

Helping Customers Innovate, Improve & Grow



The OX-172 is a high stability ovenized crystal oscillator characterized for IEEE-1588 PTP applications in a 28 x 38 mm package. Driven by an SC cut crystal, the oscillator provides TDEV and MTIE values that exceed the GR1244 system performance requirements when locked through a 1 MHz bandwidth. The OX-172 is designed for operation during congested network conditions, when the frequency and quality of the packet information is degraded. The OX-172 is a member of the OX-17 oscillator series. Other oscillators in the series include the OX-170 standard oscillator, OX-171 high stability oscillator, and the OX-174 and OX-175 low phase noise oscillators. The Vectron design team will also help develop custom solutions where performance optimization is required for specific applications. Please contact the factory for customization options.

### Features

- Reflow Process Compatible
- SC-Cut resonator
- Temperature stability to 2 ppb peak to peak
- Best in class MTIE and TDEV
- Optimized to support timing over packet applications
- Standard Frequencies: 10, 12.8, 20 MHz

### Applications

- SETS clock support
- Edge and Core routers

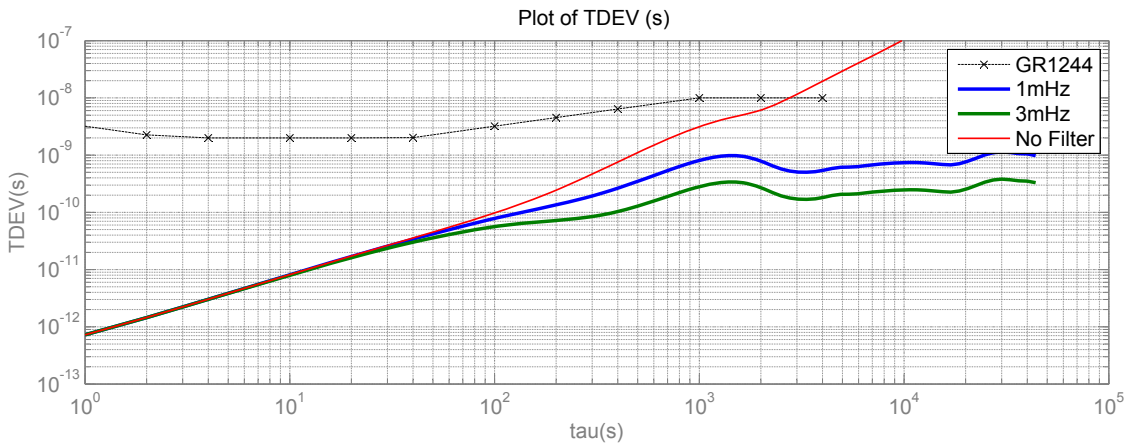
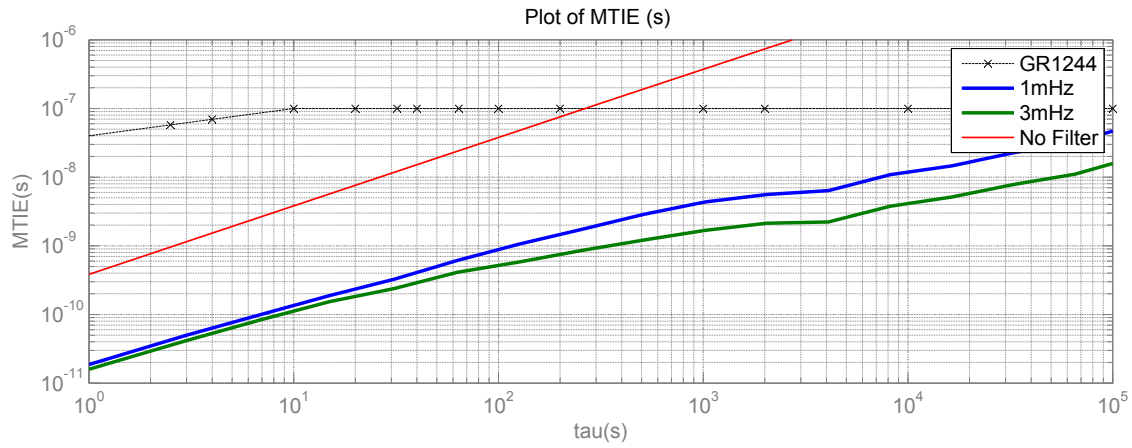
### Performance Specifications

