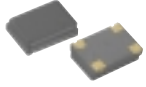




# CRYSTAL OSCILLATORS

## HCMOS/TTL 3.3V



**SURFACE MOUNT**  
**T package**  
 T1380, T1381,  
 T1382, T1388,  
 T1389  
 T3390, T3391,  
 T3392, T3398,  
 T3399

## 5 x 7 mm Surface Mount

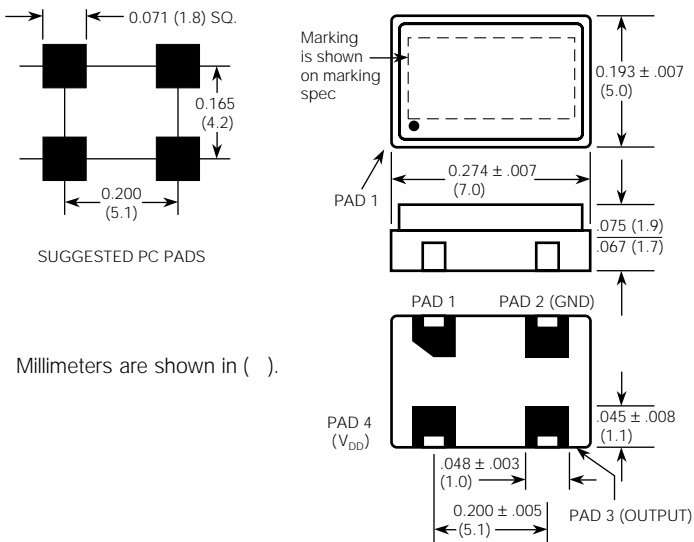
**Commercial: 0° to 70°C**  
**FIXED FREQUENCY, 1 KHz to 125 MHz**  
**TRISTATE, 14 KHz to 125 MHz**

### FEATURES

- Fixed frequency or Tristate
- Very low power when tristated
- Start up time less than 5 ms.
- Stability options from  $\pm 100$  ppm to  $\pm 20$  ppm
- Guaranteed start-up with ramping DC Supply
- 45/55 symmetry is standard

### TYPICAL APPLICATIONS

- Any surface mount PCB that requires a standard HCMOS/TTL 3.3V clock, including microprocessors and microcontrollers.



Millimeters are shown in ( ).

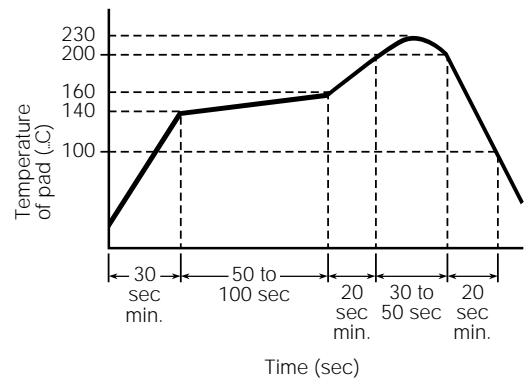
**"T" Package**

### Description

MF Electronics T-series surface mount (SMD) oscillators provide clock waveforms needed to clock standard HCMOS or TTL circuits.

### CONNECTIONS

	Fixed Output Models	Tristate Models
PAD 1	NOT USED	Floating or 1 : Oscillator runs Ground or 0 : Disable or Tristate
PAD 2	Ground and Case	
PAD 3	Output	
PAD 4	+3.3V, V <sub>DD</sub>	



**Recommended Reflow Soldering Profile**





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**SURFACE MOUNT**  
**T package**  
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**ELECTRICAL SPECIFICATIONS**

**Frequency Range**

Fixed Output	1 KHz to 125 MHz
Tristate	14 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>	3.0	3.3	3.6	volts
<b>Input Current</b>				
3 M to 10 MHz		2.0	3.5	mA
10.1 to 20 MHz		3.0	4.0	mA
20.1 to 30 MHz		5.0	6.0	mA
30.1 to 50 MHz		7.0	8.0	mA
50.1 to 67 MHz		11.0	12.0	mA
67.1 to 125 MHz		13.0	16.0	mA

**Output Levels**

"0" Level, sinking 16 mA		0.4	volts
"1" Level			
CMOS, sourcing 8 mA	V <sub>DD</sub> - .4		volts

