VFOV406

OCXO - Ultra Miniature, Ultra Low Power HCMOS / SINE WAVE

Features

- 5MHz to 250MHz frequency range
- Industry's smallest OCXO
- Fast warm-up
- Eco-friendly low power consumption
- Sine wave or HCMOS output
- Vibration resistant construction

RoHS Status

RoHS 6/6

Applications

- PLL Reference for Telecommunication Systems
- Portable (Battery Operated) devices
- Guidance Systems
- Instrumentation / Test and Measurement

Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Frequency Range	F		5		250	MHz	
Frequency Stability	ΔF/F	Vs. Operating temperature E: -30°C to +70°C		± 50		ppb	STD option shown. See "How to Order" chart
		Vs. Supply voltage		±2		ppb	Ref. V_{CC} typ.
		Vs. Aging / Day Vs. Aging / Year			±0.5 ±0.05	ppb ppm	After 30 days. Enhanced option shown. See "How to Order" chart
Operating Temperature Range	T		-40		+85	°C	STD option shown. See "How to Order" chart
Allan Variance		1s		$20E^{-12}$			
SSB Phase Noise		1Hz 10Hz 100Hz 1kHz 10kHz		-90 -125 -145 -155 -165		dBc/ Hz	For 10MHz oscillator (For 100MHz see noise plot) Note 1
Retrace		after 30 min.			±20	ppb	
G-Sensitivity		worst direction			±1	ppb/g	
Supply Voltage	V_{CC}		4.75 3.14	5.0 3.3	5.25 3.46	V	
Power Consumption	P	steady state, 25°C start-up		0.15 0.7	0.20 1.2	W	
Warm Up Time	τ	to 0.1ppm accuracy from +25°C		60	90	sec	

Note 1: See CTS OCXO Model VFOV504 for alternate product with enhanced phase noise at high frequencies and no sub-harmonics.

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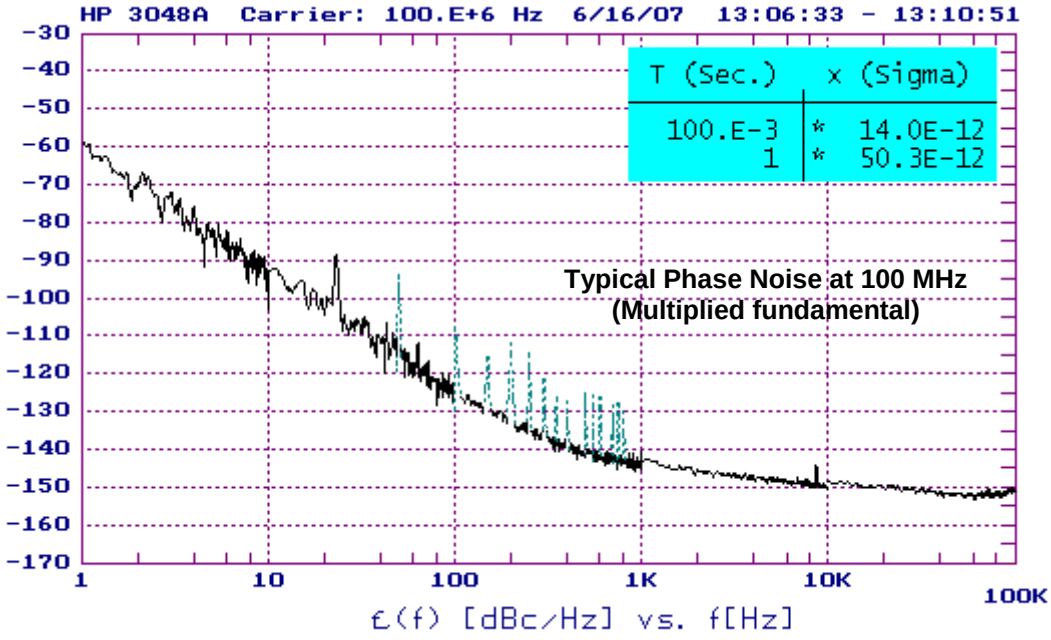
Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
HCMOS / TTL Output Levels		HCMOS/TTL		10kOhms // 15pF			Order Code H
	V_H	V_{CC}= 5.0V V_{CC}=3.3V	3.8 2.4			V	
	V_L				0.4	V	
Rise / Fall time	T_R/T_F	At 10MHz			10	ns	
Duty Cycle			45		55	%	
Sine-Wave Output		V_{CC}= 5.0V	+6	+8		dBm	Order Code S
		V_{CC}=3.3V	+3	+5			
	R_L			50		Ω	
Harmonics					-25	dBc	
Sub-Harmonics		Frequency >30MHz			-40	dBc	Multiplied fundamental Note 1
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		0.6 0.45		ppm/V	V_{CC} = 3.3V V_{CC} = 5V
Reference Output	V_{REF}	V_{CC}= 5.0V V_{CC}=3.3V	4.05 2.70	4.20 2.80	4.35 2.90	V	



