



# MV103

Oven Controlled Crystal Oscillator  
10-40 MHz

Revised 1/1/15

Your dedicated source for crystal oscillators and filters.

## Features

- Small Size
- High Stability vs. Temperature: up to  $\pm 7.5 \times 10^{-9}$
- Long Term Stability: up to  $\pm 3 \times 10^{-8}$  /year
- +5V & +12V

## Applications

- SatCom
- Test equipment
- Network clock
- Base station

## Specifications

### Temperature Stability Availability

Temperature Range	High	Higher	Comments
0 to +55° C	$< \pm 5 \times 10^{-8}$	$< \pm 1 \times 10^{-8}$	Contact factory for $< \pm 7.5 \times 10^{-9}$
-10 to +60° C	$< \pm 5 \times 10^{-8}$	$< \pm 1 \times 10^{-8}$	Contact factory for $< \pm 7.5 \times 10^{-9}$
-20 to +70° C	$< \pm 5 \times 10^{-8}$	$< \pm 1 \times 10^{-8}$	Contact factory for $< \pm 7.5 \times 10^{-9}$
-40 to +70° C	$< \pm 5 \times 10^{-8}$	$< \pm 2 \times 10^{-8}$	Contact factory for $< \pm 1 \times 10^{-8}$
-40 to +85° C	$< \pm 5 \times 10^{-8}$	C	Contact factory for $< \pm 2 \times 10^{-8}$

Temperature ranges from -60° C to +85° C available. Contact factory and see ordering designations at the end of this data sheet.

### Long Term Stability (Yearly Aging) Availability

Standard Frequencies	High	Higher	Comments
10 MHz	$< \pm 2 \times 10^{-7}$	$< \pm 3 \times 10^{-8}$	
12.8 MHz	$< \pm 2 \times 10^{-7}$	$< \pm 5 \times 10^{-8}$	Contact factory for $< \pm 3 \times 10^{-8}$
13.0 MHz	$< \pm 2 \times 10^{-7}$	$< \pm 5 \times 10^{-8}$	Contact factory for $< \pm 3 \times 10^{-8}$
16.384 MHz	$< \pm 2 \times 10^{-7}$	$< \pm 1 \times 10^{-7}$	Contact factory for $< \pm 5 \times 10^{-8}$
20 MHz	$< \pm 2 \times 10^{-7}$	$< \pm 3 \times 10^{-8}$	
25.6 MHz	$< \pm 2 \times 10^{-7}$	$< \pm 5 \times 10^{-8}$	Contact factory for $< \pm 3 \times 10^{-8}$
26 MHz	$< \pm 2 \times 10^{-7}$	$< \pm 5 \times 10^{-8}$	Contact factory for $< \pm 3 \times 10^{-8}$
32.78 MHz	$< \pm 2 \times 10^{-7}$	$< \pm 1 \times 10^{-7}$	Contact factory for $< \pm 5 \times 10^{-8}$

Contact factory for non-standard long term stability performance and see ordering designations at the end of this data sheet.

### Short Term, Pulling & Pushing Stability

Specification	HCMOS & Sinewave			Comments
Stability vs. Load ( $\pm 5\%$ )		$< \pm 5 \times 10^{-9}$		
Stability vs. power supply ( $\pm 5\%$ )		$< \pm 5 \times 10^{-9}$		
Warm-up time to w/ in $< \pm 1 \times 10^{-7}$		$< 3$ minutes		@25° C
Short-term stability frequency range	10-13MHz	13-20MHz	20-40MHz	
Short-term stability per 1 second	$< 1 \times 10^{-11}$	$< 2 \times 10^{-11}$	$< 3 \times 10^{-11}$	Allan deviation

## Specifications-Continued

## Phase Noise (dBc/Hz)

Frequency Range, MHz	HCMOS			Sinewave		
	10-13	>13-20	>20-40	10-13	>13-20	>20-40
Phase Noise, typical @						
1 Hz	-90	-75	-70	-90	-75	-70
10 Hz	-120	-105	-100	-120	-105	-100
100 Hz	-140	-135	-125	-140	-135	-125
1 kHz	-145	-145	-135	-150	-150	-140
10 kHz	-150	-150	-140	-155	-150	-145

Contact factory for lower phase noise performance and see ordering designations at the end of this data sheet.

