M2052 Series

5x7 mm, 3.3 Volt HCMOS/TTL
High Operating Temperature SMT Oscillator

FEATURES

Extreme operating temperature range to 200°C
Designed for harsh shock and vibration applications
Hermetically sealed
Long term reliability
Small form factor 5x7 SMT

APPLICATIONS

Down Hole Drilling Tools
Oil and Gas Exploration
Extreme Thermal Applications
Geo-Thermal Exploration

ORDERING INFORMATION

The M2052 Series HCMOS/TTL compatible clock oscillators offer a reliable solution for extreme environmental applications. The small form factor 5x7 SMT packages have excellent heat transfer characteristics and are hermetically sealed. The unique crystal mounting structure used on MtronPTI's high reliability oscillators is capable of surviving mechanical shocks up to 1000 g's and vibration levels to 20 g's. With power consumption being a critical parameter for down-hole drilling applications, these HCMOS/TTL compatible XOs will draw as little as 1.5 mA of input current with a 3.3 V supply.

ORDERING INFORMATION

M2052	J	A	T	A	N	00.0000 MHz

Product Series

Temperature Range
J: -40°C to +175°C
K: -40°C to +200°C

Stability
A: ± 250 ppm

Output Type
T: Tristate

Symmetry/Logic Compatibility
A: 40/60% HCMOS/TTL

Package/Lead Configurations
N: Leadless Ceramic (6 Pads)

Frequency (Customer Specified)

Example Part Number: M2052JATAN 16 .0000 MHz

02/16/22 Rev. E

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Frequency Range	F_0	2		35	MHz	
Frequency Stabilities						
vs. Operating Temperature	$\Delta F/F$	-250		+250	ppm	Includes initial tolerance @ +25°C and deviation over operating temperature range.
vs. Aging			±3		ppm	1st year
			±2		ppm	Thereafter (per year)
RF Output						
		HCMOS/TTL Compatible				
Output Load		2 TTL or 15 pF				
Symmetry (Duty Cycle)		40		60	%	Ref to ½ V_{DD}
Logic "1" Level	V_{OH}	90% V_{DD}			V	HCMOS Load
Logic "0" Level	V_{OL}			10%V_{DD}	V	HCMOS Load
Rise/Fall Time	T_R/T_F			4	ns	From 10% to 90% V_{DD}. Frequency dependent.
Tristate Function (Pad1)		Input Logic "1" or floating: Input Logic "0":				Output Active Output Disables to High Z
Other Parameters						
Random Jitter	RJ		5	12	ps	RMS (1-Sigma)
Operating Voltage and Current						
Operating Voltage	V_{DD}	3.0	3.3	3.6	V	M7S
Operating Current	I_{DD}		1.5 3.0 4.0		mA mA mA	@ 10 MHz @ 25 MHz @ 35 MHz

ENVIRONMENTAL CONDITIONS

Shock	Per MIL-STD-202, Method 213, Condition C (100 g's, 6 ms duration, ½ sinewave)
Vibration	Per MIL-STD-202, Method 204, Condition D (10-2000 Hz at 20 g's)
Hermeticity	Per MIL-STD-202, Method 112 (1 x 10-8 atm cc/s of helium)
Solderability	Per EIAJ-STD-002
Max. Soldering Conditions	See solder profile
Package Type	5 X 7 X 1.9 mm leadless ceramic. RoHS compliant.

