

**OX-221**

### Features

- Surface Mount package
- SC\_CUT Crystal
- Low Profile Compact Package
- standard frequency: 10, 20, 30.72 MHz

### Applications

- Base stations
- Test equipment
- Synthesizers
- Military communication equipment
- Digital Switching

## Performance Specifications

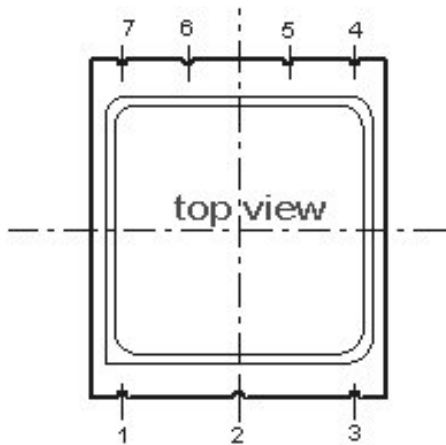
Frequency Stabilities <sup>1</sup> ( MHz)					
Parameter	Min	Typical	Max	Units	Condition
vs. operating temperature range (referenced to +25°C)	-3		-3	ppb	--40 to +85°C
Initial tolerance	-0.2		+0.2	ppm	at time of shipment, nominal EFC V <sub>s</sub> ±5% static Load ±5% static after 30 days of operation after 30 days of operation
vs. supply voltage change	-2		+2	ppb	
vs. load change	-2		+2	ppb	
vs. aging / day	-0.5		+0.5	ppb	
vs. aging / year	-60		+60	ppb	
holdover	-10		10	µsec	over 8 hours and 5°C temp jump @ T <sub>0</sub>
start up time			1	sec	
Warm-up time			5	minutes	to ±100ppb of final frequency (1 hour reading) @ +25°C

## Performance Specifications

Supply Voltage (Vs)						
Parameter	Min	Typical	Max	Units	Condition	
Supply voltage (standard)	3.135	3.3	3.465	VDC		
Power consumption			4.0	Watts	during warm-up	
			1.35	Watts	steady state @ +25°C	
RF Output						
Signal [standard]	HCMOS					
Load		15		pF		
Signal Level (Vol)			0.4	VDC	with Vs=3.3V and 15pF Load	
Signal Level (Voh)	2.4			VDC	with Vs=3.3V and 15pF Load	
rise time			5	ns		
fall time			5	ns		
Duty Cycle	45		55	%	@ (Voh-Vol)/2	
Frequency Tuning (EFC)						
Tuning Range	Fixed OCXO; No adjust					
	±0.4		±1.0	ppm	@ 10 MHz	
	±0.8		±2.4	ppm	@ 20 MHz	
Linearity	10%					
Tuning Slope	Positive					
Control Voltage Range	0.0	1.4	2.8	VDC	with Vs=3.3V	
Reference Voltage Output (Vref)						
Reference Voltage	2.75	2.8	2.85	VDC	only EFC Version   Vs = 3.3 VDC	
Additional Parameters						
Phase Noise <sup>3</sup>		-102	-80	dBc/Hz	1 Hz	@ 10MHz
		-132	-110	dBc/Hz	10 Hz	
		-145	-130	dBc/Hz	100 Hz	
		-152	-140	dBc/Hz	1 kHz	
		-155	-145	dBc/Hz	10 kHz	
		-155	-150	dBc/Hz	100kHz	
Phase Noise <sup>3</sup>		-81	-70	dBc/Hz	1 Hz	@ 30.72MHz
		-114	-100	dBc/Hz	10 Hz	
		-128	-115	dBc/Hz	100 Hz	
		-135	-130	dBc/Hz	1 kHz	
		-149	-140	dBc/Hz	10 kHz	
		-163	-150	dBc/Hz	10 kHz	
Weight			14	g		
Processing & Packing	Handling & Processing Note					