**Rise and Fall Times**

CMOS, 15 pf, 20 to 80% (<60 MHz)	3.0	4	ns
CMOS, 30 pf, 20 to 80% (<60 MHz)	4.0	5	ns
CMOS, 50 pf, 20 to 80% (<60 MHz)	6.0	8	ns
CMOS, 15 pf, 20 to 80% (>60 MHz)	2.0	2.5	ns
CMOS, 30 pf, 20 to 80% (>60 MHz)	3.0	4.5	ns

**Jitter**

from positive edge to positive edge	100	ps RMS
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**Symmetry**

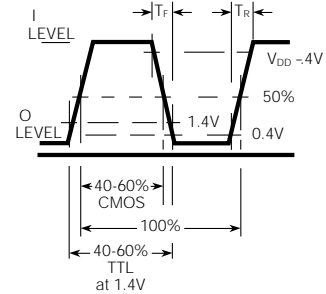
CMOS, @ 50% V <sub>DD</sub>	48/52	45/55	percent
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**Aging**

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**

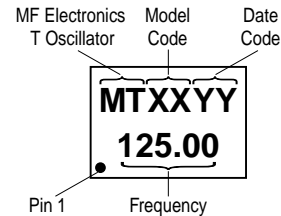
FIXED OUTPUT		
MODEL	Marking Letter ID*	Frequency Stability
T1380	E	±100 ppm
T1381	AL	±25 ppm
T1382	F	±50 ppm
T1388	BV	±20 ppm
T1389	BW	±32 ppm

TRISTATE		
MODEL	Marking Letter ID*	Frequency Stability
T3390	G	±100 ppm
T3391	Q	±25 ppm
T3392	H	±50 ppm
T3398	BY	±20 ppm
T3399	BZ	±32 ppm

\* See Marking Specification

**MARKING SPECIFICATION**

The format for the marking is:





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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**

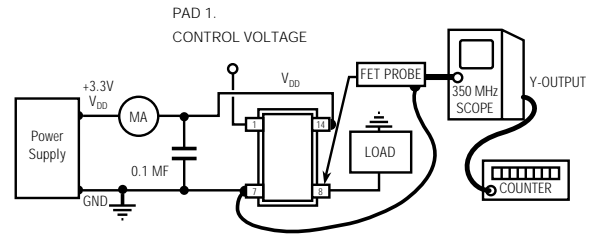
**Leak** – MIL STD 883, Method 1014, condition A1

**Case** – Hermetically sealed package

**Pads** – 60 microinch of gold over nickel

**Marking** – Epoxy ink or laser engraved

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



To adapt Fet probe to receptacle use Tektronix Part #103-0164-00

To connect output to scope use Tektronix Part #131-0258-00 (receptacle)

**TEST CIRCUIT**

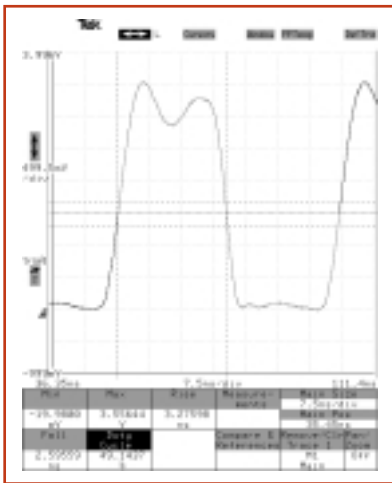


Fig.1 T3392-20M with 25pf load

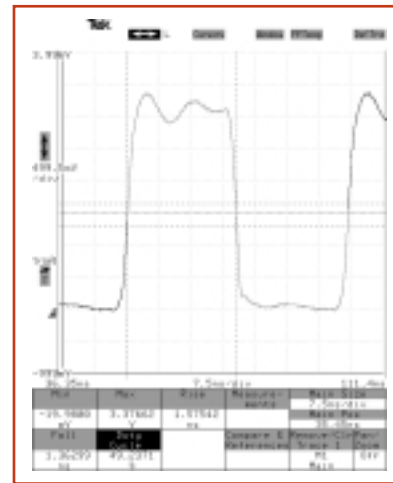


Fig. 2 T3392-20M without load

**HOW TO ORDER**

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

T 3391 - 125M

"T" is SMD  
 "T" package

"3391"  
 is model  
 type

"125 M"  
 frequency  
 in MHz

SS#	Rev.
T1380	A



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