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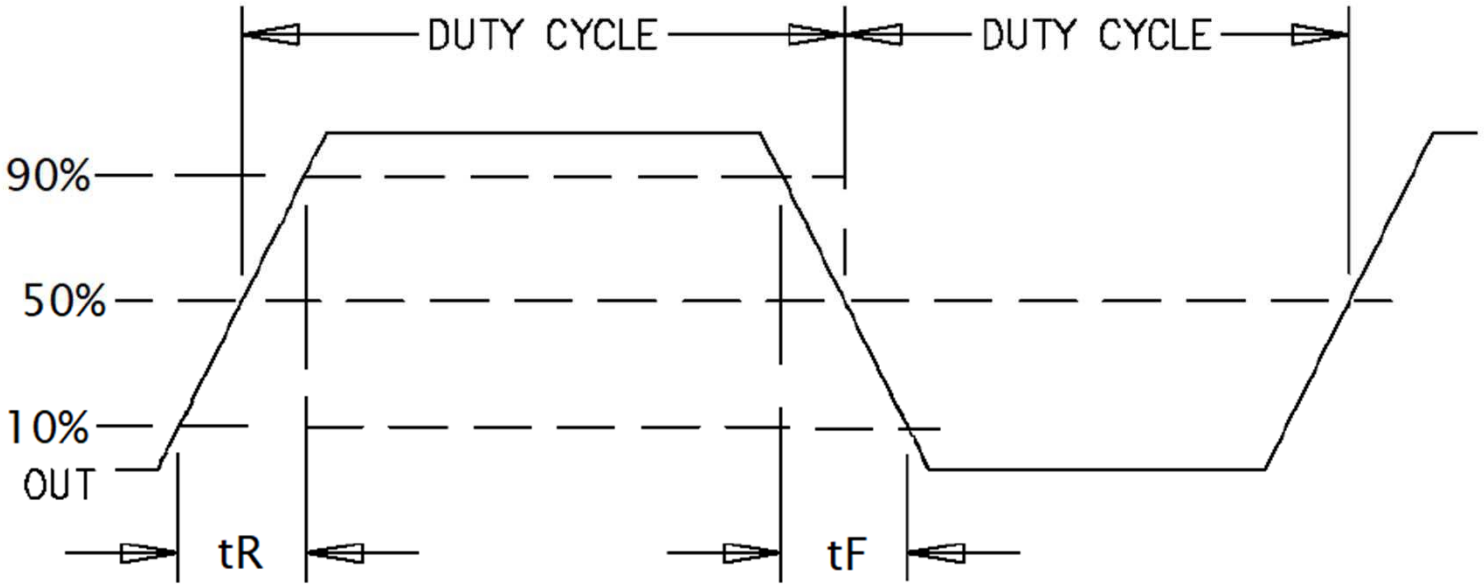
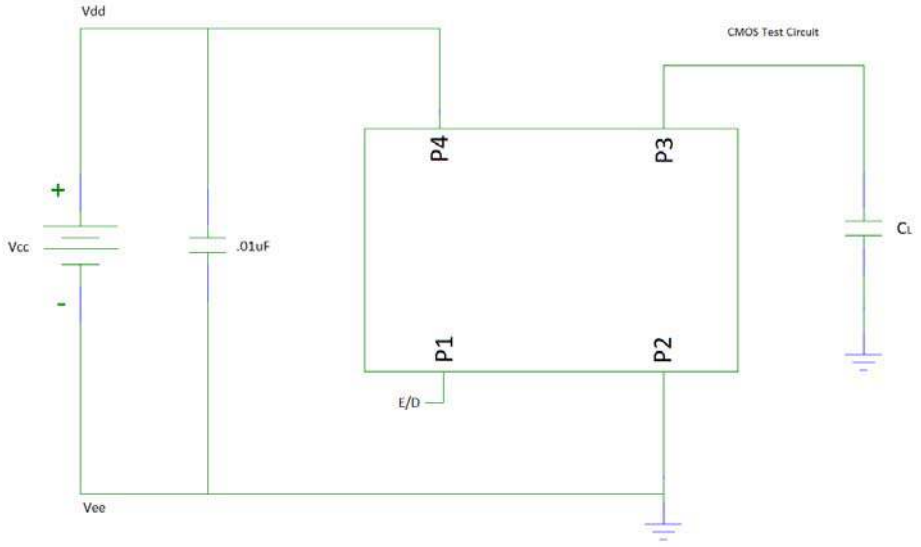
OUTPUT WAVEFORM



