

T5321, T5322, T5323, T5324
T5421, T5422, T5423, T5424
5X7 mm Surface Mount High Reliability
Tristate/Non-Tristate, 1 MHz to 100MHz



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
- Calculated MTBF is 3.8×10^6 hours at 125°C

Typical Applications

- Surface Mounted PCB projects requiring high reliability HCMOS clock waveforms

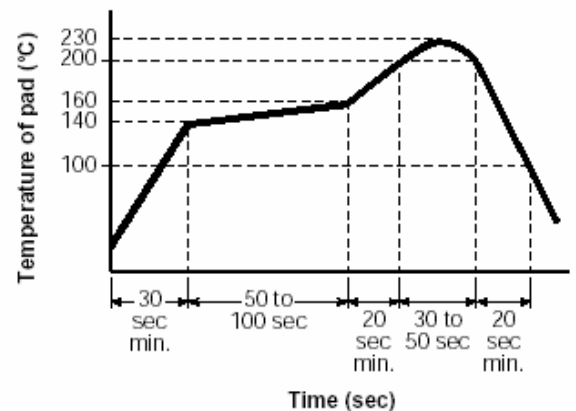
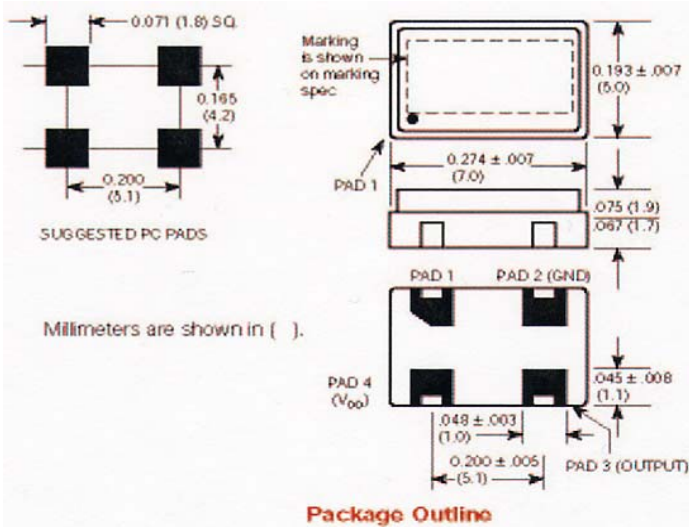
Description

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
T5321	-55 to + 85°C	+/- .0025% (+/- 25ppm)
T5322	-55 to + 85°C	+/- .005% (+/- 50ppm)
T5323	-55 to + 125°C	+/- .0075% (+/- 75ppm)
T5324	-55 to + 125°C	+/- .005% (+/- 50ppm)
T5421	-55 to + 85°C	+/- .0025% (+/- 25ppm)
T5422	-55 to + 85°C	+/- .005% (+/- 50ppm)
T5423	-55 to + 125°C	+/- .0075% (+/- 75ppm)
T5424	-55 to + 125°C	+/- .005% (+/- 50ppm)

Connections

Pad	T5321, T5322, T5323, T5324	T5421, T5422, T5423, T5424
1.	N.C.	Tristate
2.	Ground	Ground
3.	Output	Output
	+3.3V, V _{DD}	+3.3V, V _{DD}



Recommended Reflow Soldering Profile



T5321, T5322, T5323, T5324
T5421, T5422, T5423, T5424
5X7 mm Surface Mount High Reliability
Tristate/Non-Tristate, 1 MHz to 100MHz



ELECTRICAL SPECIFICATIONS

Frequency Range
 Fixed Output 1 MHz to 100MHz
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, V_{DD}	3.0	3.3	3.6	volts
Input Current			16	mA
Waveform Symmetry, Measured at 50%V _{DD}	40/60	45/55	60/40	percent
Rise and Fall Time 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

Aging
 First year 3 ppm
 After first year 1 ppm/yr

Input Requirements for Pin 1.:

