



Revised in March 2015

Low power high stability low phase-noise miniature OCXO

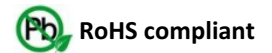
Features

Very low power consumption (to 0.15W at +25°C)
 14DIP compatible sizes including 8 mm height option
 High frequency stability (up to $\pm 5 \times 10^{-9}$ over -40°C to 85°C)
 Very fast warming-up (60 s typical, to 15 s optionally)
 Very low phase noise level (-173 dBc/Hz, floor) and phase jitter
 Low aging (2×10^{-10} /day, 2×10^{-8} /year)
 Fundamental operation at up to 150 MHz

Typical Applications

High precision GPS receivers
 Portable Wireless Communications
 Mobile Test Equipment
 UHF Synthesizers
 Battery Powered Application

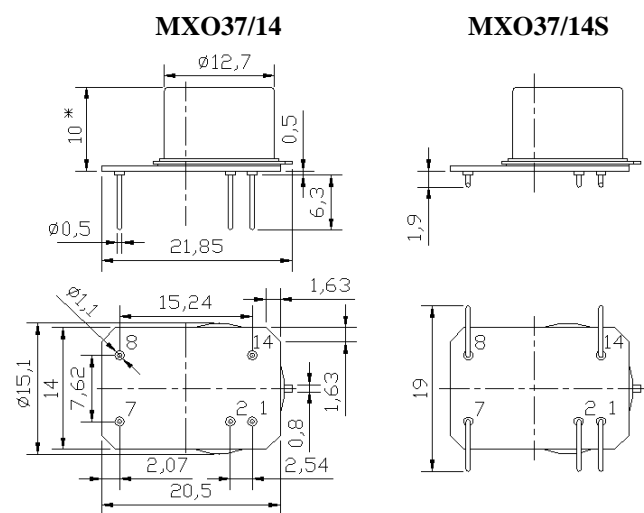
14 DIP compatible



Description

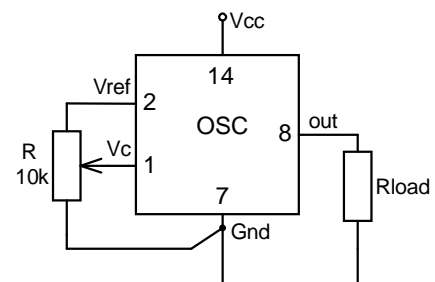
The MXO37 series utilizes the internal heating resonator technology (IHR) with arrangement of the oven system together with the crystal plate inside the TO-8 vacuum holder. Such approach results in radical reduction of the OCXO sizes, power consumption and warm-up time. The MXO37/14 and MXO37/14S (SMD) models have DIP14 compatible sizes and pins-out. The oscillators provide extraordinary combination of tiny sizes and extremely low power consumption with superb frequency stability and very low phase-noise level. Fundamental operation at up to 150 MHz enables very low spurious level in the output spectra and thereby substantial reduction of the phase jitter. That makes the MXO37/14 oscillators a very attractive solution for UHF synthesizers and other portable microwave applications.

Physical Dimensions



* - 9 mm and 8 mm heights are available on special request

Pin Connections



Pin	Signal
1	Electrical tuning
2	Reference voltage
7	GND
8	RF Out
14	+V Supply

Specification

Parameter	Sym.	Conditions	Value			Unit	Note	
			Min.	Typ.	Max.			
Frequency range	f_0		8		150	MHz	Fundamental operation	
RF output								
HCMOS (TTL) option	Load		10		15	kOhm pF	For 10 MHz	
	H-level voltage	V_H	$V_{cc}=5\text{ V}$ $V_{cc}=3.3\text{ V}$	3.8 2.4		V		
	L-level voltage	V_L			0.4	V		
	Duty cycle			45		55	%	
	Rise/Fall time					10	ns	For 10MHz operational Frequency.
Sine-wave option	Level	L		+8	+10	dBm		
	Load	R_L		50		Ohm		
	Harmonics level				-25	dBc		
Sub-harmonics level			none					
Power supply								
Voltage	V_{cc}		4.75	5.0	5.25	V	3.3V available	
Power consumption		Warm-up state Steady state, +25°C		0.7 0.15		W		
Warm-up time	t_{up}	to $\Delta f/f=1e-7$, at +25°C	15	60		s	ref. to frequency after 10 min	
Frequency control								
Control voltage range	V_c	$V_{cc}=5\text{ V}$ $V_{cc}=3.3\text{ V}$	0 0		4.2 2.8	V	Tuning slope - positive (standard option)	
Tuning range			± 0.5	± 1		ppm		
Reference voltage	V_{ref}	$V_{cc}=5\text{ V}$ $V_{cc}=3.3\text{ V}$	4.1 2.7	4.2 2.8	4.3 2.9	V		
Frequency stability								
E vs. temperature		-40°C to +85°C, ref 25°C			± 5	ppb	See chart below	
vs. supply voltage		ref V_{cc} typ.		± 2		ppb		
vs. acceleration		Worst direction	± 0.5		± 1	ppb/G		
SSB Phase noise		1 Hz	-105/-65	-95/-60		dBc/Hz	For 10MHz/100 MHz operational frequency.	
		10 Hz	-135/-97	-125/-90				
		100 Hz	-160/-130	-145/-120				
		1 kHz	-169/-155	-160/-153				
		10 kHz	-170/-170	-165/-165				
		100 kHz	-172/-172	-168/-168				
Allan variance		1 s	5	20		e-12		
Aging	per day	after 30 days of operation		± 0.5		ppb	Standard option (see chart below)	
	first year			± 0.05		ppm		
Environmental, mechanical conditions.								
Operating temperature range	See chart below.							
Storage temperature range	-60°C to +90°C							
Humidity	Non-condensing 95%							
Mechanical shock	Per MIL-STD-202, 30G half sine pulse, 11ms							
Vibration	Per MIL-STD-202, 10G swept sine 10 to 2000 Hz							
Washing conditions	Washing with water or alcohol based detergent allowed only with final enough drying stage							
Soldering conditions	Hand solder only – not reflow compatible. 260°C 10s (on pins)							

Ordering code

MXO37 /14 - C 58 B 5 S - 10 MHz

1 2 3 4 5 6

1 Packaging type	
Code	Case
/14	14 DIP
/14S	14 DIP SMD

2 Temperature range	
Code	Specification
A	0°C..50°C
B	-10°C..60°C
C	0°C..70°C
D	-20°C..70°C
E	-30°C..70°C
F	-40°C..85°C
G	-55°C..85°C

3 Stability over temperature			
Code	Specification	Temperature range available for 10 MHz	Temperature range available for 100 MHz
39	$\pm 3e-9$	A...B	-
59	$\pm 5e-9$	A...F	-
18	$\pm 1e-8$	A...G	A
28	$\pm 2e-8$	A...G	A...E
38	$\pm 3e-8$	A...G	A...F
58	$\pm 5e-8$	A...G	A...G
17	$\pm 1e-7$	A...G	A...G

4 Aging per day/year, ppb/ppm		
Code	Specification	
B	0.2/0.02	≤ 10 MHz
Z	0.3/0.03	
C	0.5/0.05	≤ 20 MHz
D	1/0.1	≤ 40 MHz
E	1.5/0.15	≤ 50 MHz
F	2/0.2	≤ 120 MHz
G	3/0.3	
H	5/0.5	≤ 150 MHz

5 Supply voltage	
Code	Specification
3	3.3V $\pm 5\%$
5	5V $\pm 5\%$

6 Output	
Code	Specification
T	HSMOS/TTL
S	Sinewave