## Output Parameters

Output	HCMOS		Sinewave
Level	"0"	< 0.4V	> 225 mV
	"1"	> 4.0V	
Duty Factor	45-55%		-
Load	10K Ohms, 30 pF		50 Ohms $\pm$ 5%
Rise/Fall Time	*		-
Harmonics	-		> -30 dBc

\*Contact factory for Rise/Fall time.

## Power Supply &amp; Voltage Control Parameters

Specification	5V $\pm$ 5%	12V $\pm$ 5%
Steady state current @ 25° C	< 200 mA	< 80 mA
Peak warm-up current	< 600 mA	< 300 mA
Frequency Adjust range	$> \pm 5 \times 10^{-7}$	$> \pm 5 \times 10^{-7}$
Frequency Adjust Voltage (Uin) or with potentiometer	0 to +4.5V 20 kOhm	0 to +5V 20 kOhm
Reference Voltage (Uref)	+4.5V	+5.0V

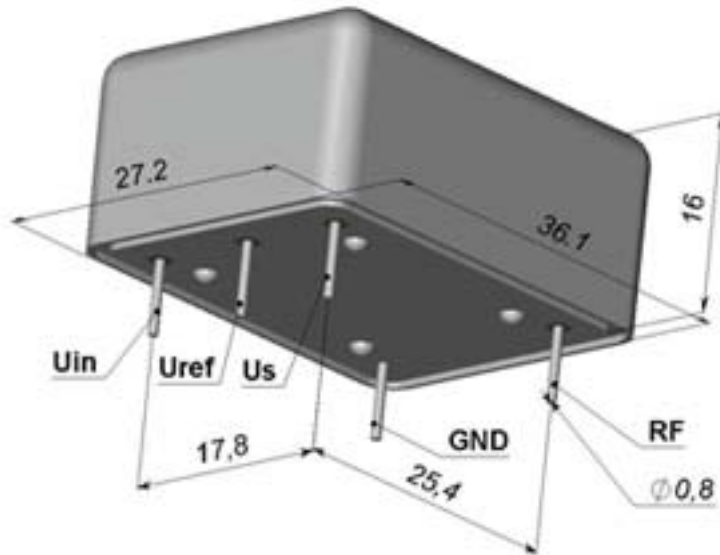
See ordering designations at the end of this data sheet.

## Environmental Parameters

Specification	Conditions
Vibration Frequency	10-500 Hz
Vibration Acceleration	10 gs
Shock Acceleration	100 gs
Shock Duration	3 $\pm$ 1 mS
Humidity	-
Storage Temperature	-55 to +85° C
RoHs	Option

Contact factory for extended environmental conditions.

## Outline Drawing



Pin	Value
Uref	Reference Voltage
Us	Power Supply
RF	RF Out
GND	Ground
Uin	Frequency Adjustment Voltage

## Ordering Guide



Availability of certain stability vs. operating temperature range.		$\pm 5 \times 10^{-8}$	$\pm 2 \times 10^{-8}$	$\pm 1 \times 10^{-8}$	$\pm 7.5 \times 10^{-9}$
		50	20	10	7
A	0 to +55° C	A	A	A	C
B	-10 to +60° C	A	A	A	C
C	-20 to +70° C	A	A	A	C
D	-40 to +70° C	A	A	C	N
EX	-40 to +85° C	A	C	C	N

A=Available, C=Contact factory, N=Not available

Availability of certain aging values for certain frequencies.		Standard Frequencies							
		10.0 MHz	12.8 MHz	13.0 MHz	16.384 MHz	20.0 MHz	25.6 MHz	26.0 MHz	32.768 MHz
H	$\pm 2 \times 10^{-7}$ /year	A	A	A	A	A	A	A	A
G	$\pm 1 \times 10^{-7}$ /year	A	A	A	A	A	A	A	A
F	$\pm 5 \times 10^{-8}$ /year	A	A	A	C	A	A	A	C
E	$\pm 3 \times 10^{-8}$ /year	A	C	C	N	A	C	C	N

A=Available, C=Contact factory, N=Not available

### Additional Notes:

- 1) Contact factory for daily aging values. General rule:  $x10^{-x}$  /year =  $x10^{-(x+2)}$  /day.
- 2) Advise RoHs requirement at Order.
- 3) Contact factory for non-standard temperature ranges.