MV291

Oven Controlled Crystal Oscillator
10-20 MHz

Revised 1/4/17

Your dedicated source for crystal oscillators and filters.

Features
- Small Package: 1”x1”x0.5” (25 x 25 x 12.7 mm)
- High Stability vs. Temperature: up to ±1x10^{-9}
- Long Term Stability: up to ±2x10^{-8} /year
- +5V & +12V

Applications
- SatCom
- Test equipment
- Network clock
- Base station

Specifications

Temperature Stability Availability			
Temperature Range	High	Higher	Comments
0 to +55^0 C	<±5x10^{-9}	<±1x10^{-9}	
-10 to +60^0 C	<±5x10^{-9}	<±1x10^{-9}	
-20 to +70^0 C	<±5x10^{-9}	<±2x10^{-9}	Contact factory for <±1x10^{-9}
-40 to +70^0 C	<±5x10^{-9}	<±2x10^{-9}	Contact factory for <±1x10^{-9}
-40 to +85^0 C	<±5x10^{-9}	<±3x10^{-9}	Contact factory for <±2x10^{-9}

Temperature ranges from -60^0 C to +85^0 C available. Comtact 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	<±1x10^{-7}	<±2x10^{-8}	
12.8 MHz	<±1x10^{-7}	<±5x10^{-8}	Contact factory for <±3x10^{-8}
13.0 MHz	<±1x10^{-7}	<±5x10^{-8}	Contact factory for <±3x10^{-8}
16.384 MHz	<±2x10^{-7}	<±1x10^{-7}	Contact factory for <±5x10^{-8}
20 MHz	<±2x10^{-7}	C	Contact factory for <±1x10^{-7}

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

Short Term, Pulling & Pushing Stability				
Specification	Standard	Option	Option	Comments
Short term stability per 1 sec.	<±5x10^{-12}	<±2x10^{-12}	<±7x10^{-13}	Allan deviation, 10 MHz
Stability vs. Load (±5%)	<±5x10^{-10}			
Stability vs. power supply (±5%)	<±2x10^{-10}			
Warm-up time to w/ in <±2x10^{-8}	<3 minutes			@25^0 C

Specifications-Continued

Phase Noise, 10 MHz, 12V, Sinewave (dBc/Hz)					
Frequency Offset	Standard	LN	IULN	ULN	Comments
1 Hz	< -95	< -100	< -105	< -108	
10 Hz	< -125	< -130	< -135	< -138	
100 Hz	< -145	< -150	< -150	< -150	
1 kHz	< -150	< -155	< -155	< -155	
10 kHz	< -155	< -160	< -160	< -160	

Comtact factory for lower phase noise perfomance and +5V phase noise performance. See ordering designations at the end of this data sheet.

Output Parameters			
Output		HCMOS	Sinewave
Level	"0"	< 0.5V	> 300 mV
	"1"	> 4.0V	
Load		10K Ohms, 30 pF	50 Ohms ± 5%
Rise/Fall Time		< 6 nS (3 nS Optional)	-
Harmonic Suppression		-	> -30 dBc

See ordering designations at the end of this data sheet.

Power Supply & Voltage Control Parameters		
Specification	12V ±5%	5V ±5%
Steady state current @ 25^0 C	< 170 mA	< 400 mA
Peak warm-up current @ -40^0 C	< 400 mA	< 900 mA
Frequency Adjust range (10 MHz)	$>\pm 4x10^{-7}$	$>\pm 4x10^{-7}$
Frequency Adjust Voltage (Uin)	0 to +5V	0 to +4.5V
Reference Voltage (Uref)	+5V	+4.5V

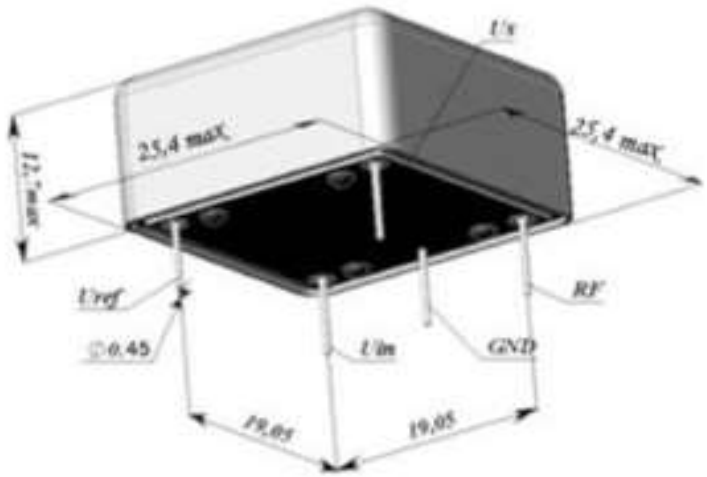
See ordering designations at the end of this data sheet.

