

VFOV414

Low Power OCXO

Features

- 24MHz to 300MHz frequency range
- Fast warm-up
- Very low power consumption
- Sinewave or HCMOS output
- Vibration resistant construction



Dimensions: 21.6 x 15.3 x 9.5 mm

Description

The VFOV414 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.

Table 1 - Ordering Information

Model	Stability	Temp Range	Supply Voltage	Aging	Output	Package Type	Mech Shock	Frequency
VFOV414	18	G	E	D	H	S		xxxMxxx

Code	Stability
17	±1x10 ⁻⁷
58	±5x10 ⁻⁸
38	±3x10 ⁻⁸
28	±2x10 ⁻⁸
18	±1x10 ⁻⁸
59	±5x10 ⁻⁹

Code	Supply
D	5V ± 5%
E	3.3V ± 5%

Code	Output
H	HCMOS
S	Sinewave

Code	Pkg
T	Thru hole
S	SMD

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	Frequency
A	5ppb	0.5ppm	≤300MHz
F	3ppb	0.3ppm	≤300MHz
B	2ppb	0.2ppm	≤300MHz
I	1.5ppb	0.15ppm	≤250MHz
C	1ppb	0.1ppm	≤200MHz
D	0.5ppb	0.05ppm	≤100MHz
L	0.3ppb	0.03ppm	≤30MHz
G	0.2ppb	0.02ppm	≤30MHz

Code	Shock Level
blank	30G (std)
5	500G

Table 2 - Available Frequency Stabilities vs. Operating Temperature

Code	Temperature Range	Stability					
		17	58	38	28	18	59
		±1x10 ⁻⁷	±5x10 ⁻⁸	±3x10 ⁻⁸	±2x10 ⁻⁸	±1x10 ⁻⁸	±5x10 ⁻⁹
A	0 to 50°C	*	*	*	D	C	B
B	0 to 70°C	*	*	*	D	C	A
C	-10 to 60°C	*	*	*	D	C	A
D	-20 to 70°C	*	*	*	C	C	A
E	-30 to 70°C	*	*	*	C	C	A
G	-40 to 85°C	*	*	D	C	B	

Stability Legend

- * = Available for all frequencies
- A = ≤30 MHz
- B = ≤50 MHz
- C = ≤100 MHz
- D = ≤250 MHz

Deviations of parameters from those indicated are available to meet specific customer requirements. Consult factory.

Part Number Example: **VFOV414-18GEDHS-10M000**

Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	See Table 1	-40	-	+85	°C
Supply Voltage	V _{CC}	3.135 4.75	3.3 5.0	3.465 5.25	Vdc
Power Consumption	During warm up Steady state @ 25°C	- -	- 150	1200 -	mW
Frequency Stability					
Frequency Range	F _{NOM}	24	-	300	MHz
Temperature Stability	See Table 2 for options	-	±5	-	ppb
Voltage Stability	V _{CC} ±5%	-	±2	-	ppb
Aging (After 30 days)	See Table 1 for options	Per day Per year	- -	±0.5 ±0.05	ppb ppm
Allan Deviation	1s	-	0.02	-	ppb
Retrace	After 30 minutes	-	-	±20	ppb
G-Sensitivity (Note 1)	Worst axis (0 ~ 1kHz)	-	1*	-	ppb/g
Warmup-Up Time	T _A =25°C; to within 0.1 ppm accuracy of freq. @ 15 min	-	60	-	seconds
Output Parameters					
HCMOS/TTL (order code H)	Load	≤50 MHz	10kOhms / 15 pF		
		≤80 MHz	10kOhms / 10 pF		
		≤300 MHz	10kOhms / 5 pF		
V _H	V _{CC} = 5.0V V _{CC} = 3.3V	3.8 2.4	- -	- -	V
V _L		-	-	0.4	V
Rise / Fall Times	@ 10MHz/100MHz	-	-	10/3	ns
Duty Cycle		45		55	%
Sinewave Output (order code S)	V _{CC} = 5.0V V _{CC} = 3.3V	+7 +4	- -	- -	dBm
	R _L	-	50	-	Ω
Harmonics		-	-	-25	dBc
Sub-harmonics (Note 2)		-	-	-40	dBc
Phase Noise (Note 3)	Offset		10 MHz (typ)	100 MHz (typ)	
	1 Hz		-90	-	
	10 Hz		-120	-90	
	100 Hz		-145	-115	dBc/Hz
	1 kHz		-155	-140	
	10 kHz		-165	-150	
100 kHz		-165	-150		

