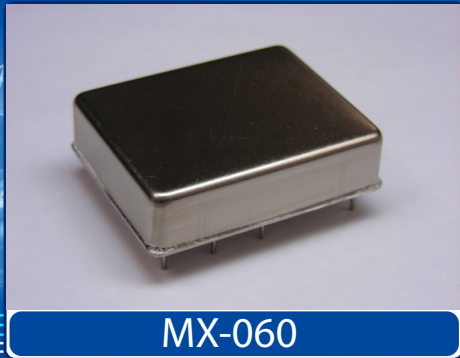


Helping Customers Innovate, Improve & Grow



**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 <sup>1</sup>   |       |      |       |         |   |
|--|-------|------|-------|---------|---|
| (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 <sup>2</sup>   | -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     |   |

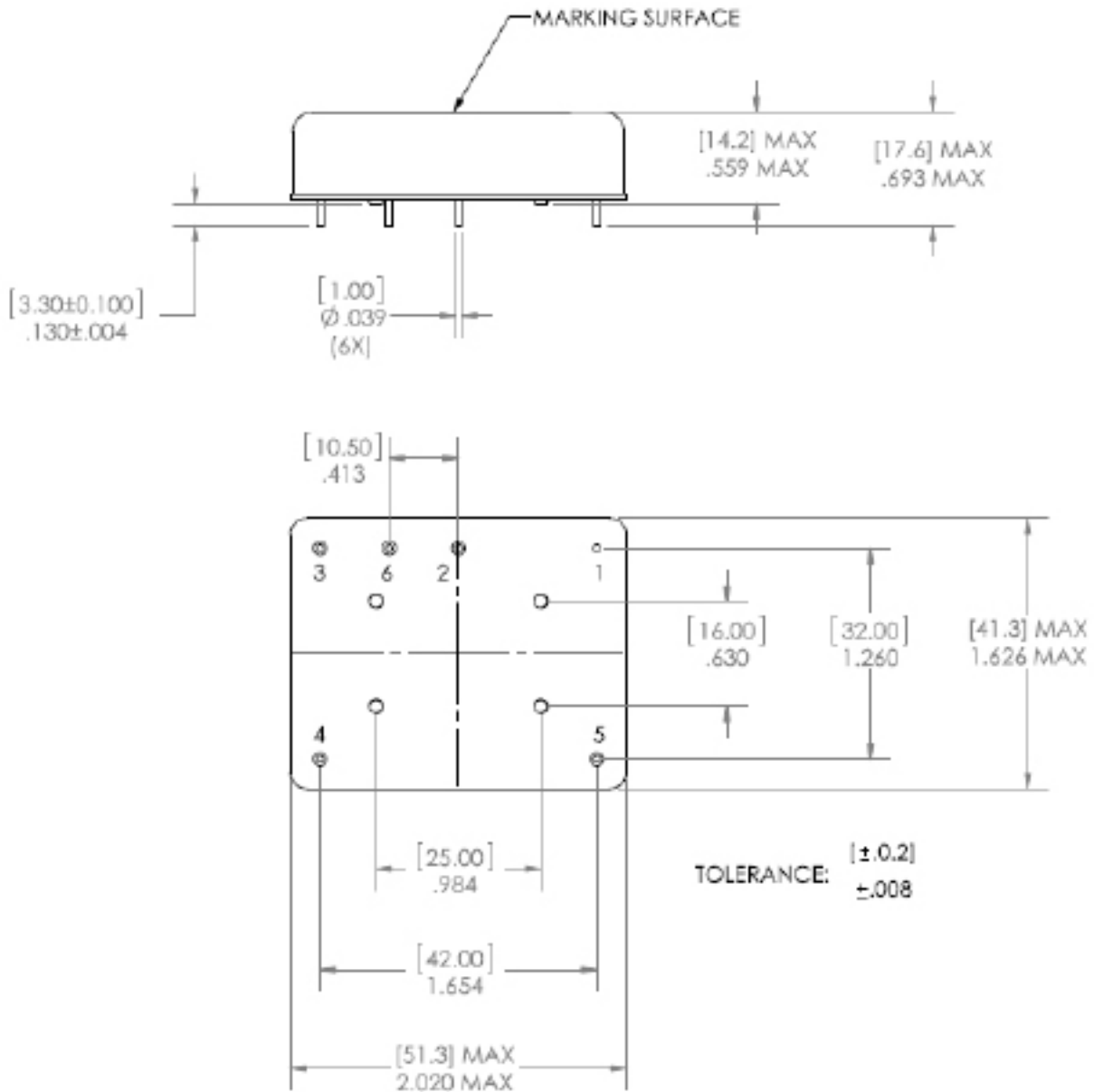
## Performance Specifications

| 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<br>Reference Voltage (Vref) - when<br>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=12.0V                                 |
| Reference Voltage Output (Vref)<br>the MX-060 can be configured with a reference voltage on pin 2. This configuration requires a custom part number. Please contact the<br>factory for ordering information. |           |         |      |       |   |
| Reference Voltage (Vref) - when<br>specified for custom units.   | 3.92      | 4.0     | 4.08 | VDC   | with Vs = 5.0 VDC                             |
|  | 4.9       | 5       | 5.1  | VDC   | with Vs =12 VDC                               |

| Additional Parameters   |  |         |            |            |   |         |
|---|--|---------|------------|------------|---|---------|
| Parameter   | Min  | Typical | Max        | Units      | Condition   |         |
| Phase noise <sup>3</sup>  |  |         | -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.<br>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.<br>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<br>open | pF<br>Ohms | CMOS<br>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<br>Optional Reference Voltage  |
| 3               | RF Output                          |
| 4               | Ground (Case)                      |
| 5               | Supply Voltage Input (Vs)          |

