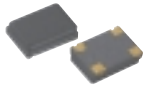




CRYSTAL OSCILLATORS HCMOS 5V

SURFACE MOUNT
T package
T3590, T3592



5 x 7 mm Surface Mount Commercial: 0° to 70°C TRISTATE, 50 MHz to 105 MHz

FEATURES

- Exceptionally clean waveform due to inverted mesa crystal
- Jitter is less than 5 ps rms
- Very fast rise time
- 5 x 7 mm Surface Mount Device
- Start up time less than 5 ms
- Stability choice of ± 50 ppm or ± 100 ppm
- Guaranteed start-up with ramping DC Supply
- 45/55 symmetry is standard
- Very low power when tristated

TYPICAL APPLICATIONS

These oscillators are intended for high-speed data communications applications such as Gigabit Ethernet and Fibre Channel. Common frequencies are: 53.125 MHz, 62.5 MHz, 75.0 MHz and 100.0 MHz.

Description

These oscillators are an important landmark in SMD oscillators due to the use of inverted mesa crystals. These crystals operate at fundamental frequency, providing a clean waveform with fast rise and fall times and guaranteed low jitter less than 5 ps RMS. These oscillators are intended for telecom applications which require very low jitter.

MF Electronics' creation of a proprietary multi-layer gold-ceramic package has ushered in a new generation of tiny, robust surface mount oscillators. Measuring only 5 x 7 x 1.9 mm, the T-Oscillators (T is for tiny) significantly reduce PCB real estate, saving board space, and permitting new value-adding functions. They are intended for the most stringent telecommunications applications where small size and excellent waveform characteristics are required.

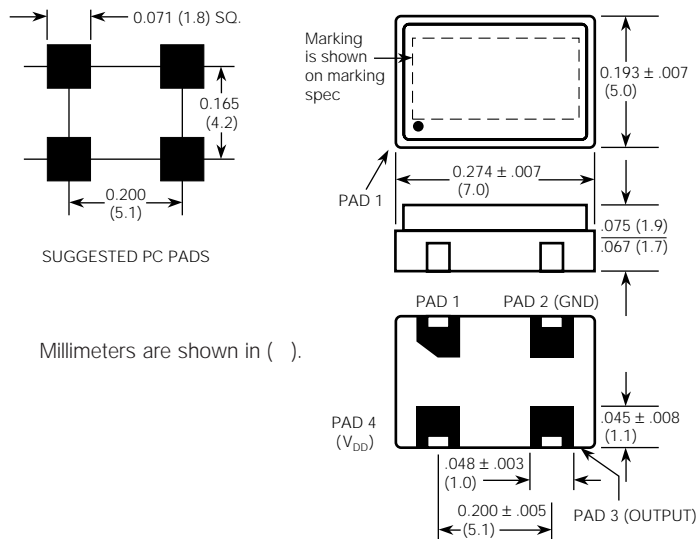


Fig. 2. "T" Package

CONNECTIONS

Tristate Models	
PAD 1	Floating or 1 : Oscillator runs Ground or 0 : Disable or Tristate
PAD 2	Ground and Case
PAD 3	Output
PAD 4	+5V, V _{DD}

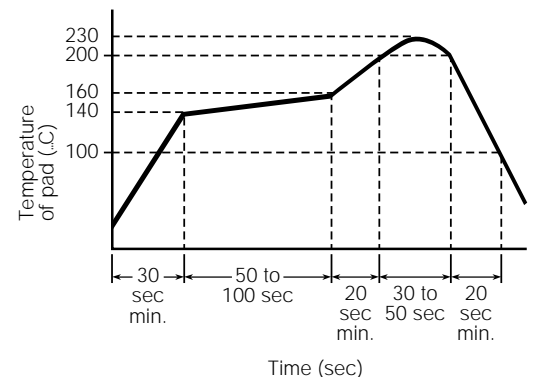


Fig. 1. Recommended Reflow Soldering Profile





CRYSTAL OSCILLATORS
HCMOS 5V
5 x 7 mm Surface Mount
Commercial: 0° TO 70°C
TRISTATE, 50 MHz to 105 MHz

