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	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	5V ± 5%
E	3.3V ± 5%

Code	Output
H	HCMOS
S	Sinewave

Code	Pkg
T	Thru hole
S	SMD

Code	Per day	Per year	
A	5ppb	0.5ppm	≤300MHz
F	3ppb	0.3ppm	
B	2ppb	0.2ppm	
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	

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

Table 2 - Available Frequency Stabilities vs. Operating Temperature

Code	Temperature Range	Stability 17 ±1x10^{-7}	58 ±5x10^{-8}	38 ±3x10^{-8}	28 ±2x10^{-8}	18 ±1x10^{-8}	59 ±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		-	-	1200	mW
	Steady state @ 25°C		-	150	-	
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	-	-	±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 (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	3.8	-	-	V
		V_{CC} = 3.3V	2.4	-	-	
	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		+7	-	-	dBm
	V_{CC} = 3.3V		+4	-	-	
	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	-	dBc/Hz
	10 Hz	-120	-90	
	100 Hz	-145	-115	
	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 V_{CC} = 3.3V	0 0	- -	4.2 2.8	V
Tuning Range	Sufficient for 10 yrs aging; Slope positive, monotonic		±0.3	±1	-	ppm
Reference output	V_{REF}	V_{CC} = 5.0V V_{CC} = 3.3V	4.0 2.7	4.2 3.0	4.3 3.1	V

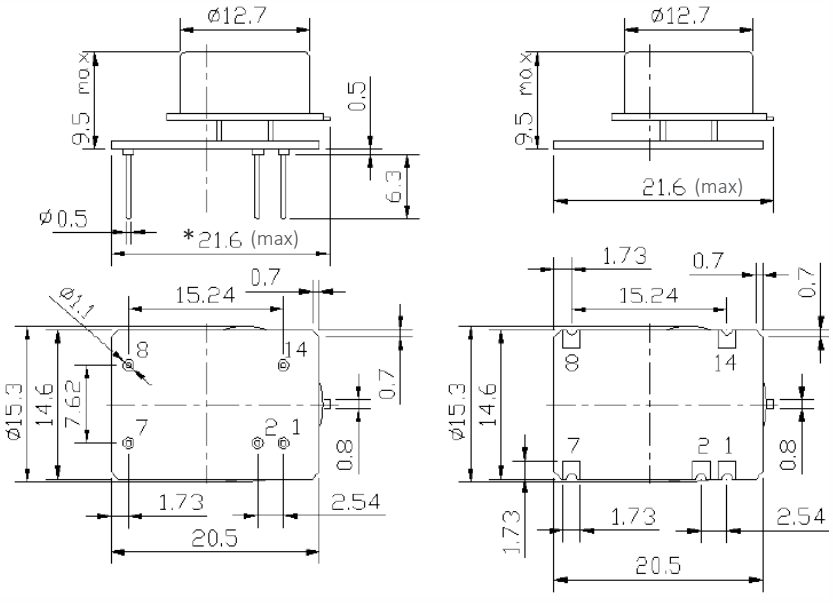
Absolute Maximum Ratings

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

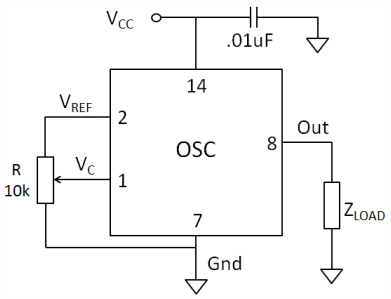
Mechanical Specifications



All tolerances – 0.254mm (0.01")

**Not reflow compatible

Connection Diagram



Pin Assignments

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

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

Recommended SMD Solder Pad Geometry