

T5621, T5622, T5623, T5624
T5721, T5722, T5723, T5724
5X7 mm Surface Mount High Reliability
Tristate/Non-Tristate, 16 KHz to 150MHz



Hi-Reliability Product Specification

XO

Features

- Leadless chip carrier package is hermetically sealed 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, typical
- Tristate option available
- Serialized test data available
- Calculated MTBF is 3.8×10^6 hours at 125°C

Typical Applications

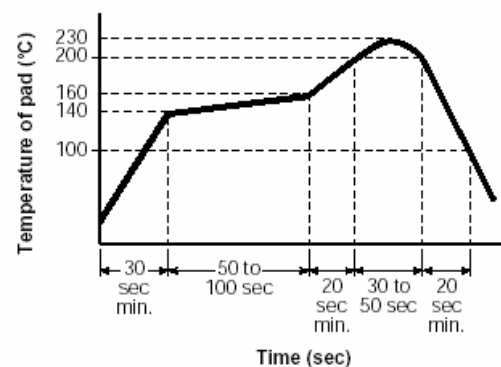
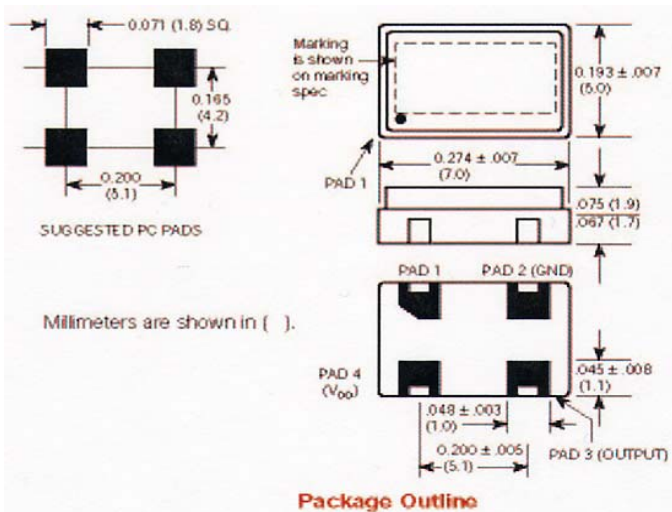
- Surface mounted PCB projects requiring high reliability HCMOS clock waveforms

Description

These high reliability oscillators provide HCMOS clock waveforms for applications subjected to the most stringent environmental conditions. They are mechanically robust and weigh less than 0.2 grams. This 5X7 mm SMD package has a hermetic seal, thus ensuring the integrity of each oscillator. Each oscillator is burned-in at 125°C for 168 hours, temperature cycled and centrifuged then fully tested in accordance with Table 1. Reliability tests are performed per Table 2. The calculated MTBF is 3.8×10^6 at 125°C.

Models	Operating Temperature	Frequency Stability
T5621	-55 to +85°C	+/- .0025% (+/-25ppm)
T5622	-55 to +85°C	+/- .005% (+/-50ppm)
T5623	-55 to 125°C	+/- .0075% (+/-75ppm)
T5624	-55 to 125°C	+/- .005% (+/-50ppm)
T5721	-55 to +85°C	+/- .0025% (+/-25ppm)
T5722	-55 to +85°C	+/- .005% (+/-50ppm)
T5723	-55 to 125°C	+/- .0075% (+/-75ppm)
T5724	-55 to 125°C	+/- .005% (+/-50ppm)

Pad	T5621, T5622, T5623, T5624	T5721, T5722, T5723, T5724
1.	N.C.	Tristate
2.	Ground	Ground
3.	Output	Output
4.	+5V, V _{DD}	+5V, V _{DD}



Recommended Reflow Soldering Profile

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ELECTRICAL SPECIFICATIONS

Frequency Range

Fixed Output 16 KHz to 150 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	4.5	5.0	5.5	volts
Input Current		20	35	mA

