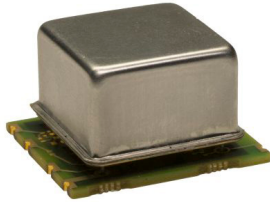


Helping Customers Innovate, Improve & Grow

**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

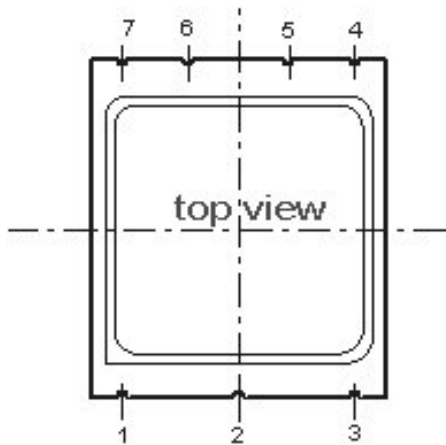
Frequency Stabilities ¹ (SC-Cut Crystal - 10 & 20 MHz)					
Parameter	Min	Typical	Max	Units	Condition
vs. operating temperature range (referenced to +25°C)	-3 -3		+3 +3	ppb ppb	-20 to +70°C --40 to +85°C
Initial tolerance	-0.2		+0.2	ppm	at time of shipment, nominal EFC
vs. supply voltage change	-2		+2	ppb	$V_s \pm 5\%$ static
vs. load change	-2		+2	ppb	Load $\pm 5\%$ static
vs. aging / day	-0.5		+0.5	ppb	@ 10 Mhz after 30 days of operation
vs. aging / day	-1		+1	ppb	@ 20 Mhz after 30 days of operation
vs. aging / year	-60		+60	ppb	@ 10 Mhz after 30 days of operation
vs. aging / year	-100		+100	ppb	@ 20 Mhz after 30 days of operation
holdover	-10		10	μ sec	over 8 hours and 5°C temp jump @ T_0
start up time					
Warm-up time			5	minutes	to ± 100 ppb 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					Option ³
	±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 ³		-95	-80	dBc/Hz	1 Hz	@ 10MHz
		-122	-110	dBc/Hz	10 Hz	
		-132	-130	dBc/Hz	100 Hz	
		-143	-140	dBc/Hz	1 kHz	
		-151	-145	dBc/Hz	10 kHz	
		-154	-150	dBc/Hz	100kHz	
Phase Noise ³		-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					

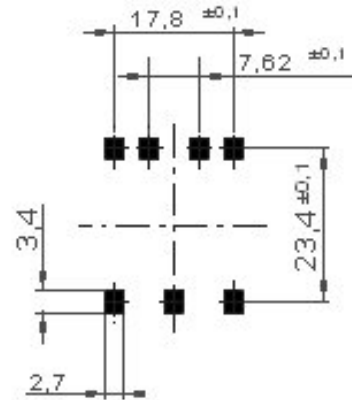
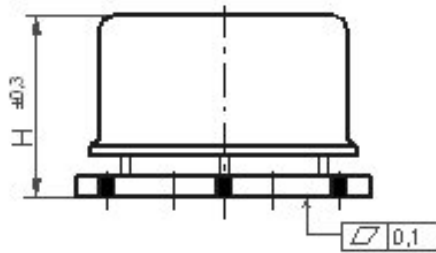
Absolute Maximum Ratings					
supply voltage (Vs)			5.5	V	with Vs=3.3 & 5.0VDC
Output Load			50	pF	
Operable Temperature Range	-45		+85	°C	
Storage Temperature Range	-45		+85	°C	

