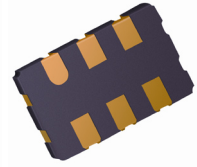


Product Features

- 3.3 Vdc LVPECL
- 3.2 x 5 mm ultra miniature ceramic package
- Low Jitter 1 ps max., 12 kHz to 20 MHz
- Frequency stability to 25 ppm
- -40°C to +85°C operating temperature
- Wide frequency range, 62.500 to 212.500 MHz
- RoHS compliant



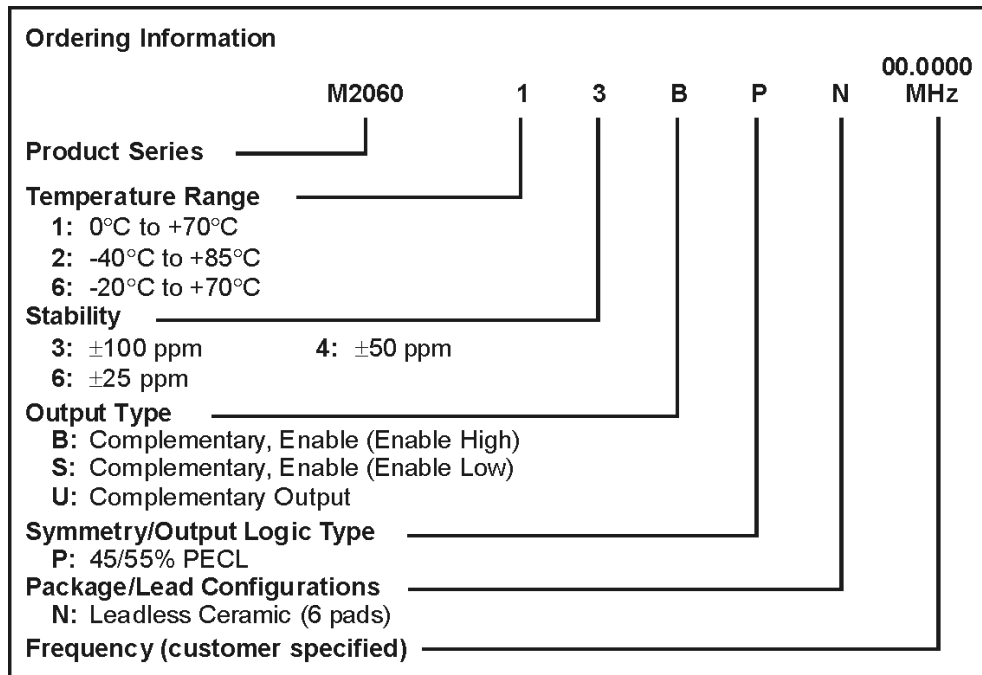
Product Description

The MtronPTI M2060 Series is an ultra miniature 3.2 x 5.0 mm surface mount LVPECL fixed frequency clock oscillator. It is designed for any application requiring minimum printed circuit board space, low jitter, wide temperature range and a low supply voltage of 3.3 Vdc.

Product Applications

The M2060 Series is an excellent clock oscillator when the design dictates low supply voltage, low jitter, minimum PC board real estate and excellent phase noise performance. Applications for the M2060 include SONET / SDH / DWDM / ATM / DSRC, Ethernet, Fiber Channel, Digital Switching Networks and Hand Held Wireless Communications.