THERMAL CHARACTERISTICS

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

SURFACE MOUNT APPLICATION

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-1000 Gs, 0.35 ms, ½ sine wave, 3 shocks in each plane
Vibration-10-2000 Hz of .06” d.a. or 20Gs, whichever is less
Humidity-Resistant to 85° R.H. at 85°C

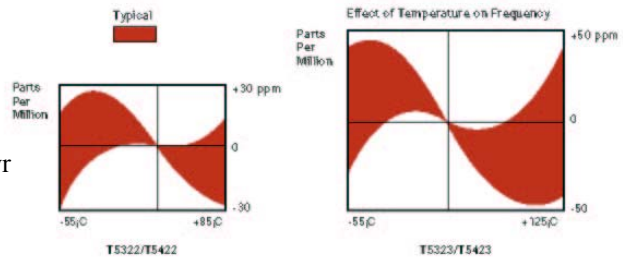
Table 1

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 3.6V |
| C. Rise Time | H. Frequency at 3.0V |
| 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





T5321, T5322, T5323, T5324
T5421, T5422, T5423, T5424
5X7 mm Surface Mount High Reliability
Tristate/Non-Tristate, 1 MHz to 100MHz

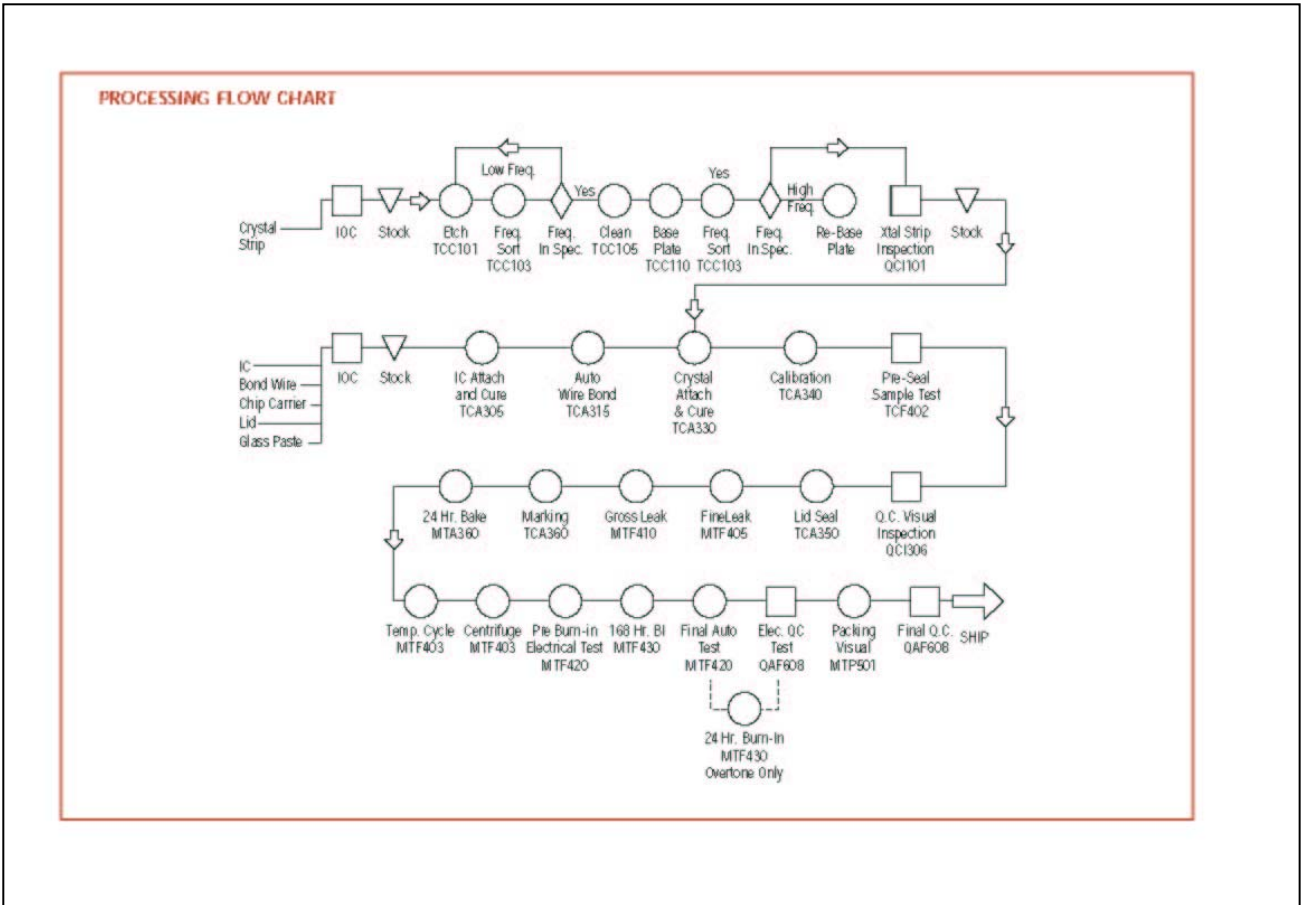
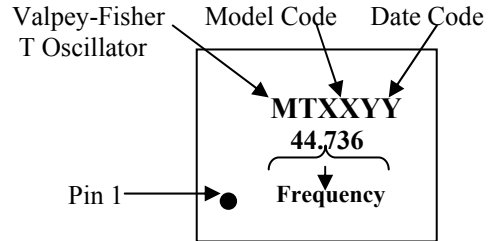


