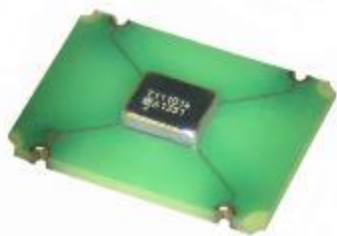


Kyocera's New Crystal Oscillators

Z series

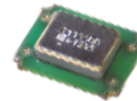
Easy to use, Easy to get!



KC7050Z



KC5032Z



KC3225Z



KC2520Z



KC2016Z

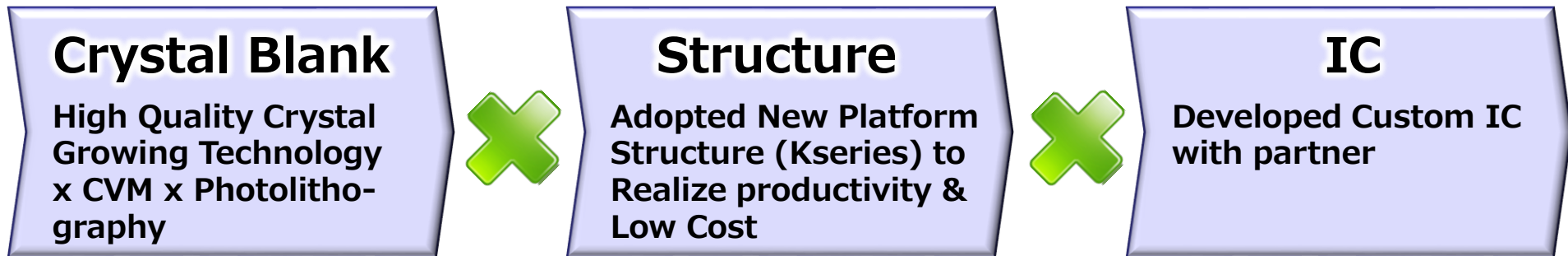


1. Z series Development Concept

- Easy to use (Multi Size / Wide Spec Variation)
- Easy to get (Cost / Short Lead Time)

▶ Realized Low Cost, Short LT and High Performance

2. Kyocera Unique Technology



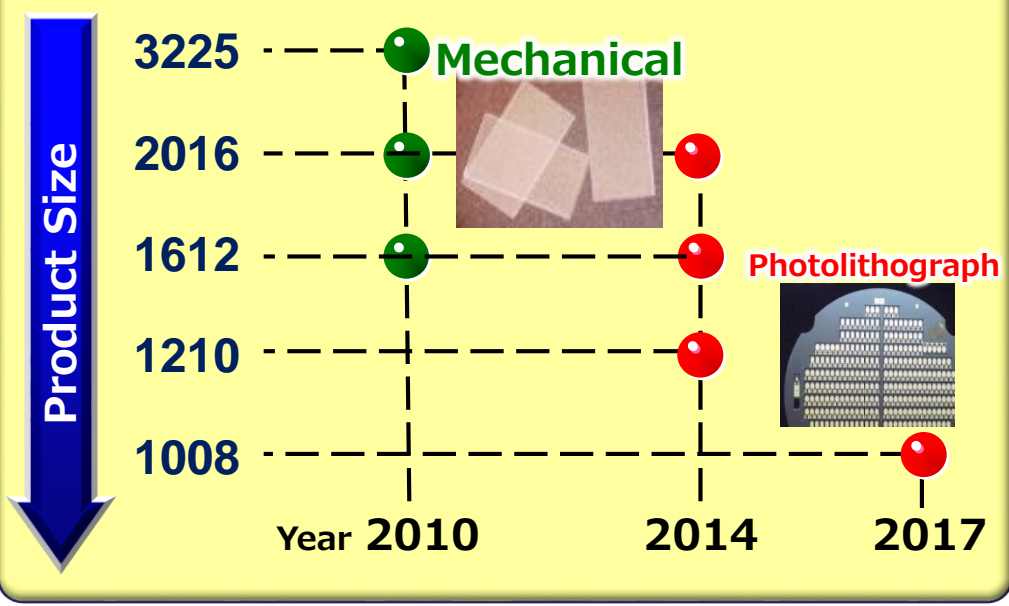
▶ Combination of Kyocera Unique Technology for replacement of Conventional Oscillator and Silicon MEMS

