

VFOV404

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: 21.6 x 15.3 x 10 mm
Weight: 3 grams

Description

The VFOV404 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
VFOV404	— 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 \pm 5%
E	3.3V \pm 5%

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
B	2ppb	0.2ppm
I	1.5ppb	0.15ppm
C	1ppb	0.1ppm
D	0.5ppb	0.05ppm
G	0.2ppb	0.02ppm

Code	Output
H	HCMOS
S	Sinewave

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

Available Frequency Stabilities over Operating Temperature Ranges

Code	Temperature Range	Stability					
		R	T	30	U	V	W
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	0.22	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	$V_{CC} \pm 5\%$	-	±2	-	ppb	
Aging (After 30 days)	Per day	-	-	±0.5	ppb	
	Per year	-	-	±0.05	ppm	
Allan Deviation	1s	-	0.02	-	ppb	
Retrace	After 30 minutes	-	-	±20	ppb	
G-Sensitivity (Note 1)	Worst axis	-	1*	-	ppb/g	
Warmup-Up Time	$T_A=25^\circ\text{C}$; 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	$V_{CC} = 5.0\text{V}$	3.8	-	-	V
		$V_{CC} = 3.3\text{V}$	2.4	-	-	
V_L		-	-	0.4	V	
Rise / Fall Times	@ 10MHz	-	-	10	ns	
Duty Cycle		45		55	%	
Sinewave Output (order code S)	$V_{CC} = 5.0\text{V}$	+7	-	-	dBm	
	$V_{CC} = 3.3\text{V}$	+4.5	-	-		
Harmonics	R_L	-	50	-	Ω	
Sub-harmonics (Note 2)	Frequency >30MHz	-	-	-40	dBc	
Phase Noise (Note 3)	Offset	10 MHz (typical)		100 MHz (typical)		
	1 Hz	-90		-		
	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

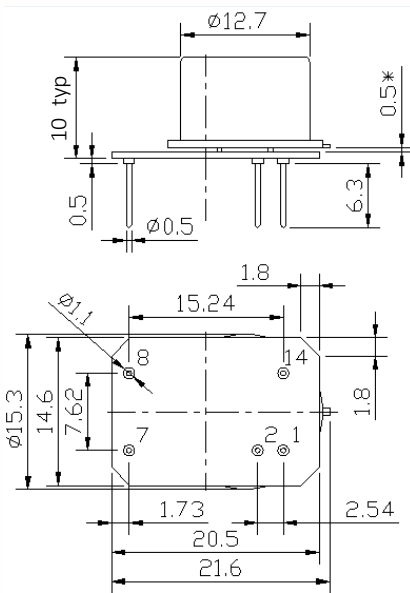
Absolute Maximum Ratings

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

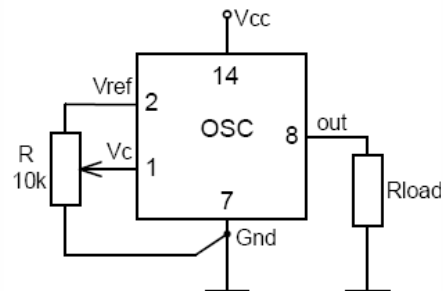
Mechanical and Environmental

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 – 0.254mm (0.01")



Pin	Connection
1	V_C
2	V_{REF}
7	Ground
8	Output
14	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.