MECHANICAL SPECIFICATIONS

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

MARKING SPECIFICATION

The format for the marking is:





T5321, T5322, T5323, T5324
T5421, T5422, T5423, T5424
5X7 mm Surface Mount High Reliability
Fixed/Tristate, 1 MHz to 100MHz

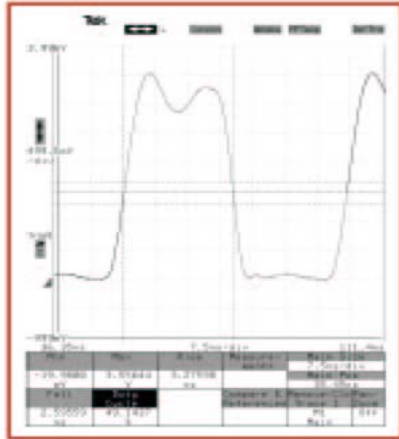


Fig.1 T5322-20M with 25pf load

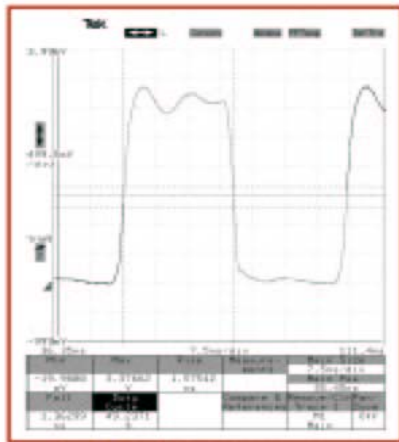


Fig. 2 T5322-20M without load

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 T5322 and T5422)
 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 125°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, 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)

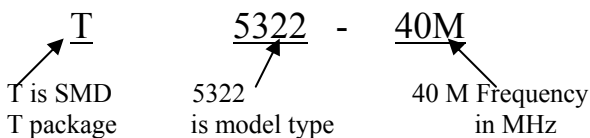
Standard	Condition	Description	End point measurement
MIL-STD-883	METHOD 1011 COND. B	Thermal Shock Liq. to liq. -55 to 125°C, 15 cycles	Frequency Output waveform
MIL-STD-202	METHOD 105 COND. B.	Altitude, 3.44 inch Hg, 12 hrs	Frequency Output waveform
MIL-STD-883	METHOD 1004	Moisture resist with 3.3V 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. No. Oper	24 hrs. @ -55°C 24 hrs. @ 125°C	Frequency 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. A1	Fine Leak	Qs < 5 x 10 ⁻⁶
MIL-STD-883	METHOD 1014 COND. C1	Gross Leak	Visual in 125°C Detector fluid