Product Ordering Information



Performance Characteristics

| Parameters | Symbol | Min. | Typ. | Max. | Units | Conditions/Notes |
|--|----------------------------|------------------------------------|------------------------------------|--|-------|---|
| Frequency Range | F _o | 62.5 | | 212.5 | MHz | See Note 1 |
| Operating Temperature | T _A | See Ordering Information | | | °C | |
| Storage Temperature | T _s | -55C to +125C | | | | |
| Frequency Stability | ΔF/F | See Ordering Information | | | | Includes calibration tolerance, deviation over operating temperature, load & supply variations, and 1 yr. Aging at +25°C. |
| Aging 1 st Year | | -5 | | +5 | ppm | At 25°C +/- 3°C for first year |
| Aging After 1 st Year | | | | | ppm | Per year. |
| Input Voltage | V _{dd} | 3.0 | 3.3 | 3.6 | Volts | |
| Supply Current | I _{dd} | | | 90 | mA | 62.500 to 212.500 MHz |
| Output Logic Type | | | | | | |
| Output Load | | 50 Ohms (V _{dd} to -2.0V) | | | | |
| Symmetry | | 45/55% | | | | |
| Logic Level "1" | V _{OH} | +2.215 | | +2.42 | V | |
| | | | | | V | |
| Logic Level "0" | V _{OL} | +1.47 | | +1.745 | V | |
| | | | | | V | |
| Rise/Fall Time | Tr/Tf | | | 1.0 | ns | 20/80% of amplitude |
| Disable Delay Time | | | | 200 | ns | |
| Enable Delay Time | | | | 2 | ms | |
| Random Jitter | | 1ps RMS max. (12KHz to 20MHz band) | | | | |
| | | | | | | |
| | Parameter | Test Method | | Specification | | |
| Environmental | Mechanical Shock | MIL-STD-202, Method 213, C | | ≥100 g's | | |
| | Vibration | MIL-STD-202, Method 201 & 204 | | ≥10 g's from 10-2000 Hz | | |
| | Thermal Cycle | MIL-STD-883, Method 1010, B | | -55 Deg. C to +125 Deg. C, 15 minute Dwell, 10 Cycles min. | | |
| | Aging | Internal Specification | | 1 yr w/ accelerated testing for 1000 Hours @ 55°C | | |
| | Gross Leak | MIL-STD-202, Method 112 | | 30 Second Immersion | | |
| | Fine Leak | MIL-STD-202, Method 112 | | Must meet 1 X 10 ⁻⁸ | | |
| | Solderability | Per EIAJ-STD-002 | | | | |
| Maximum Soldering Temp | MIL-STD-202, Method 210, C | | +260°C for no more than 10 seconds | | | |
| 1. Not all Frequencies are available with all options. Please consult with MtronPTI to determine availability. LVPECL Load – see LVPECL load diagram in this datasheet. | | | | | | |

Part Marking Guide

- “F” = Frequency (example: 6.176000 MHz = 6M176)
- “M” = Used in place of the decimal point; signifies MHz
- “O” = Output type/stability combined
 - S = fixed output, ± 100 ppm stability
 - T = fixed output, ± 50 ppm stability
 - X = tristate output, ± 100 ppm stability
 - Y = tristate output, ± 50 ppm stability
- “L” = Symmetry
 - A = 40/60 TTL/HCMOS
 - C = 45/55 HCMOS
 - G = 40/60 HCMOS
- “X” = Month code

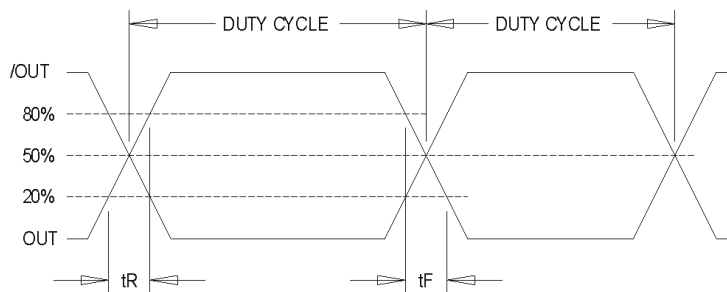
| | |
|--------------|---------------|
| A = January | G = July |
| B = February | H = August |
| C = March | J = September |
| D = April | K = October |
| E = May | L = November |
| F = June | M = December |
- “Y” = Last digit of year (example: 2003 = 3)

Catalog ModelNumber
FFF.FFFFFM
● MbYYWWV

“M” in last line=MtronPTI

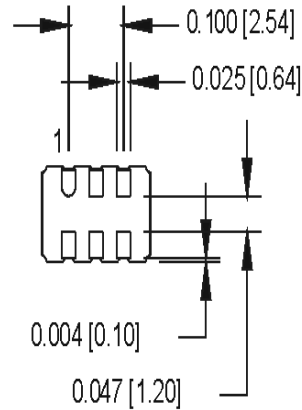
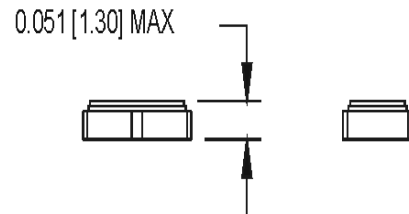
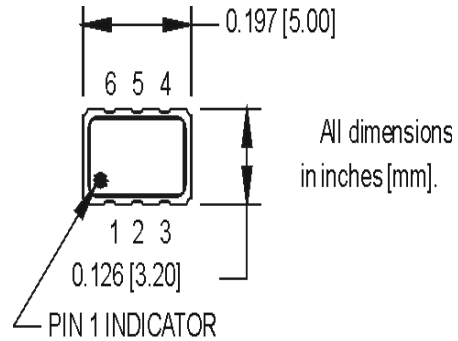
Parts manufactured at MtronPTI partner facilities will have a one digit letter code or a two digit number code after the date code.

