

VFOV406

OCXO - Ultra Miniature, Ultra Low Power

HCMOS / SINE WAVE



Features

- 5MHz to 250MHz frequency range
- Industry's smallest OCXO
- Fast warm-up (30s typical)
- Eco-friendly < 120mW 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	$\Delta F/F$	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)
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		0.12 0.7	0.15 1.2	W	
Warm Up Time	τ	to 0.1ppm accuracy from +25°C		30	60	sec	Note 1

*Note 1: Warm up time is affected by input voltage, initial accuracy, frequency, aging and other conditions.

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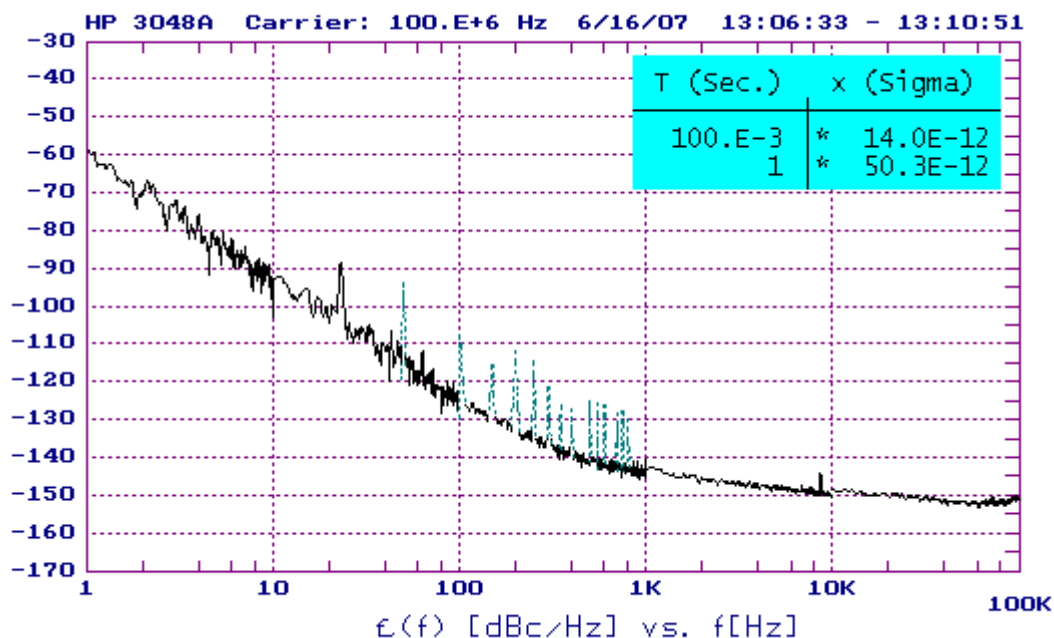
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Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
HCMOS / TTL Output Levels		HCMOS/TTL	10kOhms // 15pF				Order Code H
	V_H	$V_{CC}= 5.0V$ $V_{CC}=3.3V$	3.9 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
Control Voltage	V_C	$V_{CC}= 5.0V$ $V_{CC}=3.3V$	0 0		4.3 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	



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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	1×10^{-7}
T	5×10^{-8}
U	2×10^{-8}
V	1×10^{-8}
W	5×10^{-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	Specification
D	5V $\pm$ 5%
E	3.3V $\pm$ 5%

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

Code	Specification
H	HCMOS
S	Sine wave

Available Frequency Stabilities over Operating Temperature Ranges

Order Code	Temperature Range	Stability				
		1×10^{-7}	5×10^{-8}	2×10^{-8}	1×10^{-8}	5×10^{-9}
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	*	◇	◇		

◇ Only available below 30MHz

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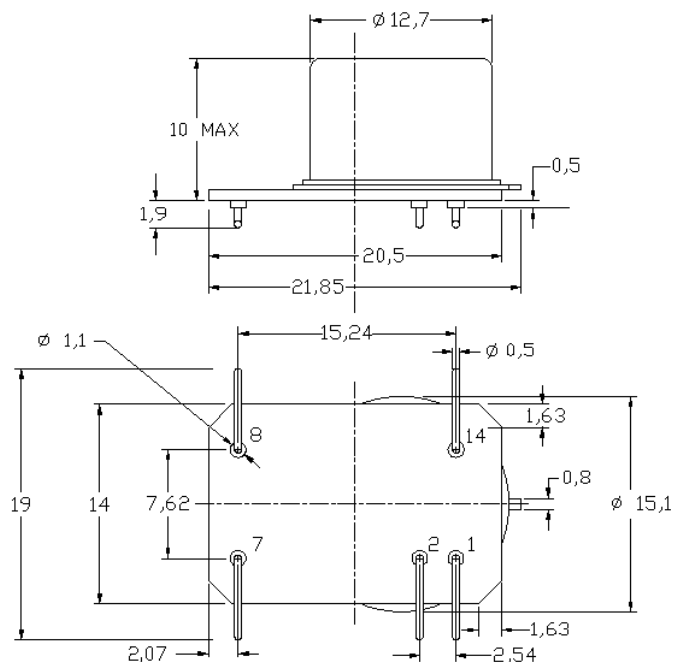
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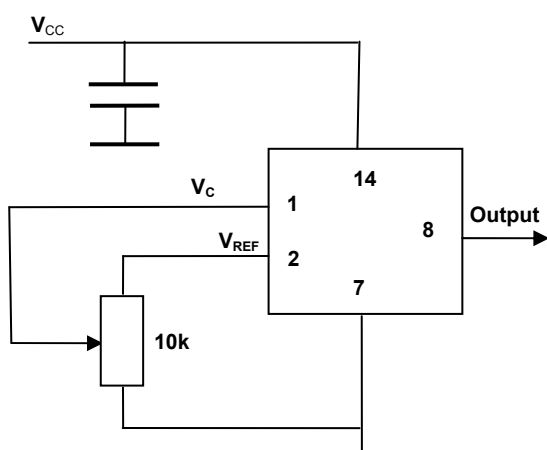
Package



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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}