


**OX-402**

### Description

The OX-402 is part of a series of oscillators specifically designed to support Timing Over Packet applications, in particular 1588-2008 based frequency and phase reference systems. The OX-402 is stratum 3E compliant.

### Features

- Standard Frequencies: 10; 12,8; 20; 24,576; 25 MHz
- Excellent temperature stability
- Superior long term stability
- Optimized to support Timing Over Packet applications
- Stratum 3E compliant according to GR1244

### Applications

- SETS clock support
- Wireless Base Stations
- Edge and Core Routers

### Performance Specifications

Frequency Stability <sup>1</sup>					
Parameter	Min	Typ	Max	Units	Notes
Over all stability (df/f <sub>0</sub> )			±4.6	ppm	Free run accuracy
Holdover			10	ppb	Over 24 hours and 40°C window
Drift			±1	ppb	Over 24 hours and ±2.8°C
Temperature stability (df/f)			±10	ppb	-40 to 85°C
Initial Tolerance (df/f <sub>0</sub> )			±500	ppb	@25°C
vs. supply voltage change (df/f)			±10	ppb	static; 3.3V ± 5%
vs. load change (df/f)			±10	ppb	static; Load ± 5%
vs. aging / daily (df/f)			± 1	ppb	after 30 days; @25°C
vs. aging / month (df/f)			± 25	ppb	after 30 days; @25°C
vs. aging / year (df/f)			± 100	ppb	after 30 days; @25°C
vs. aging / 10 years (df/f)			± 1	ppm	after 30 days; @25°C
Phase Stability					
Parameter	Min	Typ	Max	Units	Notes
Jitter			< 1.00	ps rms	@12kHz to 20MHz
MTIE 1s		0.2		ns	Wander Generation per GR1244, system performance when locked through a 1mHz loop bandwidth, see typical performance data.
MTIE 10s		2.0		ns	
MTIE 100s		10.0		ns	
MTIE 1000s		40.0		ns	