Frequency Stabilities <sup>1</sup>					
(Stabilities listed for 10 MHz. For stabilities above 10 MHz values may degrade. Please contact factory)					
Parameter	Min	Typical	Max	Units	Condition
Overall Stability	-1.0		+1.0	ppm	Free run accuracy (20 years all conditions)
Drift	-0.3		+0.3	ppb	over 24 hours and $\pm 3.0^{\circ}\text{C}$
vs. Operating Temperature Range (referenced to $+25^{\circ}\text{C}$ )			2 4	ppb pk-pk ppb pk-pk	$-20$ to $+70^{\circ}\text{C}$ $-40$ to $+85^{\circ}\text{C}$
Initial Tolerance	-500		+500	ppb	at time of shipment
vs. Supply Voltage Change	-0.5		+0.5	ppb	$V_s \pm 5\%$
vs. Load Change	-0.5		+0.5	ppb	Load $\pm 5\%$
vs. Aging / Day	-1		+1	ppb	after 24 hours operation @ $25^{\circ}\text{C}$
vs. Aging / Day	-0.2		+0.2	ppb	after 72 hours operation @ $25^{\circ}\text{C}$
vs. Aging / Year	-20		+20	ppb	after 72 hours operation @ $25^{\circ}\text{C}$
vs. Aging / 20 Years	-300		+300	ppb	after 72 hours operation @ $25^{\circ}\text{C}$
Retrace <sup>2</sup>	-10		+10	ppb	
Warm-up Time			5	minutes	to $\pm 10$ ppb of final frequency (1 hour reading) @ $+25^{\circ}\text{C}$

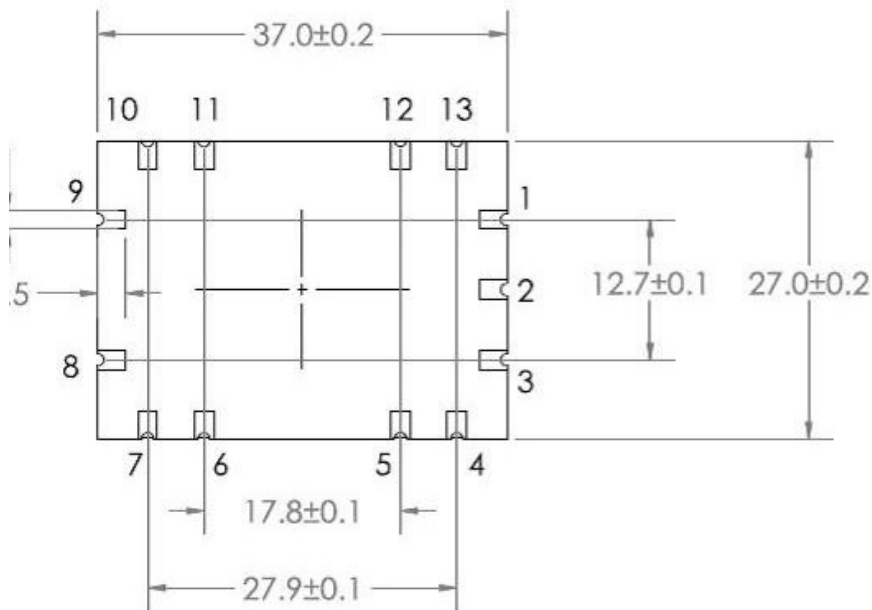
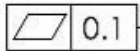
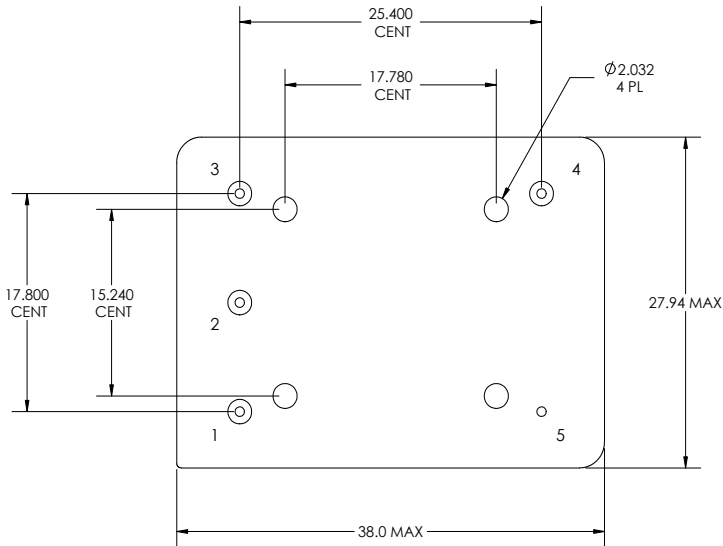
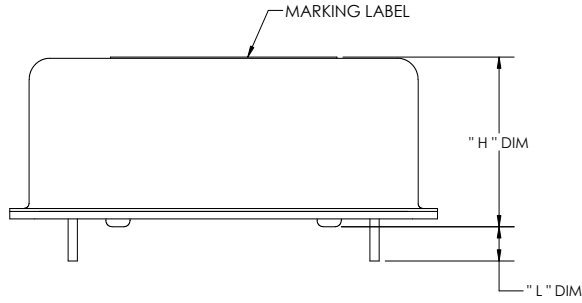
## Performance Specifications

