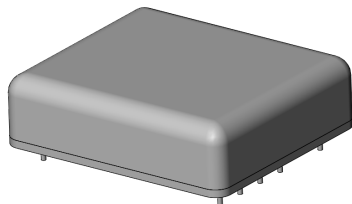


Helping Customers Innovate, Improve & Grow



OX-070

The OX-070 is a high-stability ovenized crystal oscillator in a package that is pin compatible with miniature atomic clocks. The unit is capable of aging rates of 0.06 ppb/day and temperature stabilities of 1ppb over an industrial temperature range.

Features

- Reflow process compatible
- SC-Cut resonator
- Temperature stability to 0.4 ppb
- Aging rate options to 0.06 ppb/day
- Frequency range 5 to 20 MHz
- Standard frequencies: 5, 10, 12.8, 20 MHz

Applications

- Holdover reference
- Test equipment
- Synthesizers
- Military communication equipment
- Digital switching

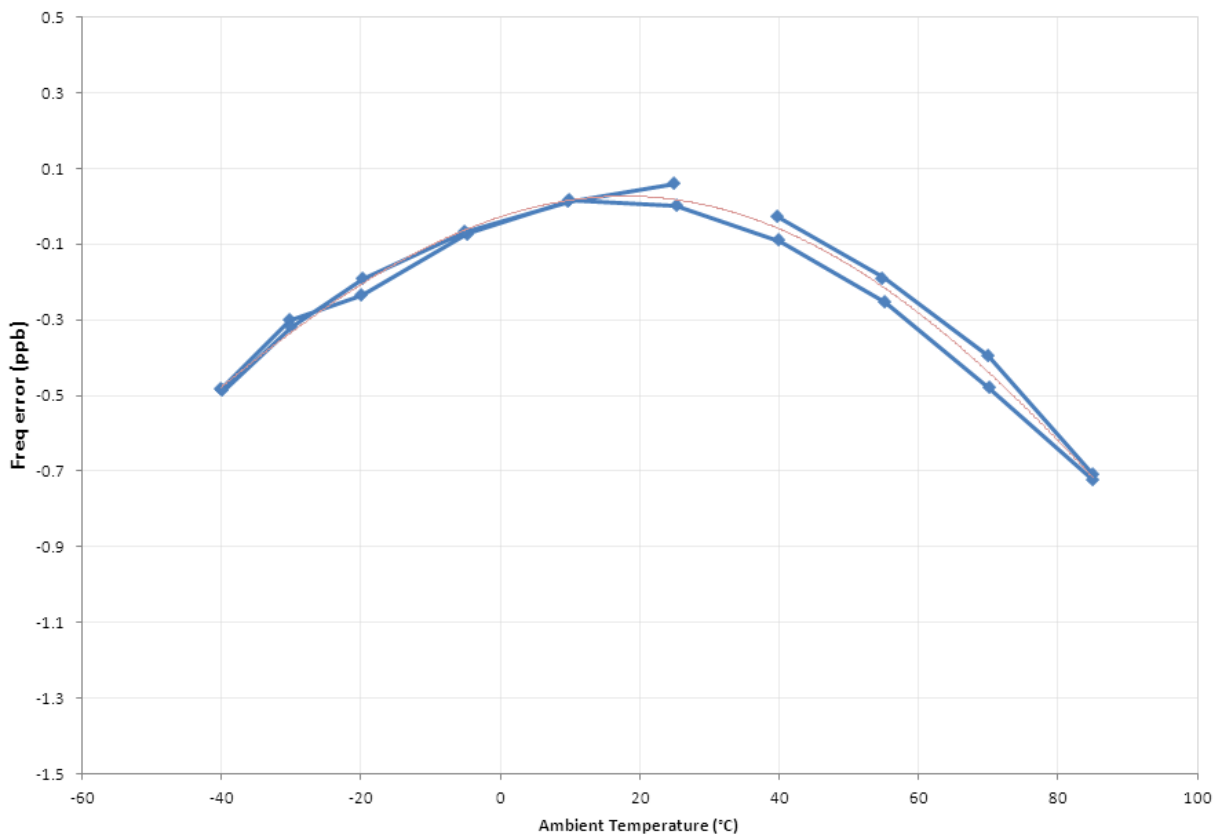
Performance Specifications

Frequency Stabilities ¹					
(Stabilities listed for 10 MHz. For stabilities above 10 MHz values may degrade. Please contact factory)					
Parameter	Min	Typical	Max	Units	Condition
vs. Operating Temperature Range (referenced to +25°C)	-0.4		+0.4	ppb	0 to +70°C
	-0.6		+0.6	ppb	-20 to +70°C
	-0.8		+0.8	ppb	-40 to +85°C
For better stability refer to the MX-060, MX-041 or MX-042 datasheets.					
Initial Tolerance	-25		+25	ppb	at time of shipment, nominal EFC
vs. Supply Voltage Change	-0.5		+0.5	ppb	V _s ±5%
vs. Load Change	-0.2		+0.2	ppb	Load ±5%
vs. Aging / Day	-1		+1	ppb	after 24 hours operation
vs. Aging / Day	-0.1		+0.1	ppb	after 72 hours operation
vs. Aging/ Day	-0.06		+0.06	ppb	after 7 days operation
vs. Aging / 1 st Year	-15		+15	ppb	after 72 hours operation
vs. Aging / Year (following year)	-10		+10	ppb	
vs. Aging/ 10 years	-75		+75	ppb	after 72 hours operation
Retrace ²	-10		+10	ppb	
Warm-up Time			5	minutes	to ±10ppb of final frequency (1 hour reading) @ +25°C

