



CRYSTAL OSCILLATORS HCMOS/TTL 5V

RoHS Status



Surface Mount

T1280, T1281,
T1282, T1286,
T1287*, T1288,
T1289, T1991, T1992,
T1997*, T1998, T1999,
T3290, T3291,
T3292, T3296, T3297*
T3298, T3299
T3991, T3992,
T3997*, T3998, T3999
**not available for new designs.*

5 x 7 mm Surface Mount

Commercial: 0° to 70°C

FIXED FREQUENCY, 1 KHz to 175 MHz

TRISTATE, 14 KHz to 175 MHz

FEATURES

- Fixed frequency or Tristate
- Very low power when tristated
- Frequency from 1 KHz to 175 MHz
- 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

TYPICAL APPLICATIONS

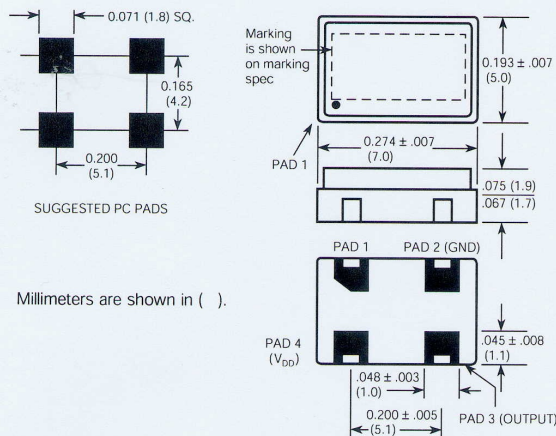
- Any surface mount PCB that requires a standard HCMOS/TTL 5V clock, including microprocessors and microcontrollers.

Description

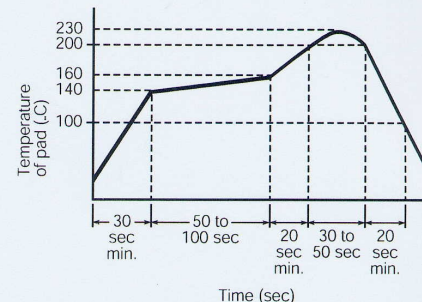
MF Electronics T-series surface mount (SMD) oscillators provide clock wave-forms needed to clock standard HCMOS or TTL circuits.

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	+5V, V _{DD}	



"T" Package



Recommended Reflow Soldering Profile

MF ELECTRONICS



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ELECTRICAL SPECIFICATIONS

Frequency Range

Fixed Output 1 KHz to 175 MHz
Tristate 14 KHz to 175 MHz

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

	MIN	TYP	MAX	UNITS
Input Voltage	4.50	5.0	5.50	volts

Input Current

3 M to 10 MHz	6	10	mA
10.1 to 20 MHz	10	13	mA
20.1 to 30 MHz	11	15	mA
30.1 to 50 MHz	16	22	mA
50.1 to 67 MHz	20	30	mA
67.1 to 125 MHz	25	35	mA

Output Levels

"0" Level, sinking 16 mA		0.4	volts
"1" Level,			
TTL	2.4	4.6	volts
CMOS, sourcing 8 mA	V _{DD} -4		volts

Rise and Fall Times

TTL, from 0.8 to 2.4V	2.4	4	ns
HCMOS, 15 pf, 20 to 80%			
1 KHz to 75 MHz	2.5	4	ns
75.1 to 175 MHz	1.5	2	ns
HCMOS, 30 pf, 20 to 80%			
1 KHz to 125MHz	4.0	6	ns
HCMOS, 50 pf, 20 to 80%			
1KHz to 75 MHz	4.0	6	ns

Jitter

from positive edge to positive edge	100	ps RMS
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Symmetry

10 TTL, @ 1.4V	45/55	40/60	percent
Depending on model		or 45/55	percent
HCMOS, @ 50% V _{DD}	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

FIXED OUTPUT

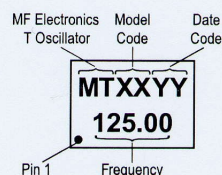
40/60 Symmetry		45/55 Symmetry		Frequency Stability
MODEL	Marking Letter ID*	MODEL	Marking Letter ID*	
T1280	A	T1286	AM	±100 ppm
T1281	O	T1991	BB	±25 ppm
T1282	B	T1992	BD	±50 ppm
T1287	R	T1997	BN	±10 ppm
T1288	BF	T1998	BH	±20 ppm
T1289	BJ	T1999	BK	±32 ppm

TRISTATE

40/60 Symmetry		45/55 Symmetry		Frequency Stability
MODEL	Marking Letter ID*	MODEL	Marking Letter ID*	
T3290	C	T3296	AN	±100 ppm
T3291	O	T3991	BA	±25 ppm
T3292	B	T3992	BC	±50 ppm
T3297	R	T3997	BO	±10 ppm
T3298	BF	T3998	BG	±20 ppm
T3299	BJ	T3999	BL	±32 ppm

MARKING SPECIFICATION

The format for the marking is:



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ENVIRONMENTAL SPECIFICATIONS

Temperature — All models

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

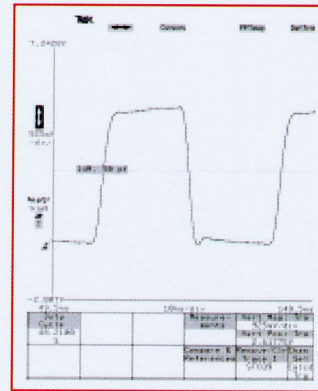
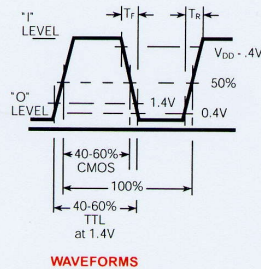
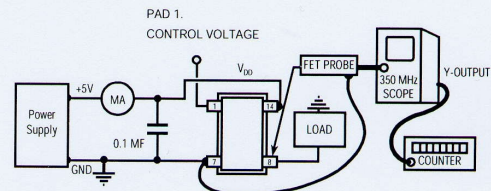


Fig. 1 T3290-14M with 50pf load
Duty Cycle is 48.2% at $V_{DD}/2$



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

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

TEST CIRCUIT

HOW TO ORDER

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

T 3292 - 50M

"T" is SMD
"T" package

"3292"
is model
type

"50 M"
frequency
in MHz