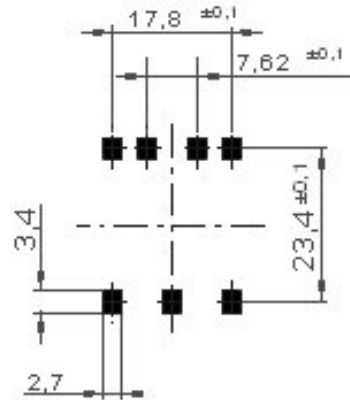
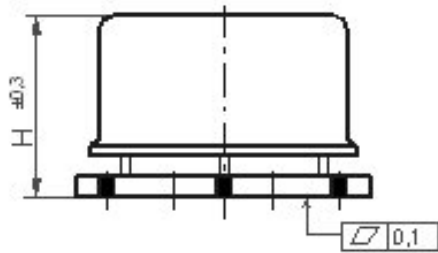
Absolute Maximum Ratings					
supply voltage (Vs)			5.5	V	with Vs=3.3 & 5.0VDC
Output Load			50	pF	
Operable Temperature Range	-45		+85	°C	
Storage Temperature Range	-45		+85	°C	

## Outline Drawing / Enclosure

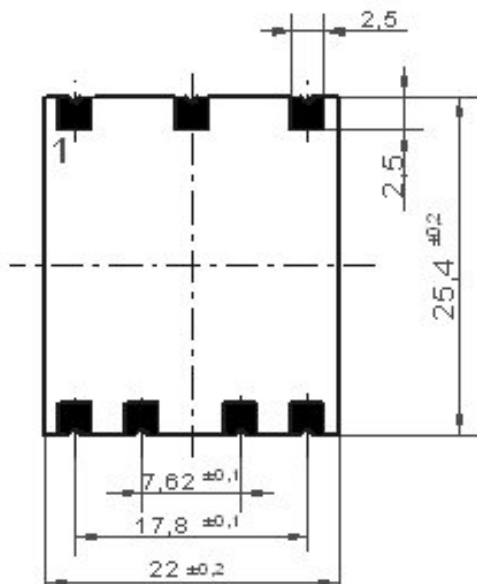


G275

OX-220	
Height "H"	cover material
12.1	metal



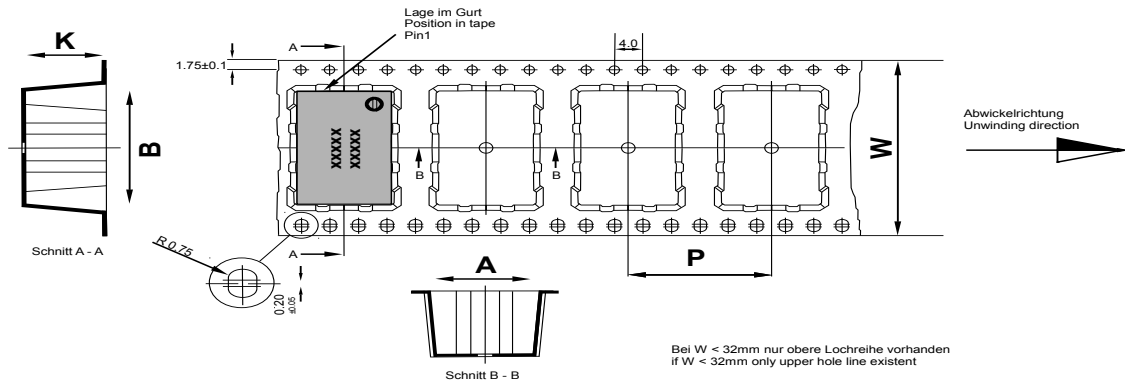
Padvorschlag  
land pattern  
recommendation



Pin Connections	
1	Electronic Frequency Control Input (EFC)
2	Reference Voltage output
3	Supply Voltage Input (Vs)
4	RF Output
5	N.C.
6	N.C or Option (must remain un connected)
7	Ground (Case)

Dimensions in mm

# Standard Shipping Method (OX-221)



Maßangaben in mm: A, B und K Maße von 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
--	--

All dimensions in millimeters unless otherwise stated

Enclosure Type	Tape Width W (mm)	Quantity per meter	Quantity per reel	Dimension P
OX-2211 (12.1mm)	44	37.5	100	28

## Recommended Reflow Profile

IPC/JEDEC J-STD-020 (latest revision)

Additional Information:

This SMD oscillator has been designed for pick and place reflow soldering.