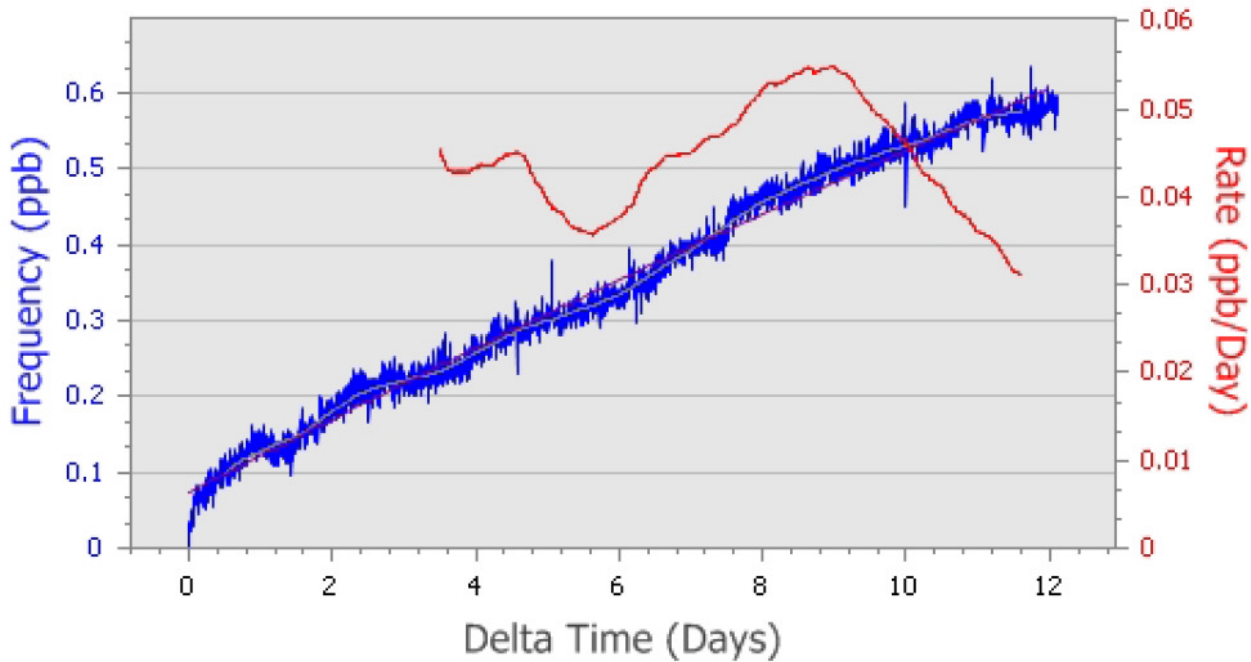
Performance Specifications

Supply Voltage (Vs)					
Parameter	Min	Typical	Max	Units	Condition
Supply Voltage (Vs)	3.135	3.3	3.465	VDC	Ordering code E
	4.75	5.0	5.25	VDC	Ordering code D
	11.4	12.0	12.6	VDC	Ordering code B , temp stability T and J only
Power Consumption			4	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
RF Output					
Start Time		1	2	s	time required to achieve 90% of amplitude
Signal [standard]	HCMOS				
Load		15		pF	
Signal Level (Vol)			0.4	VDC	with Vs=3.3V and 15pF Load
Signal Level (Vol)			0.5		with Vs=5.0V & 12V and 15pF Load
Signal Level (Voh)	2.4			VDC	with Vs=3.3V and 15pF Load
Signal Level (Voh)	3.5				with Vs=5.0V & 12V and 15pF Load
Duty Cycle	45		55	%	@ (Voh-Vol)/2
Signal	Sine Wave				
Load		50		Ω	
Output Power @3.3V	+2	+5	+8	dBm	
Output Power @ 5.0V,12 V	+5	+8	+11	dBm	
Harmonics			-40	dBc	
Subharmonics			-40	dBc	frequencies >= 10 MHz
Frequency Tuning (EFC)					
Tuning range	±150		±250	ppb	(fixed frequency option available)
Linearity		10		%	
Tuning Slope	Positive				