Output Waveform

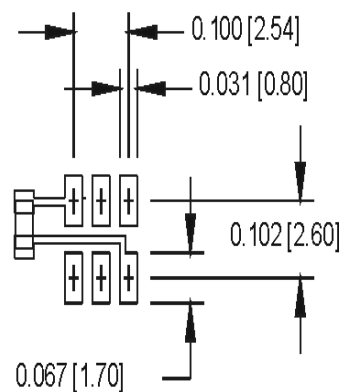


Product Dimension & Pinout Information

| PIN | CONNECTION | |
|-----|-----------------|-------------|
| 1 | "L" | OPEN OR "H" |
| 2 | N.C. | |
| 3 | V _{SS} | |
| 4 | Z | OUTPUT |
| 5 | Z | C-OUTPUT |
| 6 | V _{DD} | |



SUGGESTED SOLDER PAD LAYOUT



Handling Information

Although protection circuitry has been designed into the M2060 oscillator, proper precautions should be taken to avoid exposure to electrostatic discharge (ESD) during handling and mounting. MtronPTI utilizes a human-body model (HBM) and a charged-device model (CDM) for ESD-susceptibility testing and protection design evaluation. ESD voltage thresholds are dependent on the circuit parameters used to define the mode. Although no industry-wide standard has been adopted for the CDM, a standard HBM (resistance = 1500 Ω, capacitance = 100 pF) is widely used and therefore can be used for comparison purposes. The HBM ESD threshold presented here was obtained using these circuit parameters.

| Model | ESD Threshold, Minimum | Unit |
|----------------|------------------------|------|
| Human Body | 1500* | V |
| Charged Device | 1500* | V |

* MIL-STD-883D, Method 3015, Class 1



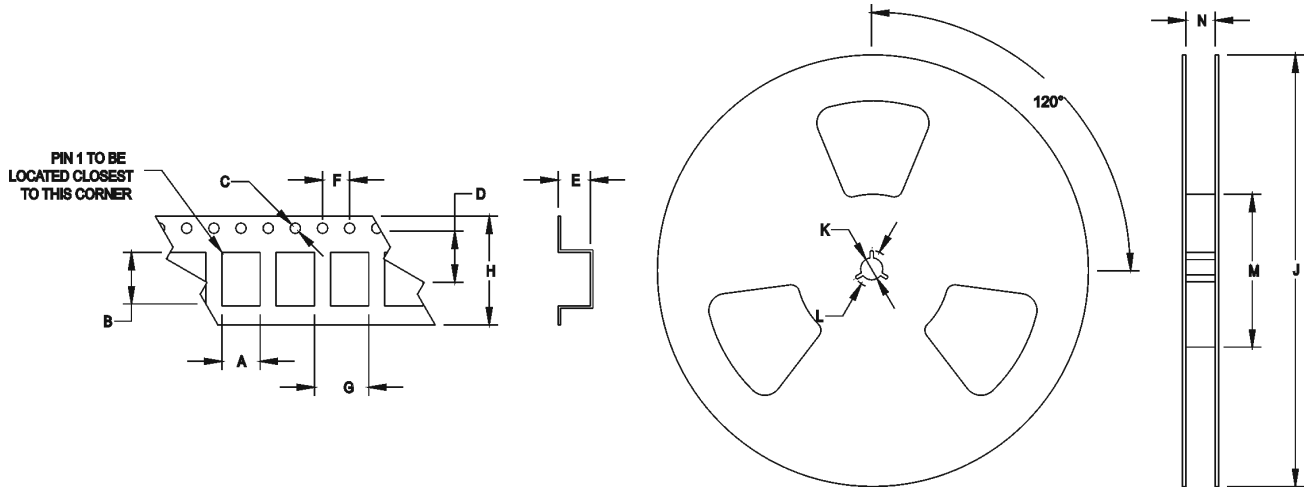
ATTENTION
Static Sensitive
Devices
Handle only at
Static Safe Work
Stations

