

Helping Customers Innovate, Improve & Grow



### 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: 10MHz, 19.44MHz, 20MHz, 38.88MHz, 40MHz
- 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

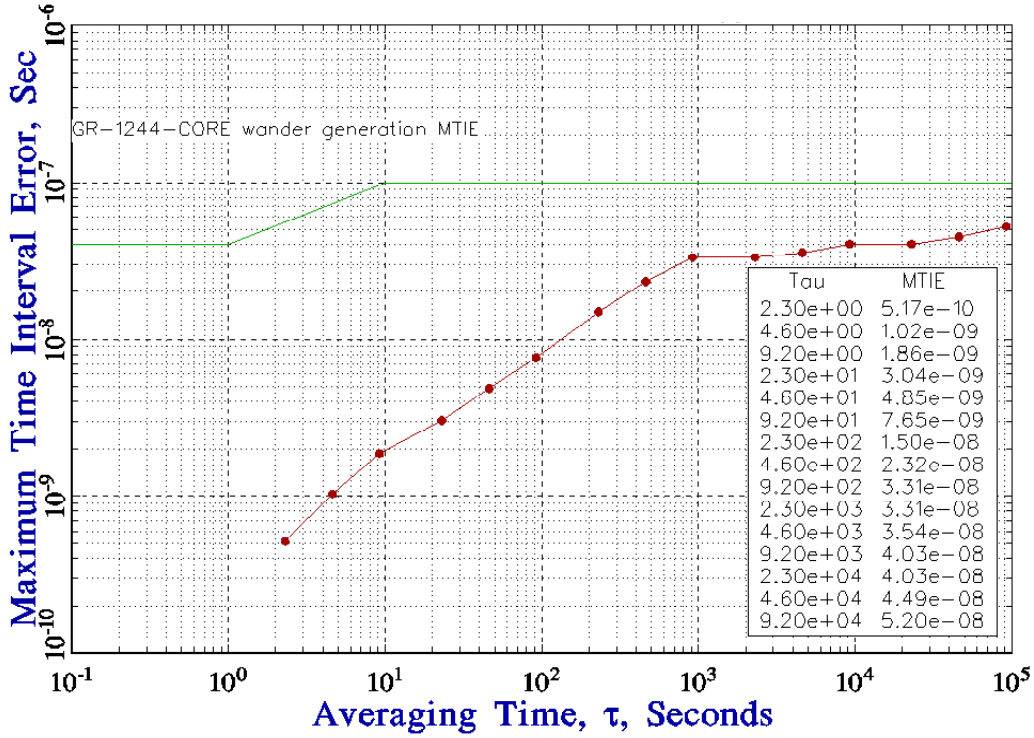
### Performance Specifications

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	

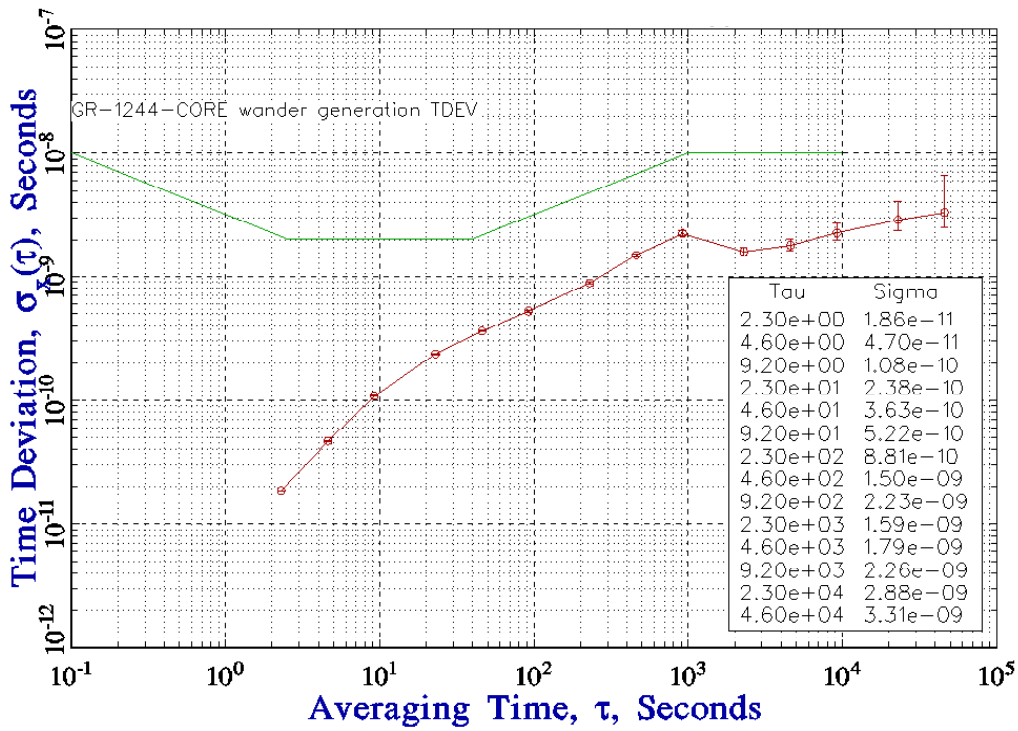
## Performance Specifications

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
ROHS	100% ROHS 6 compliant				
Washable	Washable device (hermetically sealed).				
Absolute Maximum Ratings					
	Min		Max		Units
Operating temperature range	-40		85		°C
Storage temperature range	-50		85		°C
Supply Voltage			5.5		V

