



### Features

Very high frequency stability: to  $\pm 1 \times 10^{-10}$  over  $(-40 \text{ to } +80)^\circ\text{C}$   
 Miniature packaging: about 5 ccm  
 Low aging: to  $\pm 1 \times 10^{-10}$ /day,  $2 \times 10^{-8}$ /year  
 Low phase noise level:  $-170 \text{ dBc/Hz}$ , TYP, floor  
 Low power consumption: to 1W at  $+25^\circ\text{C}$

### Typical Applications

Rubidium Standard Replacement  
 GPS Receivers  
 Instrumentation  
 Stratum 2 Clock Systems

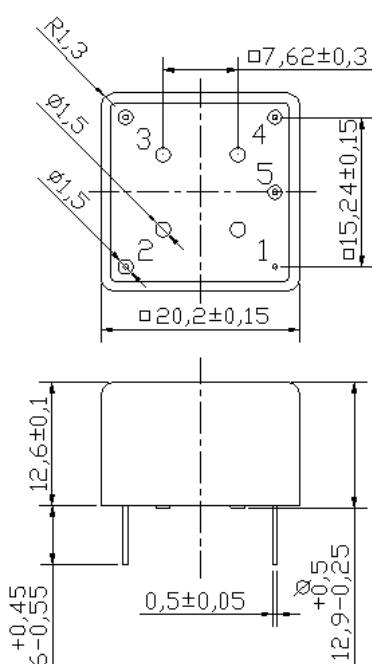
Packaging type R: 20.4 x 20.4 x 12.6 mm



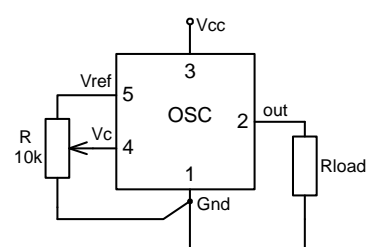
### Description

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 as high as 0.1 ppb temperature stability and 0.2 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 8 to 100 MHz operational frequency range.

### Physical Dimensions



### Pin Connections



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



**Specification**

Parameter	Sym.	Conditions	Value			Unit	Note
			Min.	Typ.	Max.		
Frequency range	f <sub>0</sub>		5		100	MHz	
<b>RF output</b>							
HCMOS (TTL) option	Load		10		15	kOhm pF	for 10 MHz operational frequency
	H-level voltage	V <sub>H</sub>	V <sub>cc</sub> =5 V V <sub>cc</sub> =3.3 V	3.8 2.4		V V	
	L-level voltage	V <sub>L</sub>			0.4	V	
	Duty cycle			45		55	%
	Rise/Fall time					10	ns
Sine-wave option	Level	L	+6	+8	+10	dBm	for 10 MHz operational frequency
	Load	R <sub>L</sub>		50		Ohm	
	Harmonics level					-30	dBc
Sub-harmonics level		Operational frequency ≤30 MHz Operational frequency >30 MHz		none		-40	dBc
<b>Power supply</b>							
Voltage	V <sub>cc</sub>		4.75	5.0	5.25	V	3.3V available
Power consumption		Warm-up state Steady state, +25°C		1.0	1.2	W W	
Warm-up time	t <sub>up</sub>	to Δf/f=1e-7, at +25°C			90	s	ref. to frequency after 30 min.
<b>Frequency control*</b>							
Control voltage range	V <sub>c</sub>		0		4.2	V	Tuning slope - positive
Tuning range			±0.5	±1.0		ppm	
Reference voltage	V <sub>ref</sub>	V <sub>cc</sub> =5 V V <sub>cc</sub> =3.3 V	4.1	4.2	4.3	V	
			2.7	2.8	2.9	V	
<b>Frequency stability</b>							
vs. temperature		-30°C to +70°C, ref 25°C				±0.1	ppb
vs. supply voltage		ref V <sub>cc</sub> typ.				±0.2	ppb
SSB Phase noise		1 Hz	-103	-95			dBc/Hz
		10 Hz	-132	-125			
		100 Hz	-155	-145			
		1 kHz	-165	-155			
		10 kHz	-169	-163			
		100 kHz	-170	-167			
Allan variance		1 s	5				e-12
Aging	per day	after 30 days of operation	±0.2				ppb
	first year		±20				ppb
<b>Environmental, mechanical conditions.</b>							
Operating temperature range	See chart below.						
Storage temperature range	-60°C to +90°C						
Humidity	Hermetically sealed						
Mechanical shock	Per MIL-STD-202, 30G half sine pulse, 11ms						
Vibration	Per MIL-STD-202, 5G swept sine 10 to 500 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 10 s (on pins)						

\* No frequency control option – on customer requirement

**Ordering code**

MXODR - B 50 B 5 T - 10 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
F	-40°C..80°C

2	Stability over temperature		
Code	Specification	Temperature range code available*	
XZ	±Xe-Y		
10	±1e-10	A...F	
20	±2e-10	A...F	
30	±3e-10	A...F	
50	±5e-10	A...F	
19	±1e-9	A...F	
29	±2e-9	A...F	

3	Aging per day/year, ppb/ppm	
Code	Specification	
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	

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

5	Output	
Code	Specification	
T	HSMOS/TTL	
S	Sine-wave	

\*For 10 MHz operational frequency

Deviations of the parameters are possible on Customer's requirements.