LOAD CIRCUIT DIAGRAM

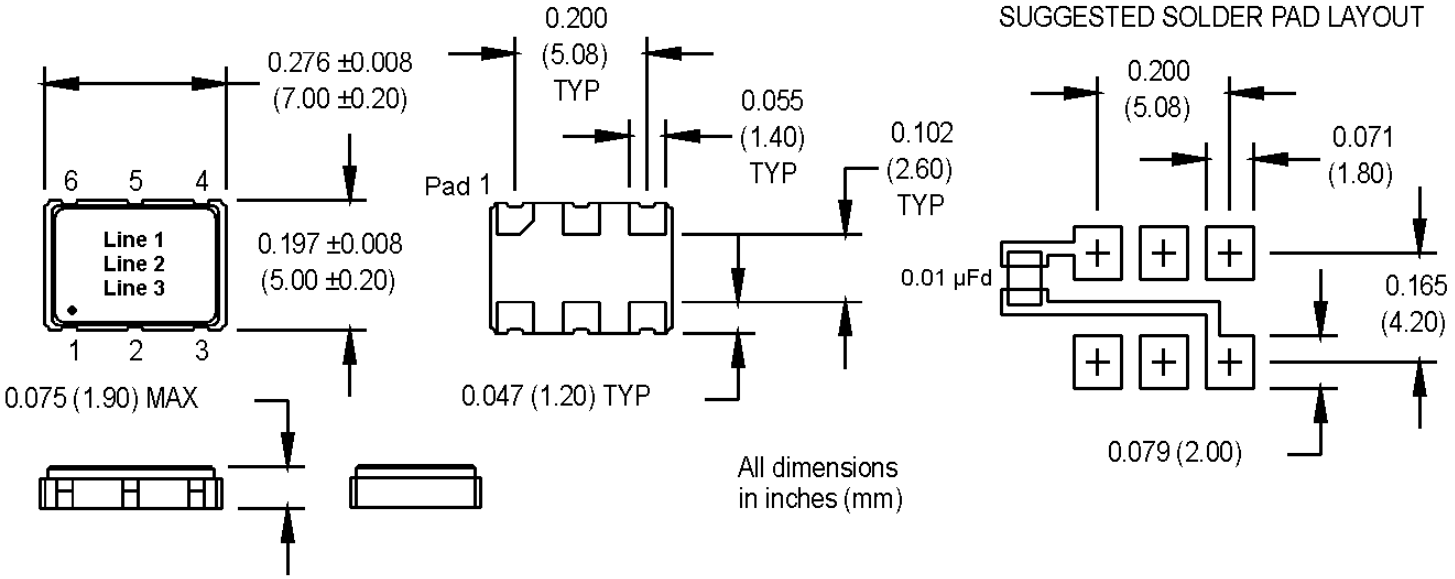


MECHANICAL, PIN OUT AND MARKING INFORMATION

Pad	Function
1	Tristate or N/C
2	No Internal Connection
3	Ground
4	Output
5	No Internal Connection
6	Supply Voltage

Part Marking	
Line 1	M2052
Line 2	xxMxxx
Line 3	Myyww

Legend	
XXMXXX	Frequency MHz
yy	Year
ww	Work Week



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HANDLING INFORMATION

Although protection circuitry has been designed into the M2052 Series 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

QUALITY PARAMETERS

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°C to +125°C, 15-minute Dwell, 10 cycles
Aging	Internal Specification	168 Hours at 105°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

