

**Series T7250-T7258, T9250-T9258,
T4001-T7013, T9301-T9313**
Extended Temperature/COTS
XO, 3.3V



Features

- 20kHz to 100MHz frequency range
- 5X7 SMD form factor
- Hermetically sealed for rugged environmental conditions
- Extremely wide operating temperature range accommodates harsh environments
- Crystals are processed with tight angle control to assure best frequency-temperature characteristics
- Units are vacuum baked before sealing at 175°C for 16 hours to eliminate moisture traces and pre-age units for superior stability
- Tristate feature optional
- Equivalent 5V parts are available in [T1250 series](#)



RoHS Status



Description

Owing to their small size, light weight, and rugged characteristics, these 3.3V HCMOS extended temperature/COTS oscillators fulfill tasks not previously feasible. They are used in applications that take advantage of their extended temperature range and high performance. Twenty four different models (with and without tristate) cover -55°C to +200°C operation and provide frequency selection from 20kHz to 100MHz. They combine excellent long-term reliability, loading characteristics, and superior startup performance.

Applications

- Applications that require an HCMOS 3.3V clock and might be exposed to extremely harsh environmental conditions.

Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note	
Frequency Range	F		0.02		100	MHz		
Frequency Stability	$\Delta F/F$	Overall condition including calibration, temperature voltage and load variation	± 25		± 500	ppm	See Chart	
Operating Temperature	T		-55°		+200°	°C	See Chart	
Aging		First Year After First Year		3 1		ppm ppm/yr		
Supply Voltage	V _{CC}		3.0	3.3	3.6	V		
Supply Current					20	mA		
Output		All units, full range Loads 3 TTL loads, or 10 LSTTL loads, or 15pF CMOS						
Symmetry		TTL and LSTTL @ 1.4V CMOS, @ 50% V _{DD}		40/60 40/60		%		
Rise and Fall Times		TTL and LSTTL from 0.4 to 2.4V CMOS, 15 pF, from 0.4 to (V _{DD} - 0.4) V CMOS, 30 pF, from 0.4 to (V _{DD} - 0.4) V			8 8 10	ns		
Input requirement for pin.1		Output enable - Output disable (Tristate)	pin 1 may float or 2.8V min pin 1 requires 0.4V max					



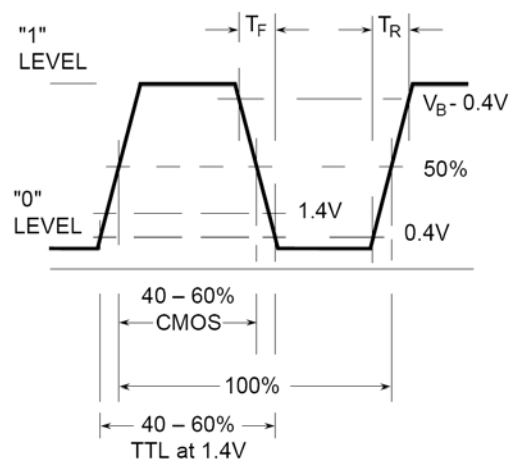
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Environmental and Mechanical Conditions

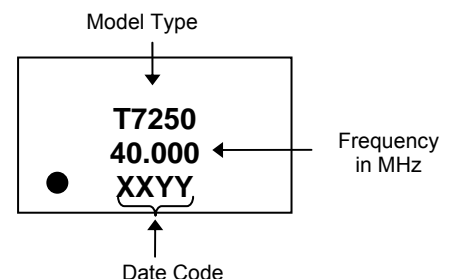
Parameter	Specification
Shock	1000 Gs, 0.35 ms, ½ sine wave, 3 shocks in each plane
Vibration	10-2000 Hz of 0.06" d.a. or 20 Gs, whichever is less
Humidity	Resistant to 85° R.H. at 85°C
Gross Leak	Each unit checked in 125°C fluorocarbon
Fine Leak	Mass spectrometer leak rate less than 2×10^{-8} atm, cc/sec of helium
Case	Ceramic with glass hermetic seal
Pads	40 microinch of gold over nickel or tinned (solder coated)
Marking	Epoxy ink or laser engraved
Resistance to Solvents	MIL STD 202, Method 215

FIXED OUTPUT	TRISTATE	Frequency Stability	Operating Temperature
Model	Model		
T7250	T9250	±75ppm	-40° to +85°C
T7254	T9254	±100 ppm	0° to +175°C
T7256	T9256	±75 ppm	-55° to +85°C
T7258	T9258	±100 ppm	-40° to +85°C
T7001	T9301	±500 ppm	-55° to +200°C
T7002	T9302	±500 ppm	0° to 200°C
T7003	T9303	±250 ppm	-55° to +200°C
T7004	T9304	±250 ppm	0° to +200°C
T7005	T9305	±250 ppm	-55° to +175°C
T7006	T9306	±250 ppm	0° to +175°C
T7007	T9307	±150 ppm	-55° to +175°C
T7008	T9308	±150 ppm	0° to +175°C
T7009	T9309	±100 ppm	-55° to +125°C
T7010	T9310	±50 ppm	-55° to +85°C
T7011	T9311	±25 ppm	-55° to +85°C
T7012	T9312	±75 ppm	-55° to +125°C
T7013	T9313	±50 ppm	-55° to +125°C