Quality Parameters

| Environmental Specifications/Qualification Testing Performed on the M2060 Clock Oscillator | | |
|--|------------------------------|---|
| Test | Test Method | Test Condition |
| Electrical Characteristics | Internal Specification | Per Specification |
| Frequency vs. Temperature | Internal Specification | Per Specification |
| Mechanical Shock | MIL-STD-202, Method 213, C | 100 g's |
| Vibration | MIL-STD-202, Method 201-204 | 10 g's from 10-2000 Hz |
| Thermal Cycle | MIL-STD-883, Method 1010, B | -55 Deg. C to +125 Deg. C, 15 minute Dwell, 10 cycles |
| Aging | Internal Specification | 168 Hours at 105 Degrees C |
| Gross Leak | MIL-STD-202, Method 112 | 30 Second Immersion |
| Fine Leak | MIL-STD-202, Method 112 | Must meet 1x10 ⁻⁸ |
| Solderability | MIL-STD-883, Method 2003 | 8 Hour Steam Age – Must Exhibit 95% coverage |
| Resistance to Solvents | MIL-STD-883, Method 2015 | Three 1 minute soaks |
| Terminal Pull | MIL-STD-883, Method 2004, A | 2 Pounds |
| Lead Bend | MIL-STD-883, Method 2004, B1 | 1 Bending Cycle |
| Physical Dimensions | MIL-STD-883, Method 2016 | Per Specification |
| Internal Visual | Internal Specification | Per Internal Specification |

Tape & Reel Specifications

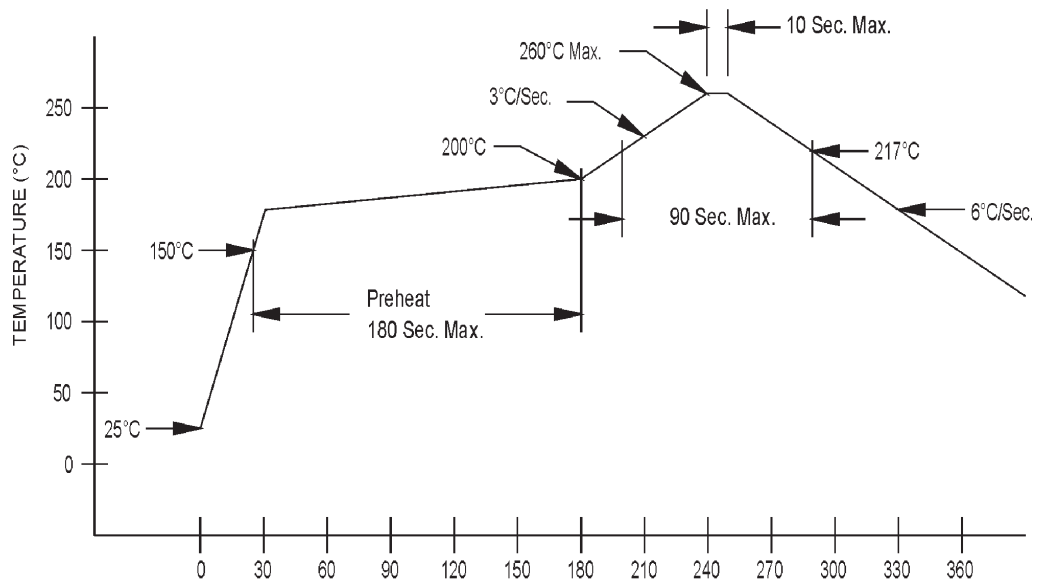
| (all measurements are in mm) | A | B | C | D | E | F | G | H | J | K | L | M | N |
|------------------------------|-----|-----|-----|-----|-----|-----|---|----|-----|----|----|----|----|
| M2060 | 3.5 | 5.4 | 1.5 | 5.5 | 1.4 | 4.0 | 8 | 12 | 180 | 13 | 21 | 60 | 15 |



Standard Tape and Reel: 1,000 parts per reel

Maximum Soldering Conditions

+260°C REFLOW PROFILE (RoHS COMPLIANT SOLDER)

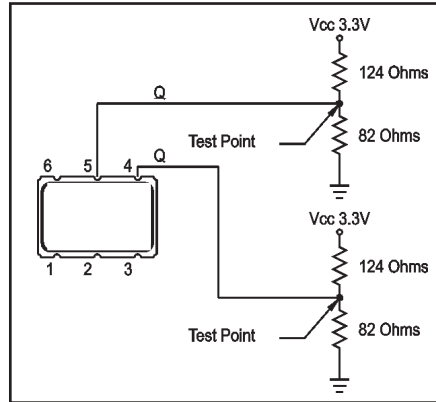


Solder Conditions

Note: Exceeding these limits may damage the device.

Typical Test Circuit & Load Circuit

3.3V LVPECL Load Circuit



Product Revision Table

| Date | Revision | PCN Number | Details of Revision |
|------|----------|------------|---------------------|
| | | | |

For custom products or additional specifications contact our sales team at
800.762.8800 (toll free) or 605.665.9321

For more information on this product visit the MtronPTI website at
www.mtronpti.com