SMD oscillators must be on the top side of the PCB during the reflow process.

## 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	Mech.Shock MIL-STD-202 Meth 213 Cond.C 100G 6ms 6 shocks in each direction
Solderability	J_STD_002C Cond A, Through hole device/ Cond. B, SMD 255C (diving 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-F Class 1C 10* 1000V
Moisture Sensit.	Level 1 JESD22-A113-B
RoHS compliance	100% RoHS 6 compliant
Washable	washable device

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

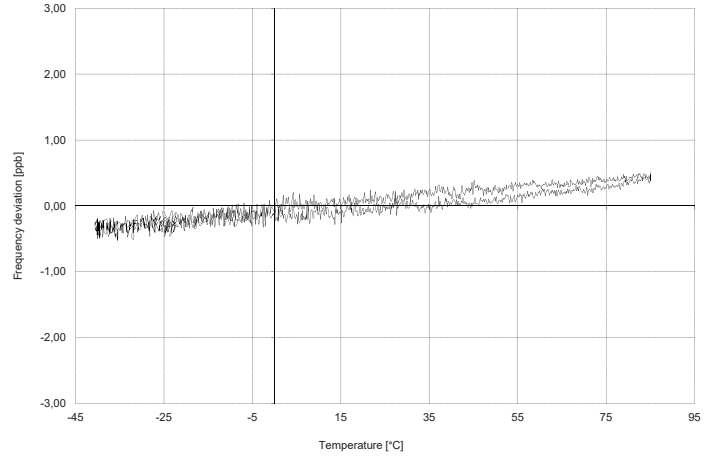
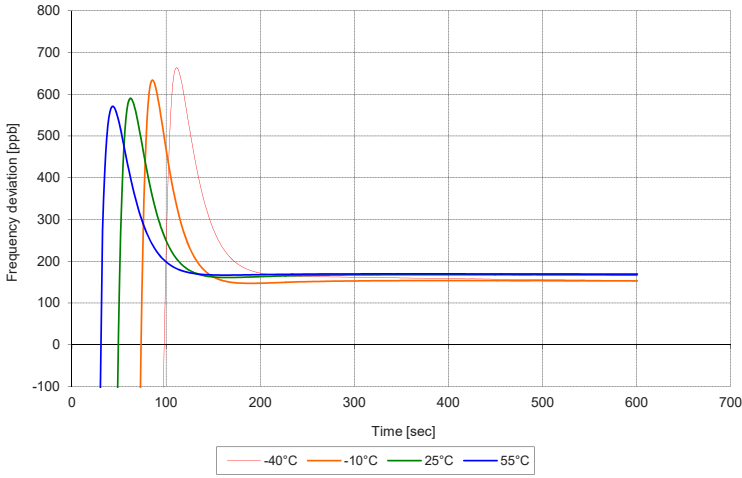
# typical performance data