# FREQUENCY STABILITY



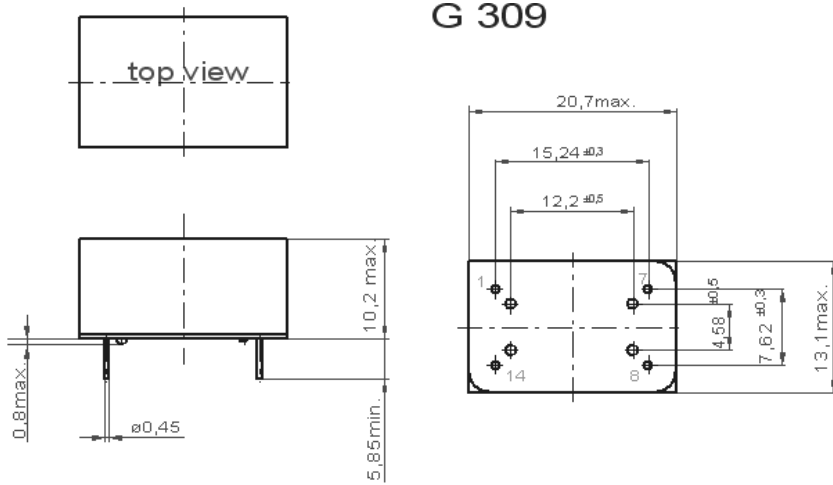
# TIME STABILITY



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

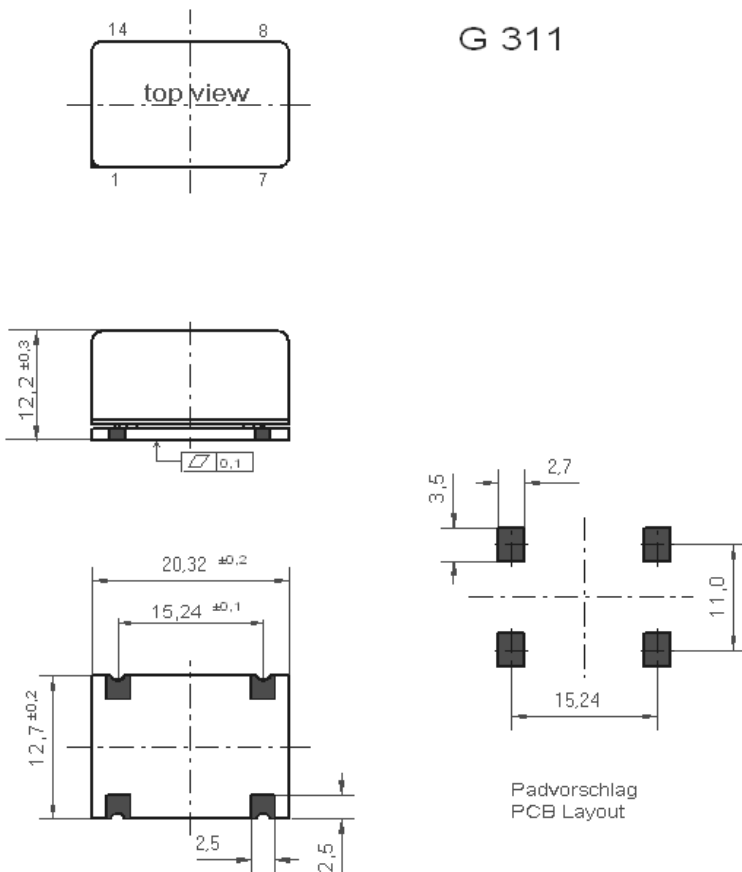
Code	Height "H"	Pin Length "L"
2	10.2	5.85

### Pin Assignment

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

