

TXC Corporation Product Introduction

Purpose

- To introduce TXC's MO (MEMS Oscillator).

Objectives

- What is a MO
- Different BOM Structure between MO and XO
- Product Feature
- Product Advantage
- Target Application
- Manufacturing Flow
- TXC Core Competence

Content

- 8 pages

Learning Time

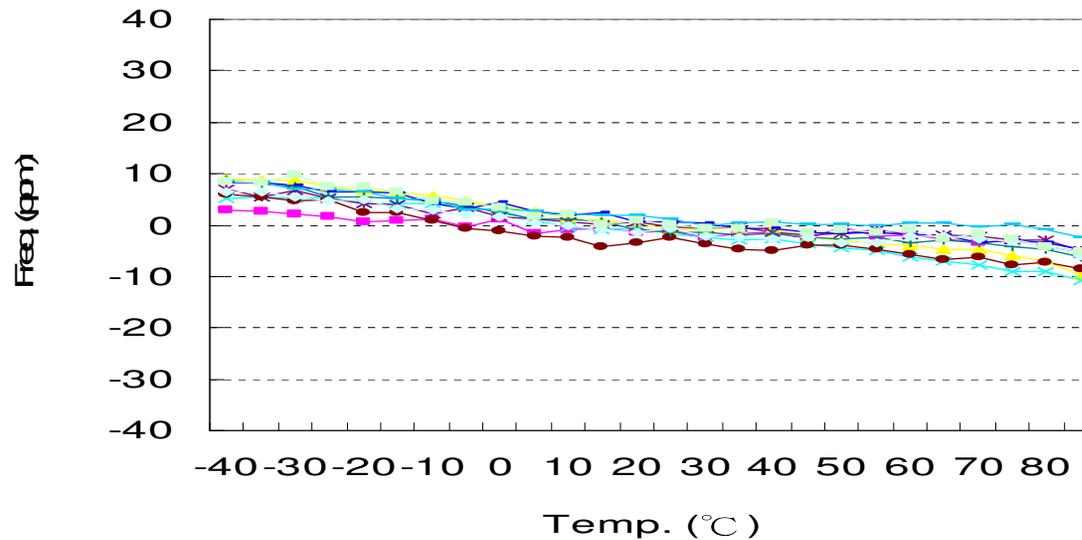
- 10 minutes



What is a MO?

- MO stands for “MEMS Oscillator”
- MEMS (micro-electrical mechanical system) based timing solutions
- Good frequency stability performance

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MO is a silicon-based MEMS oscillator with good frequency stability performance over operation temperature range

Different BOM Structure

- A silicon based oscillator consist of a MEMS resonator with circuit IC molded in a plastic package different as quartz-base oscillator.

Single-end XO (Crystal)	BOM Structure	Single-end MO (Silicon)
Quartz Crystal	Resonator	Silicon MEMS
Fundamental 3rd Overtone PLL	IC	PLL Temperature- Compensated
Ceramic Base Metal Lid	Package	Plastic Mold
PIN to PIN Compatible		

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A silicon based MEMS oscillator consists of a MEMS resonator with a PLL& TC IC molded in a plastic package. TXC's oscillator can provide the accurate, stable and low noise performance clock signal over the operating temperature range with reliable quality which allows the engineers to use the oscillator easily in both design stage and mass production.

Product Advantage

	MO	XO
Lead Time	2-4 weeks	6-10 weeks
Inventory Management	Integrated to one die	Multi-materials, Quartz blank, IC, lid, substrate
Quality	Excellent Entire auto-production	Good Well-controlled to avoid particle
Robustness	50,000G	2,000G
Stability over operation temp.	Linear curve, Temperature compensation to get high stability	Curve of second degree, quartz easy to be affected by temperature
Package size	7050/5032/3225/2520 cover 1~150MHz	Frequency range is different in 7050/5032/3225/2520/2016
High frequency	Up to 800MHz	Need filter design for 150MHz above
Packaging	Plastic QFN molding, No dependency on ceramic package allocation	Ceramic + Metal Lid

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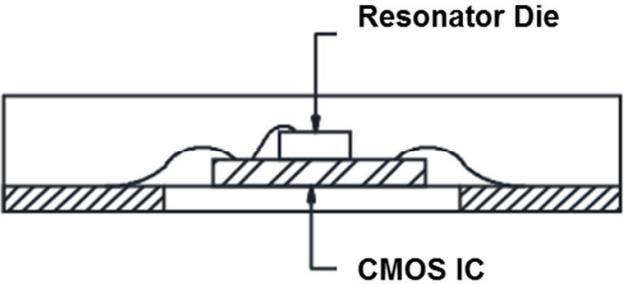
TXC MO has short lead time, well-managed for inventory, excellent quality with entire auto-production and better robustness. MO stability is good over operation temperature range and support 1-150MHz in 7050/5032/3225/2520 package size. The frequency can up to 800MHz by PLL design. MO is by plastic molding and no dependency on ceramic package allocation.