Input Impedance		100		kOhm	
Bandwidth Modulation	150			Hz	
Control Voltage Range	0.0	1.4	2.8	VDC	with Vs=3.3V
	0.0	2.0	4.0	VDC	with Vs=5.0V
	0.0	2.5	5	VDC	with Vs=12.0V

Additional Parameters						
Parameter	Min	Typical	Max	Units	Condition	
Phase noise ³			-95	dBc/Hz	1 Hz	
			-125	dBc/Hz	10 Hz	
			-140	dBc/Hz	100 Hz	
			-145	dBc/Hz	1 kHz	
			-145	dBc/Hz	10 kHz	
For lower phase noise, please review the OX-174 datasheet.						
Allan Deviation			5e-12		1 s tau	
			8e-12		10 s tau	
			1e-11		100 s tau	
			5e-11		1000 s tau	
For oscillators with lower ADEV requirements. Please review the OX-174 datasheet. For oscillators with TDEV and MTIE requirements. Please review the OX-172 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.						
Weight			25	g		
Absolute Maximum Ratings						
			15.0	VDC		
Output load	25		50 open	pF Ohms	CMOS Sine	
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		

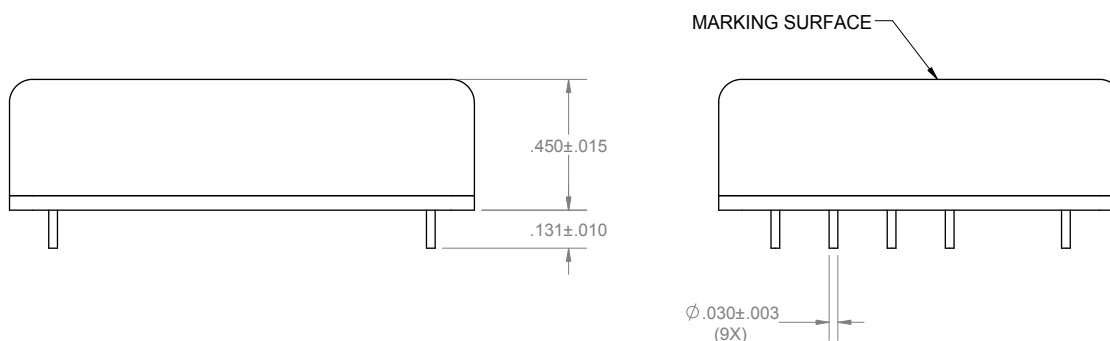


Frequency vs temperature plot -
Blue line - measured data -
Red line - curve fit of data.

