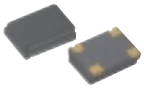
CRYSTAL OSCILLATORS
HCMOS 3.3V

SURFACE MOUNT
T package
T5322, T5323



5 x 7 mm Surface Mount
HIGH RELIABILITY
1 MHz to 100 MHz

MF Electronics oscillators are not compliant with MIL-PRF-55310

FEATURES
- Leadless chip carrier package is hermetically sealed at 350ºC for superior aging and field performance
- Crystal angle controlled to ±1 minute for excellent temperature stability
- 168 hour Class B burn-in and extensive environmental testing for best performance in rugged field environments
- Start-up time less than 10 ms
- Serialized test data available

TYPICAL APPLICATIONS
- Surface mounted PCB projects requiring high reliability HCMOS clock waveforms

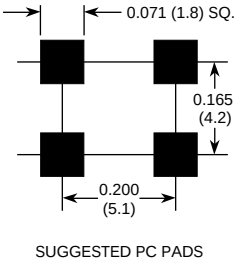
Description

These high reliability oscillators provide HCMOS clock waveforms for applications subjected to the most stringent environmental conditions. This 5x7mm SMD package uses a glass frit seal process at 350ºC, resulting in more reliable field performance. This package also allows for large soldering area for better holdability.

Models	Operating Temperature	Frequency Stability
T5322	–55 to +85°C	±.005% (±50 ppm)
T5323	–55 to +125°C	±.0075% (±75 ppm)

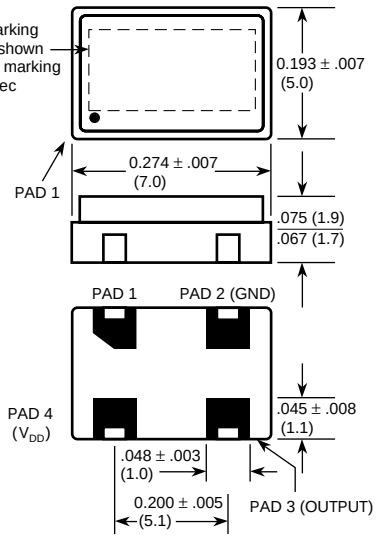
CONNECTIONS

Pad	T5322, T5323
1.	N.C.
2.	Ground
3.	Output
4.	+3.3V, V_{DD}

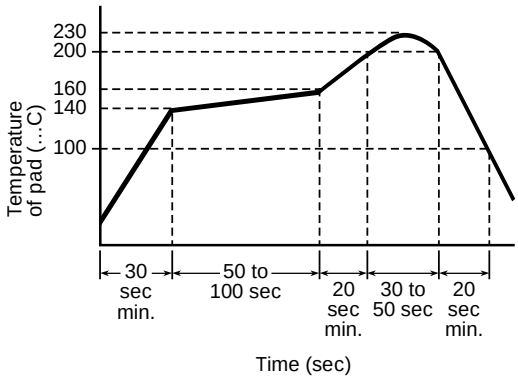


SUGGESTED PC PADS

Millimeters are shown in ( ).



"T" Package



Recommended Reflow Soldering Profile

MF ELECTRONICS

International Sales: +1.914-712-2200 • USA Sales: +1.800.331.1236 • Fax: 914.712.2290 • www.mfelectronics.com • email:sales@mfelectronics.com

ELECTRICAL SPECIFICATIONS

Frequency Range
Fixed Output 1 MHz to 100 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	3.0	3.3	3.6	volts
Input Current		3-7	16	mA
Waveform Symmetry,				
Measured at 1.5V	40/60	45/55	60/40	percent
Rise and Fall Times				
CMOS, 15 pf,				
20 to 80% (<60 MHz)		3.0	4.0	ns
20 to 80% (>60 MHz)		2.0	2.5	ns
CMOS, 30 pf,				
20 to 80% (<60 MHz)		4.0	5.0	ns
20 to 80% (>60 MHz)		3.0	4.5	ns
"Zero" Level,				
Sinking 16 mA			0.4	volts
"One" Level				
Sourcing 8 mA	V_{DD} - 0.4V			volts
Frequency Change				
from ±3.0V to ±3.6V		±5	±10	ppm
Aging				
First year		3		ppm
After first year		1		ppm/yr

ENVIRONMENTAL SPECIFICATIONS

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 – MIL-STD 202, Method 213A, Test Condition 1 (1000 Gs, 0.35 ms, 1/2 sine wave, 3 shocks in each plane)

Vibration – MIL-STD 202, Method 204B, Test Condition B (10-2000 Hz of .06" d.a. or 20 Gs, whichever is less)

