

Revised in November 2024

## High stability high frequency very low power OCXO

### Features

*High temperature stability: up to 1 ppb (over -40+85°C)*  
*Low aging: 0.5 ppb/day, 50 ppb/year (at 100 MHz)*  
*Low power consumption: 0.23W at +25°C*  
*Low Allan Variance: 5e-12/at 1s*  
*Fast warming-up: <90 s*  
*Wide frequency range: 30 – 300 MHz*  
*Hermetically sealed miniature steel package*

### Typical Applications

*Portable Wireless Communications*  
*Mobile Test equipment*  
*Synthesizer reference*  
*Microwave communication*  
*Battery Powered Application*

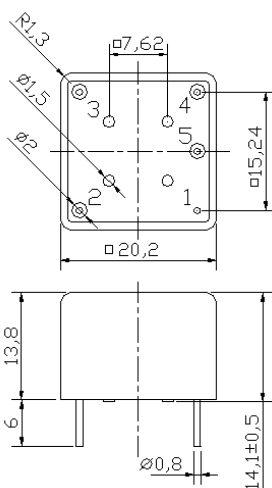
**Packaging: 20.2 x 20.2 mm**

**RoHS compliant**

### Description

The MXO37H/R series utilizes the internal heated resonator technology (IHR) providing very small oscillator volume, low power consumption and fast warming up. Usage of the internal multiplication of frequency (by 3 or 5) enables to the oscillators extension of the operational frequencies up to 300 MHz and improvement of the temperature stability and aging rate in 30-150 MHz range. Being enclosed in hermetically sealed steel packaging the MXO37H/R oscillators are intended for employment in harsh environmental conditions (100% humidity, high or low pressure, etc.) and are excellent solution for various portable or (and) battered systems.

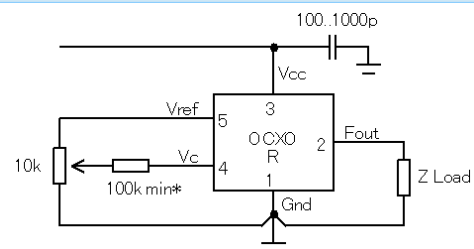
### Physical Dimensions



12.9 mm, 12.0 mm height are available

The manufacturer reserves the right to reduce the external dimensions without changing of connecting dimensions.