Product Feature

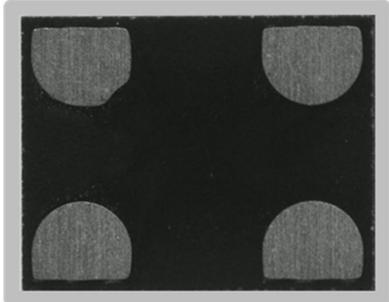
Oscillator	Product Series	Frequency Range	Feature	Oscillation
	T Series (MO) (7050/5032/3225/2520)	1 ~ 150MHz	$\pm 25\text{ppm} / \pm 50\text{ppm}$ -40 ~ 85°C 1.8 ~ 3.3V	PLL (Silicon)

MO (Silicon based MEMS Oscillator) ideal for PC, Tablet, HDD, DSC, STB, Server, Storage, Networking

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Top view



Bottom view

TXC offers CMOS output oscillators by silicon-based in various package sizes, operating voltages, frequency stability over operating temperature 5 range and frequency range from 1MHz to 150MHz. Other frequency or features may be available upon request.

Target Application

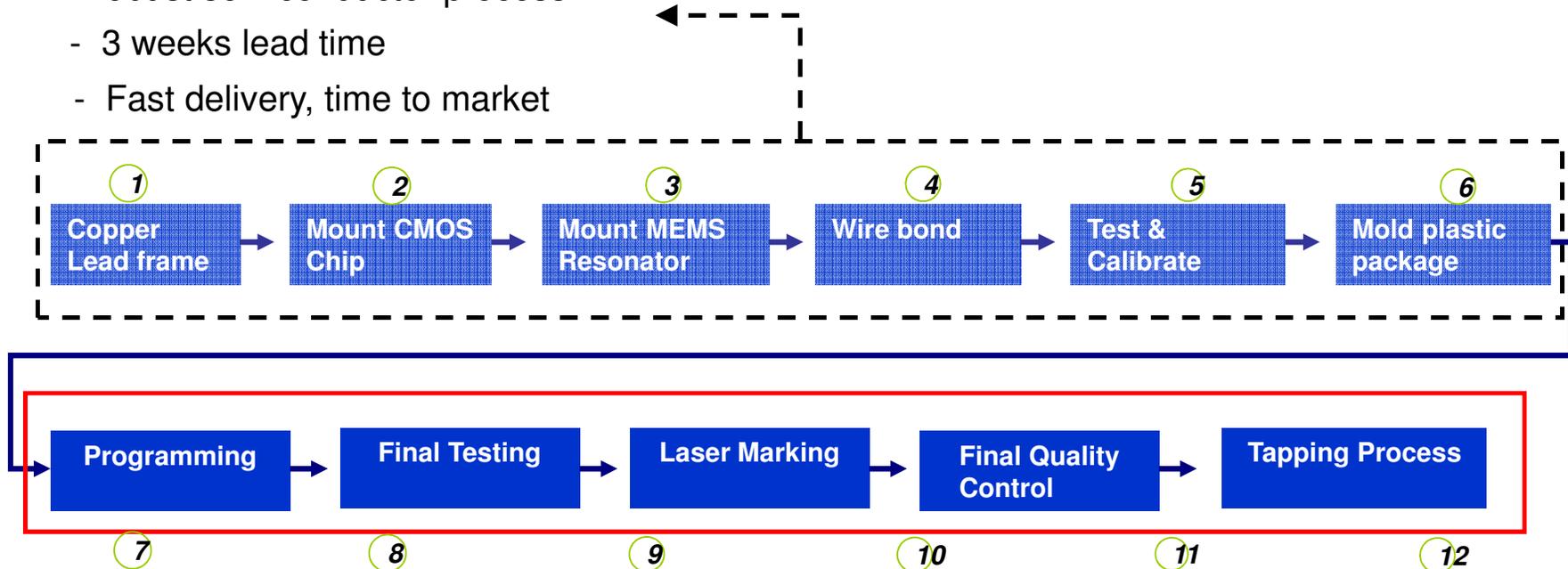
- MO is ideal for the following wired applications

Applications	Common Frequency (MHz)	Value
GPON/EPON	25, 32.768, 66, 125	Shock & Vibration resistance
Ethernet/Switch/ Network appliances	25, 25.000625, 33, 48, 50, 66.666, 100, 125	Pin-to-pin replacement of quartz
Server SATA/SAS	33, 50, 66.667, 75, 100, 133.33	Excellent stability over operation temperature
Tablet, SSD	5, 12, 24, 22.5792, 26, 38.4, 48, 50	2-4 weeks lead time
DSC	12, 24, 40.5, 72	Low power
STB	12.2, 27, 50	Small size
DVR/IP cam	12.288, 24, 25, 27, 33, 36, 50, 54,	Competitive cost

Manufacturing Flow

- Robust semiconductor process:

- 3 weeks lead time
- Fast delivery, time to market



- In-house programming and quality inspection process

- 100% quality assurance
- Standard is 3 weeks, with rolling forecast can be 1 week, rush case can be discussed.

Steps 1 to 6 are robust semiconductor process. From step 7 is TXC in house programming and testing. Steps 8 “Final Test” station which is the 1st 100% test process to confirm the oscillator specification compliance. 7

TXC Core Competence

- **Technology**

In-House Programming, Simulation, and Processing Capabilities

- **Quality**

Assurance on Design and Production

- **Service**

Global Sales, Marketing and FAE Support

- **Cost Efficiency**

Economy of Scale Production in both Taiwan and China Factories

- **Time to Market**

Leader in Crystal & Oscillator Miniaturization

- **Flexibility**

Agile Sampling Capability and Quick Ramp Up to Volume

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TXC Think of Frequency

Think of **TXC**



TXC is proud to be considered by many as one of the best managed “Crystal & Oscillator” companies in the world based on Competitive Product Offering and Service Excellence to Customers, Growth Sustainability, Revenues-Profit Performance, Values to the Shareholders, Quality Brand Name, and Employee Satisfaction.”