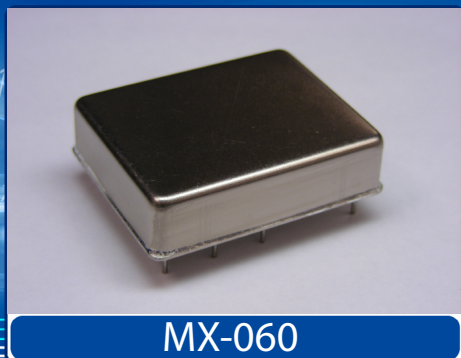


Helping Customers Innovate, Improve & Grow


MX-060
Features

- SC-Cut resonator
- Frequency Range: 5 MHz to 15 MHz
- Low Package Height
- Temperature stability to 0.4 ppb
- Aging rate 0.1 ppb/day
- Frequency range 5 to 20 MHz
- Standard frequencies: 5, 10, 20 MHz

Applications

- LTE, LTE-A
- Test and Measurement Equipment
- Broadcast Reference Standard
- Satcom terminals

Performance Specifications

Frequency Stabilities ¹					
(Stabilities listed for 10 MHz. For stabilities above 10 MHz values may degrade. Please contact factory)					
Parameter	Min	Typ	Max	Units	Condition
vs. operating temperature range (referenced to +25°C)	-0.2		+0.2	ppb	0... +70°C
	-0.4		+0.4	ppb	-20... +70°C
	-0.6		+0.6	ppb	-40... +85°C (+5V version)
For better stability refer to the MX-042 datasheet.					
Initial Tolerance	-50		+50	ppb	at time of shipment, nominal EFC
vs. supply voltage change	-0.1		+0.1	ppb	VS ± 5%
vs. load change	-0.1		+0.1	ppb	Load ± 5%
vs aging/ day	-1		+1	ppb	after 24 hours of operation
vs aging/ day	-0.06		+0.06	ppb	after 72 hours of operation
vs. aging / 1 year	-20		+20	ppb	after 72 hours of operation
vs. aging / year (following years)	-10		+10	ppb	
vs. aging/ 10 years	-75		+75	ppb	after 72 hours of operation
Retrace ²	-10		+10	ppb	
Warm-up Time			5	minutes	to ± 10 ppb of final frequency (1 hour) @25°C
Supply Voltage (Vs)					
Supply voltage (Standard)	4.75	5.0	5.25	VDC	
Supply voltage (Option)	11.4	12.0	12.6	VDC	