### Pin Connections



\* required for some versions

Pin	Signal
1	GND
2	RF Out
3	+V Supply
4	Electrical tuning
5	Reference voltage

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**Specification**

Parameter	Sym.	Conditions	Value			Unit	Note	
			Min.	Typ.	Max.			
Frequency range	$f_0$		30		300	MHz	Frequency multiplication on 3 and 5	
Initial tolerance	$(f-f_0)/f_0$	$+25^\circ\text{C}, V_{cc}=0.5*V_{ref}$		$\pm 0.1$		ppm		
<b>RF output</b>								
HCMOS (TTL) option	Load		10		5	kOhm pF	100 MHz	
	H-level voltage	$V_H$	$V_{cc}=5\text{ V}$ $V_{cc}=3.3\text{ V}$	3.7 2.4		V		
	L-level voltage	$V_L$			0.4	V		
	Duty cycle			45		55	%	
	Rise/Fall time					3	ns	100 MHz
Sine-wave option	Level	L	$V_{cc}=5\text{ V}$ $V_{cc}=3.3\text{ V}$	+7 +4		dBm		
	Load	$R_L$			50	Ohm		
	Harmonics level					-30	dBc	
Sub-harmonics level						-40	dBc	
<b>Power supply</b>								
Voltage	$V_{cc}$		4.75 3.15	5.0 3.3	5.25 3.45	V		
Power consumption		Warm-up time Steady state, $+25^\circ\text{C}$		230	1200	mW	100MHz, $-40^\circ\text{C}..85^\circ\text{C}$	
Warm-up time	$t_{up}$	at $+25^\circ\text{C}$ to $\Delta f/f=1e-7$ at $+25^\circ\text{C}$ to $\Delta f/f=1e-8$		90 120		s	ref. to freq. after 15 min. of operation	
<b>Frequency control</b>								
Control voltage range	$V_c$	$V_{cc}=5\text{ V}$ $V_{cc}=3.3\text{ V}$	0 0		4.3 3.1	V		
Tuning range		Compliance with 10 years of aging	$\pm 0.3$			ppm	positive slope	
Reference voltage	$V_{ref}$	$V_{cc}=5\text{ V}$ $V_{cc}=3.3\text{ V}$	4.0 2.7		4.3 3.1	V		
<b>Frequency stability</b>								
vs. temperature		ref. $25^\circ\text{C}$ , air flow 0.5 m/s max.	$\pm 1.0$			ppb	See ordering code	
vs. supply voltage		ref $V_{cc}$ typ.		$\pm 0.2$		ppb		
G – sensitivity		worst direction, 0 – 1kHz vibration BW (for 0 – 2kHz BW consult the factory)	$\pm 0.2$	$\pm 1.0$		ppb/G		
Retrace		24h work after 24h off			$\pm 10$	ppb	10MHz	
SSB Phase noise		10 Hz	-110		-100	dBc/Hz	100MHz multiplication by 5 $V_{cc}=5\text{V}$	
		100 Hz	-130		-120			
		1 kHz	-145		-140			
		10 kHz	-155		-150			
		100 kHz	-155		-150			
Allan deviation		1 s	5		30	e-12	100MHz	
Aging	per day	after 30 days of operation	$\pm 0.5$			ppb	100MHz see ordering code	
	first year		$\pm 0.05$			ppm		
<b>Environmental, mechanical conditions</b>								
Airflow velocity	0.5 m/s maximum							
Operating temperature range	See ordering code							
Storage temperature range	$-60^\circ\text{C}$ to $+85^\circ\text{C}$							
Power voltage	$-0.5\text{V}$ to $V_{cc}+20\%$							
Control voltage	$-0.5\text{V}$ to $6\text{V}$							
Humidity	Hermetically sealed							
Mechanical shock	Per MIL-STD-202, 30G half sine pulse, 11ms							
Vibration	Per MIL-STD-202, 10G swept sine 10 to 2000Hz (5G swept sine 10 to 500Hz for OCXO with 0.5mm pins)							
Soldering conditions	Hand solder only – not reflow compatible. $260^\circ\text{C}$ 10s (on pins)							
Washing Conditions	Washing with water or alcohol based detergent allowed only with final enough drying stage							

**For ordering code – see next page**

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**Ordering code**

MXO37H/R	-	B	50	B	5	T	-	100 MHz
		1	2	3	4	5		

1	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
J	-40°C..80°C
F	-40°C..85°C
G	-55°C..85°C
Q	-60°C..85°C

4	Supply voltage
Code	Specification
3	3.3V±5%
5	5V±5%

2	Stability over temperature	
Code	Specific.	Temperature range code available for 100MHz 5V
XY	±Xe-Y	
30	±3e-10	-
50	±5e-10	A, B
19	±1e-9	A, B, C, D, E, J
29	±2e-9	A, B, C, D, E, J, F
39	±3e-9	A, B, C, D, E, J, F
59	±5e-9	A, B, C, D, E, J, F
18	±1e-8	A, B, C, D, E, J, F, G
28	±2e-8	A, B, C, D, E, J, F, G
38	±3e-8	A, B, C, D, E, J, F, G, Q
58	±5e-8	A, B, C, D, E, J, F, G, Q
17	±1e-7	A, B, C, D, E, J, F, G, Q

3	Aging per day/year, ppb/ppm	
Code	Specification	
A	0.1/0.015*	≤ 50 MHz
B	0.2/0.02	
Z	0.3/0.03	≤ 100 MHz
C	0.5/0.05	
D	1/0.1	≤ 200 MHz
E	1.5/0.15	≤ 300 MHz
F	2/0.2	
G	3/0.3	
H	5/0.5	

\* available for temperature range A,B,C,D,E

5	Output
Code	Specification
T	HSMOS/TTL
S	Sine wave

Deviation of the parameters is possible on customer's requirements. Please consult the factory.