

# VFOV405

## OCXO – Ultra Low Power

### Features

- 5MHz to 100MHz frequency range
- Fast warm-up
- Ultra low power consumption
- HCMOS output
- Vibration resistant construction



Dimensions: 16 x 15.3 x 10 mm

### Description

The VFOV405 is a high stability, low power OCXO that utilizes Internal Heating Resonator (IHR) technology. The entire oven control system along with the SC resonator are housed inside of the TO-8 vacuum enclosure to reduce OCXO size, power consumption and warm-up time. Applications for this product include PLL reference for telecom systems, Portable equipment, Guidance Systems, and Instrumentation/Test and Measurement.

### Ordering Information – Table 1

Model	Stability	Temp Range	Supply Voltage	Aging	Output	Frequency
VFOV405	— U	B	E	B	H	— 50MHz

Code	Specification
R	$1 \times 10^{-7}$
T	$5 \times 10^{-8}$
30	$3 \times 10^{-8}$
U	$2 \times 10^{-8}$
V	$1 \times 10^{-8}$
W	$5 \times 10^{-9}$

Code	Specification
D	$5V \pm 5\%$
E	$3.3V \pm 5\%$

Code	Spec.
H	HCMOS

Code	Specification
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	Per day	Per year	Frequency
B	2ppb	0.5ppm	≤100 MHz
C	1ppb	0.3ppm	≤40 MHz
D	0.5ppb	0.2ppm	≤20 MHz

### Available Frequency Stabilities over Operating Temperature Ranges

Code	Temperature Range	Stability					
		R	T	30	U	V	W
		$1 \times 10^{-7}$	$5 \times 10^{-8}$	$3 \times 10^{-8}$	$2 \times 10^{-8}$	$1 \times 10^{-8}$	$5 \times 10^{-9}$
A	0 to 50°C	*	*	*	*	*	D
B	0 to 70°C	*	*	*	*	D	C
C	-10 to 60°C	*	*	*	*	D	C
D	-20 to 70°C	*	*	*	*	C	B
E	-30 to 70°C	*	*	*	C	C	A
G	-40 to 85°C	*	*	*	D	B	A

### Stability Legend

- \* = Available for all frequencies
- A = ≤10 MHz
- B = ≤30 MHz
- C = ≤50 MHz
- D = ≤100 MHz



## Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
<b>Operating Conditions</b>					
Operating Temperature Range	See "Ordering Information" table	-40	-	+85	°C
Supply Voltage	V <sub>CC</sub>	3.14 4.75	3.3 5.0	3.46 5.25	Vdc
Power Consumption	During warm up	-	-	1.2	W
	Steady state @ 25°C	-	0.17	0.22	

## Frequency Stability

Frequency Range	F <sub>NOM</sub>	5		100	MHz
Temperature Stability (See options – Table 1)	See "Ordering Information" options table above.	-	±10	-	ppb
Voltage Stability	V <sub>CC</sub> ±5%	-	±2	-	ppb
Aging (After 30 days)	Per day	-	-	±0.5	ppb/day
	Per year	-	-	±0.05	ppm/year
Allan Variance	1s	-	0.02	-	ppb
Retrace	After 30 minutes	-	-	±20	ppb
G-Sensitivity (Note 1)	Worst axis	-	1*	-	ppb/g
Warmup-Up Time	T <sub>A</sub> =25°C; to within 0.1 ppm accuracy	-	60	90	seconds

## Output Parameters

	Load		10kOhms / 15 pF			
HCMOS/TTL	V <sub>H</sub>	V <sub>CC</sub> = 5.0V	3.8	-	-	V
		V <sub>CC</sub> = 3.3V	2.4	-	-	
	V <sub>L</sub>		-	-	0.4	V
Rise / Fall Times	@ 10MHz		-	-	10	ns
Duty Cycle			45		55	%
Phase Noise (Note 2)	Offset		10 MHz (typical)		100 MHz (typical)	dBc/Hz
	1 Hz		-90		-	
	10 Hz		-120		-90	
	100 Hz		-140		-120	
	1 kHz		-160		-140	
	10 kHz		-165		-160	
100 kHz		-165		-163		

Note 1. Lower G-Sensitivity performance is available. Consult factory.

Note 2. For additional phase noise options, consult factory.

## Electrical Specifications continued

### Electronic Frequency Control (option)

Control Voltage	$V_C$	$V_{CC} = 5.0V$ $V_{CC} = 3.3V$	0 0	- -	4.3 2.8	V
Pull Range	From $F_{NOM}$		$\pm 0.5$	$\pm 1$	-	ppm
Deviation Slope	Monotonic, positive	$V_{CC} = 5.0V$ $V_{CC} = 3.3V$	- -	0.6 0.45	- -	ppm/V
Reference output	$V_{REF}$	$V_{CC} = 5.0V$ $V_{CC} = 3.3V$	4.1 2.7	4.2 2.8	4.3 2.9	V

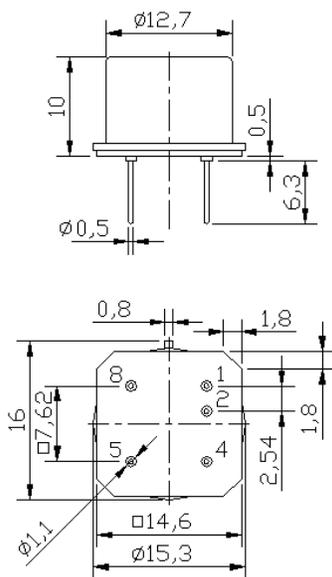
### Absolute Maximum Ratings

Supply Breakdown Voltage	$V_{CC}$	-0.5	-	$V_{CC} + 20\%$	V
Control Voltage	$V_C$	-1	-	9	V

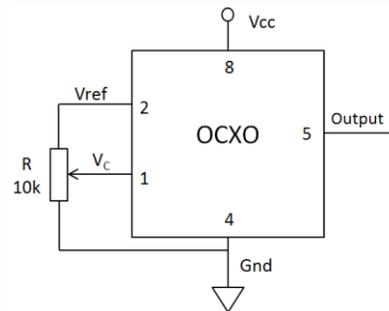
## Mechanical and Environmental

Storage Temperature	-60°C to +90°C
Humidity	Non-condensing, 95%
Mechanical Shock	Per MIL-STD-202, 30g, half sine, 11 ms
Vibration	Per MIL-STD-202, 10g, swept sine to 2000Hz
Soldering Conditions	260°C for 10s. Hand solder only – not reflow compatible
Marking	Epoxy ink or laser engraved

## Mechanical Specifications



All tolerances – 0.1 mm (0.004")



Pin	Connection
1	$V_C$
2	$V_{REF}$
4	Ground
5	Output
8	$V_{CC}$

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.