Outline Drawing / Enclosure

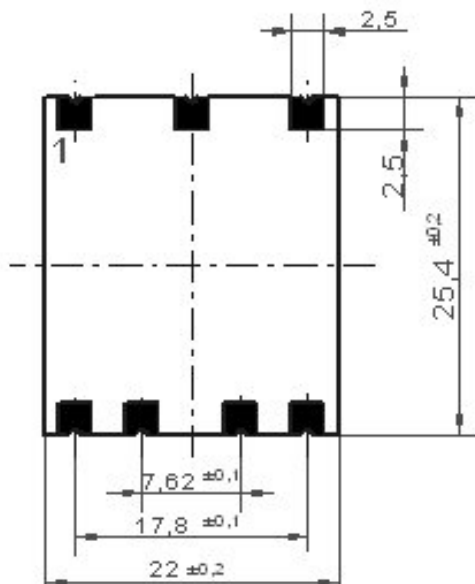


G275

OX-220	
Height "H"	cover material
12.1	metal



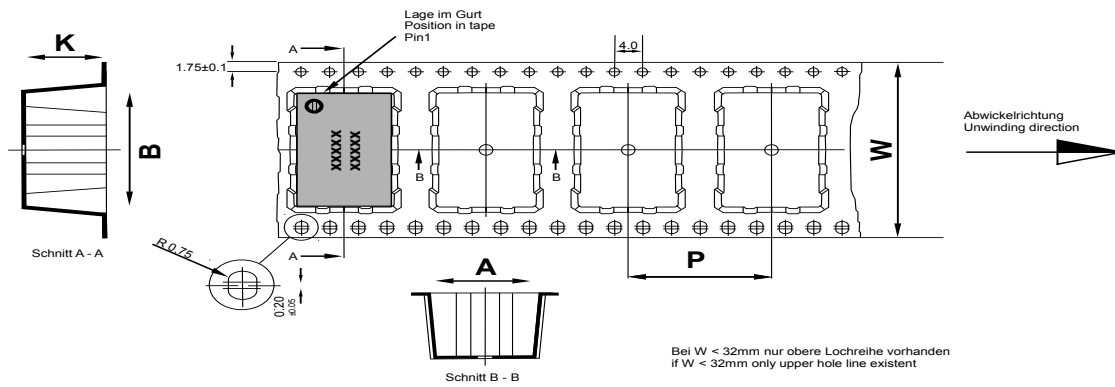
Padvorschlag
land pattern
recommendation



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
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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	175	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.

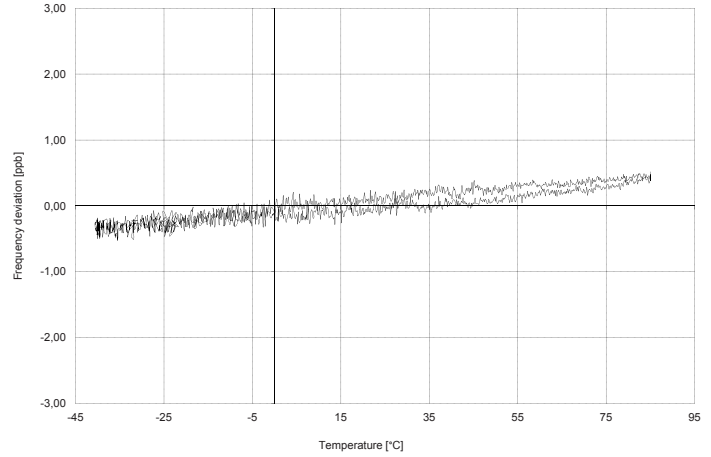
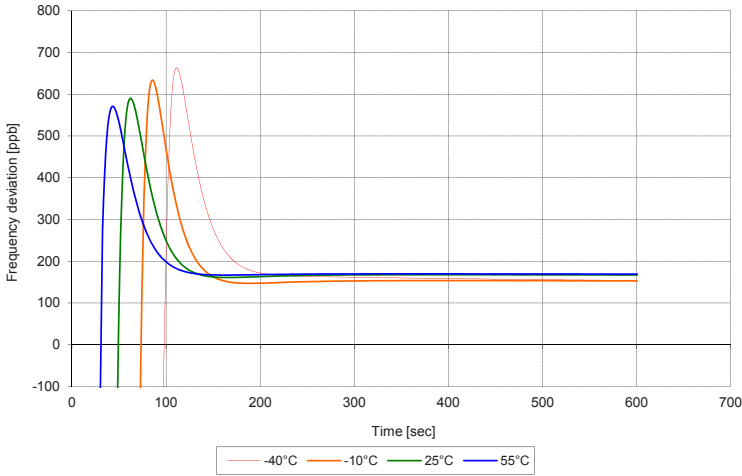
typical performance data