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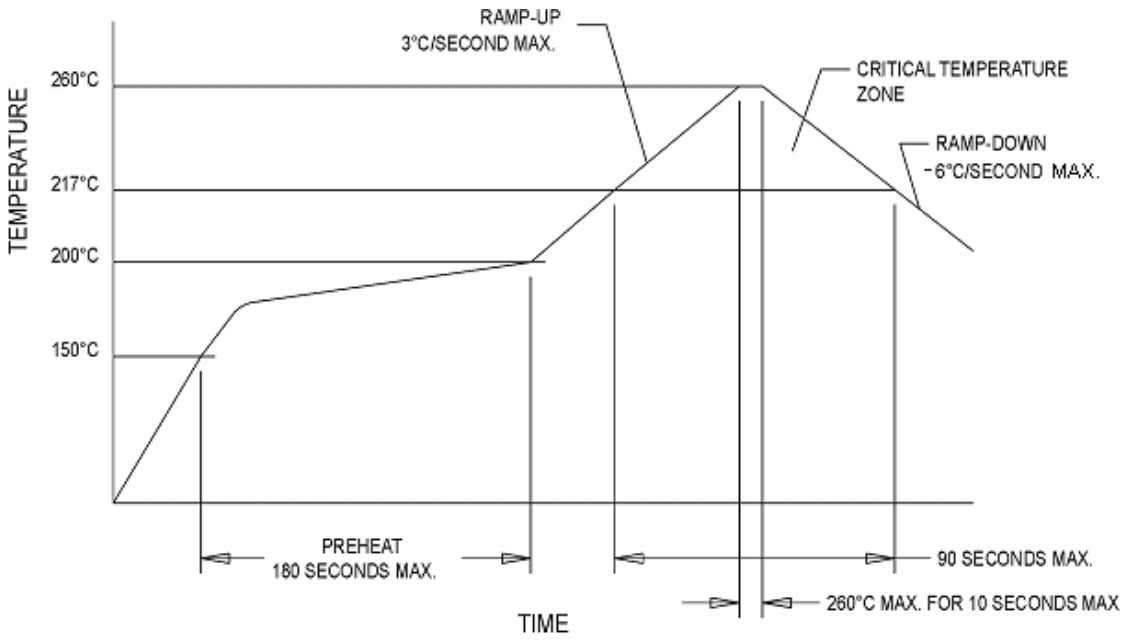
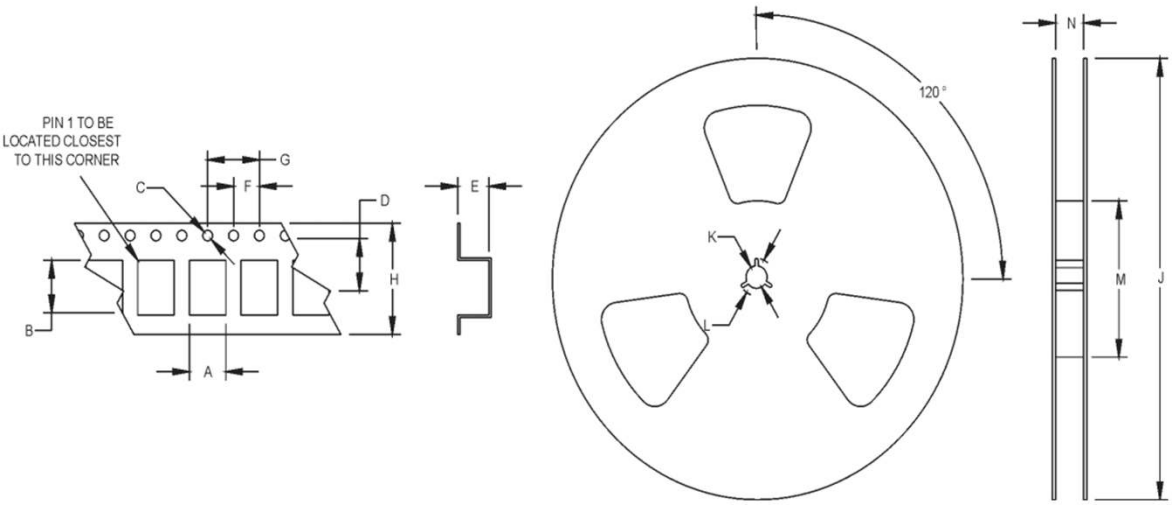
LEAD FREE SOLDER PROFILE



TAPE AND REEL SPECIFICATIONS

All units in mm



A	B	C	D	E	F	G	H	J	K	L	M
6.51	9.29	1.5	7.5	2.8	4	8/12	16	180-330	13	21	60-100