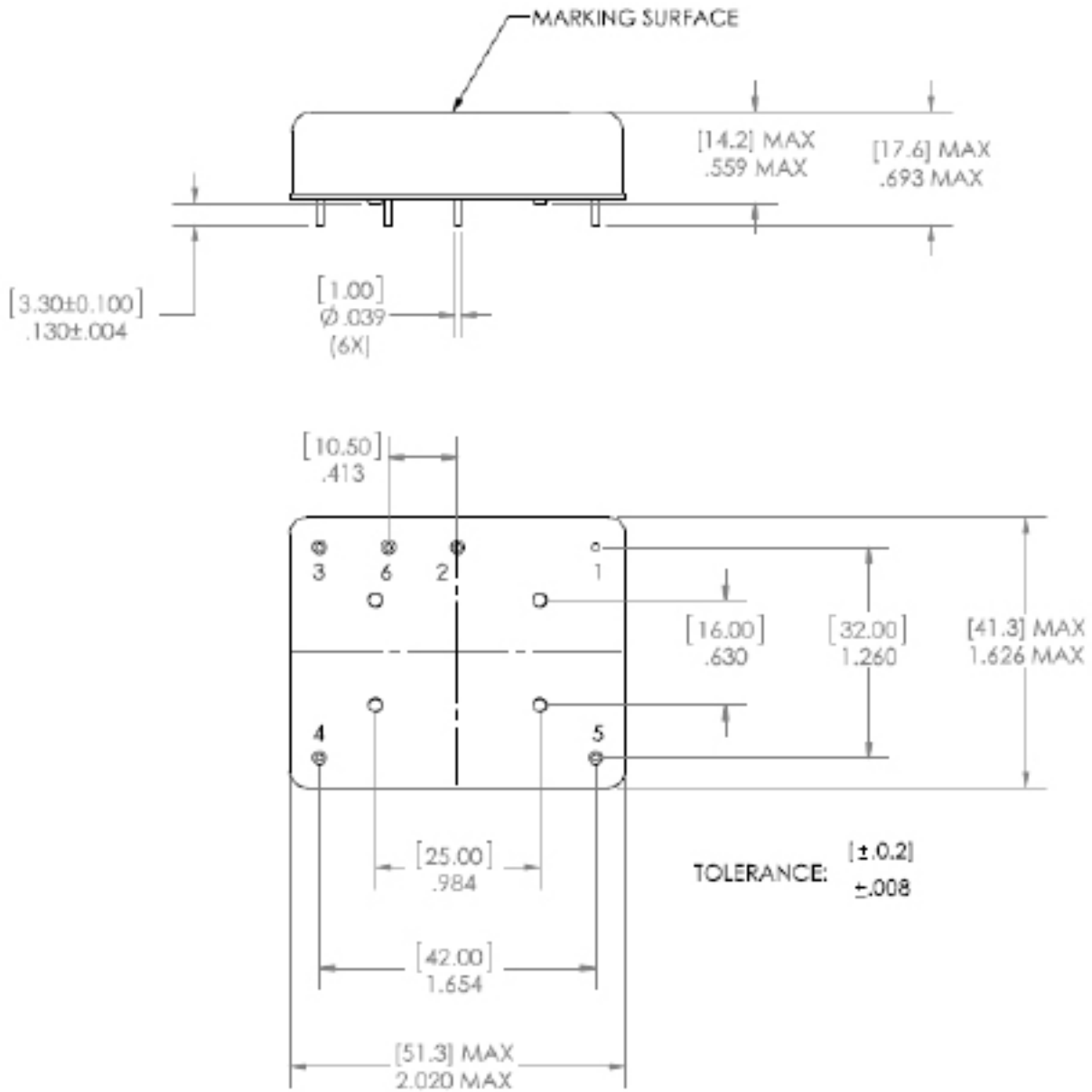
Performance Specifications

Supply Voltage (Vs)					
Parameter	Min	Typical	Max	Units	Condition
Supply Voltage	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 eference Voltage (Vref) - when specified for custom units.			5.0	Watts	during warm-up, all temperatures
			2.0	Watts	steady state @ +25°C
		4.0		Watts	steady state @ -40°C
		1.0		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)			0.5	VDC	
Signal Level (Voh)	3.5			VDC	
Duty Cycle	45		55	%	@ (Voh-Vol)/2
Signal	Sine Wave				
Load		50		Ω	
Output Power @ 5.0V,12 V	+5	+7	+9	dBm	
Harmonics			-40	dBc	
Subharmonics			-40	dBc	frequencies >= 10 MHz
Frequency Tuning (EFC)					
Tuning range	±150		±250	ppb	(fixed frequency option available)
Linearity		5		%	
Tuning Slope	Positive				
Input Impedance		100		kOhm	
Bandwidth Modulation	150			Hz	
Control Voltage Range	0.0	2.5	5	VDC	with Vs=12.0 VDC
	0.0	2.0	4.0	VDC	with Vs=5.0 VDC
Reference Voltage Output (Vref) the MX-060 can be configured with a reference voltage on pin 2. This configuration requires a custom part number. Please contact the factory for ordering information.					
Reference Voltage (Vref) - when specified for custom units	4.9	5	5.1	VDC	with Vs =12.0 VDC
	3.92	4.0	4.08	VDC	with Vs = 5.0 VDC