typical warm up

@ OX-2211-EAE-3090-10M000

typical temp stability

@ OX-2211-EAE-3090-10M000

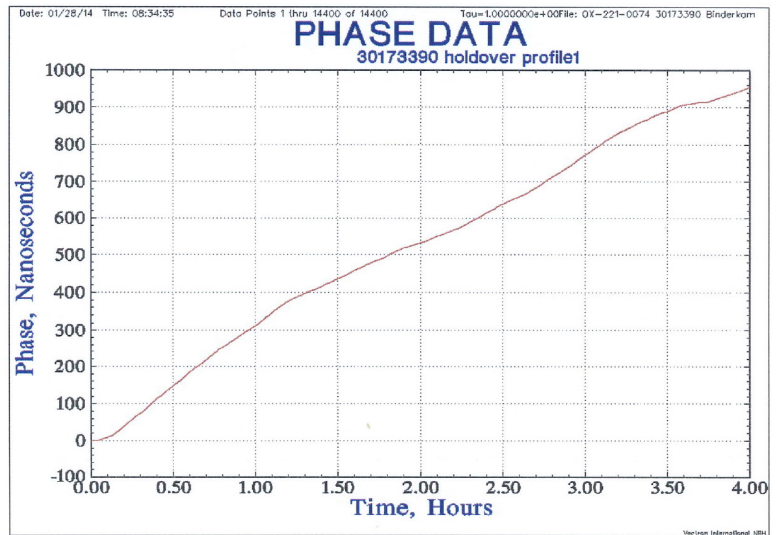
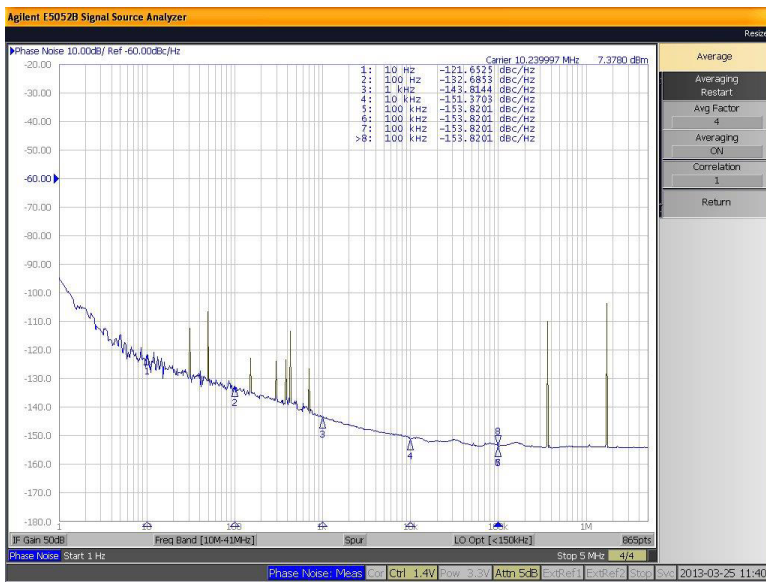