Phase Stability (at 10 MHz)					
Parameter	Min	Typical	Max	Units	Condition
<b>Additional Parameters</b>					
MTIE 1 s		0.02		ns	Wander Generation per GR1244, system performance when locked through a 1MHz loop bandwidth, see typical performance data.
MTIE 10 s		0.1		ns	
MTIE 100 s		1.0		ns	
MTIE 1000 s		5.0		ns	
TDEV 1 s		0.001		ns	Wander Generation per GR1244, system performance when locked through a 1MHz loop bandwidth, see typical performance data.
TDEV 10 s		0.008		ns	
TDEV 100s		0.1		ns	
TDEV 1000s		1		ns	
Phase Noise			-85	dBc/Hz	1 Hz
			-115	dBc/Hz	10 Hz
			-135	dBc/Hz	100 Hz
			-145	dBc/Hz	1 kHz
			-150	dBc/Hz	10 kHz
For lower phase noise, please review the OX-174 datasheet.					
g-sensitivity				1	ppb/g
g-sensitivity of 0.5 ppb/g available in this package size. Please contact factory for ordering information.					
For g-sensitivity <0.5 ppb/g, please review the OX-043 series.					
<b>Supply Voltage (Vs)</b>					
Parameter	Min	Typical	Max	Units	Condition
Supply Voltage (Vs)	3.135	3.3	3.465	VDC	
	4.75	5.0	5.25	VDC	
Power Consumption			3.5	Watts	during warm-up, all temperatures
			1.5	Watts	steady state @ +25°C
		3.3		Watts	steady state @ -40°C
		0.5		Watts	steady state @ +85°C
<b>RF Output</b>					
Start Time		1		s	time required to achieve 90% of amplitude
Signal [standard]	HCMOS				
Load		15		pF	
Signal Level (Vol)			0.4	VDC	with Vs=3.3V
Signal Level (Vol)			0.5		with Vs=5.0V
Signal Level (Voh)	2.4			VDC	with Vs=3.3V
Signal Level (Voh)	3.5				with Vs=5.0V
Duty Cycle	45		55	%	@ (Voh-Vol)/2
<b>Frequency Tuning (EFC)</b>					
Tuning Range	Fixed OCXO; No adjust				

Absolute Maximum Ratings					
Supply Voltage (Vs)			6.5	VDC	with Vs=3.3 & 5.0 VDC
Output Load			50	pF	
Operable Temperature Range	-55		+95	°C	Operable temperature range implies the device will continue to operate with no long-term damage to unit; however, it will not be specification compliant outside the operating temperature range.
Environmental and Product Classification					
Shock (Endurance)	MIL-STD-202, Method 213, Condition J, 30g 11 ms				
Sine Vibration (Endurance)	MIL-STD-202, Method 201 and 204, Condition A, except 5g to 500 Hz, 1 sweep each axis				
Random Vibration (Endurance)	MIL-STD-202, Method 214, Condition I-D				
Humidity	MIL-STD-202, Method 103, Condition B, 100% rh				
Seal	MIL-STD-202, Method 112, Condition D, hermetic, washable				
Altitude	MIL-STD-202, Method 105, sea level to space				
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition A,B,C				
Terminal Strength	MIL-STD-202, Method 211, Condition C (5 bends at 45°, 2 lbs)				
Moisture Sensitive Level	1				
RoHS	6 (fully compliant)				
Storage Temperature Range	-55		+125	°C	
Weight			25	g	



