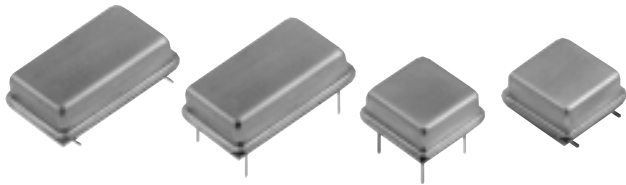




# CRYSTAL OSCILLATORS HCMOS/TTL 5V



## FULL SIZE D.I.L. M package

M1280, M1281,  
M1282, M1286,  
M1288, M1289,  
M1290, M1291,  
M1292, M1298,  
M1299  
M1991, M1992,  
M1998, M1999  
M3290, M3291,  
M3292, M3296,  
M3298, M3299  
M3991, M3992,  
M3998, M3999

## HALF SIZE D.I.L. H package

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## Thru-Hole / Gull Wing

Commercial: 0° to 70°C

FIXED FREQUENCY, 1 KHz to 175 MHz

TRISTATE, 32.768 KHz to 175 MHz

"HARD ZERO", 62.5 KHz to 125 MHz

### FEATURES

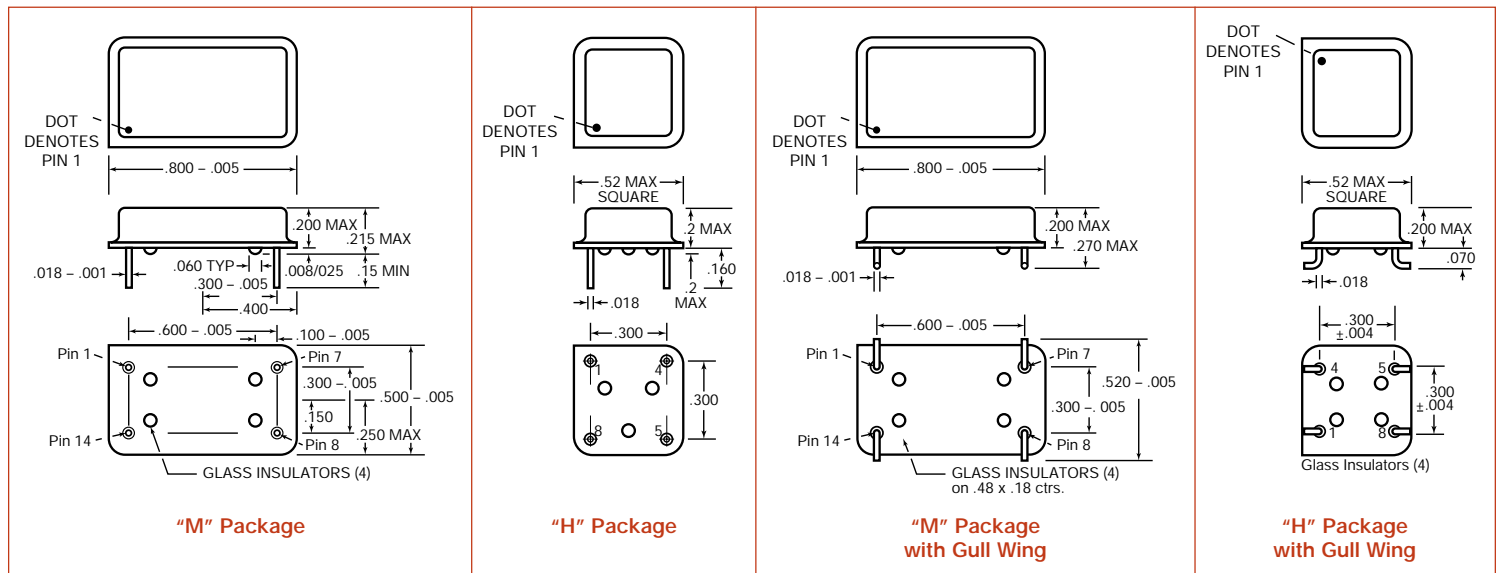
- Frequency from 1 KHz to 175 MHz
- Choice of thru-hole packages
  - DIL Full Size ("M")
  - Half Size DIL ("H")
  - Gull Wing SMD
- Tristate and "Hard Zero" options accommodate ATE
- Very low power when tristated
- Start up time less than 5 ms
- Stability options from ±100 ppm to ±20 ppm
- Guaranteed start-up with ramping DC Supply
- 45/55 symmetry available
- Internal bypass capacitor delivers superior waveform characteristics
- Jitter from positive edge to positive edge is 50 ps RMS max