Typical Phase Noise at 100 MHz (Multiplied fundamental)

Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Break Down Voltage	V_{CC}		-0.5		V_{CC}+20%	V	
Control Voltage	V_C		-1		9	V	

Environmental and Mechanical Conditions

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

How to Order

Model	Stability	Temperature Range	Supply Voltage	Aging	Output	Frequency, MHz
VFOV406	W	D	E	C	H	10

Package Dimensions (mm)	
VFOV406	21.85 x 19 SMD

Code	Specification
R	$1x10^{-7}$
T	$5x10^{-8}$
30	$3x10^{-8}$
U	$2x10^{-8}$
V	$1x10^{-8}$
W	$5x10^{-9}$

Code	Specification
A	0°C to 50°C
B	0°C to 70°C
C	-10°C to 60°C
D	-20°C to 70°C
E	-30°C to 70°C
G	-40°C to 85°C

Code	Per day	Per year
B	2ppb	0.2ppm
C	1ppb	0.1ppm
D	0.5ppb	0.05ppm
I	1.5ppb	0.15ppm

Code	Specification
D	5V ± 5%
E	3.3V± 5%

Code	Specification
H	HCMOS
S	Sine wave

Available Frequency Stabilities over Operating Temperature Ranges

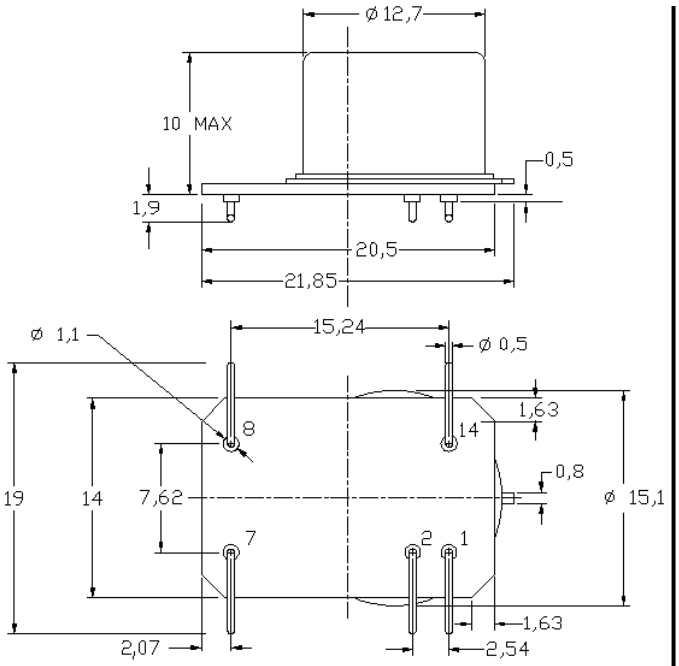
Order Code	Temperature Range	Stability					
		R	T	30	U	V	W
		$1x10^{-7}$	$5x10^{-8}$	$3x10^{-8}$	$2x10^{-8}$	$1x10^{-8}$	$5x10^{-9}$
A	0°C to 50°C	*	*	*	*	*	C
B	0°C to 70°C	*	*	*	*	*	B
C	-10°C to 60°C	*	*	*	*	*	B
D	-20°C to 70°C	*	*	*	*	C	A
E	-30°C to 70°C	*	*	*	*	B	A
G	-40°C to 85°C	*	*	*	C	B	A

Stability Legend

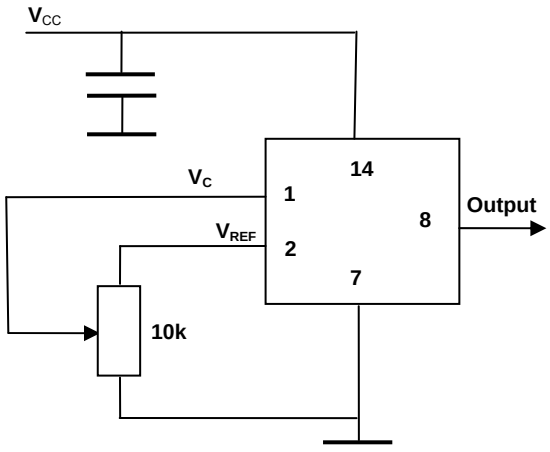
* = Available for all frequencies
A = Available only for frequencies ≤10 MHz
B = Available only for frequencies ≤50 MHz
C = Available only for frequencies ≤100 MHz

Package

VFOV406
HCMOS or Sine wave



All tolerances 0.1mm (0.004")



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