



Revised in March 2015

MXOC series - High stability low phase-noise OCXOs

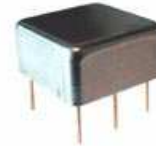
## Features

High temperature stability: to  $\pm 1$  ppb in  $(-40$  to  $+85)^{\circ}\text{C}$   
 Very low phase noise: (to  $-175$  dBc/Hz, floor)  
 Low aging: to  $0.2$  ppb/day and  $0.02$  ppm/year  
 Fundamental operation at 5 through 150 MHz  
 Small sizes packaging

## Typical Applications

Cellular Base Stations  
 Instrumentation  
 Microwave Applications  
 Stratum 3E clock systems  
 Radar reference

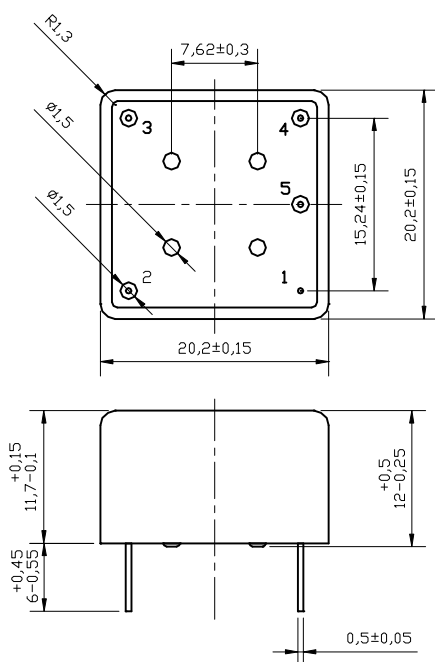
Packaging type R: 20x20x10.3 mm



## Description

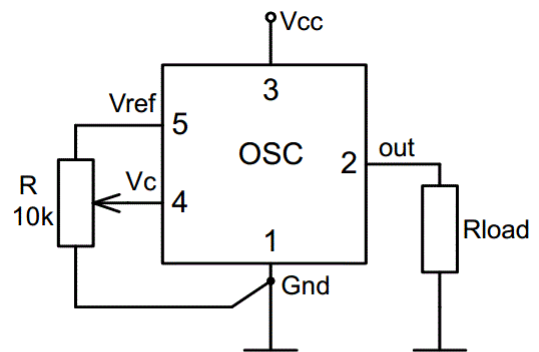
The MXOC series oven-controlled crystal oscillators are intended for wide applications where high temperature stability, low aging, low phase-noise along and compact sizes are major requirements. The module concept of the OCXOs design allowed realization of same performance in a variety of small packages on customer choice: MXOCE, MXOCI, MXOCR, MXOCS models.

## Physical Dimensions



\* - 12.0 mm, 12.9 mm heights and 0.8 mm pins diameter are available

## Pin Connections



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.		
<b>Frequency range</b>	$f_0$		5		150	MHz	Fundamental operation
<b>RF output</b>							
HCMOS (TTL) option	Load		10		15	kOhm pF	for 10 MHz operational frequency
	H-level voltage	$V_H$	$V_{cc}=5$ or 12 V $V_{cc}=3.3$ V	3.8 2.4		V V	
	L-level voltage	$V_L$			0.4	V	
	Duty cycle			45		55	%
	Rise/Fall time					10	ns
Sine-wave option	Level	L	+6	+8	+10	dBm	
	Load	$R_L$		50		Ohm	
	Harmonics level				-30	dBc	
Spurious level					-100	dBc	
<b>Power supply</b>							
Voltage	$V_{cc}$		4.75	5.0	5.25	V	3.3V, 12V optional
Power consumption		Warm-up state Steady state, +25°C		3.2 1	3.5 1.2	W W	
Warm-up time	$t_{up}$	to $\Delta f/f=1e-7$ , at +25°C			180	s	ref. to frequency after 30 min.
<b>Frequency control*</b>							
Control voltage range	$V_c$	$V_{cc}=5$ or 12 V $V_{cc}=3.3$ V	0 0		4.2 2.8	V V	Positive tuning slope (standard option)
Tuning range			$\pm 0.5$	$\pm 1$		ppm	
Reference voltage	$V_{ref}$	$V_{cc}=5$ or 12 V $V_{cc}=3.3$ V	4.1 2.7	4.2 2.8	4.3 2.9	V V	
<b>Frequency stability</b>							
vs. temperature		-40°C to +85°C, ref 25°C		$\pm 10$		ppb	See chart below
vs. supply voltage		ref Vcc typ.		$\pm 1$		ppb	
vs. acceleration		Worst direction	$\pm 0.5$		$\pm 1$	ppb/G	
SSB Phase noise		1 Hz	-106/-	-100/-		dBc/Hz	for 10MHz operational frequency
		10 Hz	-135/-95	-125/-90			
		100 Hz	-155/-130	-145/-120			
		1 kHz	-163/-155	-155/-150			
		10 kHz	-170/-170	-165/-165			
		100 kHz	-172/-175	-168/-168			
Allan variance		1 s	5	10		e-12	
Aging	per day	after 30 days of operation	0.2	0.5		ppb	For 10 MHz (see chart below)
	first year		20	50		ppb	
	for 20 years		0.3	0.5		ppm	
<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, 10G swept sine 10 to 500 Hz (pins 0.5 mm), 10G swept sine 0-2000 Hz (pins 0.8 mm)						
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						

\* No frequency control option – on customer requirement

## Ordering code

MXOCR - C 18 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..85°C
G	-55°C..85°C
H	-40°C..125°C

2		Stability over temperature	
Code	Specification	Temperature range code available	
		for 10 MHz	for 100 MHz
XZ	$\pm Xe-Y$		
50	$\pm 5e-10$	A...B	-
19	$\pm 1e-9$	A...F	-
29	$\pm 2e-9$	A...F	-
39	$\pm 3e-9$	A...G	
59	$\pm 5e-9$	A...G	A...F
18	$\pm 1e-8$	A...G	A...G
28	$\pm 2e-8$	A...H	A...G
58	$\pm 5e-8$	A...H	A...G
17	$\pm 1e-7$	A...H	A...G

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

4		Supply voltage	
Code	Specification		
3	3.3V $\pm 5\%$		
5	5V $\pm 5\%$		
2	12V $\pm 10\%$		

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

Deviation of the parameters is possible on customers' requirements.

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