## typical warm up

@ OX-2211-EAE-3090-10M000

## typical temp stability

@ OX-2211-EAE-3090-10M000

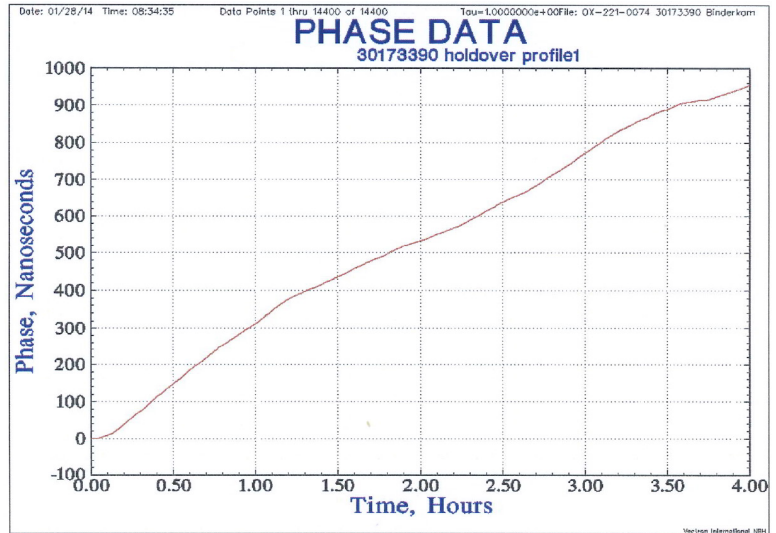
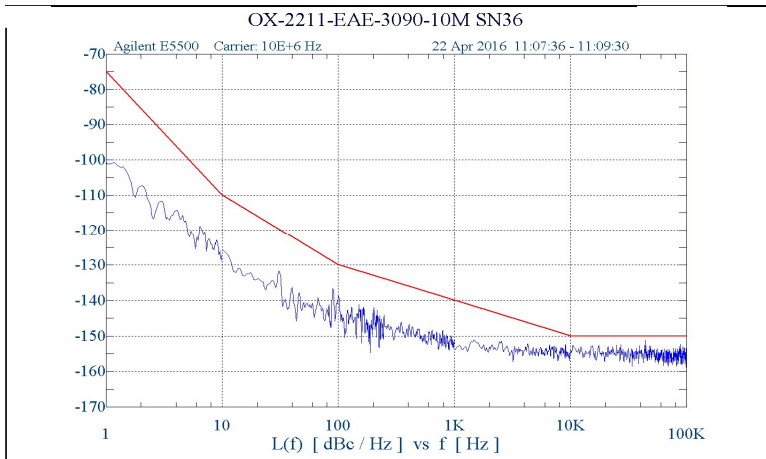