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

TABLE 1

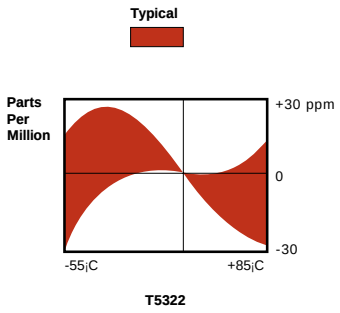
Each unit undergoes the following:

1. Stabilization Bake	MIL-STD-883 Method 1008, Cond. B
2. Temperature Cycling	MIL-STD-883 Method 1010, Cond. B
3. Centrifuge	MIL-STD-883 Method 2001, Cond. A
4. Fine Leak	MIL-STD-883 Method 1014, Cond. A1
5. Gross Leak	MIL-STD-883 Method 1014, Cond. C
6. Temperature Stability	Within 75 ppm from –55 to +125°C (T5323)
	Within 50 ppm from –55 to +85°C (T5322)

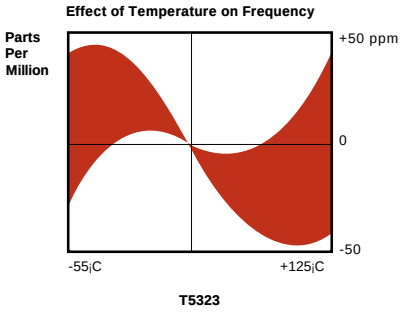
7. Electrical Test at 25°C, as follows:

A. Frequency	H. Duty Cycle (FL)
B. Current	I. Frequency at 3.6V
C. Rise Time (NL)	J. Frequency at 3.0V
D. Fall Time (NL)	K. Overvoltage (4.3 volts for 30 seconds)
E. Rise Time (FL)	L. "Zero" logic level
F. Fall Time (FL)	M. "One" logic level
G. Duty Cycle (NL)	

Test data on each unit is available for additional cost



T5322



T5323

MECHANICAL DESCRIPTION

Gross Leak – Each unit checked in 125°C fluorocarbon

Fine Leak – Mass spectrometer leak rate less than 5 X 10 (-8) atm, cc/sec of helium

Case – Ceramic, Glass Seal

Pads – 60 microinch of gold over nickel

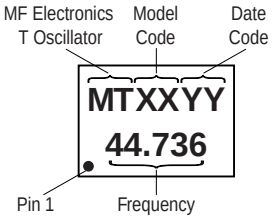
Resistance to Solvents – MIL STD 202, Method 215

Marking – MF letter ID and date code Marking will withstand MIL-STD 202, Method 215

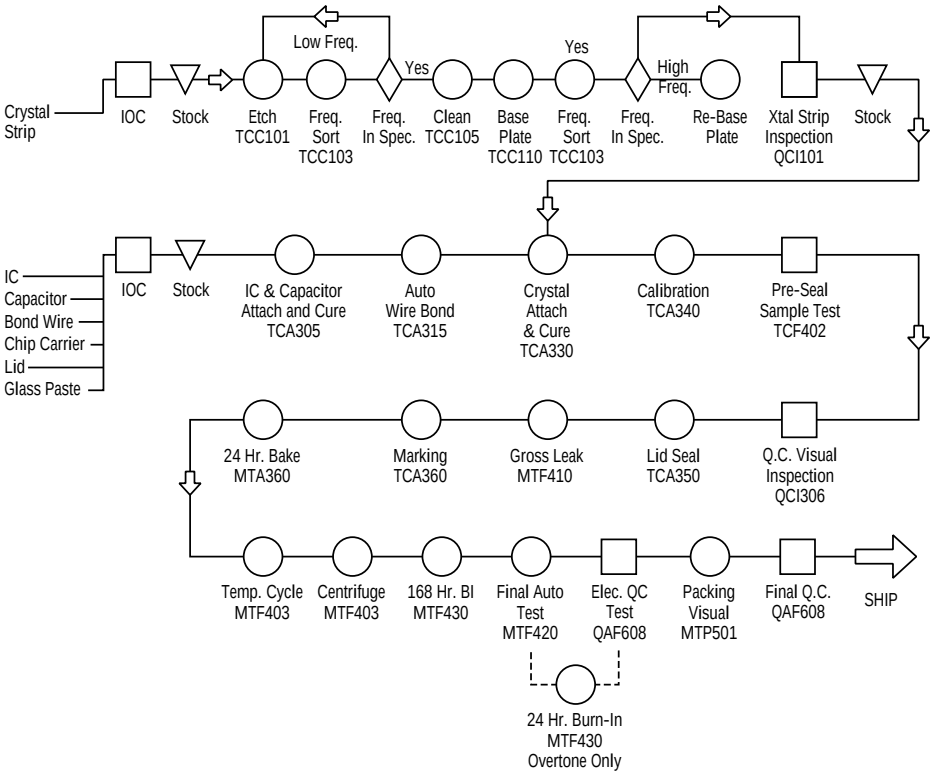
MODEL	Marking Letter ID
T5322	AZ
T5323	FZ

