XTAL BALL TECHNOLOGIES

Reality of Perfection!

XBO8, XBO8S, XBO8L, XBO8D

Low Power Miniature OCXO

FEATURES

To 130 mW at +25°C consumption (-40 to 85°C work range)
2ppb stability over (-40°C to 85°C)
0.05 ppb/day, 1 ppb/month aging
Phase-noise (- 105 dBc/Hz@1Hz, -172dBc/Hz,floor)
To 0.2 ppb/g g-sensitivity
3E-12/1s Allan Deviation
Operation frequency range 8-150 MHz

TYPICAL APPLICATIONS

Portable GPS and Wireless Communication,
Mobile redars,
Battery powered test equipment,
Underwater clocks for seismic exploration,
Beacons & rescue systems

8 DIP COMPATIBLE

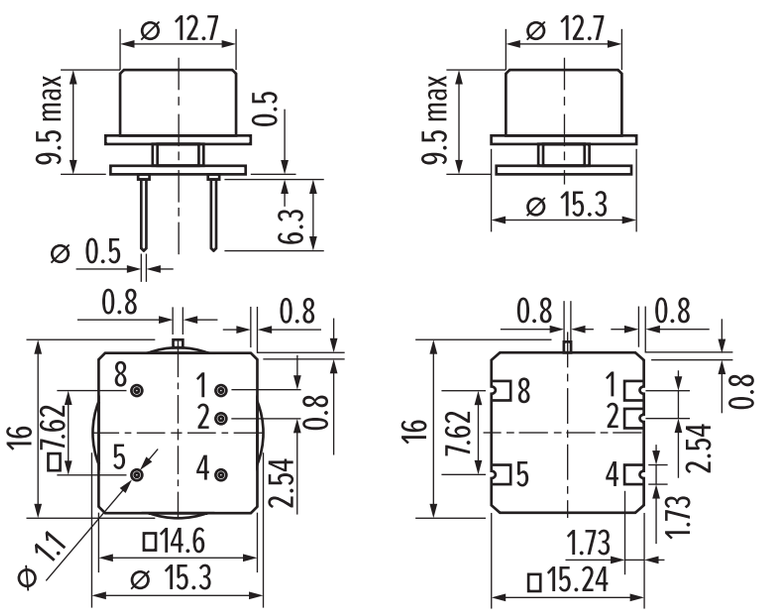
RoHS compliant



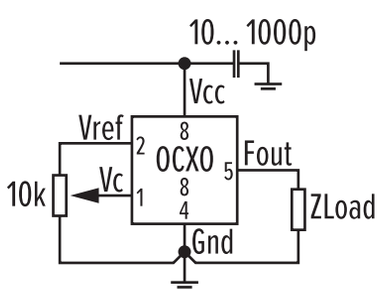
DESCRIPTION

These low power OCXOs are built on the internal heating resonator (IHR) designs incorporating inside the TO-8 vacuum holder the whole heating system together with high precision SC-cut crystal plate. Such OCXO concept ensures radical reduction of the package volume and extremely low power consumption combined with excellent frequency stability and low phase-noise level. The XBO8 series comprises high stability XBO8 model with XBO8S surface mount version, providing to 1 ppb/month aging and 3E-12/1S Allan deviation, low profile XBO8L having 7.5 mm height and shock resistant XBO8D parts withstanding up to 500 g, 1 ms acceleration and 20 g vibration in 0-2000 Hz range.

PHYSICAL DIMENSIONS



PIN CONNECTIONS



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

7.5 mm height is available for XBO8L

The manufacturer reserves the right to reduce the external dimensions without changing of connecting dimensions.

