MX-171

Oven Controlled Crystal Oscillator



The MX-171 is a high stability ovenized crystal oscillator in a 28 x 38 mm package, capable of aging rates of 0.2 ppb/day and temperature stabilities of 0.4 ppb over an industrial temperature range. Driven by an SC-cut crystal, the oscillator provides excellent phase noise and Allan Deviation. The Microchip 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 0.2 ppb
- Aging rate options to 0.2 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)	-0.2 -0.4		+0.2 +0.4	ppb ppb	-20 to +70°C -40 to +85°C
Initial tolerance vs. supply voltage change vs. load change vs. aging / day vs. aging / year vs. aging / year (following year) vs. aging/ 10 years	-25 -0.5 -0.2 -0.2 -50 -20 -150		+25 +0.5 +0.2 +0.2 +50 +20 +150	ppb ppb ppb ppb ppb ppb ppb	at time of shipment, nominal EFC V_S ±5% Load ±5% after 72 hours operation after 72 hours operation after 72 hours operation
Retrace[2]	-5		+5	ppb	
Warm-up time			5	minutes	to ±5 ppb of final frequency (1 hour reading) @ +25°C

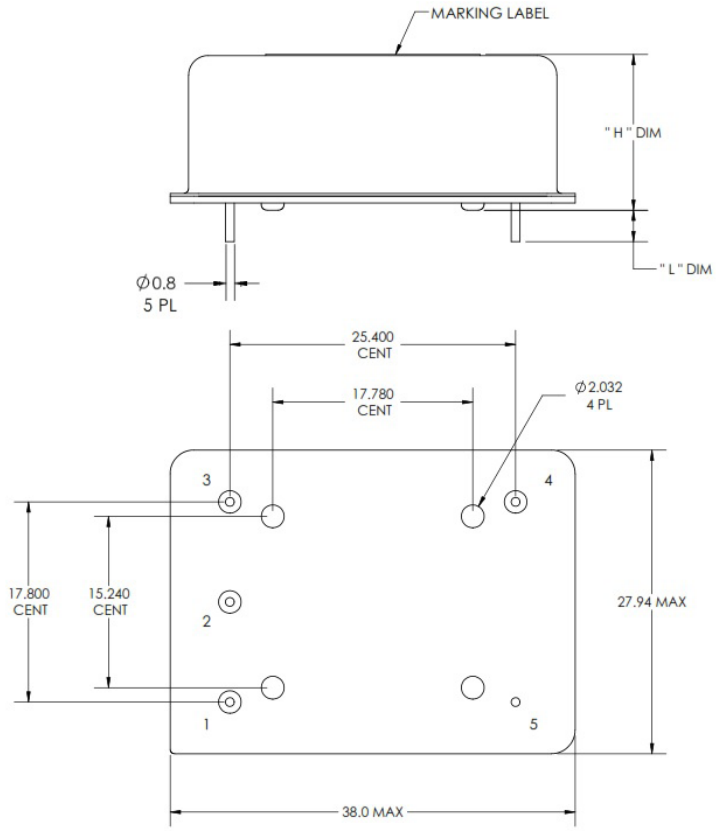
Performance Specifications

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
Power Consumption			4	Watts	during warm-up, all temperatures
			2	Watts	steady state @ +25°C
		3.5		Watts	steady state @ -40°C
		0.75		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
			0.5	VDC	with Vs=5.0V and 15pF Load
Signal Level (Voh)	2.4			VDC	with Vs=3.3V and 15pF Load
	3.5			VDC	with Vs=5.0V 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	5	8	11	dBm	
Harmonics			-30	dBc	
Frequency Tuning (EFC)					
Tuning Range	±200		±400	ppb	(fixed frequency option available)
Linearity		10		%	
Tuning Slope	Positive				
Input Impedance		50		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