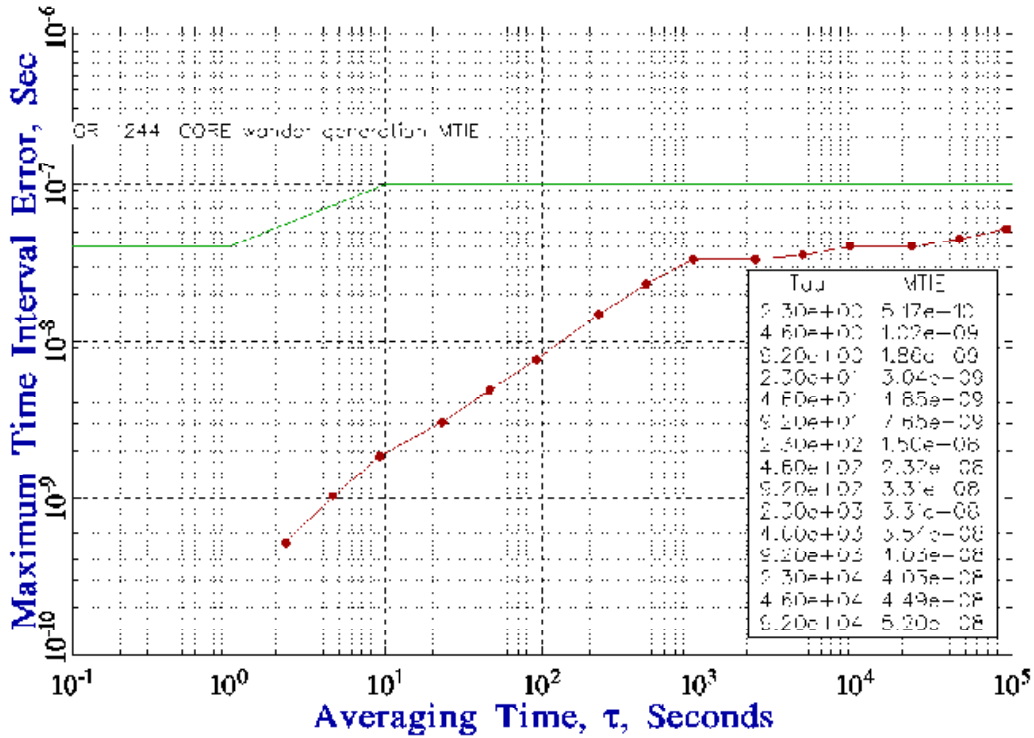
## Performance Specifications

Phase Stability (continued)					
Parameter	Min	Typ	Max	Units	Notes
TDEV 1s		0.015		ns	Wander Generation per GR1244, system performance when locked through a 1mHz loop bandwidth, see typical performance data.
TDEV 10s		0.13		ns	
TDEV 100s		1.5		ns	
TDEV 1000s		5.0		ns	
Phase Noise					
Parameter	Min	Typ	Max	Units	Notes
Phase Noise at 1 Hz Offset		-85	-60	dBc/Hz	At 20MHz
Phase Noise at 10 Hz Offset		-110	-90	dBc/Hz	
Phase Noise at 100 Hz Offset		-130	-115	dBc/Hz	
Phase Noise 1 kHz Offset		-143	-130	dBc/Hz	
Phase Noise at 10 kHz Offset		-150	-145	dBc/Hz	
RF Output					
Signal	LVCMOS				
Load	15			pF	±10%
Rise Time	< 10			ns	@ 10% to 90% V <sub>out</sub>
Fall Time	<10			ns	@90% to 10% V <sub>out</sub>
Duty Cycle	45/55			%	@ 1.65 V
V Low	x < 0.4			V	
V High	x > 2.4			V	
Supply					
Supply Voltage (V <sub>s</sub> )	3.3±10%			V	
Current consumption	< 330			mA	Steady state, @ V <sub>s</sub> nom, 25°C
Current consumption	< 757			mA	During warm up, @ V <sub>s</sub>
Additional Parameters					
Warm Up Time	< 3			minutes	@ 25°C to final frequency
Absolute Maximum Ratings					
	Min		Max		Units
Operating temperature range	-40		85		°C
Storage temperature range	-50		85		°C
Supply Voltage			5.5		V