# Outline Drawing / Enclosure



## Through hole Package configuration A

	Height "H"	Pin Length "L"
0	18.2 max	4.5 mm min

Additional height options available contact factory .  
Note lower height reduces stability

## Pin Connections

1,2	No Connect
3	Supply Voltage Input (VS)
4	RF Output
5	Ground (Case)

Dimensions in mm

## Surface mount Package configuration B

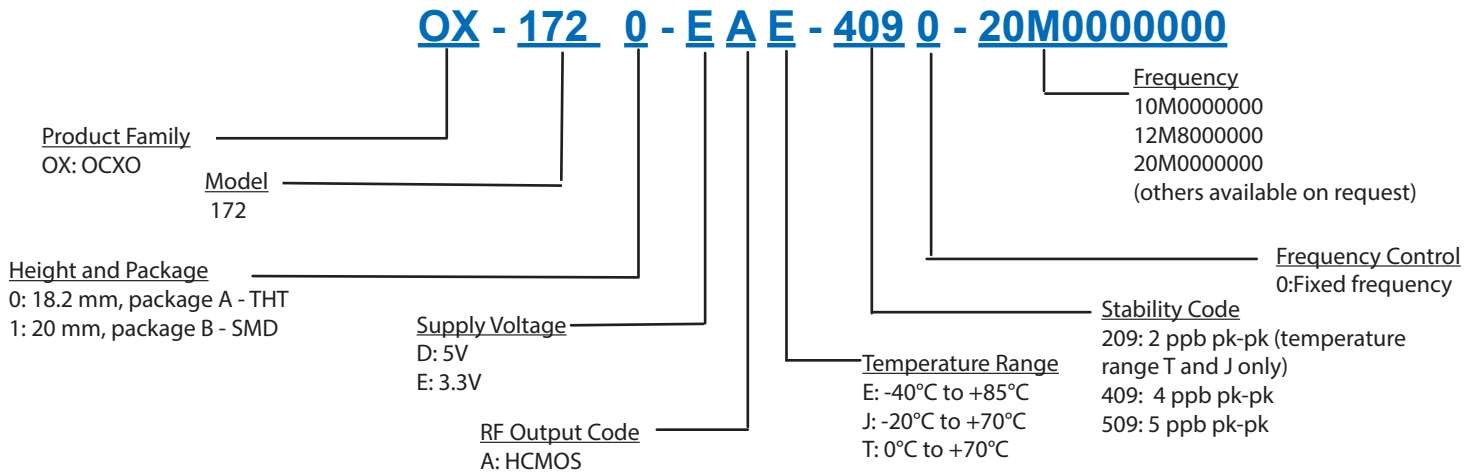
	Height "H"	Pin Length "L"
1	20 max	n/a

Additional height options available contact factory .  
Note - lower height reduces stability

## Pin Connections

1,2,4,5,6,7, 11,12,13	No Connect
3	Supply Voltage Input (Vs)
8	RF Output
9,10	Ground (Case)

## Ordering Information<sup>3</sup>



## Additional Ordering Options

Additional ordering options available include custom aging rates, custom temperature ranges, custom temperature stabilities, custom phase noise requirements, sine wave option, improved g-sensitivity, and oscillators with EFC and reference voltages. These modifications require a custom dash number - please contact the factory for additional information.

## Design Tools

Vectron stocks the following items for small orders and prototype development:
OX-1720-EAE-4090-20M0000000
Vectron stocks the following evaluation board for this product:
OCXO Evaluation Board
Application Notes:
None

### Notes:

- Unless otherwise stated, all values are valid after warm-up time and refer to typical conditions for supply voltage, load, and temperature (25°C).
- Retrace is defined as the frequency difference between the end of two 24 hour on power periods with a 24 hour off period in between while at a constant temperature.
- Not all options and codes available at all frequencies.

## For Additional Information, Please Contact

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