Waveform Symmetry

Measured at 50%V_{DD} 40/60 60/40 percent

Rise and Fall Times

Below 10 MHz				
0.8 to 2.4 volts		5	15	ns
10 MHz and above				
0.8 to 2.4 volts		2	5	ns

“Zero” Level

Sinking 16mA 0.5 volts

“One” Level

Sourcing 10mA 4.5 volts

Frequency Change

From +5.5 to +5.0V	+/-5	+/-10	ppm
From +4.5 to 5.0V	+/-5	+/-10	ppm

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

THERMAL CHARACTERISTICS

Thermal Resistance

From Junction to Case, R_{θjc} 16°C/Watt

Surface Mount “T”

These packages are designed for reflow soldering in accordance with recommended profiles. For hand-soldering, the temperature of the iron should not exceed 400°C for three seconds.

ENVIRONMENTAL SPECIFICATIONS

Shock-MIL-STD 883, Method 2002, Test Condition B (1500 peak g, 0.5 ms duration, ½ sine wave, 5 shocks in 6 planes)

Vibration-MIL-STD 883, Method 2007, Test Condition A (20-2000Hz of .06: d.a. or 20 Gs, whichever is less)

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

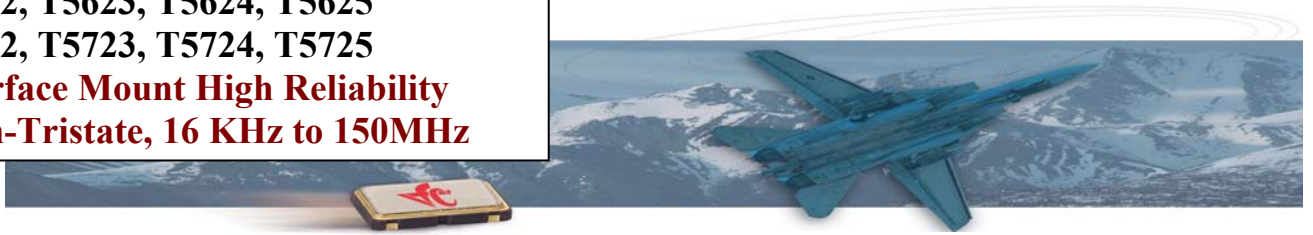
Table 1

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. Constant Acceleration | MIL-STD-883 Method 2001, Cond, A |
| 4. Burn-in | MIL-STD-883 Method 1015, Cond B
(125°C for 168 hours with bias) |
| 5. Fine Leak | MIL-STD-883 Method 1014, Cond. A1 |
| 6. Gross Leak | MIL-STD-883 Method 1014, Cond C |
| 7. Electrical Test at 25°C and temperature extremes, as follows: | |
| A. Frequency | F. Duty Cycle |
| B. Current | G. Frequency at 5.5V |
| C. Rise Time | H. Frequency at 4.5V |
| D. Fall Time | I. “Zero” logic level |
| E. Duty Cycle | J. “One” logic level |
| | K. Tristate |

Test Data on each unit is available for additional cost

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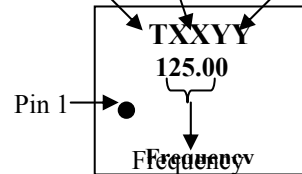
MECHANICAL DESCRIPTION

- Leak**-MIL STD 883, method 1014, condition A1 and C1
- Case**-Hermetically sealed ceramic LCC
- Pads**-60 microinch of gold over nickel
- Marking**-Epoxy ink or laser engraved
- Resistance to Solvents**-MIL STD 202, Method 215

