VFOV103

OCXO – Ultra Low Noise, Ultra Stable

Features

- 5MHz to 150MHz frequency range
- Ultra Low Phase Noise: (fundamental crystal)
  - -155 dBc/Hz @ 1kHz offset
  - -168 dBc/Hz floor
- Sinewave or HCMOS output

Dimensions: 25.4 x 25.4 x 13.25 mm

Applications

- PLL reference for Telecommunication Systems
- Microwave Communications / RADAR signal source
- GPS holdover
- Instrumentation / Test and Measurement

Table 1 - Ordering Information

Model		Stability	Temp Range	Supply Voltage	Aging	Output		Frequency
VFOV103	-	U	B	E	B	H	-	10.000MHz

Code	Stability
R	$1x10^{-7}$
T	$5x10^{-8}$
U	$2x10^{-8}$
V	$1x10^{-8}$
W	$5x10^{-9}$
29	$2x10^{-9}$
Y	$1x10^{-9}$
Z	$5x10^{-10}$

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%
B	12V ±5%

Code	Output
H	HCMOS
S	Sinewave

Code	Per day	Per year	
A	5 ppb	0.5 ppm	≤150MHz
F	3 ppb	0.3 ppm	≤120MHz
B	2 ppb	0.2 ppm	
C	1 ppb	0.1 ppm	≤40MHz
D	0.5 ppb	60 ppb	≤20MHz
E	0.4 ppb	50 ppb	
G	0.2 ppb	20 ppb	≤10MHz
H	0.1 ppb	15 ppb	

Available Frequency Stabilities over Operating Temperature Ranges

Code	Temperature Range	Stability (10MHz/100MHz)			
		W	29	Y	Z
		$\pm5x10^{-9}$	$\pm2x10^{-9}$	$\pm1x10^{-9}$	$\pm5x10^{-10}$
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	*/*	*/	*/	

Part Number Example:

VFOV103-UBEBH-50.000MHz

Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	See "Ordering Information" table	-30	-	+70	°C
Supply Voltage	V_{CC}	3.15 4.75 11.4	3.3 5.0 12.0	3.45 5.25 12.6	Vdc
Power Consumption	During warm up Steady state @ 25°C Steady state @ -30°C	- - -	3.2 1.0 2.0	3.5 1.2 2.2	W
Load	HCMOS (10 MHz) HCMOS (100 MHz) Sine wave		10Kohm / 15pF 10Kohm / 5pF 50		Ω
Frequency Stability					
Frequency	F_{NOM}	5		150	MHz
Freq. vs Temperature (See Table 1 options)	Ref to 25°C, air flow 0.5 m/s max	-	-	±10	ppb
Freq. vs Supply Voltage	V_{CC} ±5%	-	±1	-	ppb
Freq. vs Time (Aging) (See Table 1 options)	After 30 days of operation	- -	- -	±0.5 ±60	ppb/day ppb/year
G-Sensitivity	Worst axis	-	1	-	ppb/g
Allan Deviation	1 sec	-	0.01	-	ppb
Retrace	After 30 minutes	-	-	±20	ppb
Warmup-Up Time	T_A=25°C; to within 0.1 ppm accuracy of freq. @ 30 min	-	2	3	minutes
Output Parameters					
HCMOS/TTL (order code H)	V_{CC} = 5.0 or 12V V_{CC} = 3.3V	V_{OL} V_{OL}	- -	- -	0.4 0.4	V
		V_{OH} V_{OH}	3.8 2.4	- -	- -	V
Rise / Fall Times	10 MHz 100 MHz		-	-	10 3	ns
Duty Cycle	@50% of output signal		45	50	55	%
Sinewave Output (order code S)	V_{CC} = 5.0 or 12V V_{CC} = 3.3V		+6 +4	- -	+11 +9	dBm
Harmonics			-	-	-25	dBc
Sub-harmonics				None		

Output Parameters - continued

Parameter	Conditions & Remarks	Min	Typical	Max
Phase Noise For additional phase noise performance options, consult factory.	Offset 1Hz 10Hz 100Hz 1KHz 10KHz 100KHz	10MHz (typical) -90 -120 -140 -155 -165 -168	100MHz (typical) - -90 -120 -140 -160 -165	dBc/Hz

Electronic Frequency Control

Control Voltage	V_C	V_{CC} = 5.0 or 12V V_{CC} = 3.3V	0 0	- -	4.3 2.9	V
Frequency Tuning Range	From F_{NOM} sufficient range for 10 years aging.		±0.3	±1	-	ppm
Deviation Slope	Monotonic, positive	V_{CC} = 5.0 or 12V V_{CC} = 3.3V	0.14 0.2	- -	- -	ppm/V
Reference output	V_{REF}	V_{CC} = 5.0 or 12V V_{CC} = 3.3V	4.0 2.7	4.2 2.8	4.3 2.9	V

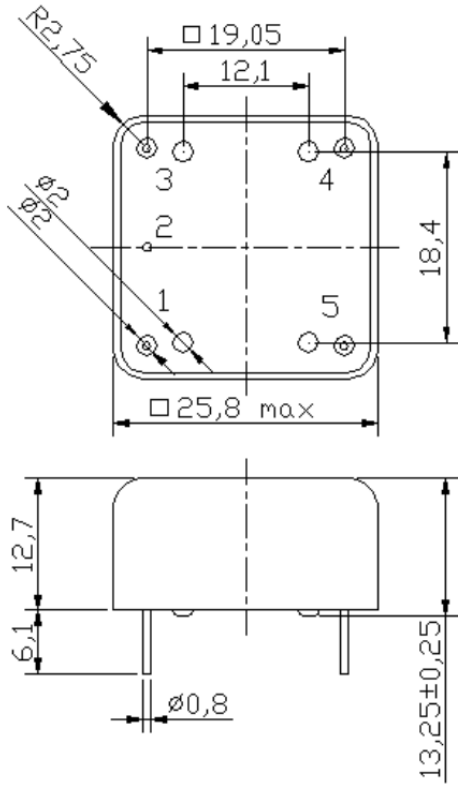
Absolute Maximum Ratings

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

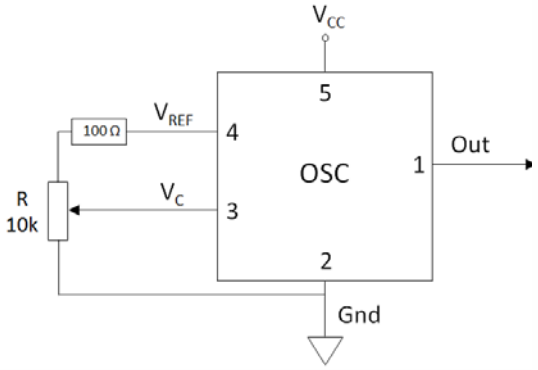
Mechanical and Environmental

Storage Temperature	-60°C to +90°C
Humidity	Hermetically sealed
Mechanical Shock	Per MIL-STD-202G, meth 213B, 30g, 11 ms, ½ sine pulse
Vibration	Per MIL-STD-202G, meth 204D, 1.5mm DA 10 to 55Hz, 10g pk sine to 2000Hz
Soldering Conditions	260°C for 10s. Hand solder only – not reflow compatible

Mechanical Specifications



Pin	Connection
1	Output
2	Ground
3	V_C
4	V_{REF}
5	V_{CC}



All dimensions: mm