## typical Phase Noise

@ OX-2211-EAE-3090-10M000

## typical holdover over 4 hour +5°C temp jump

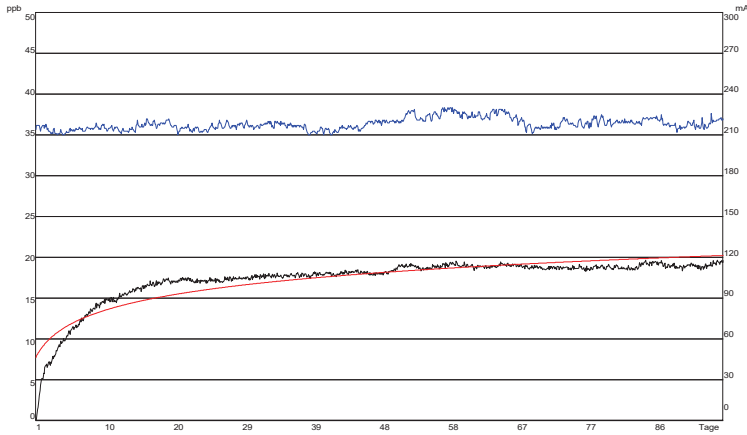
@ OX-2211-EAE-3090-10M000



# typical performance data

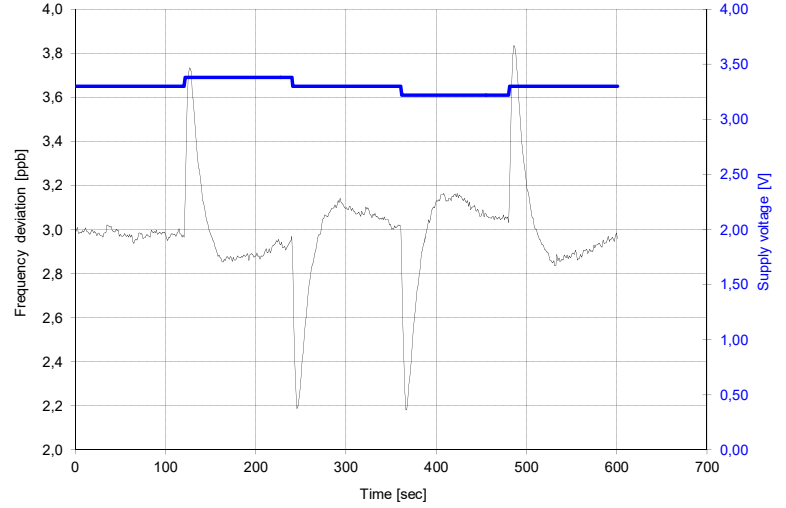
## typical aging data

@ OX-2211-EAE-3090-10M000



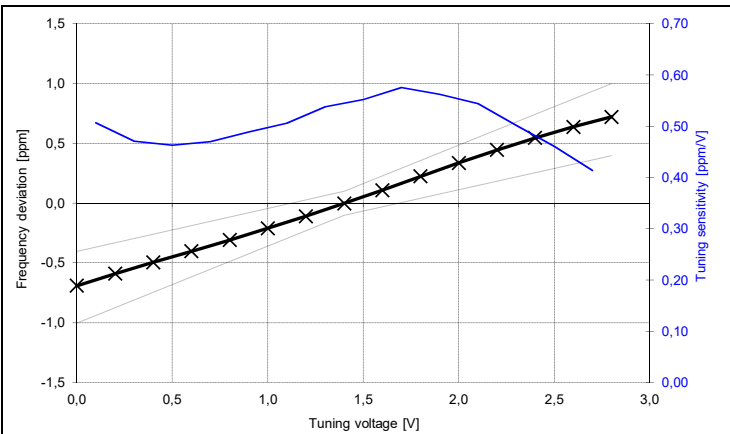
## typical frequency vs. supply voltage

@ OX-2211-EAE-3090-10M000



## typical frequency tuning

@ OX-2211-EAE-3090-10M000



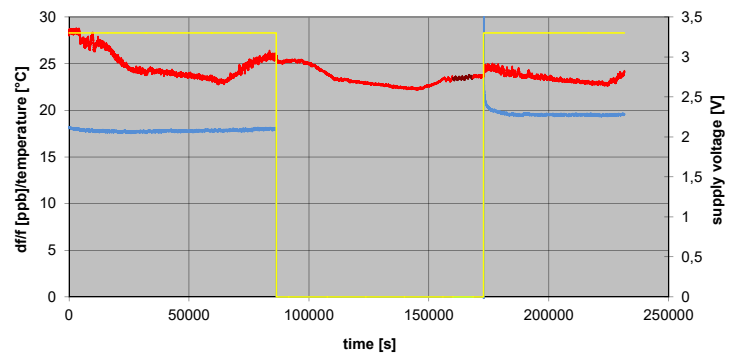
