

# VFOV102

## OCXO – Ultra Low Noise, Ultra Stable

### Features

- 5 to 120 MHz Frequency Range
- Ultra Low Phase Noise: (fundamental crystal)
  - -155 dBc/Hz @ 1KHz offset
  - -168 dBc/Hz floor
- Sine wave or HCMOS output

### Applications

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



Dimensions: 35.4 x 26.7 x 12.65 mm

### Ordering Information – Table 1

Model	Stability	Temperature Range	Supply Voltage	Aging	Output	Frequency, MHz
VFOV102	— V	D	E	D	H —	10.000MHz

Code	Stability	Code	Temp range	Code	Supply	Code	Output
R	1x10 <sup>-7</sup>	A	0 to 50°C	D	5.0V ±5%	H	HCMOS
T	5x10 <sup>-8</sup>	B	0 to 70°C	E	3.3V ±5%	S	Sine wave
U	2x10 <sup>-8</sup>	C	-10 to 60°C	B	12V ±5%		
V	1x10 <sup>-8</sup>	D	-20 to 70°C				
W	5x10 <sup>-9</sup>	E	-30 to 70°C				
		G	-40 to 85°C				

Code	Per day	Per year	
A	5 ppb	0.5 ppm	>50 MHz
F	3 ppb	0.3 ppm	
B	2 ppb	0.2 ppm	
I	1.5 ppb	0.15 ppm	≤50 MHz
C	1 ppb	0.1 ppm	
D	0.5 ppb	60 ppb	
E	0.4 ppb	50 ppb	
G	0.2 ppb	30 ppb	≤13 MHz

### Available Frequency Stabilities over Operating Temperature Ranges

Code	Temperature Range	Stability				
		R	T	U	V	W
		±1x10 <sup>-7</sup>	±5x10 <sup>-8</sup>	±2x10 <sup>-8</sup>	±1x10 <sup>-8</sup>	±5x10 <sup>-9</sup>
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	*	*	*	◇	◇

\* All frequencies  
 ◇ For frequencies ≤13 MHz

**Part Number Example:**  
**VFOV102-VDEDH-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		
		3.15	3.3	3.45		
Power Consumption	Steady State; T <sub>A</sub> = 25°C	-	1.0	1.2	W	
	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	-	120	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%	-	±1	-	ppb	
Freq. vs Time (Aging) (See table 1 options)	After 30 days of operation	-	3	-	ppb/day	
		-	0.3	-	ppb/year	
G-Sensitivity	Worst direction	-	±1	-	ppb/g	
Allan Variance	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
			-	-	0.4	
		V <sub>OH</sub>	3.8	-	-	
Rise/Fall Times	10MHz	-	-	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	-	+10	dBm	
	V <sub>CC</sub> = 3.3V	+3	-	+5		
Harmonics	Sinewave	-	-	-25	dBc	
Sub-harmonics	Fundamental	-	None	-	dBc	
Phase Noise	Offset	10 MHz (typical)		100 MHz (typical)		
	1 Hz	-95		-		
	10 Hz	-125		-95		
	100 Hz	-145		-125		
	1 kHz	-155		-145		
	10 kHz	-165		-165		
	100 kHz	-168		-168		
Consult factory for additional phase noise performance options.						

## 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	-	4.2	Volts
	$V_{CC} = 3.3V$	0.0	-	2.8	
Frequency Tuning Range	From $F_0$	$\pm 0.5$	$\pm 1$	-	ppm
Deviation Slope	Positive, monotonic	-	0.4	-	ppm/V
Reference Output	$V_{REF}$ $V_{CC} = 5$ or $12V$	4.0	4.2	4.3	Volts
	$V_{CC} = 3.3V$	2.7	2.8	2.9	

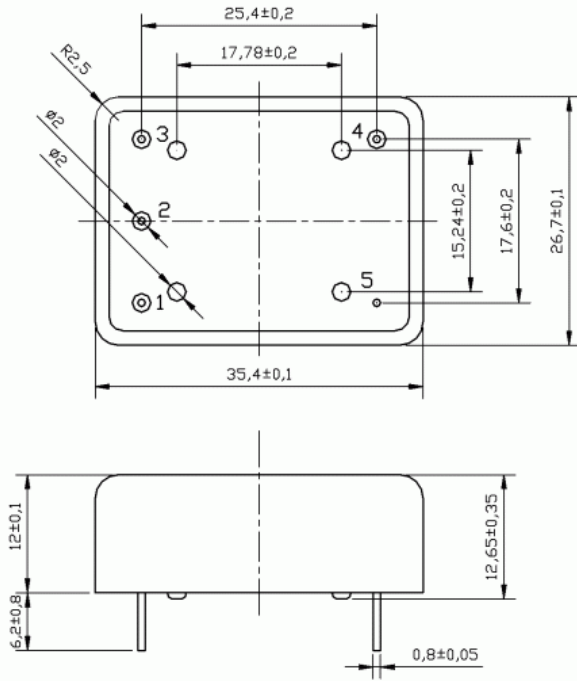
## Absolute Ratings

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

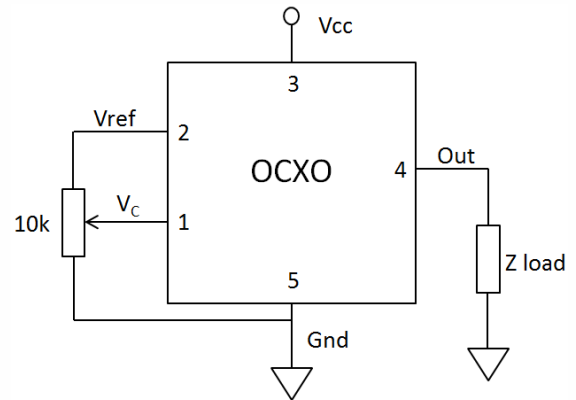
Parameter	Condition
Storage Temperature Range	$-60^{\circ}C$ to $+90^{\circ}C$
Humidity	Hermetically sealed
Mechanical Shock	MIL-STD-202G, meth 213B, 30g, 11ms, 1/2 sine pulse
Vibration	MIL-STD-202G, meth 204D, 1.5mm DA 10 to 55Hz, 10G pk sine to 2000Hz
Soldering Conditions	Hand solder only – not reflow compatible. $260^{\circ}C$ , 10 seconds.

Mechanical Specifications



All dimensions: mm

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



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