typical Phase Noise

@ OX-2211-EAE-3090-10M000

typical holdover over 4 hour +5°C temp jump

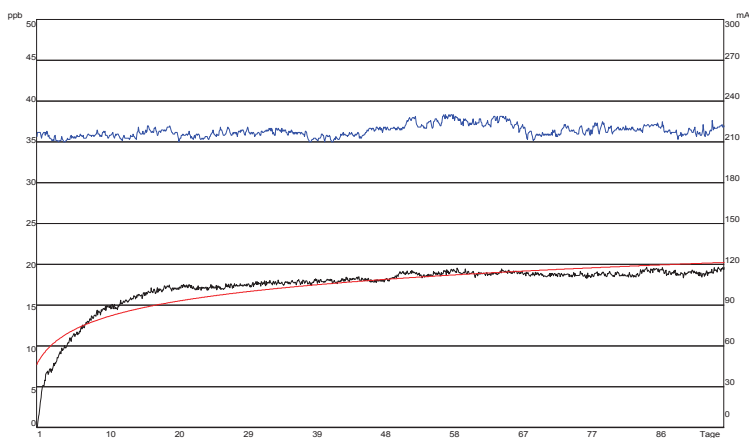
@ OX-2211-EAE-3090-10M000



typical performance data

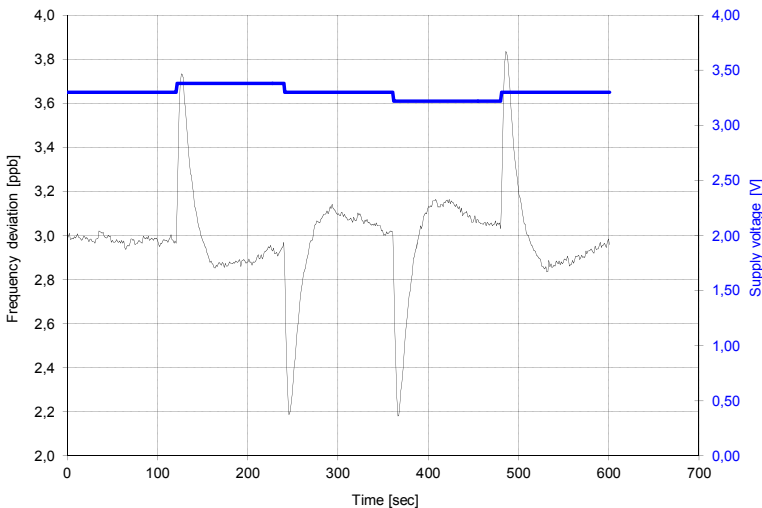
typical aging data

@ OX-2211-EAE-3090-10M000



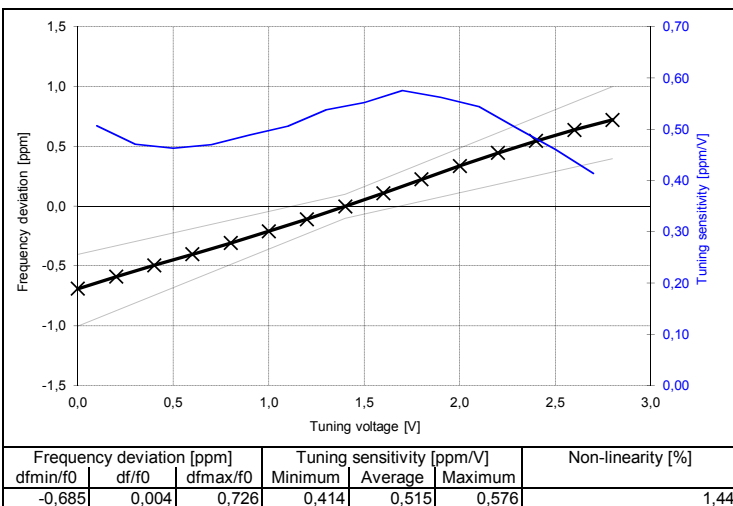