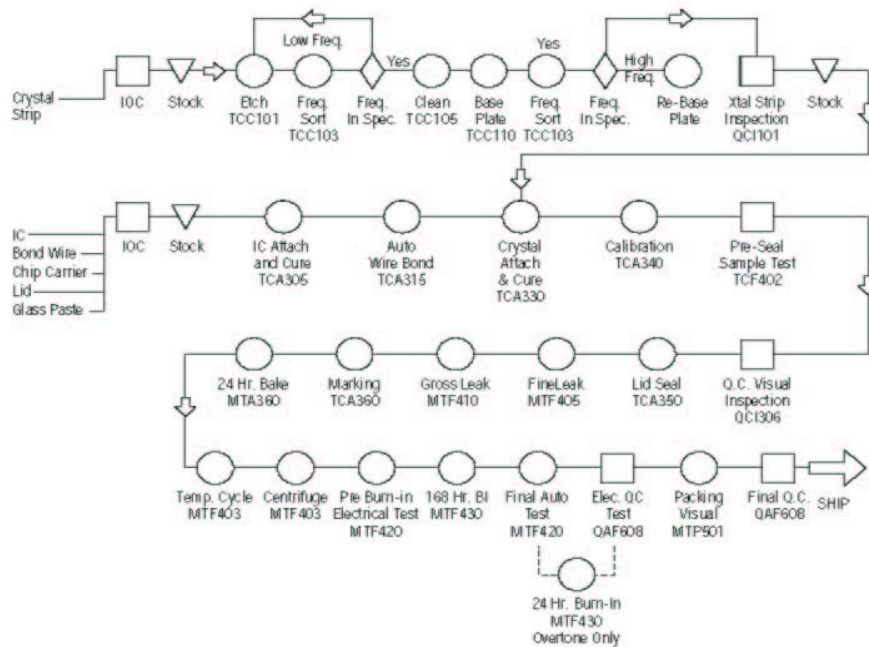
MARKING SPECIFICATION

The format for the marking is:

Valpey-Fisher Model Code Date Code
 T Oscillator



PROCESSING FLOW CHART



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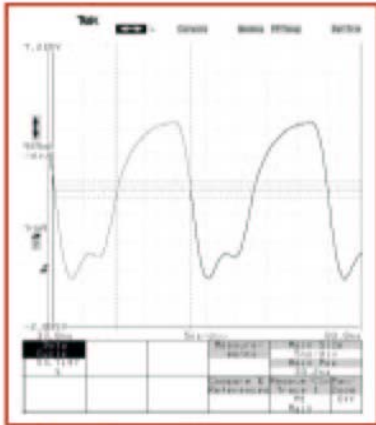
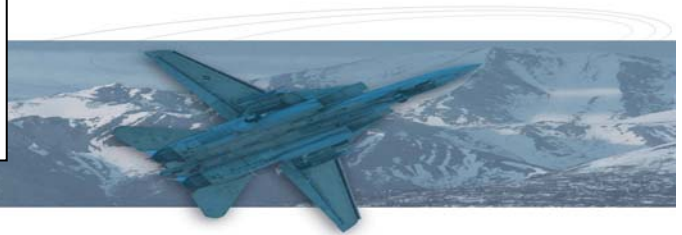


Fig. 1 T5622-45M with 33pf load

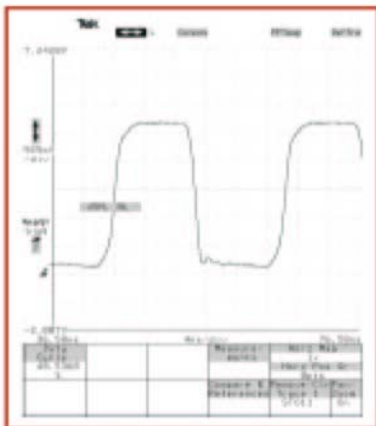


Fig. 2 T5622-45M without load

HOW TO ORDER

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

T 5622 - 40M

↑ "T" is SMD "T" package ↑ "5622" 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 -55, 25 and 125°C (85°C for T5622 and T5722)
- Frequency @ 4.5, 5.0 and 5.5 volts (for 5 volts units)
- 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 125°C, 5.0V 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, 0.5ms 5 blows, 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 5V 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
MIL-STD-883	METHOD 1014 COND. A1	Fine Leak	Visual Qs < 5 x 10 ⁻⁸
MIL-STD-883	METHOD 1014 COND. C1	Gross Leak	Visual in 125°C Detector fluid