HOW TO ORDER

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



SUNSTAR 商斯达实业集团是集研发、生产、工程、销售、代理经销、技术咨询、信息服务等为一体的高科技企业，是专业高科技电子产品生产厂家，是具有 10 多年历史的专业电子元器件供应商，是中国最早和最大的仓储式连锁规模经营大型综合电子零部件代理分销商之一，是一家专业代理和分销世界各大品牌 IC 芯片和电子元器件的连锁经营综合性国际公司，专业经营进口、国产名厂名牌电子元件，型号、种类齐全。在香港、北京、深圳、上海、西安、成都等全国主要电子市场设有直属分公司和产品展示展销窗口门市部专卖店及代理分销商，已在全国范围内建成强大统一的供货和代理分销网络。我们专业代理经销、开发生产电子元器件、集成电路、传感器、微波光电元器件、工控机/DOC/DOM 电子盘、专用电路、单片机开发、MCU/DSP/ARM/FPGA 软件硬件、二极管、三极管、模块等，是您可靠的一站式现货配套供应商、方案提供商、部件功能模块开发配套商。商斯达实业公司拥有庞大的资料库，有数位毕业于著名高校——有中国电子工业摇篮之称的西安电子科技大学（西军电）并长期从事国防尖端科技研究的高级工程师为您精挑细选、量身订做各种高科技电子元器件，并解决各种技术问题。

微波光电部专业代理经销高频、微波、光纤、光电元器件、组件、部件、模块、整机；电磁兼容元器件、材料、设备；微波 CAD、EDA 软件、开发测试仿真工具；微波、光纤仪器仪表。欢迎国外高科技微波、光纤厂商将优秀产品介绍到中国、共同开拓市场。长期大量现货专业批发高频、微波、卫星、光纤、电视、CATV 器件：晶振、VCO、连接器、PIN 开关、变容二极管、开关二极管、低噪晶体管、功率电阻及电容、放大器、功率管、MMIC、混频器、耦合器、功分器、振荡器、合成器、衰减器、滤波器、隔离器、环行器、移相器、调制解调器；光电子器件和组件：红外发射管、红外接收管、光电开关、光敏管、发光二极管和发光二极管组件、半导体激光二极管和激光器组件、光电探测器和光接收组件、光发射接收模块、光纤激光器和光放大器、光调制器、光开关、DWDM 用光发射和接收器件、用户接入系统光收发器件与模块、光纤连接器、光纤跳线/尾纤、光衰减器、光纤适配器、光隔离器、光耦合器、光环行器、光复用器/转换器；无线收发芯片和模组、蓝牙芯片和模组。

更多产品请看本公司产品专用销售网站：

商斯达中国传感器科技信息网：<http://www.sensor-ic.com/>

商斯达工控安防网：<http://www.pc-ps.net/>

商斯达电子元器件网：<http://www.sunstare.com/>

商斯达微波光电产品网：[HTTP://www.rfoe.net/](http://www.rfoe.net/)

商斯达消费电子产品网：<http://www.icasic.com/>

商斯达实业科技产品网：<http://www.sunstars.cn/> 微波元器件销售热线：

地址：深圳市福田区福华路福庆街鸿图大厦 1602 室

电话：0755-82884100 83397033 83396822 83398585

传真：0755-83376182 (0) 13823648918 MSN: SUNS8888@hotmail.com

邮编：518033 E-mail:szss20@163.com QQ: 195847376

深圳赛格展销部：深圳华强北路赛格电子市场 2583 号 电话：0755-83665529 25059422

技术支持：0755-83394033 13501568376

欢迎索取免费详细资料、设计指南和光盘；产品凡多，未能尽录，欢迎来电查询。

北京分公司：北京海淀区知春路 132 号中发电子大厦 3097 号

TEL: 010-81159046 82615020 13501189838 FAX: 010-62543996

上海分公司：上海市北京东路 668 号上海赛格电子市场 D125 号

TEL: 021-28311762 56703037 13701955389 FAX: 021-56703037

西安分公司：西安高新开发区 20 所(中国电子科技集团导航技术研究所)

西安劳动南路 88 号电子商城二楼 D23 号

TEL: 029-81022619 13072977981 FAX:029-88789382