SURFACE MOUNT
T package
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ELECTRICAL SPECIFICATIONS

Frequency Range 50 to 105 MHz

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

Maximum Load 30 pf

	MIN	TYP	MAX	UNITS
Input Voltage, V_{DD}	4.5	5.0	5.5	volts
Input Current			75	mA
Output Levels				
"0" Level, sinking 16 ma			0.4	volts
"1" Level, sourcing 8 ma	$V_{DD}-0.4$			volts
Rise Time, 30 pf				
0.4V to $(V_{DD}-0.4)V$			2.0	ns
Fall Time, 30 pf				
$(V_{DD}-0.4)V$ to 0.4V			2.0	ns
Jitter , all voltage, temperature and load				
pos. edge to pos. edge, rms		3	5	ps
pos. edge to pos. edge, pk-pk		16	25	ps
Symmetry				
CMOS, @ 50% V_{DD}		48/52	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

ENVIRONMENTAL SPECIFICATIONS

Temperature

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

Temperature Cycle – Not to exceed ± 5 ppm change when exposed to 2 hours maximum at each temperature from 0 to 120°C, with 25°C reference

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

Gross Leak – Each unit checked in 125°C fluorocarbon

Fine Leak – Mass spectrometer leak rate less than 2×10^{-8} atm, cc/sec of helium

Case – Hermetically sealed in package

Pads – 60 microinch of gold over nickel

Marking – Print is permanent white ink

Resistance to Solvents – MIL STD 202, Method 215

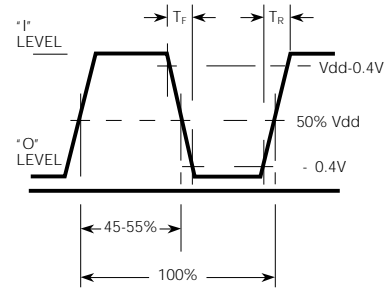


Fig. 3. Timing

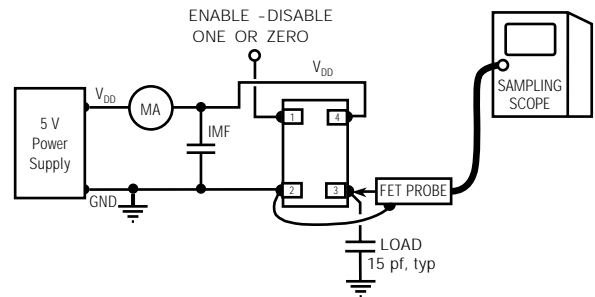


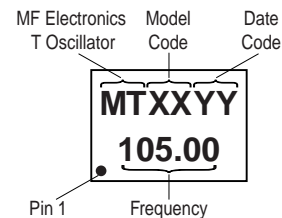
Fig. 4. Test Circuit

MODEL	Frequency Stability	Marking Letter ID*
T3590	± 100 ppm	FB
T3592	± 50 ppm	FD

* See Marking Specification

MARKING SPECIFICATION

The format for the marking is:





CRYSTAL OSCILLATORS
 HCMOS 5V
5 x 7 mm Surface Mount
 Commercial: 0° TO 70°C
 TRISTATE, 50 MHz to 105 MHz

SURFACE MOUNT
T package
 T3590, T3592

TYPICAL WAVEFORMS

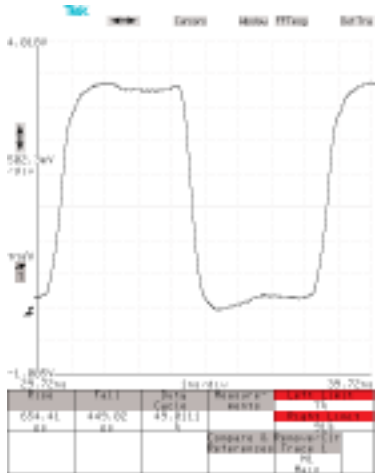


Fig. 5. T3592-105 M without load.
 Rise time is 0.654 ns. Fall time is 0.449 ns. Duty cycle is 49.0%.
 Readings taken at 3.3V.