typical frequency vs. supply voltage

@ OX-2211-EAE-3090-10M000



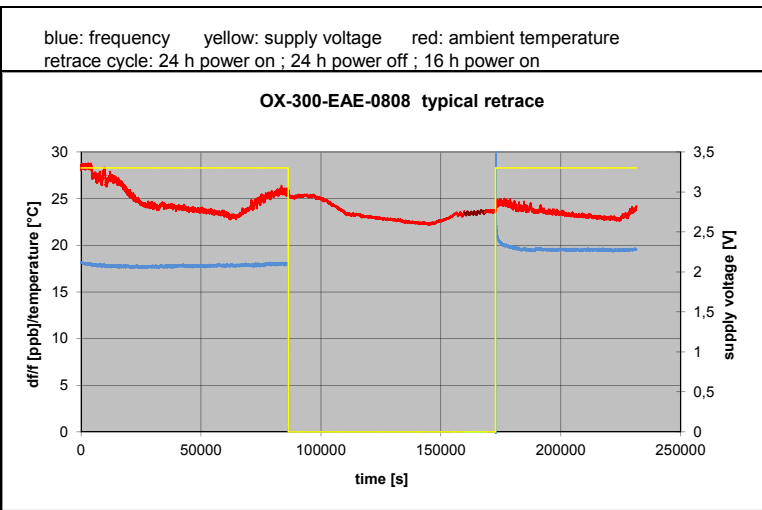
typical frequency tuning

@ OX-2211-EAE-3090-10M000



typical retrace

@ OX-2211-EAE-3090-10M000



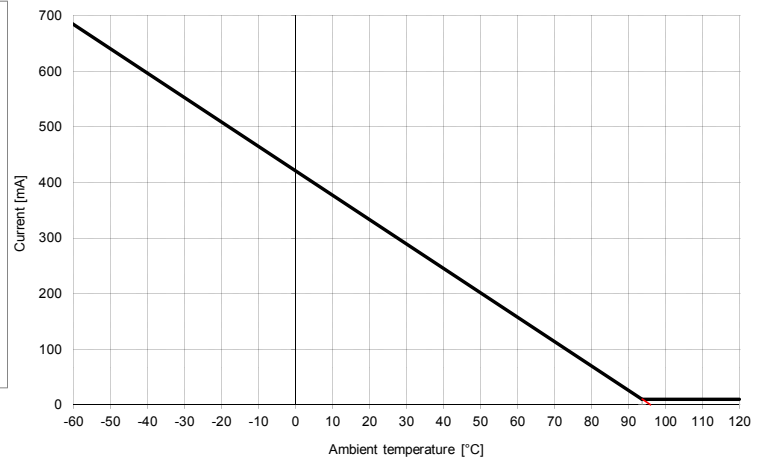
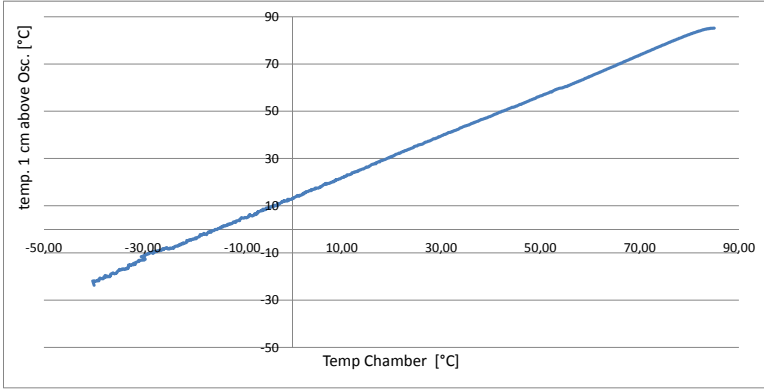
typical performance data