Additional Parameters						
Parameter	Min	Typical	Max	Units	Condition	
Phase noise ³			-95	dBc/Hz	1 Hz	@ 10MHz
			-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 or OX-204 datasheet.						
Allan Deviation			3e-12		1 s tau	@ 10MHz
			5e-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			55	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		

Outline Drawing / Enclosure

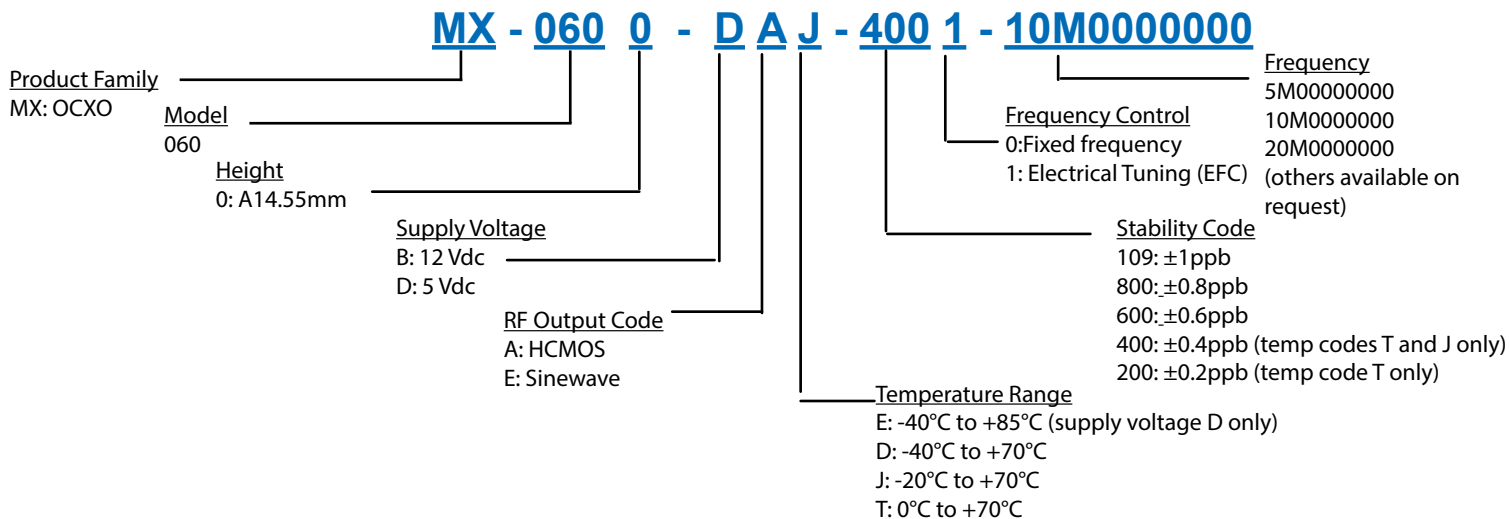
Dimensions in inches, [] in mm.



Type A		
Code	Height "H"	Pin Length "L"
0	14.55	7.5

Pin Connections	
1	Electronic Frequency Control (EFC)
2	N/C Optional Reference Voltage
3	RF Output
4	Ground (Case)
5	Supply Voltage Input (Vs)

Ordering Information



Stability code - Temperature and Frequency Options

Frequency	0 to +70 °C	-20 to +70 °C	-40 to +70°C	-40 to +85°C (supply voltage D only)
5 to 10 MHz	200	400	600	600
> 10 MHz	400	600	800	109

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, and oscillators with voltage reference output on pin 2. These modifications require a custom dash number - please contact the factory for additional information.

Design Tools

Microsemi stocks the following items for small orders and prototype development:
MX-0600-DEE-6001-10M0000000
Microsemi stocks the following evaluation board for this product:
OCXO Evaluation Board
Application Notes:
None

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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