### TYPICAL APPLICATIONS

- Any thru-hole PCB that requires a standard HCMOS/TTL 5V clock, including microprocessors and microcontrollers.

### Description

MF Electronics thru-hole oscillators embody 25 years of design and manufacturing know-how. They are available in full-size and half size packages, all hermetically sealed with welded stainless steel cover. These 5V thru-hole oscillators are designed for everyday stresses of 0°C to 70°C operation and extended frequency selection of 1 KHz to 175 MHz. Higher (5V) operation ensures superior output loading and faster rise/fall times characteristics.





**CRYSTAL OSCILLATORS**  
**HCMOS/TTL 5V**  
**Thru-Hole /Gull Wing**  
**Commercial: 0° to 70°C**  
**FIXED FREQUENCY, 1 KHz to 175 MHz**  
**TRISTATE, 32.768 KHz to 175 MHz**  
**"HARD ZERO", 62.5 KHz to 125 MHz**

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**ELECTRICAL SPECIFICATIONS**

**Frequency Range**

Fixed Output 1 KHz to 175 MHz  
Tristate 32.768 to 175 MHz  
"Hard Zero" 62.5 KHz to 125 MHz

**Frequency Stability** Includes calibration at 25°C, operating temperature, change of input voltage, change of load, shock and vibration.

	MIN	TYP	MAX	UNITS
<b>Input Voltage, V<sub>DD</sub></b>	4.50	5.0	5.50	volts
<b>Input Current</b>				
1 KHz to 10 MHz		10	20	mA
10.1 to 25 MHz		20	35	mA
25.1 to 50 MHz		25	45	mA
50.1 to 75 MHz		40	55	mA
75.1 to 125 MHz		50	60	mA
100.1 to 175 MHz		55	65	mA

**Output Levels**

"0" Level, sinking 16 mA 0.4 volts  
"1" Level, TTL 4.6 volts  
CMOS, sourcing 8 mA V<sub>DD</sub>-0.4 volts

**Rise and Fall Times**

TTL, from 0.8 to 2.4V 2.4 ns  
HCMOS, 15 pf, 20 to 80% 1 KHz to 75 MHz 2.5 ns  
75.1 to 175 MHz 1.5 ns  
HCMOS, 30 pf, 20 to 80% 1 KHz to 125MHz 4.0 ns  
HCMOS, 50 pf, 20 to 80% 1KHz to 75 MHz 4.0 ns

**Jitter**

From positive edge to positive edge 50 ps RMS

**Symmetry**

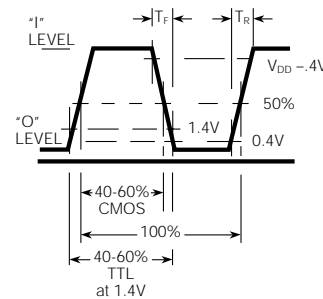
10 TTL, @ 1.4V 45/55 40/60 percent  
Depending on model or 45/55 percent  
HCMOS, @ 50% V<sub>DD</sub> 45/55 40/60 percent  
Depending on model or 45/55 percent

**Aging**

First year 3 ppm  
After first year 1 ppm/yr

**Input Requirements for Pin 1.:**

"1": On - Pin 1 may float or 2.4V min., sourcing 400 microAmp  
"0": Disable or Tristate - Pin 1 requires 0.4V, sinking 400 microAmp