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

Note 2. See Model VFOV514 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	$V_{CC} = 5.0V$	0	-	4.2	V
		$V_{CC} = 3.3V$	0	-	2.8	
Tuning Range	Sufficient for 10 yrs aging; Slope positive, monotonic		± 0.3	± 1	-	ppm
Reference output	V_{REF}	$V_{CC} = 5.0V$	4.0	4.2	4.3	V
		$V_{CC} = 3.3V$	2.7	3.0	3.1	

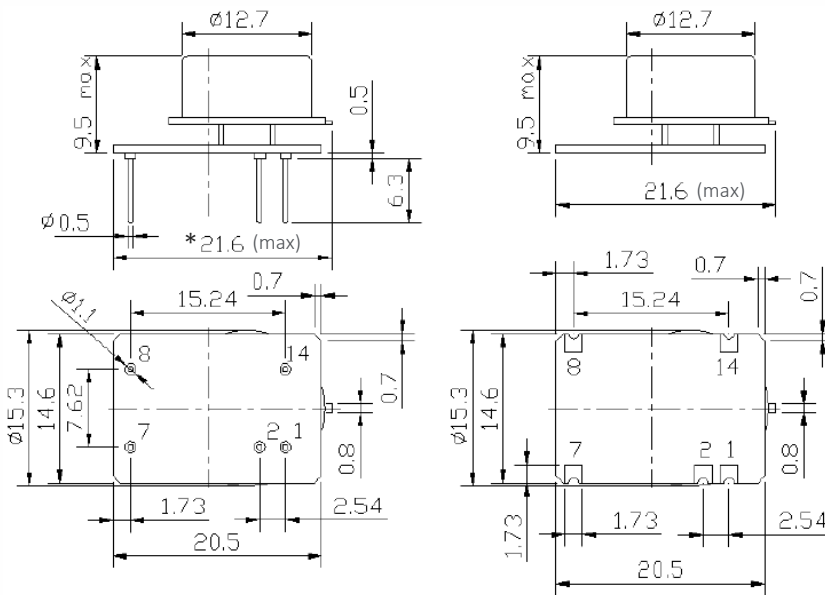
Absolute Maximum Ratings

Supply Breakdown Voltage	V_{CC}	-0.5	-	$V_{CC} + 20\%$	V
Control Voltage	V_C	-1	-	6	V

Mechanical and Environmental

Storage Temperature	-60°C to +85°C
Air flow	0.5 m/s max.
Humidity	Non-condensing, 95%
Mechanical Shock	Per MIL-STD-202, 30g, half sine, 11 ms (500G, 1ms option "5")
Vibration	Per MIL-STD-202, 10g, swept sine to 2000Hz
Altitude	Meets all electrical specifications to 70,000 ft elevation
Soldering Conditions	260°C for 10s. Hand solder only – not reflow compatible **
Marking	Epoxy ink or laser engraved

Mechanical Specifications

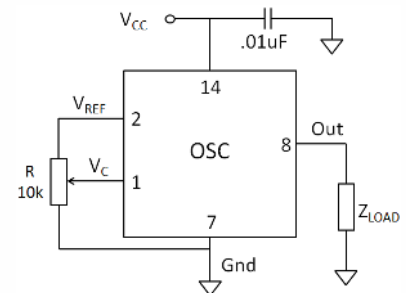


All tolerances – 0.254mm (0.01")

**Not reflow compatible

* Note - The tab on the metal enclosure may be rotated 180° for certain frequency and performance combinations.

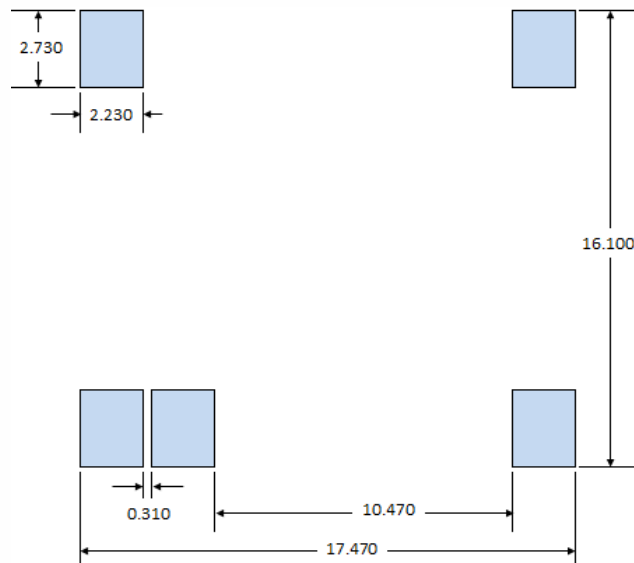
Connection Diagram



Pin Assignments

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

Recommended SMD Solder Pad Geometry



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.