Waveforms

Marking Specification



How to Order

T 7 2 5 0 - FREQ. - TL

"T" is SMD (gold pads) T package

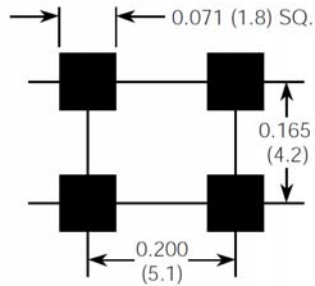
"7250" is model type

" " is none "TL" is tinned pads



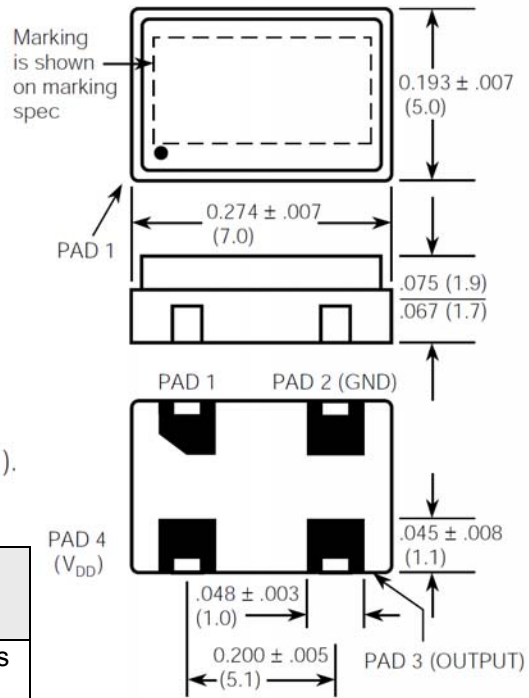
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Package Outline



SUGGESTED PC PADS

Millimeters are shown in ().

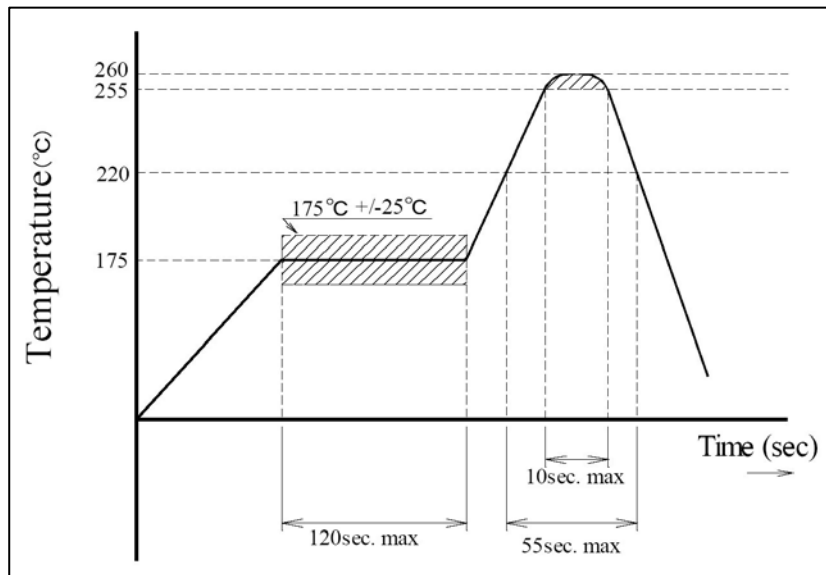
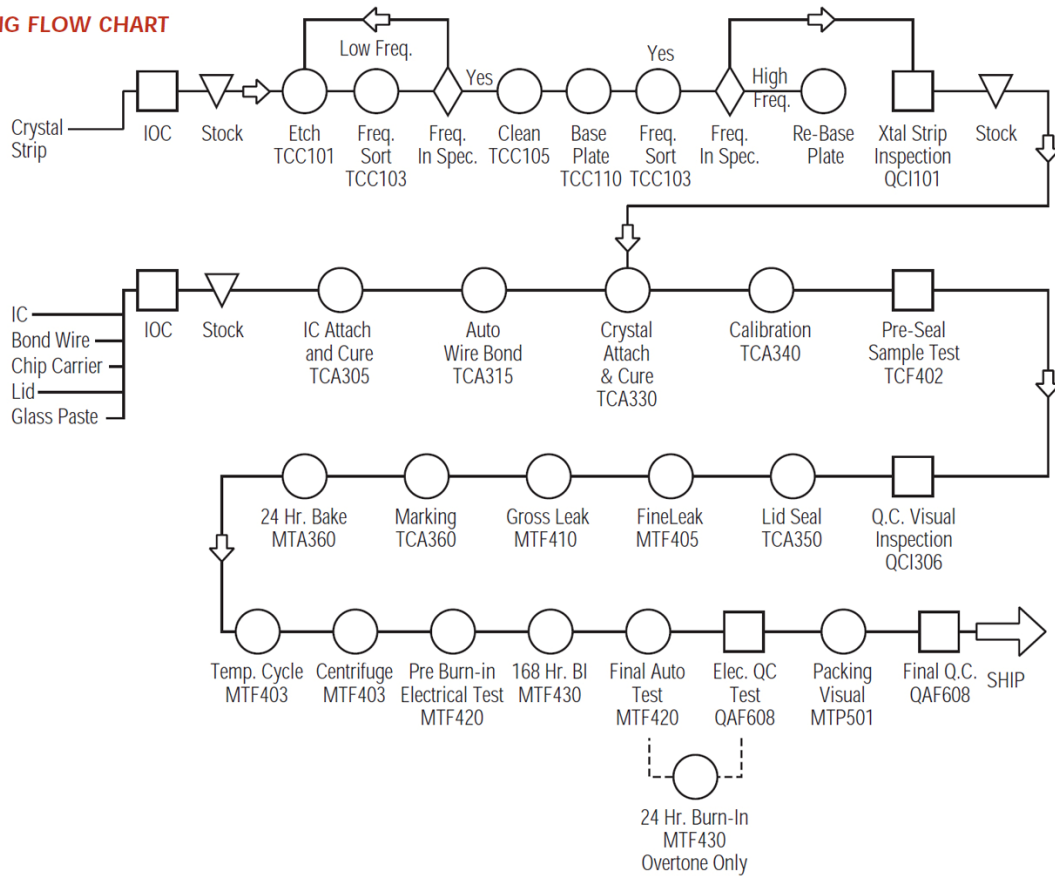


