

Revised in March 2019

## Miniature Ultra High Stability Ultra Low power OCXO

### Features

Power consumption: up to 70 mW at 25°C  
 Miniature 5 ccm packaging  
 High stability - to  $\pm 5 \times 10^{-10}$  over -40 to +85°C  
 Low aging rate - to  $\pm 1 \times 10^{-10}$ /day,  $1.5 \times 10^{-8}$ /year  
 Low Allan variance value – up to  $3 \times 10^{-12}$ /1s  
 Frequency range: 5 to 150 MHz

### Typical Applications

GPS Disciplined Mobile Frequency Standards  
 Portable Instrumentation  
 Mobile Communication Systems  
 Battery Supply Beacons

**Packaging: 20.2 x 20.2 mm**

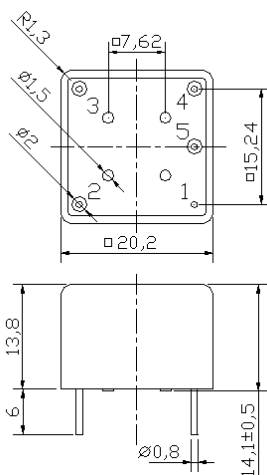


**RoHS compliant**

### Description

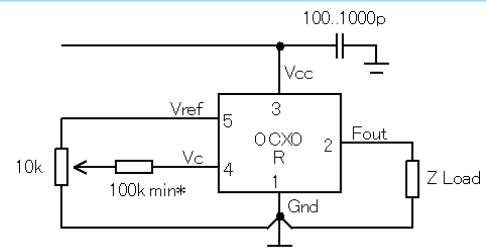
The MXO37/RU model is built on advanced internally heated resonator (IHR) technology providing combination of very low power consumption and small sizes with outstanding frequency stability in wide temperature range that is unachievable with usage of conventional OCXO designs. The unique parameters of the oscillators make it very prospective for application in various high-end portable (especially battery supplied) equipment demanding superb frequency stability at minimal power consumption and smallest sizes.

### Physical Dimensions



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	$f_0$		5		150	MHz		
Initial tolerance	$(f-f_0)/f_0$	+25°C, $V_{cc}=0.5*V_{ref}$	±0.01	±0.1		ppm		
<b>RF output</b>								
HCMOS (TTL) option	Load		10		15/5	kOhm pF	10/100 MHz	
	H-level voltage	$V_H$	$V_{cc}=5V$ $V_{cc}=3.3V$	3.7 2.4		V		
	L-level voltage	$V_L$			0.4	V		
	Duty cycle			45		55	%	
	Rise/Fall time					10/3	ns	10/100 MHz
Sine-wave option	Level	L	$V_{cc}=5V$ $V_{cc}=3.3V$	+7 +4		dBm		
	Load	$R_L$			50	Ohm		
	Harmonics level				-30	dBc		
Sub-harmonics level			none					
<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°C			1200	mW	10MHz, -40°C..85°C	
Warm-up time	$t_{up}$	at +25°C to $\Delta f/f=1e-7$ at +25°C to $\Delta f/f=1e-8$	30	60 120		s	ref. to freq. after 15 min. of operation	
<b>Frequency control</b>								
Control voltage range	$V_c$	$V_{cc}=5V$ $V_{cc}=3.3V$	0 0		4.3 3.0	V		
Tuning range		Compliance with 10 years of aging	±0.3			ppm	positive slope	
Reference voltage	$V_{ref}$	$V_{cc}=5V$ $V_{cc}=3.3V$	4.0 2.5		4.3 3.1	V		
<b>Frequency stability</b>								
vs. temperature		ref. 25°C, air flow 0.5 m/s max.	±0.5			ppb	See ordering code	
vs. supply voltage		ref $V_{cc}$ typ.		±0.2		ppb		
G – sensitivity		worst direction, 0 - 700 Hz vibration BW (for 0 - 2kHz BW consult the factory)	±0.2	±1		ppb/G		
Retrace		24h work after 24h off			±10	ppb	10MHz	
SSB Phase noise		1 Hz	-110/----		-90/----	dBc/Hz	10/100MHz $V_{cc}=5V$	
		10 Hz	-140/-100		-120/-90			
		100 Hz	-155/-130		-145/-120			
		1 kHz	-165/-155		-155/-150			
		10 kHz	-170/-170		-165/-165			
		100 kHz	-172/-173		-165/-165			
Allan deviation		1 s	3		30	e-12	10MHz	
Aging	per day	after 30 days of operation	±0.1			ppb	10MHz see ordering code	
	first year		±0.015			ppm		
<b>Environmental, mechanical conditions</b>								
Airflow velocity	0.5 m/s maximum							
Operating temperature range	See ordering code							
Storage temperature range	-60°C to +85°C							
Power voltage	-0.5V to $V_{cc}+20\%$							
Control voltage	-0.5V to 6V							
Humidity	Hermetically sealed							
Mechanical shock	Per MIL-STD-202, 30G half sine pulse, 11ms							
Vibration	Per MIL-STD-202, 10G swept sine 10 to 1500Hz (5G swept sine 10 to 300Hz for OCXO with 0.5mm pins)							
Soldering conditions	Hand solder only – not reflow compatible. 260°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**

MXO37/RU	-	B	50	B	5	T	-	10 MHz
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		

<b>1</b>	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

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

<b>3</b>		Aging per day/year, ppb/ppm
Code	Specification	
A	0.1/0.015*	≤10 MHz
B	0.2/0.02	
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	≤120 MHz
H	5/0.5	≤150 MHz

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

<b>4</b>	Supply voltage
Code	Specification
3	3.3V±5%
5	5V±5%

<b>5</b>		Output
Code	Specification	
T	HSMOS/TTL	
S	Sine wave	

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