

Revised in September 2021

## High stability low phase-noise OCXO

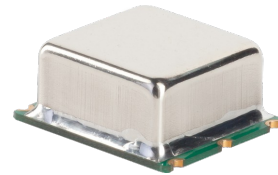
### Features

High temperature stability: to  $\pm 0.5$  ppb in  $(-40 +85)^{\circ}\text{C}$   
 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

Packaging type S: "Surface mount" 25.4x22

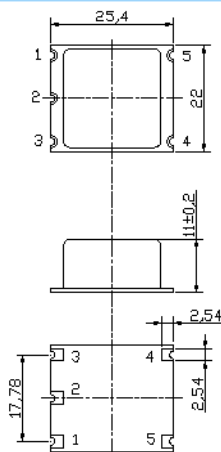


RoHS compliant

## 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.

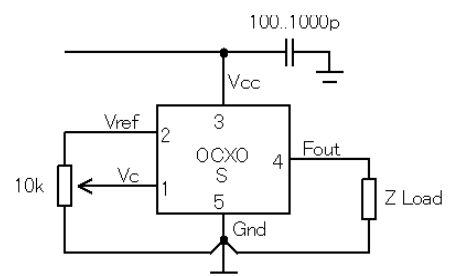
### Physical Dimensions



\*Some frequency stabilities are available in 13.6mm height only.

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

### Pin Connections



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

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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, $V_c=0.5*V_{ref}$	±0.01	±0.1		ppm		
<b>RF output</b>								
HCMOS (TTL) option	Load		10		15/5	kOhm pF	10/100 MHz	
	H-level voltage	$V_{Hl}$	$V_{cc}=5V, 12V$ $V_{cc}=3.3V$	3.7 2.4		V		
	L-level voltage	$V_{Ll}$			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 – 500 Hz 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 $V_{cc}=5V, 12V$	
		10 Hz	-140/-100		-120/-85			
		100 Hz	-155/-130		-145/-115			
		1 kHz	-165/-155		-155/-150			
		10 kHz	-170/-170		-160/-160			
	100 kHz	-172/-175		-162/-165				
Allan deviation		1 s	0.5		15	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 sweep sine 0 to 500Hz							
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>MXOCS</b>	<b>-</b>	<b>B</b>	<b>18</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>	<b>Temperature range</b>
<i>Code</i>	<i>Specification</i>
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

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

<b>3</b>		<b>Aging per day/year, ppb/ppm</b>
<i>Code</i>	<i>Specification</i>	
A	0.1/0.015	≤10 MHz
B	0.2/0.02	
Z	0.3/0.03	≤20 MHz
C	0.5/0.05	
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

<b>4</b>	<b>Supply voltage</b>
<i>Code</i>	<i>Specification</i>
3	3.3V±5%
5	5V±5%
2	12V±5%

<b>5</b>		<b>Output</b>
<i>Code</i>	<i>Specification</i>	
T	HSMOS/TTL	
S	Sine wave	

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