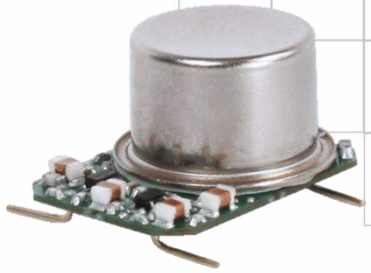
VFOV406

OCXO – Ultra Low Power

Features

- 5MHz to 300MHz frequency range
- Fast warm-up
- Ultra low power consumption
- Sinewave or HCMOS output
- Vibration resistant construction



Dimensions: 21.85 x 15.1 x 10 mm

Description

The VFOV406 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, Instrumentation/Test and Measurement, and Microwave communications.

Ordering Information

Model	Stability	Temp Range	Supply Voltage	Aging	Output		Frequency
VFOV406	— W	D	E	C	H	—	10.000MHz

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

Code	Supply
D	5V ± 5%
E	3.3V ± 5%

Code	Output
H	HCMOS
S	Sinewave

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	Per day	Per year	
A	5ppb	0.5ppm	≤300MHz
B	2ppb	0.2ppm	
I	1.5ppb	0.15ppm	≤150MHz
C	1ppb	0.1ppm	
D	0.5ppb	0.05ppm	≤100MHz
G	0.2ppb	0.02ppm	≤50MHz

Available Frequency Stabilities over Operating Temperature Ranges

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

Stability Legend

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

Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	See "Ordering Information" table	-40	-	+85	°C
Supply Voltage	V_{CC}	3.135 4.75	3.3 5.0	3.465 5.25	Vdc
Power Consumption	Steady state @ 25°C	-	0.15	0.20	W
	During warm up	-	0.7	1.2	
Frequency Stability					
Frequency Range	F_{NOM}	5		300	MHz
Temperature Stability	-30 to +70°C; standard option shown. See "Ordering Information" table.	-	±50	-	ppb
Voltage Stability	V_{CC} ±5%	-	±2	-	ppb
Aging (After 30 days)	Per day	-	-	±0.5	ppb
	Per year	-	-	±0.05	ppm
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_A=25°C; to within 0.1 ppm accuracy of freq. @ 30 min	-	60	90	seconds
Output Parameters					
HCMOS/TTL (order code H)	Load		10kOhms / 15 pF		
	V_H V_{CC} = 5.0V	3.8	-	-	V
	V_H V_{CC} = 3.3V	2.4	-	-	
	V_L	-	-	0.4	V
Rise / Fall Times	@ 10MHz	-	-	10	ns
Duty Cycle		45		55	%
Sinewave Output (order code S)	V_{CC} = 5.0V	+7	+8	-	dBm
	V_{CC} = 3.3V	+3	+5	-	
	R_L	-	50	-	Ω
Harmonics		-	-	-25	dBc
Sub-harmonics (Note 2)	Frequency >30MHz	-	-	-40	dBc

Phase Noise (Note 3)	Offset	10 MHz (typical)	100 MHz (typical)	
	1 Hz	-90	-	dBc/Hz
	10 Hz	-120	-90	
	100 Hz	-140	-120	
	1 kHz	-160	-140	
	10 kHz	-165	-150	
	100 kHz	-165	-150	

Note 1. Lower G-sensitivity performance is available. Consult factory.
Note 2. See Model VFOV504 for alternate product at high frequencies and no sub-harmonics
Note 3. 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	- -	4.2 2.8	V
Pull Range	From F_{NOM}		±0.5	±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	4.05 2.7	4.2 2.8	4.35 2.9	V

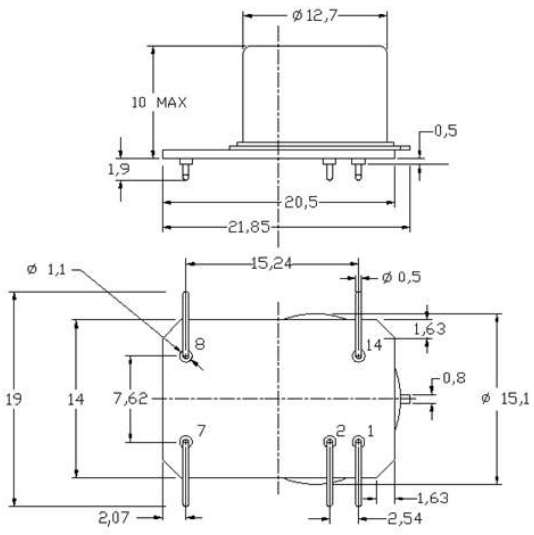
Absolute Maximum Ratings

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

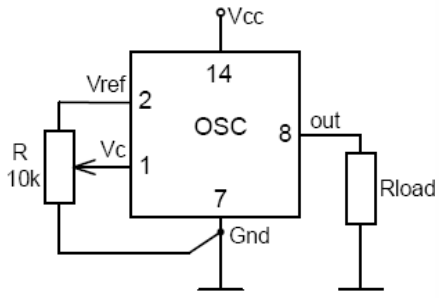
Mechanical and Environmental

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}
7	Ground
8	Output
14	V_{CC}