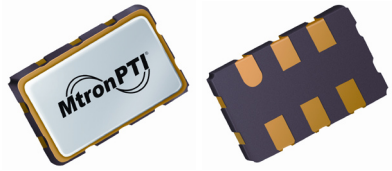
M2060 Series

3.2 x 5 mm, 3.3 Volt, LVPECL, Clock Oscillator

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

Ordering Information

M2060 — 1 — 3 — B — P — N — 00.0000 MHz

Product Series

Temperature Range
- **1:** 0°C to +70°C
- **2:** -40°C to +85°C
- **6:** -20°C to +70°C

Stability
- **3:** ±100 ppm
- **4:** ±50 ppm
- **6:** ±25 ppm

Output Type
- **B:** Complementary, Enable (Enable High)
- **S:** Complementary, Enable (Enable Low)
- **U:** Complementary Output

Symmetry/Output Logic Type
- **P:** 45/55% PECL

Package/Lead Configurations
- **N:** Leadless Ceramic (6 pads)

Frequency (customer specified)

Performance Characteristics

	Parameters	Symbol	Min.	Typ.	Max.	Units	Conditions/Notes
Electrical Specifications	Frequency Range	F_o	62.5		212.5	MHz	See Note 1
	Operating Temperature	T_A	See Ordering Information			°C	
	Storage Temperature	Ts	-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 1st Year		-5		+5	ppm	At 25°C +/- 3°C for first year
	Aging After 1st 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 (Vdd 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)				

Environmental	Parameter	Test Method	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 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

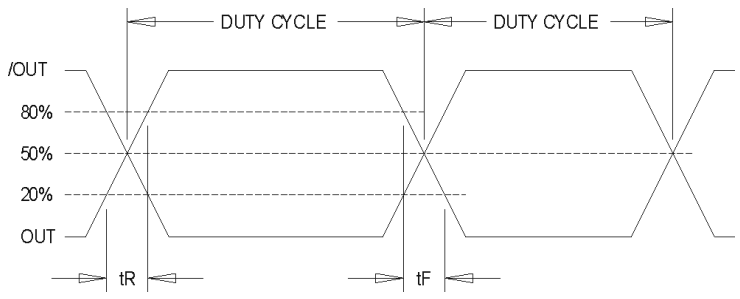
"Y" = Last digit of year (example: 2003 = 3)

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

Catalog ModelNumber
FFF.FFFFM
● MbYYWWV

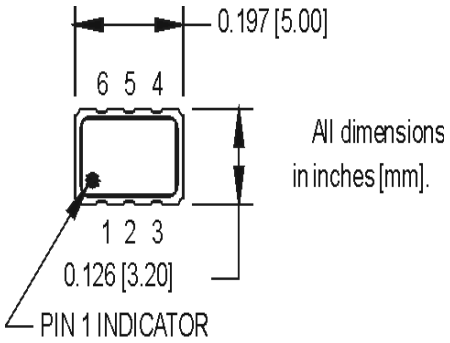
"M" in last line=MtronPTI

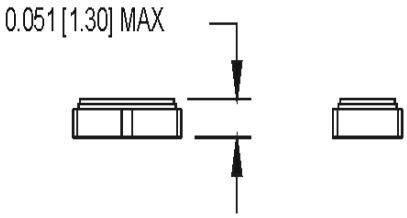
Output Waveform

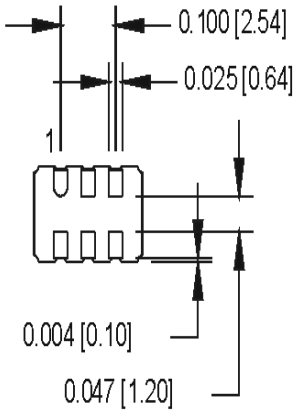


Product Dimension & Pinout Information

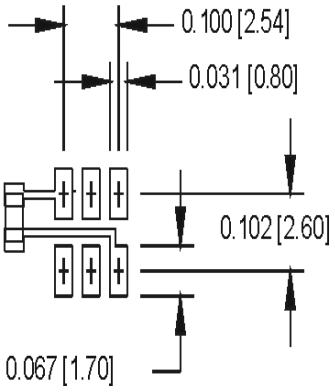
PIN	CONNECTION	
1	"L"	OPEN OR "H"
2	N.C.	
3	V_{SS}	
4	Z	OUTPUT
5	Z	C-OUTPUT
6	V_{DD}	







