

# VFOV100

## OCXO – Ultra Low Noise, Ultra Stable

### Features

- 5 to 150 MHz Frequency Range
- Ultra low phase noise available
  - -155 dBc/Hz @ 1kHz
  - -168 dBc/Hz floor
- Sine wave or HCMOS output
- Fundamental crystal – no multiplication



Dimensions: 25.4 x 22.1 x 11 mm

### Applications

- PLL reference for telecommunications systems
- Microwave Communications / RADAR signal source
- GPS holdover
- Instrumentation / test and measurement

### Ordering Information – Table 1

Model	Stability	Temperature Range	Supply Voltage	Aging	Output	Frequency, MHz
VFOV100	— W*	G	E	D	S	10.000MHz

Code	Stability
R	1x10 <sup>-7</sup>
T	5x10 <sup>-8</sup>
U	2x10 <sup>-8</sup>
V	1x10 <sup>-8</sup>
W	5x10 <sup>-9</sup>
29	2x10 <sup>-9</sup>
Y	1x10 <sup>-9</sup>
Z	5x10 <sup>-10</sup>

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	5.0V ±5%
E	3.3V ±5%
B	12V ±5%

Code	Output
H	HCMOS
S	Sine wave

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	≤120MHz
C	1 ppb	0.1 ppm	≤40MHz
D	0.5 ppb	60 ppb	≤20MHz
G	0.2 ppb	20 ppb	≤10MHz
H	0.1 ppb	15 ppb	≤10MHz

\* All temperature stabilities are not available for all frequencies. Consult factory for specific options.

**Part Number Example:**  
**VFOV100-WGEDS-10.000MHz**



### Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit	
<b>Operating Conditions</b>						
Operating Temperature Range	T <sub>OP</sub> (See table 1 options)	-40	-	85	°C	
Supply Voltage	V <sub>CC</sub>	11.4	12.0	12.6	Vdc	
		4.75	5.0	5.25		
		3.14	3.3	3.46		
Power Consumption	Steady State; T <sub>A</sub> = 25°C	-	1.0	1.2	W	
	Steady State; T <sub>A</sub> = -30°C	-	2.0	2.2		
	Start-up	-	3.2	3.5		
Load	HCMOS (10 MHz)	10 kΩ // 15pF				
	HCMOS (100 MHz)	10 kΩ // 5pF				
	Sine wave	50			Ω	
<b>Frequency Stability</b>						
Frequency	F <sub>NOM</sub>	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 <sub>CC</sub> ±5%	-	±3	±5	ppb	
Freq. vs Time (Aging ) (See table 1 options)	After 30 days of operation	-	±3	-	ppb/day	
		-	±0.3	-	ppm/year	
G-Sensitivity	Worst direction	-	1	-	ppb/g	
Allan Deviation	1 sec	-	0.01	-	ppb	
Retrace	After 30 minutes	-	-	±20	ppb	
Warm-up time	@ 25°C, to within ±0.1 ppm referenced to the freq after 15 minutes on	-	2	3	min	
<b>Output Parameters</b>						
HCMOS Output Levels (Option H)	V <sub>CC</sub> = 5.0 or 12V V <sub>CC</sub> = 3.3V	V <sub>OL</sub>	-	-	0.4	Vdc
		V <sub>OH</sub>	3.8	-	0.4	
Rise/Fall Times	10 MHz	-	-	10	ns	
	100 MHz	-	-	3		
Duty Cycle	@50% of output signal	45	50	55	%	
Sine Wave Output Levels (Option S)	V <sub>CC</sub> = 5.0 or 12V	+6	-	+11	dBm	
	V <sub>CC</sub> = 3.3V	+4	-	+9		
Harmonics				-25	dBc	
Sub-harmonics			none			
Phase Noise	Offset		10 MHz (typical)	100 MHz (typical)	dBc/Hz	
	1 Hz		-90	-		
	10 Hz		-120	-90		
	100 Hz		-140	-120		
	1 kHz		-155	-150		
	10 kHz		-165	-160		
For additional phase noise performance options, consult factory.	100 kHz		-168	-165		