MARKING SPECIFICATION

The format for the marking is:



QUALITY CONTROL FLOW CHART



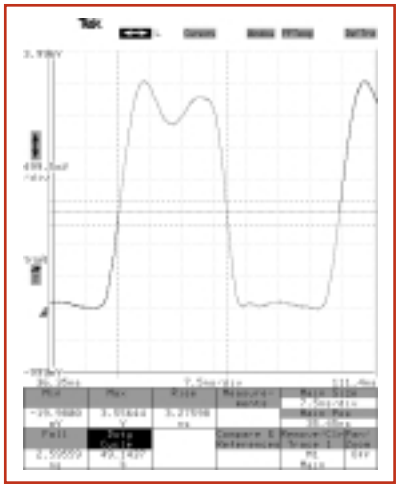


Fig.1 T5322-20M with 25pf load

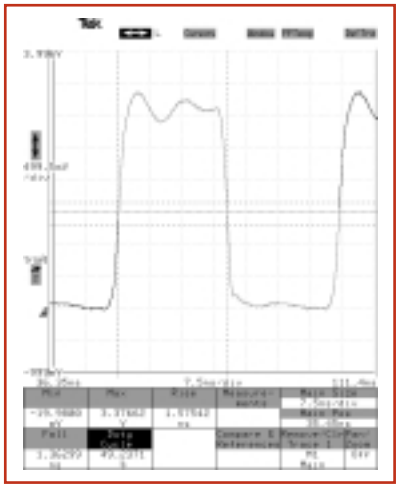


Fig. 2 T5322-20M without load

HOW TO ORDER

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

T 5322 - 40M

- T is SMD T package
- 5XXX is model type
- 40 M frequency in MHz

TABLE 2 — RELIABILITY TEST PROCEDURE AND CONDITIONS FOR QUARTZ CRYSTAL OSCILLATORS

I. Group A

Electrical Characteristics at 0, 25, 70 and 125°C
- Frequency @ 3.0, 3.3 and 3.6 volts
- Symmetry (Duty Cycle)
- Input current
- Zero/One levels
- Rise/Fall times

Physical Dimensions
- Length/width
- Height
- Glass seal (Visual)
- Package finish (Corrosion, discoloration, etc.)
- Marking placement/legibility

II. Group B

1000 hrs aging at or above 70°C, 3.3V VDC, with proper load

III. Group C – All units have passed Group A testing

A. Subgroup 1 – 8 pcs.

Standard	Condition	Description	End point measurement
MIL-STD-883	METHOD 2002 COND. B	Mechanical shock 1500 g's, 5ms 5 drops, 6 axis	Frequency Output waveform
MIL-STD-883	METHOD 2007 COND. A	Vibration, var. freq. 20 g's, .06" disp., 20-20,000-20 Hz	Frequency Output waveform
MIL-STD-883	METHOD 2003	Solderability	Visual 95% coverage

B. Subgroup 2 - 4 pcs (One-half of Subgroup 1)

MIL-STD-883	METHOD 1011 COND. B	Thermal Shock Liq. to liq. –55 to 125°C, 15 cycles	Frequency Output waveform
MIL-STD-202	METHOD 105 COND. B.	Altitude, 3.44 inch Hg, 12 hrs	Frequency Output waveform
MIL-STD-883	METHOD 1004	Moisture resist. with 3.3V applied 25-65°C, 90 to 100% RH, 10 cycles	Frequency Output waveform
MIL-STD-202	METHOD 210 COND. A.	Resistance to Solder Heat Immersion @350°C 3.5 sec	Frequency Output waveform

C. Subgroup 3 - 4 pcs. (One half of Subgroup 1)

Standard	Condition	Description	End point measurement
	Storage Temp.	24 hrs. @ –55°C	Frequency
	No. Oper.	24 hrs. @ 125°C	Output waveform
MIL-STD-883	METHOD 1009 COND. A	Salt Atmosphere 24 hrs. @ 35°C .5-3.0% Solution	Frequency Output waveform Visual
MIL-STD-883	METHOD 1014 COND. B	Fine Leak	Qs <5 x 10^{-8}
MIL-STD-883	METHOD 1014 COND. C	Gross Leak	Visual in 125°C Detector fluid