**WAVEFORMS**

**CONNECTIONS — All models**

	FULL SIZE	HALF SIZE	M1280's H1280's	M1290's, "Hard-Zero" M3290's, H3290's Tristate
PIN 1	1	1	NOT USED	Floating or "1": Oscillator runs Ground or "0": Hard "0" for M1290's or Tristate for 3290's
PIN 7	4	4	Ground and Case	
PIN 8	5	5	Output	
PIN 14	8	8	5V, V <sub>DD</sub>	

FIXED OUTPUT		TRISTATE		HARD ZERO	Frequency Stability
40/60 Symmetry	45/55 Symmetry	40/60 Symmetry	45/55 Symmetry	40/60 Symmetry	
1280	1286	3290	3296	M1290	±100 ppm
1281	1991	3291	3991	M1291	±25 ppm
1282	1992	3292	3992	M1292	±50 ppm
1288	1998	3298	3998	M1298	±20 ppm
1289	1999	3299	3999	M1299	±32 ppm





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**ENVIRONMENTAL SPECIFICATIONS**

**Temperature**

Operating 0° to 70°C  
 Storage -55° to +125°C

**Shock** – 1000 Gs, 0.35 ms, 1/2 sine wave, 3 shocks in each plane

**Vibration** – 10-2000 Hz of .06" d.a. or 20 Gs, whichever is less

**Humidity** – Resistant to 85° R.H. at 85°C

**MECHANICAL SPECIFICATIONS**

**Leak** – MIL STD 883, Method 1014, condition A1

**Pins** – Kovar, nickel plated with 60/40 solder coat

**Bend Test** – Will withstand two bends of 90° from reference

**Header** – Steel, with nickel plate

**Case** – Stainless steel, type 304

**Marking** – Epoxy ink or laser engraved

**Resistance to Solvents** – MIL STD 202, Method 215

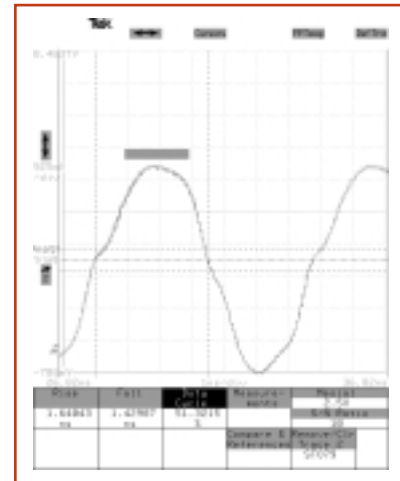
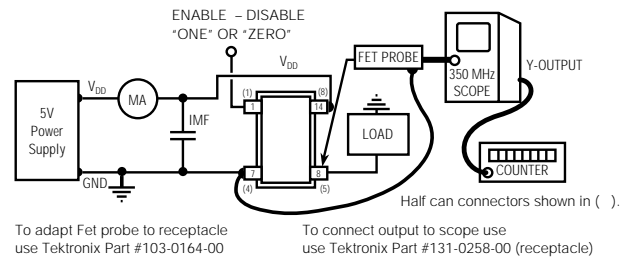


Fig. 1 M1286-148.26M with 10pf load  
 Duty Cycle is 51.3% at  $V_{DD}/2$



**ALL OSCILLATORS HAVE INTERNAL BYPASS CAPACITORS**

**TEST CIRCUIT**

**HOW TO ORDER**

For Part Number, put package type before model number, and add frequency in MHz, for example:

**H 3290 - 66.66M**

"M" is full size DIL  
 "H" is half size DIL

"3290"  
 is model  
 type

"66.66 M"  
 frequency  
 in MHz

Leave blank  
 for straight leads  
 Add "G" for  
 gullwing

SS#	Rev.
M1280	A



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