## Electrical Specifications (Continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
<b>Electronic Frequency Control - EFC (Optional)</b>					
EFC Control Voltage	$V_{CC} = 5.0$ or $12V$	0.0	-	4.3	Volts
	$V_{CC} = 3.3V$	0.0	-	2.9	
Frequency Tuning Range	From $F_{NOM}$ at time of shipment. Sufficient range for 10 years aging.	$\pm 0.3$	$\pm 1$	-	ppm
Deviation Slope (Positive/monotonic)	$V_{CC} = 5.0$ or $12V$	0.14	-	-	ppm/V
	$V_{CC} = 3.3V$	0.2	-	-	
Reference Output	$V_{CC} = 5.0$ or $12V$	4.0	4.2	4.3	Volts
	$V_{CC} = 3.3V$	2.7	2.8	2.9	

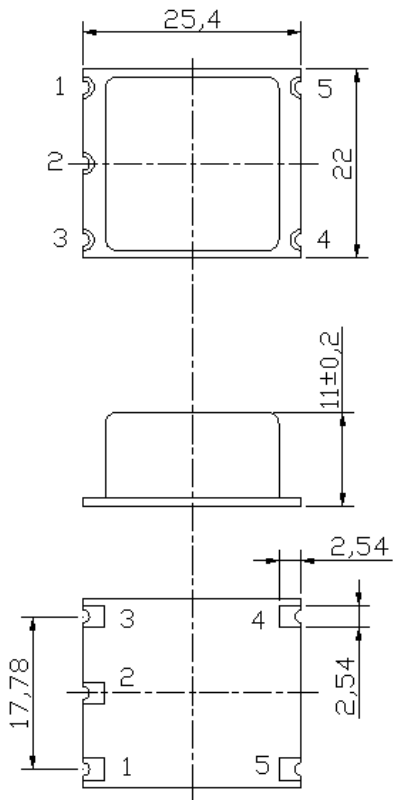
## Absolute Ratings

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply breakdown voltage	$V_{CC}$		-0.5	-	$V_{CC} + 20\%$	V	
Control Voltage	$V_C$		-1	-	6	V	

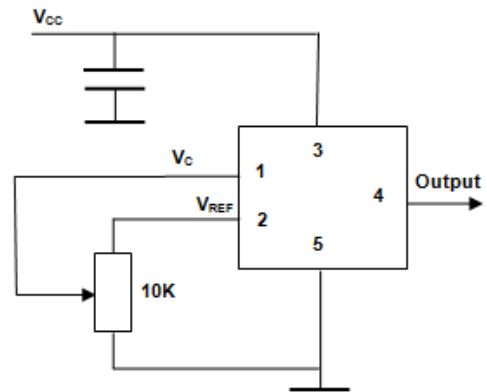
## Mechanical and Environmental

Parameter	Condition
Storage Temperature Range	$-60^{\circ}C$ to $+90^{\circ}C$
Seal	Non hermetic – cleaning by liquid immersion is not recommended
Humidity	Non-condensing 95%
Mechanical Shock	MIL-STD-202G, meth 213B, 30g, 11ms, 1/2 sine pulse
Vibration	MIL-STD-202G, meth 204D, 1.5mm DA 10 to 55Hz, 10G pk sine to 500Hz
Soldering Conditions	Hand solder only – not reflow compatible. $260^{\circ}C$ , 10 seconds.
Markings	Epoxy ink or laser engraved

### Mechanical Specifications



Pin	Connection
1	$V_{CONTROL} (V_C)$
2	$V_{REF}$
3	$V_{CC}$
4	Output
5	Ground



\* 12.7 mm height is required for some high stability options. Consult factory.

All dimensions: mm

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