Frequency deviation [ppm]			Tuning sensitivity [ppm/V]			Non-linearity [%]
dfmin/f0	df/f0	dfmax/f0	Minimum	Average	Maximum	
-0,685	0,004	0,726	0,414	0,515	0,576	1,44

## typical retrace

@ OX-2211-EAE-3090-10M000

blue: frequency yellow: supply voltage red: ambient temperature  
retrace cycle: 24 h power on ; 24 h power off ; 16 h power on

### OX-300-EAE-0808 typical retrace



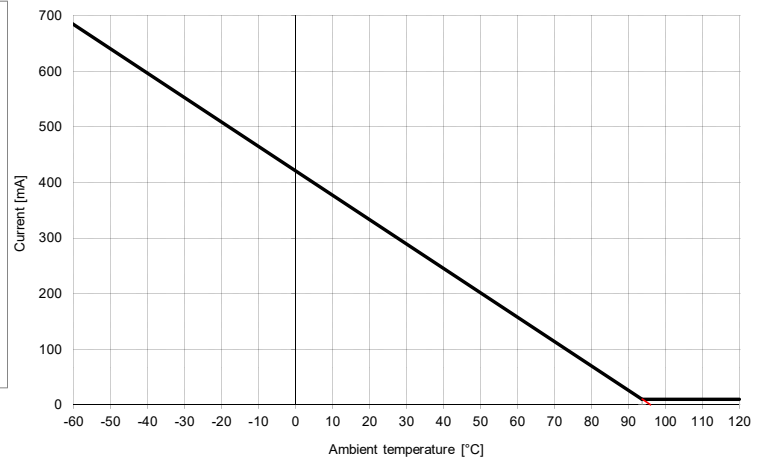
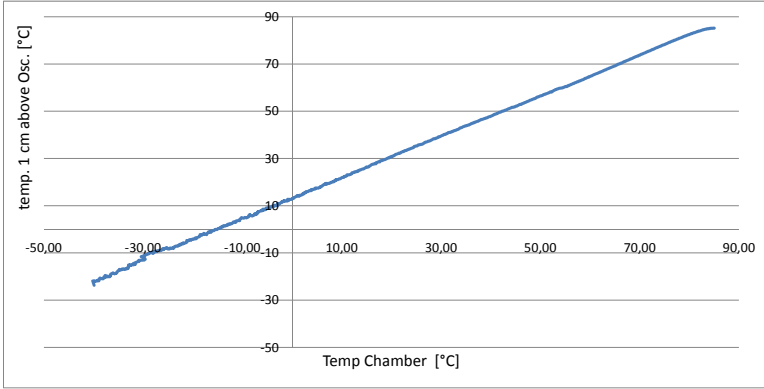
# typical performance data

