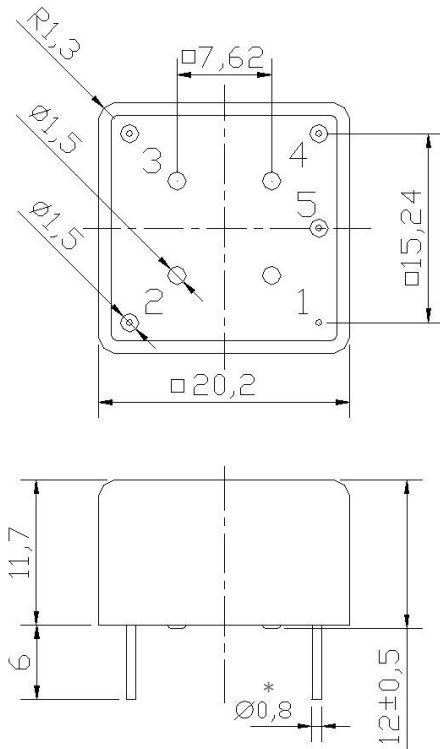
Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply breakdown voltage	$V_{CC}$		-0.5	-	$V_{CC} + 20\%$	V	
Control Voltage	$V_C$		-1	-	+6	V	

## 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> (0.8mm lead diameter): 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.

## Mechanical Specifications

### Mechanical Outline



All dimensions: mm

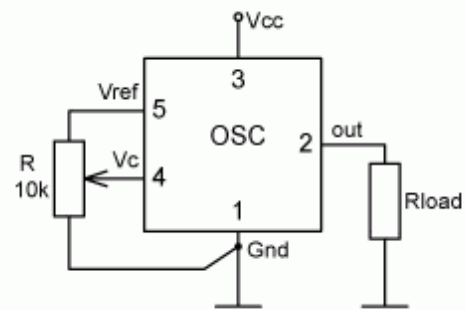
\* Terminal Diameter (See Table 1 for ordering)

- Standard: 0,8 mm diameter
- Option: 0,5 mm diameter. See “Mechanical and Environmental” table.

### Pin Assignments

Pin	Connection
1	Ground
2	Output
3	V <sub>CC</sub>
4	V <sub>C</sub>
5	V <sub>REF</sub>

### Connection Diagram



This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.