

Revised in December 2017

## 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  $0.1$  ppb/day and  $0.015$  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

## High stability low phase-noise OCXO

Packaging type I: "Inch x Inch" 25.8x25.8

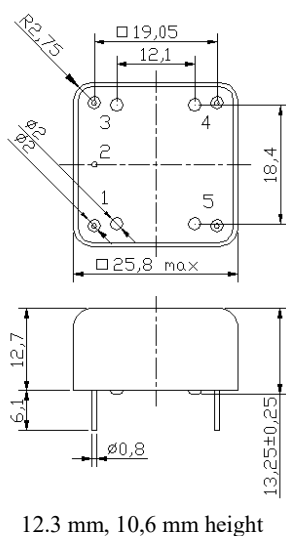


RoHS compliant

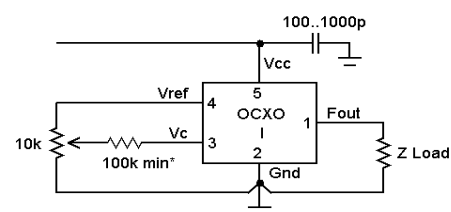
## Description

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



## Pin Connections



\* required for some versions

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

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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	$V_{Hi}$	$V_{cc}=5V, 12V$ $V_{cc}=3.3V$	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	$V_{cc}=5V, 12V$ $V_{cc}=3.3V$	+7 +4		dBm		
	Load	$R_L$			50	Ohm		
	Harmonics level					-30	dBc	
Sub-harmonics level			none					
<b>Power supply</b>								
Voltage	$V_{cc}$		11.4 4.75 3.15	12.0 5.0 3.3	12.6 5.25 3.45	V		
Power consumption		Warm-up time Steady state, +25°C			3500 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	$V_c$	$V_{cc}=5V, 12V$ $V_{cc}=3.3V$	0 0		4.3 3.1	V		
Tuning range		Compliance with 10 years of aging	±0.3			ppm	positive slope	
Reference voltage	$V_{ref}$	$V_{cc}=5V, 12V$ $V_{cc}=3.3V$	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.	±1.0			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)	±0.3	±1.0		ppb/G		
Retrace		24h work after 24h off			±10	ppb	10MHz	
SSB Phase noise Typical phase noise is default option. For different phase noise consult the factory.		1 Hz	-110/-----	-95/-----		dBc/Hz	10/100MHz $V_{cc}=5V, 12V$	
		10 Hz	-140/-100	-121/-90				
		100 Hz	-155/-130	-141/-120				
		1 kHz	-165/-155	-155/-141				
		10 kHz	-170/-170	-160/-160				
	100 kHz	-172/-175	-162/-165					
Allan deviation		1 s	0.5	10		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 (500G, 1ms — optionally)							
Vibration	Per MIL-STD-202, 10G swept sine 0 to 2000Hz							
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**

MXOCI	-	B	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
Q	-60°C..85°C
H	-40°C..125°C

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

3 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	
H	5/0.5	≤150 MHz

4 Supply voltage	
Code	Specification
3	3.3V±5%
5	5V±5%
2	12V±5%

5 Output	
Code	Specification
T	HSMOS/TTL
S	Sine wave

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