YOU ARE WELCOME TO CONTACT US:

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SPECIFICATION

Revised in May 2025

Parameter		Sym.	Conditions	Value			Unit	Note
				Min.	Typ.	Max.		
Frequency range		f_0		8		150	MHz	
Initial tolerance		$(f-f_0)/f_0$	+25°C, V_C=0.5*V_{ref}			±0.1	ppm	
RF output								
HCMOS (TTL)	Load			10		15/5	kOhm 8	10/100 MHz
	H-level voltage	V_H	V_{cc}=5V	3.7			V	
			V_{cc}=3.3V	2.4				
	L-level voltage	V_L				0.4	V	
	Duty cycle			45		55	%	
	Rise/Fall time					10/3	ns	10/100 MHz
Sine-wave	Load	R_L						
	Level	L	V_{cc}=5V	+7			dBm	
			V_{cc}=3.3V	+4				
	Harmonics level					-25	dBc	
Sub-harmonics level				none				
Power supply								
Voltage		V_{CC}		4.75	5.0	5.25	V	
				3.15	3.3	3.45		
Power consumption			at warming-up			1100	mW	
			at steady state, +25°C		130			10MHz,-40°C..85°C
Warm-up time		t_{up}	at +25°C to Δf/f=1e-7	30	90		s	ref. to freq. after 15 min. of operation
			at +25°C to Δf/f=1e-8		120			
Frequency control								
Control voltage range		V_C	V_{CC}=5V	0		4.2	V	
			V_{CC}=3.3V	0		2.8		
Tuning range			sets off 10 years of aging	±0.3	±1		ppm	positive slope
Reference voltage		V_{ref}		4.0	4.2	4.3	V	
				2.7	2.8	2.9		
Frequency stability								
vs. temperature			ref. 25°C, air flow 0.5 m/s max.			±2	ppb	10MHz -40°C..85°C See ordering code
vs. supply voltage			ref V_{CC} typ.		±1		ppb	
G – sensitivity			worst direction, 0 – 1kHz vibration BW	±0.2	±0.5		ppb/G	for 0 – 2kHz BW Consult the factory
Retrace			24h work after 24h off		±1		ppb	10 MHz
SSB Phase noise			1 Hz		-100/70		dBc/Hz	10/100 MHz V_{CC}=5V
			10 Hz		-130/-100			
			100 Hz		-153/-130			
			1 kHz		-163/-155			
			10 kHz		-170/-168			
			100 kHz		-172/-170			
Allan deviation			1 s		5		e-12	10 MHz
Aging	per day		after 30 days of operation	±0.5			ppb	10MHz see ordering code
	per month			±1			ppb	
Environmental, mechanical conditions								
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			Non-condensing 95%					
Mechanical shock			150G half sine pulse, 5 ms; 500 g, 1 ms for XBO8D version					
Vibration			10G swept sine, 0 to 2000Hz; 20G, 0 to 2000Hz for XBO8D version					
Soldering conditions			Not reflow compatible. 260°C 10s (on pins)					