Additional Parameters						
Parameter	Min	Typical	Max	Units	Condition	
Phase Noise[3]			-120 -145 -150 -155	dBc/Hz dBc/Hz dBc/Hz dBc/Hz	10 Hz 100 Hz 1 kHz 10 kHz	@ 10MHz
Allan deviation			8 1 5	E-12 E-11 E-11	1 s tau 10 s tau 100 s tau	@ 10MHz
g-sensitivity				1	ppb/g	
Weight			25	g		

Absolute Maximum Ratings					
Supply Voltage (Vs)			3.8	V	with Vs=3.3 VDC
			6.5	V	with Vs= 5 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	compliant with exemption 7c-i				
Storage Temperature Range	-55		+125	°C	

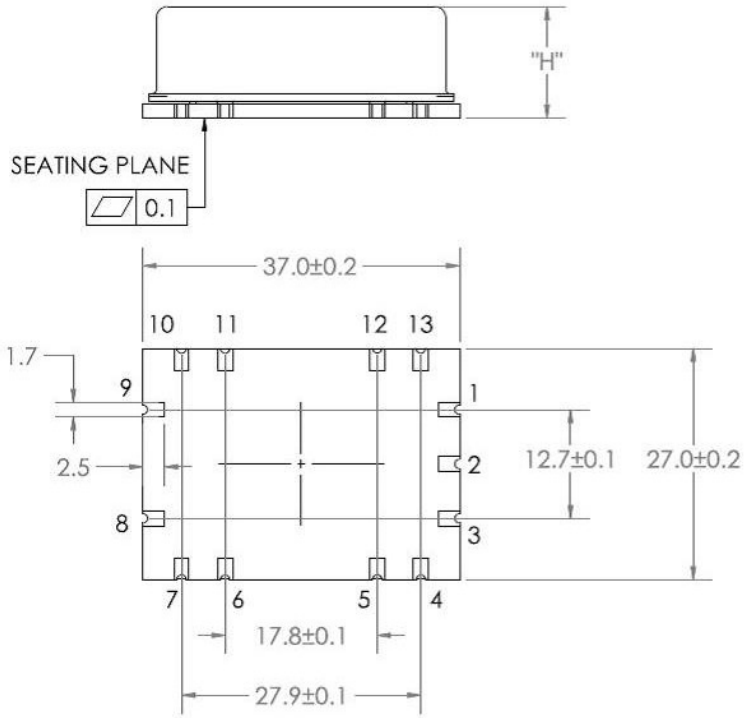
Outline Drawing / Enclosure



Through hole Package configuration A		
Code	Height "H"	Pin Length "L"
0	14	4.5 mm min

Pin Connections	
1	Electronic Frequency Control Input (EFC) No connect for fixed frequency oscillators
2	No Connect
3	Supply Voltage Input (VS)
4	RF Output
5	Ground (Case)

Dimensions in mm



SMD Package configuration 1	
Code	Height "H"
1	17

Pin Connections	
2,4,5,6,7, 11,12,13	No Connect
1	Electronic Frequency Control Input (EFC) No Connect for Fixed frequency Oscillators
3	Supply Voltage Input (Vs)
8	RF Output
9,10	Ground (Case)

Ordering Information[4]

MX - 171 0 - D A E - 400 1 - 10M0000000

- Product Family: MX: OCXO
- Model: 171
- Height and Package: 0: 14 mm, package A - THT; 1: 17 mm, package B - SMD
- Supply Voltage: D: 5V; E: 3.3V
- RF Output Code: A: HCMOS; E: Sinewave
- Temperature Range: E: -40°C to +85°C; J: -20°C to +70°C
- Stability Code: 200: ± 0.2 ppb; 400: ± 0.4 ppb
- Frequency Control: 0:Fixed frequency; 1: ±200 to ±400 ppb
- Frequency: 5M00000000; 10M0000000; 12M8000000; 20M0000000; (others available on request)

Stability code - Temperature and Frequency Options		
Frequency	-20 to +70 °C	-40 to +85°C
5 to 10 MHz	200	400

Additional Ordering Options

Additional ordering options available include: High stability reference voltage output, custom heights, custom aging rates, custom temperature ranges, custom temperature stabilities, custom phase noise requirements, and 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.

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