## Outline Drawing / Enclosure OX-403

Dimensions in mm



G 311

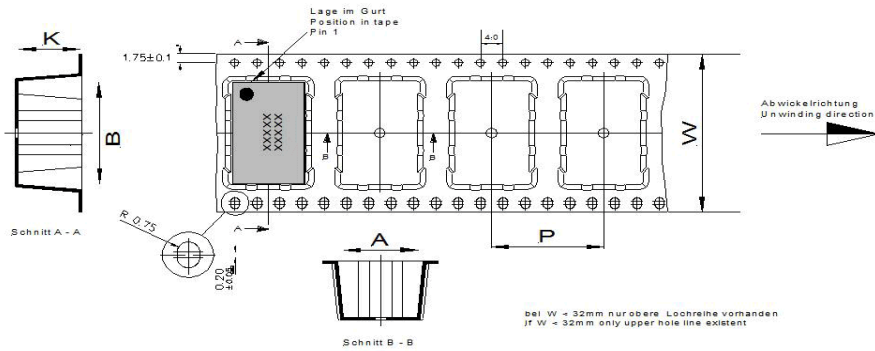
### Height Codes

Code	Height "H"	Pin Length "L"
3	12.2	NA

### Pin Assignment

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

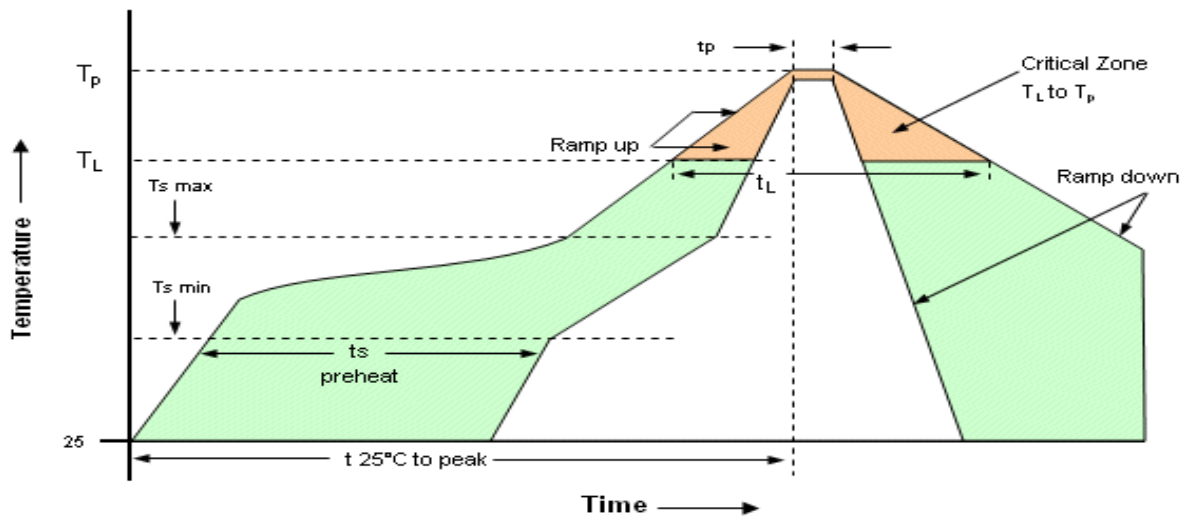
# Tape and Reel Dimensions (OX-403)