Environmental Parameters	
Specification	Conditions
Vibration Frequency	10-500 Hz
Vibration Acceleration	5 gs
Shock Acceleration	75 gs
Shock Duration	3±1 mS
Humidity	98%
Storage Temperature	-55 to $+85^0$ C
RoHs	Option

Contact factory for extemded environmental conditions.

MV291

Outline Drawing



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

Ordering Guide

Sinewave
HCMOS

Power Supply
12V
5V

Short Term Stability /1 Sec, 10 MHz		
	LN & IULN	ULN
5E-12	2E-12	7E-13

MV291 - C 3 F - 12V - SIN - 10.0 MHz - LN - 7E-13

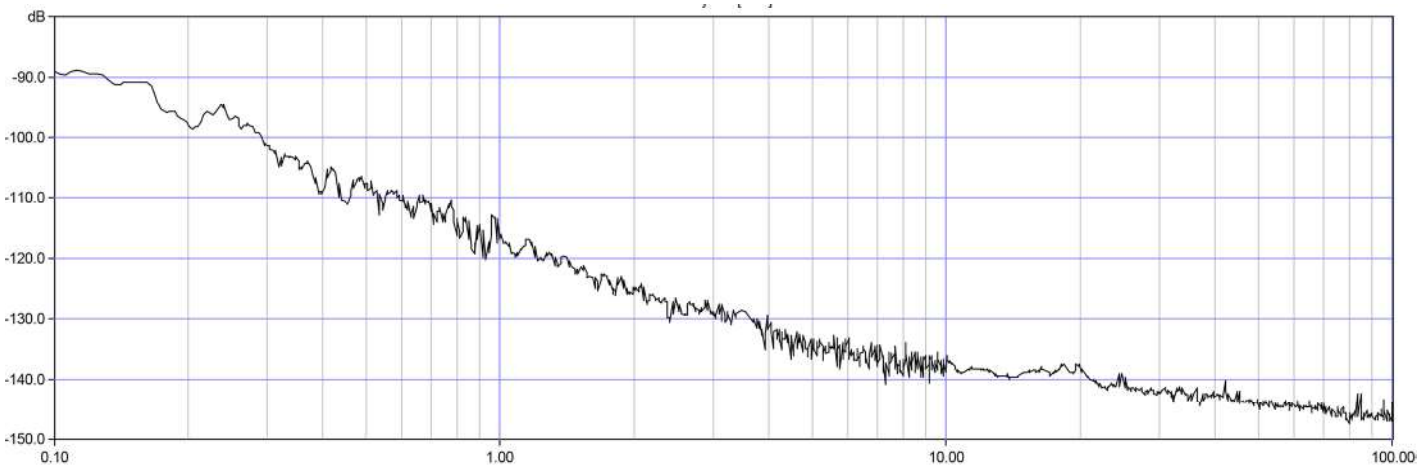
Availability of certain stability vs. operating temperature range.		±5x10^{-9}	±3x10^{-9}	±2x10^{-9}	±1x10^{-9}
		5	3	2	1
A	0 to +55^{0} C	A	A	A	A
B	-10 to +60^{0} C	A	A	A	A
C	-20 to +70^{0} C	A	A	A	C
D	-40 to +70^{0} C	A	A	A	C
EX	-40 to +85^{0} C	A	A	C	C

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
H	±2x10^{-7} /year	NA	NA	NA	A	A
G	±1x10^{-7} /year	A	A	A	A	C
F	±5x10^{-8} /year	A	A	A	C	NA
E	±3x10^{-8} /year	A	C	C	NA	NA
D	±2x10^{-8} /year	A	C	NA	NA	NA

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.

Phase Noise (dBc/Hz) 10 MHz, Sinewave, 12V	-	LN	IULN	ULN
Offset Frequency				
1 Hz	<-95	<-100	<-105	<-108
10 Hz	<-125	<-130	<-135	<-138
100 Hz	<-145	<-150	<-150	<-150
1 kHz	<-150	<-155	<-155	<-155
10 kHz	<-155	<-160	<-160	<-160
Contact factory for +5V phase noise performance.				

Close-In Phase Noise



Typical Close-In Phase Noise
0.1Hz-100Hz Offset
Carrier @ 10 MHz
(X-Y Axis: 0.1 Hz; -150 dBc/Hz)