

Revised in March 2019

## Very high stability miniature OCXO

### Features

Very high frequency stability:  $\pm 1 \times 10^{-10}$  -40 to +80°C  
 Miniature packaging: about 5 ccm  
 Low aging: to  $\pm 1 \times 10^{-10}$ /day,  $1,5 \times 10^{-8}$ /year  
 Low phase noise level: -165 dBc/Hz, TYP, floor  
 Low power consumption: to 1W at +25°C

### Typical Applications

Rubidium Standard Replacement  
 GPS Receivers  
 Instrumentation  
 Stratum 2 Clock Systems

Packaging: 20.2 x 20.2 mm

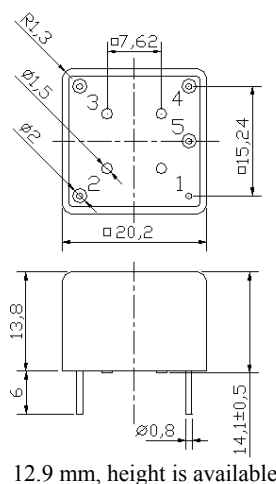


RoHS compliant

## Description

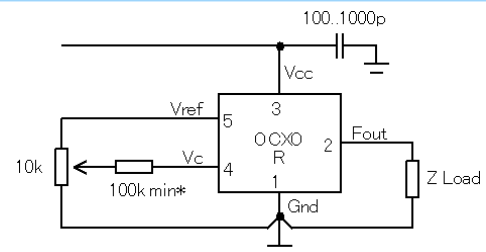
The MXODR series utilizes combined advantageous of the double-oven and internal heated resonator technologies (IHR) resulting in smallest in the class world volume (5 ccm) and less than 1W power consumption at sa high as 0.1 ppb temperature stability and 0.1 ppb/day aging. The MXODR oscillators are excellent solution for Stratum II clock system, instrumentations, and other high-end applications with simultaneous demands to the frequency stability and sizes of the reference. The oscillators are produced for 5 to 100 MHz operational frequency range.

### 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		100	MHz		
Initial tolerance	$(f-f_0)/f_0$	+25°C, $V_{cc}=0.5 \cdot V_{ref}$	±0.01	±0.1		ppm		
<b>RF output</b>								
HCMOS (TTL) option	Load		10		15/5	kOhm pF	10/100 MHz	
	H-level voltage	$V_{Hi}$	$V_{cc}=5V$ $V_{cc}=3.3V$	3.7 2.4		V		
	L-level voltage	$V_{Li}$			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			Operational frequency ≤20 MHz Operational frequency >20MHz		none	-40	dBc	Frequency multiplier used
<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		1000	4500 1200	mW	10MHz, -40°C..85°C	
Warm-up time	$t_{up}$	at +25°C to $\Delta f/f=1e-7$			180	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 3.1	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 2.7		4.3 3.1	V		
<b>Frequency stability</b>								
vs. temperature		ref. 25°C, air flow 0.5 m/s max.	±0.1			ppb	See ordering code	
vs. supply voltage		ref $V_{cc}$ typ.		±0.2		ppb		
G – sensitivity		worst direction, 0 – 1kHz vibration BW (for 0 – 2kHz BW consult the factory)	±0.2	±1.0		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	-170/-173		-165/-165			
Allan deviation		1 s	1.5		20	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 2000Hz (5G swept sine 10 to 500Hz 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**

<b>MXODR</b>	-	<b>B</b>	<b>50</b>	<b>B</b>	<b>5</b>	<b>T</b>	-	<b>10 MHz</b>
		<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
XY	±Xe-Y	
10	±1e-10	A, B, C, D, E, J
20	±2e-10	A, B, C, D, E, J, F
30	±3e-10	A, B, C, D, E, J, F, G, Q
50	±5e-10	A, B, C, D, E, J, F, G, Q
19	±1e-9	A, B, C, D, E, J, F, G, Q
29	±2e-9	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*
B	0.2/0.02
Z	0.3/0.03
C	0.5/0.05
D	1/0.1
E	1.5/0.15
F	2/0.2
G	3/0.3

\* 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.**