## typical case temperature vs. outside temperature

@ OX-2211-EAE-3090-10M000

## typical power consumption vs. operating temperature

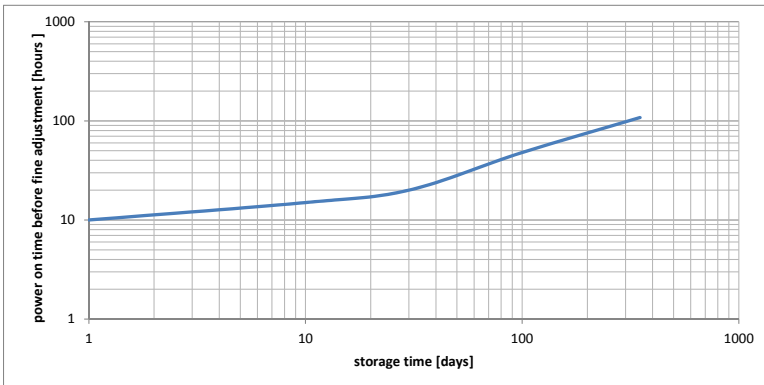
@ OX-2211-EAE-3090-10M000



## recommended power on time after x days of power off

@ OX-2211-EAE-3090-10M000

@ OX-2211-EAE-3090-10M000



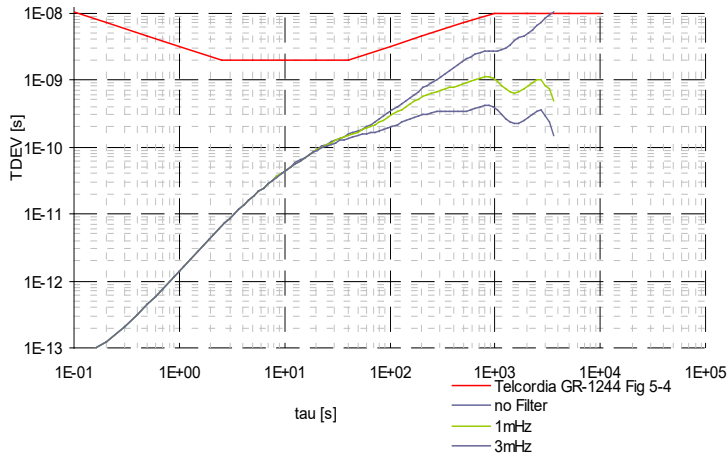
# typical performance data

## typical TDEV

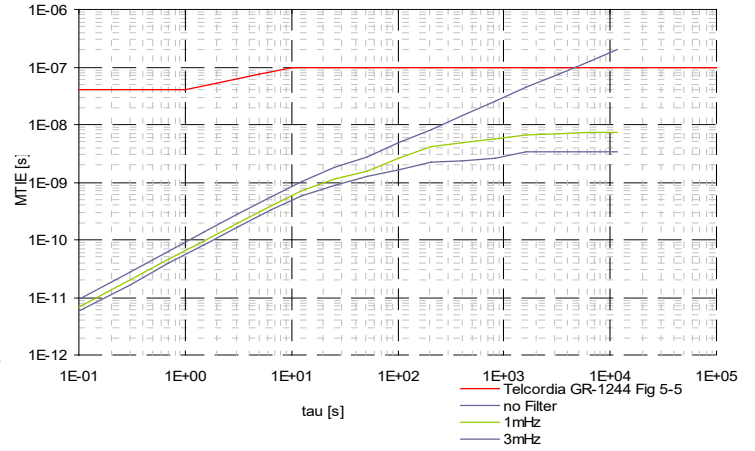
@ OX-2211-EAE-3090-10M000

## typical MTIE

@ OX-2211-EAE-3090-10M000



1mHz and 3 mHz MTIE Curve simulated based on measured frequency / phase data



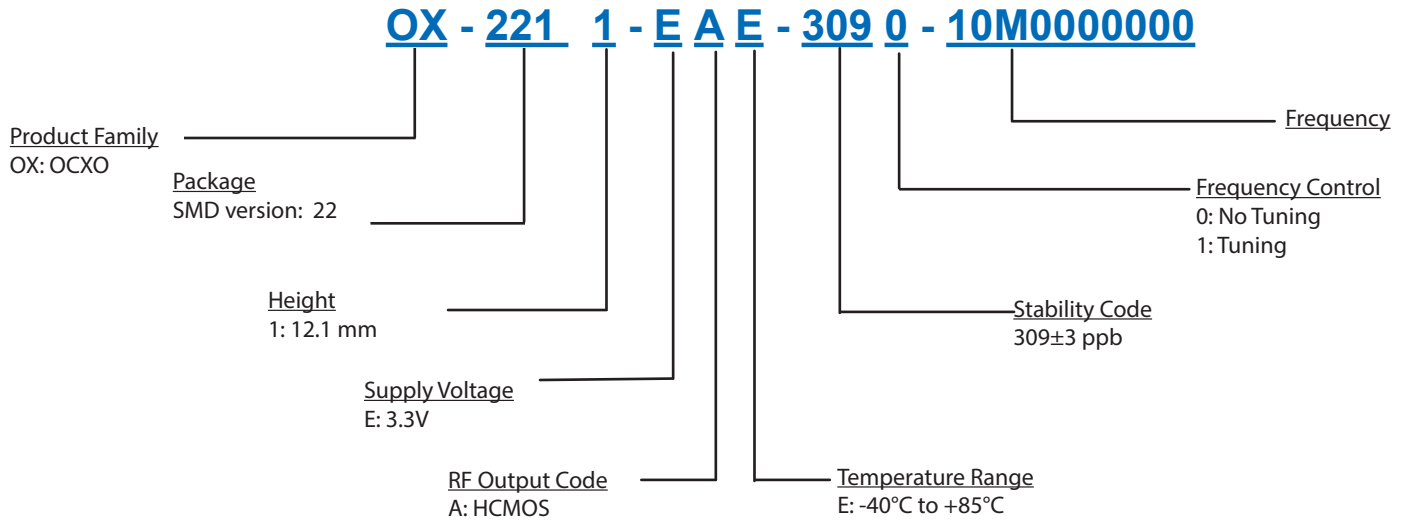
1mHz and 3 mHz MTIE Curve simulated based on measured frequency / phase data

@ OX-2211-EAE-3090-10M000

@ OX-2211-EAE-3090-10M000



## Ordering Information



**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.

## Contact Information

**USA:**

100 Watts Street  
Mt Holly Springs, PA 17065  
Tel: 1.717.486.3411  
Fax: 1.717.486.5920

**Europe:**

Landstrasse  
74924 Neckarbischofsheim  
Germany  
Tel: +49 (0) 7268.801.0  
Fax: +49 (0) 7268.801.281



Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATION OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION INCLUDING, BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly, or otherwise, under any Microchip intellectual property rights unless otherwise stated.

**Trademarks**

The Microchip and Vectron names and logos are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Microchip:](#)

[OX-2211-EAE-3091-10M000](#) [OX-221-9101-24M576](#) [OX-221-9100-20M000](#) [OX-221-9102-49M152](#) [OX-221-9115-10M000](#) [OX-221-9133-24M576](#) [OX-221-0105-20M000](#) [OX-221-0074-30M72](#)