VFOV101

OCXO – High Frequency, High Stability

Features

- 5 to 150 MHz Frequency Range
- High stability (to 0.5 ppb)
- -40°C to +85°C operating temperature range
- Sine wave or HCMOS output

Dimensions: 20.2 × 20.2 x 12 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	Pin Diameter	Frequency, MHz
VFOV101	— T	D	E	C	H	8	— 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	5.0V ±5%
E	3.3V ±5%
B	12V ±5%

Code	Output
H	HCMOS
S	Sine wave

Code	Diameter
8	0.8 mm (std)
blank	0.5 mm

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

Temperature Stability Matrix

Code	Temperature Range	Stability (10MHz/100MHz)			
		W	29	Y	Z
		$5x10^{-9}$	$2x10^{-9}$	$1x10^{-9}$	$5x10^{-10}$
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:

VFOV101-VGEDH8-10.000MHz

Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	T_{OP} (See table 1 options)	-40	-	85	°C
Supply Voltage	V_{CC} (See table 1 options)	11.4 4.75 3.14	12.0 5.0 3.3	12.6 5.25 3.47	Vdc
Power Consumption	Steady State; T_A = 25°C Start-up	- -	1.0 3.2	1.2 3.5	W
Load	HCMOS (10 MHz) HCMOS (100 MHz) Sine wave		10 kΩ // 15pF 10 kΩ // 5pF 50		Ω
Frequency Stability					
Frequency (Note 1)	F_{NOM}	5	-	150	MHz
Freq. vs Temperature (See table 1 options)	T_{OP}: Ref to +25°C (Airflow – 0.5 m/s max)	-	-	±10	ppb
Freq. vs Supply Voltage	Referenced to V_{CC} typ.	-	±1	-	ppb
Freq. vs Time (Aging)	After 30 days of operation (See table 1 options)	- -	- -	±3 ±0.3	ppb/day ppm/year
G-Sensitivity	Worst direction	-	±1	-	ppb/g
Allan Deviation (10 MHz)	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
Output Parameters					
HCMOS Output Levels (Option 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	- -	- -	
Rise/Fall Times	10 MHz 100 MHz		-	-	10 3	ns
Duty Cycle	@50% of output signal		45	50	55	%
Sine Wave Output Levels (Option S)	V_{CC} = 5.0 or 12V V_{CC} = 3.3V		+6 +4	- -	+11 +9	dBm
Harmonics			-	-	-25	dBc
Sub-harmonics (Note 1)	No frequency multiplication			None		dBc

Phase Noise (Note 2)	Offset	10 MHz (typical)	100 MHz (typical)	dBc/Hz
	1 Hz	-90	-	
	10 Hz	-120	-90	
	100 Hz	-140	-120	
	1 kHz	-155	-140	
	10 kHz	-165	-160	
	100 kHz	-168	-165	

Electrical Specifications (Continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Electronic Frequency Control - EFC (Optional)					
EFC Control Voltage	V_{CC} = 5.0 or 12V V_{CC} = 3.3V	0.0 0.0	- -	4.3 2.9	Volts
Frequency Tuning Range	From F_{NOM} sufficient range for 10 years aging	±0.3	±1	-	ppm
Deviation Slope	Positive, monotonic	-	0.4	-	ppm/V
Reference Output	V_{CC} = 5.0 or 12V V_{CC} = 3.3V	4.0 2.7	4.2 2.8	4.3 2.9	Volts

Note 1 – For frequencies above 120MHz please refer to CTS Model VFOV201
Note 2 – For additional phase noise options, please consult factory

Absolute Ratings

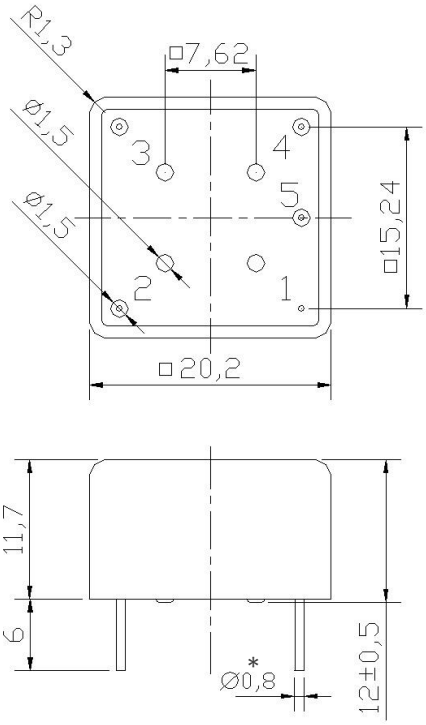
Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply breakdown voltage	V_{CC}		-0.5	-	V_{CC} + 20%	V	
Control Voltage	V_C		-1	-	6	V	

Mechanical and Environmental

Parameter	Condition
Storage Temperature Range	-60°C to +90°°C
Humidity	Hermetically sealed
Mechanical Shock	MIL-STD-202G, meth 213B, 30g, 11ms, 1/2 sine pulse
Vibration	MIL-STD-202G, meth 204D, - Standard (0.8mm lead diameter): 1.5mm DA 10 to 55Hz, 10G pk sine to 2000Hz - Option (0.5mm lead diameter): 0.75 mm DA 10 to 55 Hz, 5G pk sine to 500Hz See "Mechanical Specifications"
Soldering Conditions	Hand solder only. 260°C, 10 seconds.
Markings	Epoxy ink or laser engraved

Mechanical Specifications

Mechanical Outline

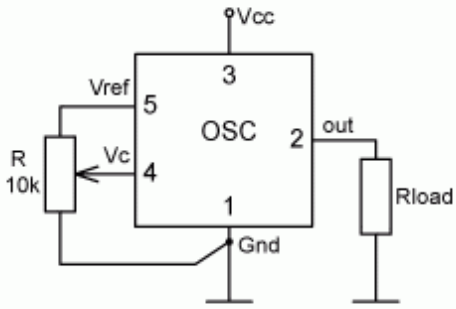


All dimensions: mm

Pin Assignments

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

Connection Diagram



* Terminal Diameter (See Table 1 for ordering)
  1. Standard: 0,8 mm diameter
  2. Option: 0,5 mm diameter. See “Mechanical and Environmental” table.