Maßangaben in mm : A, B und K Maße vom Bauelement abhängig, Fertigungstoleranzen entsprechen der DIN IEC 286-3	Dimension in mm : A, B und K are dependent upon component dimensions, production tolerance complying DIN IEC 286-3
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Enclosure Type	Tape Width W (mm)	Quantity per meter	Quantity per reel	Dimension P
OX-403	44	50	300	20

## Recommended Reflow Profile

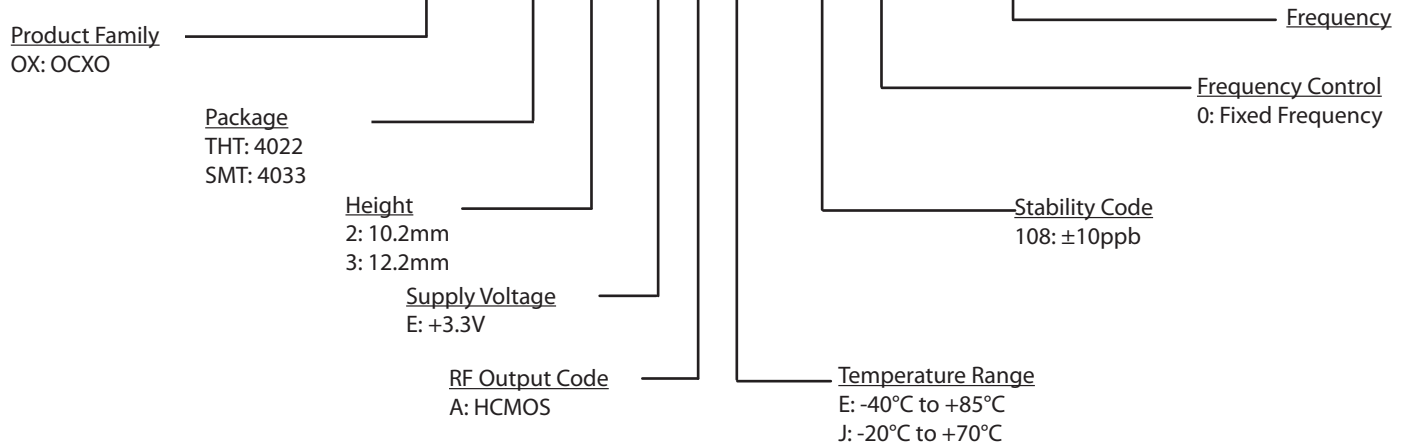


Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly	Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly
Average ramp-up rate ( $T_L$ to $T_p$ )	3°C/second max.	Time 25°C to Peak Temperature	8 minutes max.
Preheat -Temperature Min $T_{Smin}$ -Temperature Min $T_{Smax}$ -Time (min to max) $t_s$	150°C 200°C 60-180 seconds	Time maintained above -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds
$T_{Smax}$ to $T_L$ -Ramp-up Rate	3°C/second max		
Time maintained above -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds	Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Peak Temperature ( $T_p$ )	max 260°C	Ramp-down Rate	6°C/ second max

**Note:** All temperatures refer to topside of the package, measured on the package body surface.

## Ordering Information

**OX - 402 2 - E A J - 108 0 - 20M0000000**



### Notes:

1. Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
2. 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).
3. Phase noise degrades with increasing output frequency.
4. Subject to technical modification.
5. Contact factory for availability.

## For Additional Information, Please Contact

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