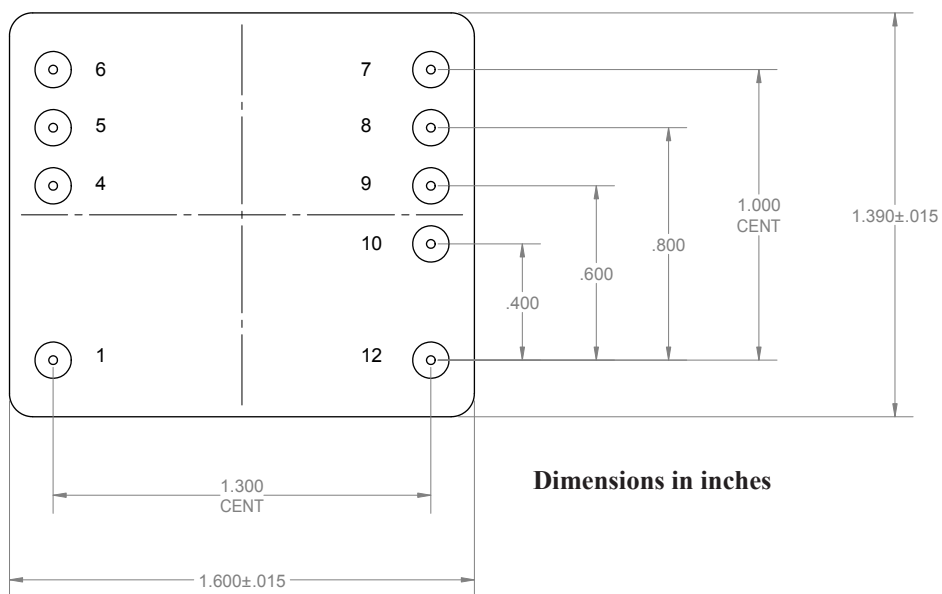


Outline Drawing / Enclosure

Pin Connections	
1	Electronic Frequency Control Input (EFC) No Connect for Fixed frequency Oscillators
7	Supply Voltage Input (Vs)
8	Ground (Case)
12	RF Output

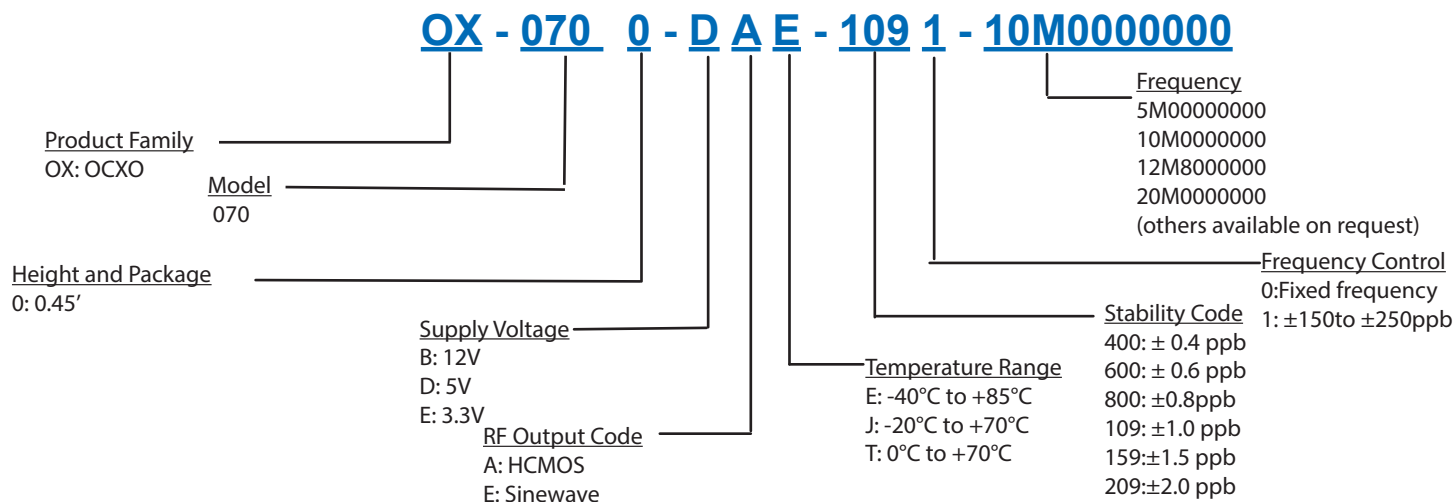


PIN NUMBERS ARE SHOWN FOR REFERENCE
AND ARE NOT MARKED ON UNIT



Dimensions in inches

Ordering Information⁴



Stability code - Temperature and Frequency Options			
Frequency	0 to +70 °C	-20 to +70 °C	-40 to +85°C
5 to 10 MHz	400	600	800
> 10 MHz	109	159	209

Additional Ordering Options

Additional ordering options available include custom heights, custom aging rates, custom temperature ranges, custom temperature stabilities, custom phase noise requirements, improved g-sensitivity, These modifications require a custom dash number - please contact the factory for additional information.

Notes:

1. Unless otherwise stated, all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, and temperature (25°C).
2. Retrace defined as f1-fo where fo is the reading after the unit has been on power for 24 hours, and f1 is the frequency after 24 hours off followed by 60 minutes on.
3. Phase noise degrades with increasing output frequency.
4. Not all options and codes available at all frequencies.

For Additional Information, Please Contact

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