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

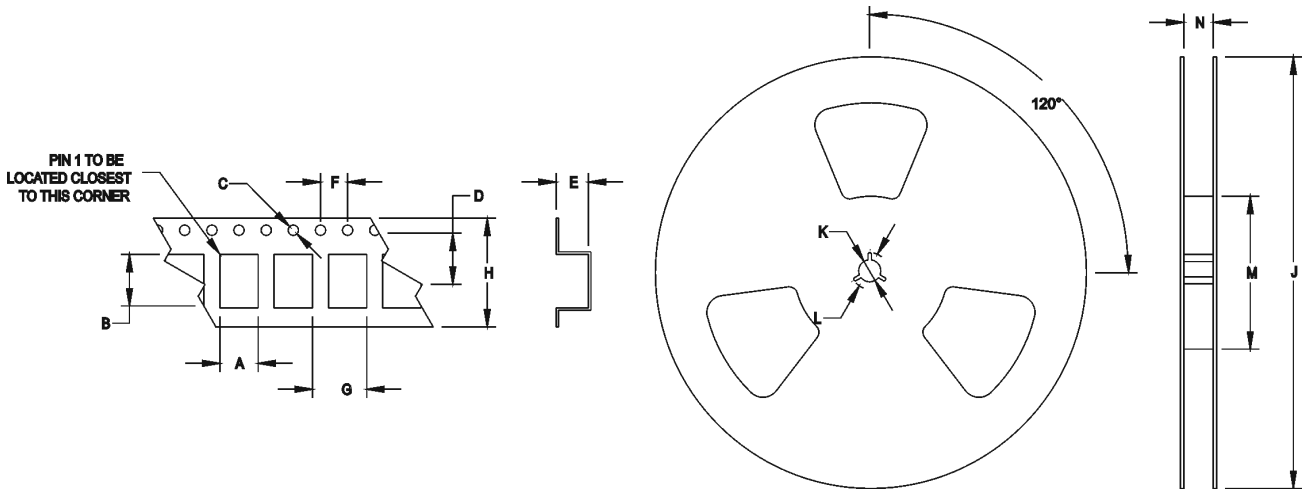
* MIL-STD-833D, Method 3015, Class 1

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

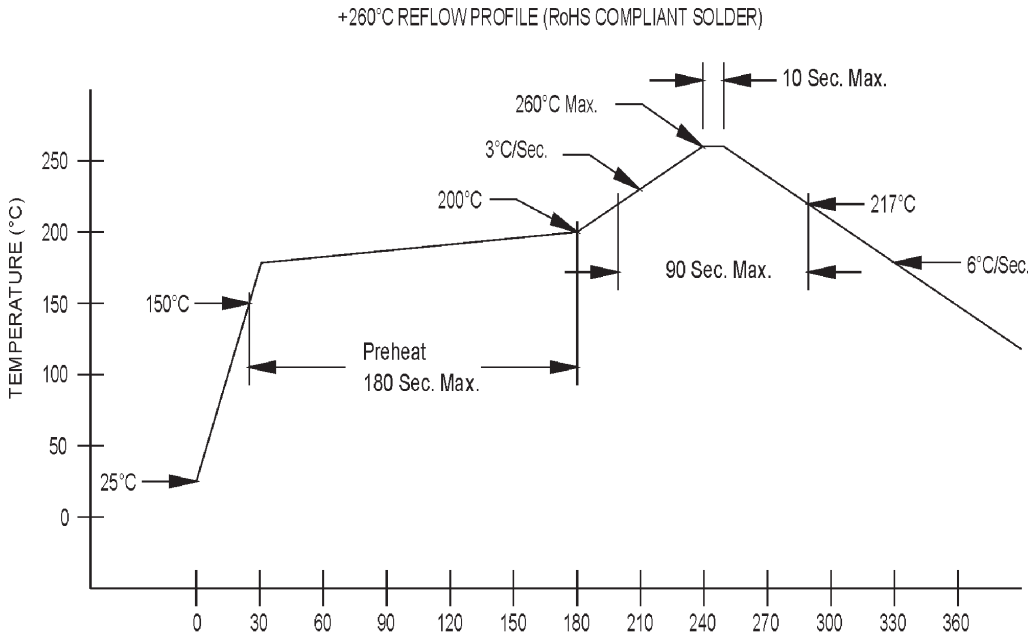
Tape & Reel Specifications

(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

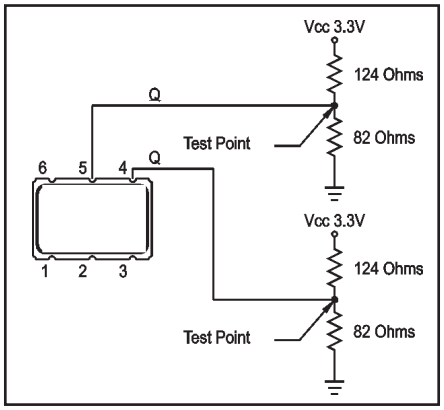


Solder Conditions

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