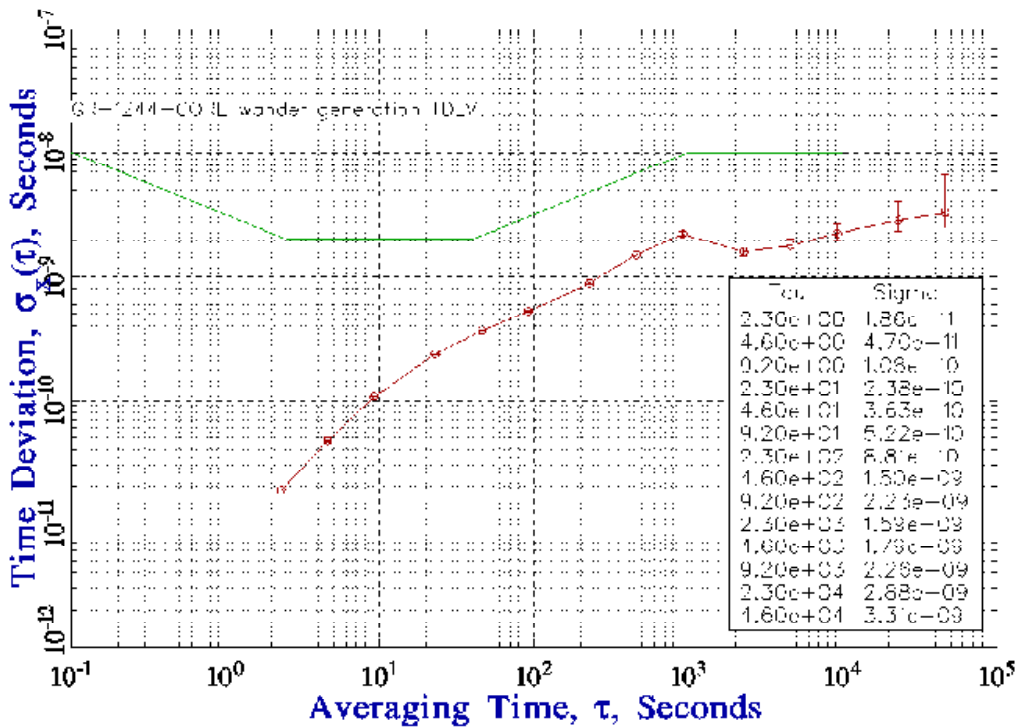
## Additional Environmental Conditions

Parameter	Description
Rapid temperature changes	MIL-883-1010 Cond B 1000 cycles -55/125C
Vibration	MIL-STD-883 Meth 2007 Cond A 20G 20-2000Hz 4x in each 3axis 4 min
Shock	JESD22-B104-B 100G 1,5ms 6 shocks in each direction
Solderability	J_STD_002C Cond A, Through hole device/ Cond. B, SMD 255C (dipping time 50,5sec.) Dip+Look with 8h damp pre-treatment: solder wetting >95%
Solvent resistance	MIL-STD-883 Meth 2015 Solv. 1,3,4
ESD	HBM JESD22-A114-E Class 2 10* 2000V
Moisture Sensit.	Level 1 JESD22-A113-B
RoHS compliance	100% RoHS 6 compliant
Washable	washable device

# FREQUENCY STABILITY



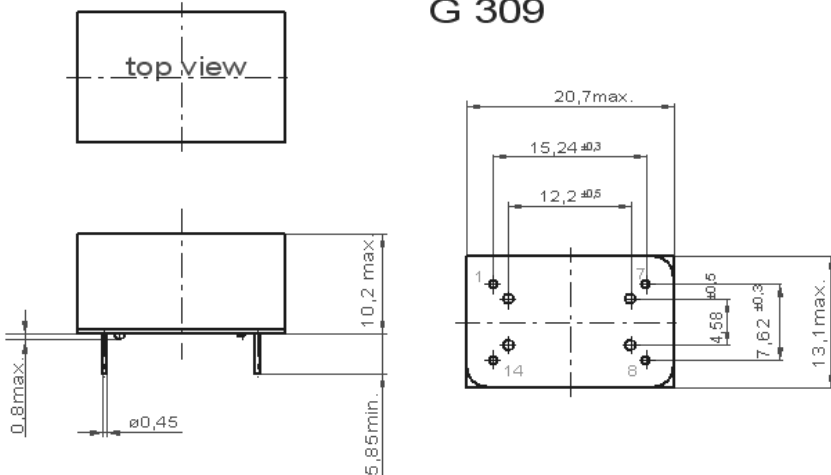
# TIME STABILITY



Wander Generation per GR1244, system performance when locked through a 1mHz loop bandwidth.

# Outline Drawing / Enclosure OX-402

Dimensions in mm



G 309

Height Codes		
Code	Height "H"	Pin Length "L"
2	10.2	5.85

Pin Assignment	
Pin	Connection
1	I.C. (do not connect)
7	GND
8	RF Out
14	V <sub>s</sub> (Supply)

## Ordering Information

**OX - 402 2 - E A J - 108 0 - 20M000000**

Product Family  
OX: OXCO

Package  
THT: 4022

Height  
2: 10.2mm

Supply Voltage  
E: +3.3V

RF Output Code  
A: HCMOS

Temperature Range  
E: -40°C to +85°C  
J: -20°C to +70°C

Stability Code  
108: ±10ppb

Frequency  
Frequency Control  
0: Fixed Frequency

### Notes:

- Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
- Unless other stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
- Phase noise degrades with increasing output frequency.
- Subject to technical modification.
- Contact factory for availability.

## For Additional Information, Please Contact

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