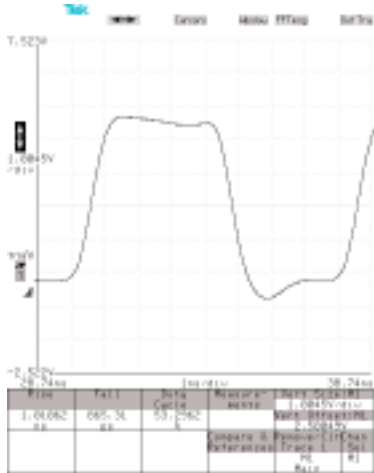


Fig. 6. T3592-105 M with 15 pf load.
 Rise time is 1.01 ns. Fall time is 0.865 ns. Duty cycle is 53.29%.
 Readings taken at 3.3V.

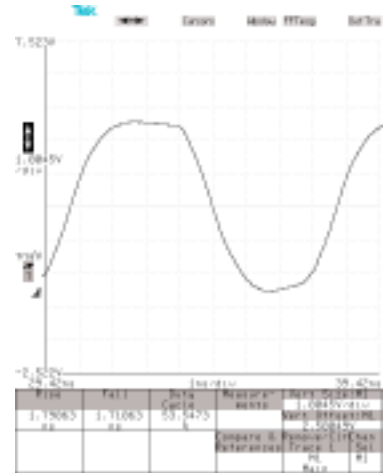


Fig. 7. T3592-105 M with 30 pf load.
 Rise time is 1.79 ns. Fall time is 1.71 ns. Duty cycle is 53.5%.
 Readings taken at 3.3V.

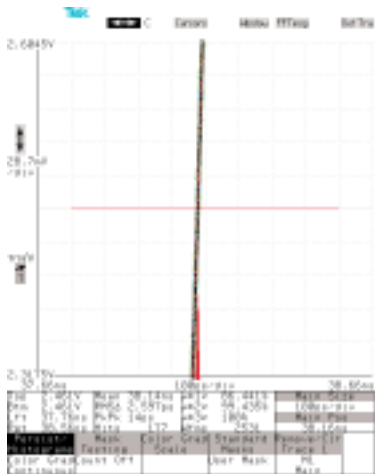


Fig. 8. T3592-105 M showing jitter, with no load. RMS jitter is 2.59 ps and peak-to-peak jitter is 14 ns. Readings taken with Tek 11801B oscilloscope with SD22 Sampling Head.

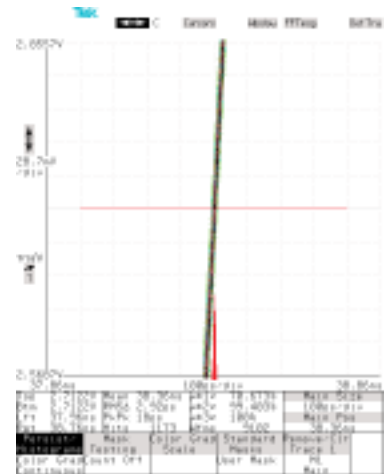


Fig. 9. T3592-105 M showing jitter, with 18 pf load. RMS jitter is 2.92 ps and peak-to-peak jitter is 18 ns. Readings taken with Tek 11801B oscilloscope with SD22 Sampling Head.

HOW TO ORDER

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

T 3590 - 105M

T is SMD
 T package 3590 is model type 105 M frequency in MHz

Unless customer-specific terms and conditions are signed by an officer of MF Electronics, the sale of this and all MF Electronics products are subject to terms and conditions set forth at www.mfelectronics.com/terms

SS#	Rev.
T3590	A

MF ELECTRONICS