typical case temperature vs. outside temperature

@ OX-2211-EAE-3090-10M000

typical power consumption vs. operating temperature

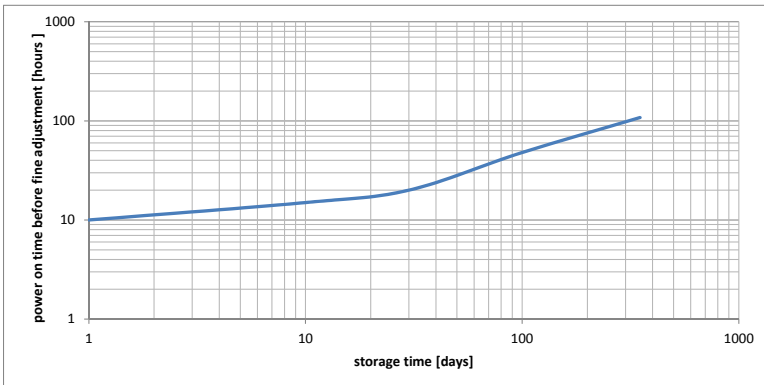
@ OX-2211-EAE-3090-10M000



recommended power on time after x days of power off

@ OX-2211-EAE-3090-10M000

@ OX-2211-EAE-3090-10M000



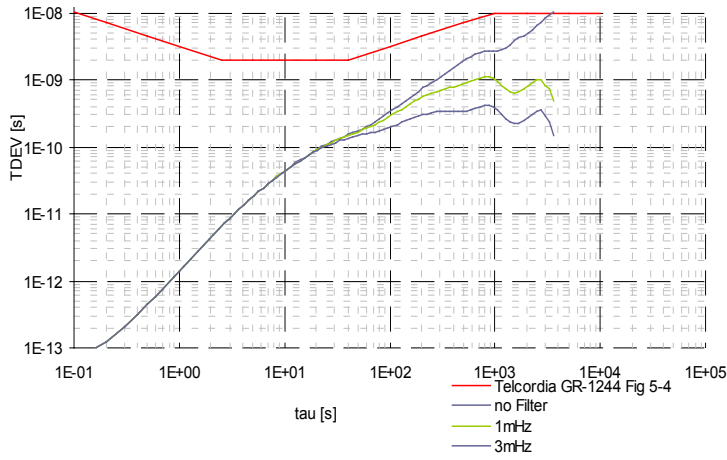
typical performnce data

typical TDEV

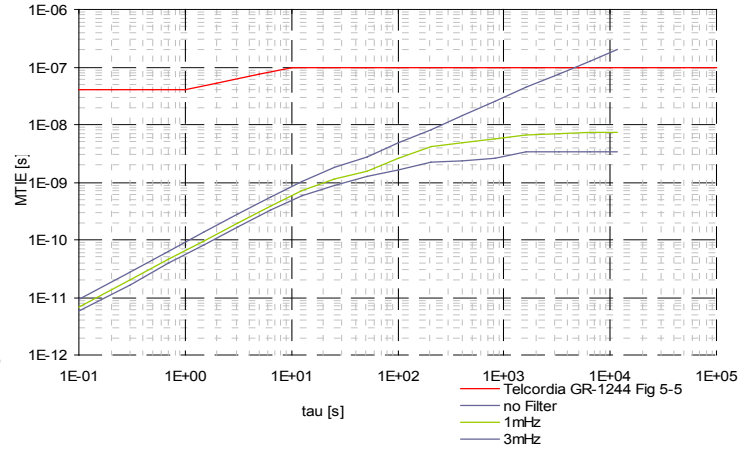
@ OX-2211-EAE-3090-10M000

typical MTIE

@ OX-2211-EAE-3090-10M000



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

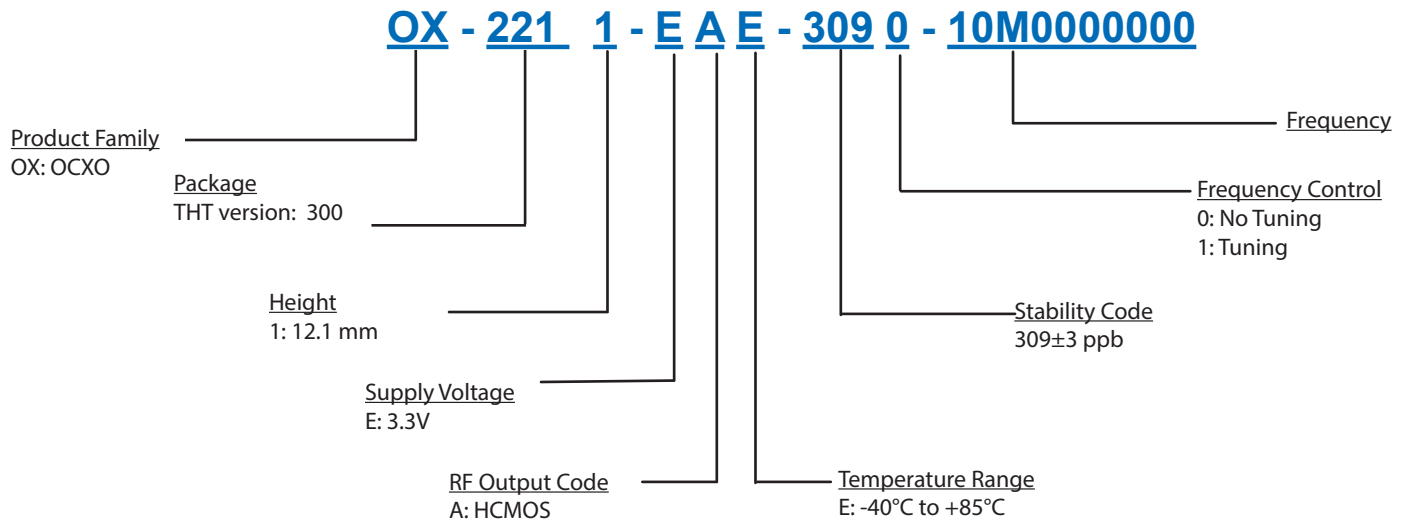


1mHz and 3 mHz MTIE Curve simulated based on measured frequency / phase data

@ 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.

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