Pin	Non-Tristate Models	Tristate Models
1	NOT USED	Floating or 1 : Oscillator runs Ground or 0 : Disable or Tristate
2	Ground and Case	
3	Output	
4	+3.3V, V _{DD}	

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PROCESSING FLOW CHART



Recommended Reflow Soldering Profile

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**TABLE 2
Reliability Test Procedures and Conditions for Quartz Crystal Oscillators**

1. Group A				B. Subgroup 2-4 pcs (One-half of Subgroup 1)			
Electrical Characteristics at temperature endpoints and 25°C				<u>Standard</u>	<u>Condition</u>	<u>Description</u>	<u>End point Measurement</u>
Frequency @ 3.0, 3.3, and 3.6 volts				MIL-STD-883	Method 1011	Thermal Shock	Frequency
Symmetry (Duty Cycle)					COND. B	Liq. To liq.	Output waveform
Input current						-55°C to 125°C,	
Zero/One levels						15 cycles	
Rise/Fall times							
Physical Dimensions				MIL-STD-202	Method 105	Altitude, 3.44	Frequency
Length/width					COND. B	inch Hg. 12 hrs	Output waveform
Height							
Seal (Visual)				MIL-STD-883	Method 1004	Moisture resist.	Frequency
Package finish (Corrosion, discoloration, etc.)						with 3.3V applied	Output waveform
Marking placement/legibility						25°C to 65°C,	
						90 to 100% RH,	
						10 cycles	
2. Group B- Life Test				MIL-STD-202	Method 210	Resistance to	Frequency
1000 hrs at or above 125°C, 3.3V VDC, with proper load					COND.A	Solder Heat	Output waveform
						Immersion @350°C	
						3.5 sec	
3. Group C- All units have passed Group A testing				C. Subgroups 3-4 pcs. (One half of Subgroup 1)			
A. Subgroup 1-8 pcs.				<u>Standard</u>	<u>Condition</u>	<u>Description</u>	<u>End point Measurement</u>
<u>Standard</u>	<u>Condition</u>	<u>Description</u>	<u>End Point Measurement</u>				
MIL-STD-883	Method 2002	Mechanical Shock	Frequency			24 hrs. @ -55°C	Frequency
	COND.B	1500 g's, 0.5ms	Output waveform			24 hrs. @ 125°C	Output waveform
		5 drops, 6 axis					
MIL-STD-883	Method 2007	Vibration, var.	Frequency				
	COND. A.	freq. 20 g's,	Output waveform				
		0.06" disp., 20-					
		20, 000-20 Hz					
MIL-STD-883	Method 2003	Solderability	Visual 95%				
			Coverage				
Test data is available for additional cost				MIL-STD-883	Method 1014	Fine Leak	Qs <5 X10 ⁻⁸
					COND. A1		
				MIL-STD-883	Method 1014	Gross Leak	Visual in 125°C
					COND. C1		Detector fluid