FOR ORDERING CODE — SEE NEXT PAGE

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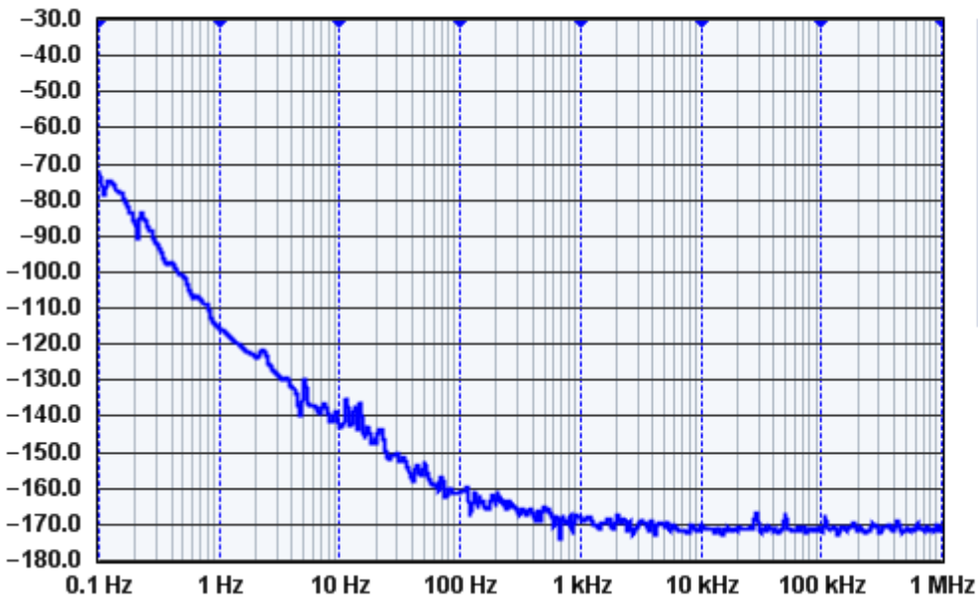
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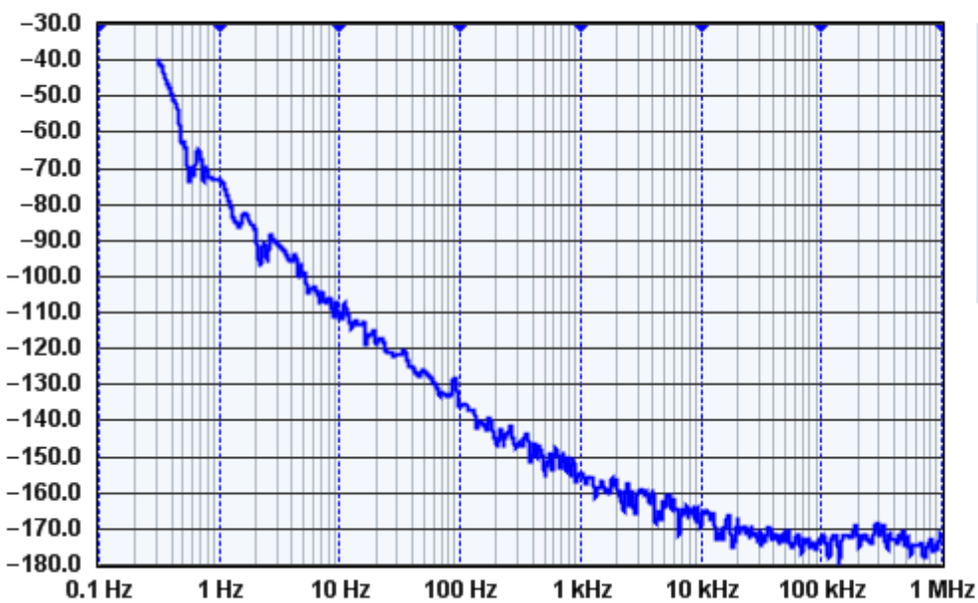
Phase Noise ℒ(f) in dBc/Hz



Noise Marker (Hz)	dBc/Hz
0.1 Hz	-72.0
1 Hz	-115.5
10 Hz	-143.2
100 Hz	-161.0
1 kHz	-168.7
10 kHz	-170.5
100 kHz	-170.8
1 MHz	-171.1

Input Freq
10.0 MHz

Phase Noise ℒ(f) in dBc/Hz



Noise Marker (Hz)	dBc/Hz
1 Hz	-73.4
10 Hz	-111.3
100 Hz	-135.7
1 kHz	-154.4
10 kHz	-165.7
100 kHz	-173.4
1 MHz	-171.1

Input Freq
100.0 MHz

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ORDERING CODE EXAMPLE

Revised in May 2025

XBO8(S,L,D)	8	58	29	5	S	10	2374C
1	2	3	4	5	6	7	8

1	XBO design
Code	
8	DIP8
8S	SMD
8L	Low profile
8D	Shock resistant

2	Temperature range
Code	Specification
5	0°C..50°C
6	-10°C..60°C
7	-30°C..70°C
8	-40°C..80°C
9	-40°C..85°C
C	Customized

3	Temperature stability *
Code	Specification
XY	±Xe-Y
	example:
29	±2e-9

*please consult the factory for availability

4	Aging code examples	
Code	ppb/day	ppb/per month
29	2	5
50	0.5	4
20	0.2	3
10	0.1	3
05	0.05	2
03	0.03	1

5	Supply voltage
Code	Specification
3	3.3V±5%
5	5V±5%

6	Output form
S	Sine
C	CMOS

7	Operation frequency, MHz

8	Manufacturer specification, Number
Determines by the factory. Needed for subsequent orders.	

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