3. Feature

- 1 Short LT
- 2 Cost Competitive
- 3 High Stability

Crystal Blank Processing Method

Product Size and Blank Process

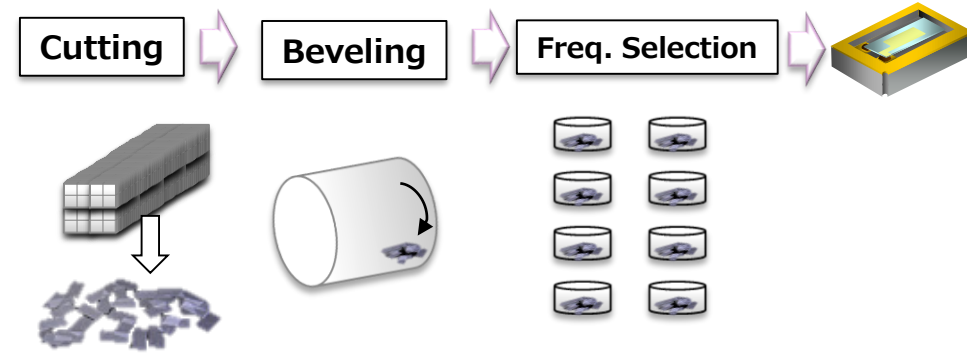


Comparison of Mechanical & Photolithography

	Mechanical	Photolithograph
1. Miniature	Limited	Optimized
2. Freq. Range	~60MHz	~300MHz
3. Electrical Char.	Standard	High performance
4. New Freq.Design LT	min 3months	Max 3months

Blank Process Comparison

Mechanical Process



Manufacturing Process by Blank Level

Photolithograph Process



Manufacturing Process by Wafer Level to realize High Productivity

Product Structure / Feature

Conventional Structure Osc.

**Large Case Size
(7050/5032)
Wire Bonding**

Metal Lid, Crystal, IC

**Miniature Case Size
(2016/2520/3225)
Flip-chip Bonding**

Original design needed for each size

- PKG/Crystal/IC/Lid is different by Size
- Crystal design is different by Size

Kyocera Platform Structure Osc.

Metal Lid, Ceramic PKG, Crystal, IC, Head Unit, Bottom Base

for 2016, for 2520, for 3225, for 5032, for 7050

Kyocera Platform Structure Osc.

Purpose: Short LT, Low Cost, High Performance

Feature : 1. Common Head Unit
2. Change size by PCB

- **Sales Performance**
Smartphone, Automotive, GPS Devices, Smart Meter, Modules, etc.
- **Capacity: 50Mpcs/M**

Product Comparison

General Clock Oscillator

Feature	PLL	Temp. Compensation	Freq. Range	Sample
1Room Ceramic PKG	NO	NO	1.5–160MHz	In Mass Production

Kyocera Platform Structure (**K series**)

Feature	PLL	Temp. Compensation	Freq. Range	Sample
Platform Structure	NO	NO	1.5–160MHz	In Mass Production

Kyocera Platform Structure (**Z series**) **Waived NCNR**

Type	Feature	PLL	Temp. Compensation	Freq. range	Sample
①	Short LT/ Cost competitive	YES	NO	0.5–170MHz	Mar.2018
②	Short LT/ High Performance	YES	YES	0.5–170MHz	May.2018
③	Low Jitter/ High Performance	NO	YES	24 – 72MHz	May.2018

Type 1

Short LT / Low Cost



Easy to use, Easy to get!

Features

Short LT Sample Shipment in 1day

- Covering wide frequency range by Custom IC with PLL function
- Realized 1day LT by utilizing Platform Structure (2.0x1.6~7.0x5.0mm)

Cost competitive

- High Productivity by CVM & Photolitho Technology
- Common Material by Platform Structure

Specifications

- **Frequency Range**
0.5MHz ~ 170MHz
- **Operating Temp. Range**
-40 ~ +85°C (+125°C)
- **Frequency Stability**
+/- 20ppm (-40 ~ + 85°C)
+/- 30ppm (-40 ~ +125°C)
- **Voltage Range**
1.71 to 3.63V
- **Current Consumption**
Typ 2.85mA
(@25MHz / 3.3V / No Load)
- **Enable/Disable function**
- **Automotive Grade Available**
AEC-Q100/200

Schedule

• Sample, Mass Production(MP) Schedule

E/S(Approval)
MAR/2018

C/S(MP)
JUN/2018

Type 2

High Performance/Short LT

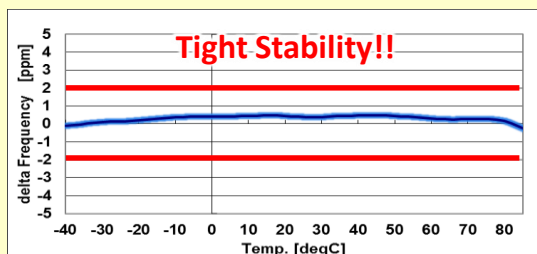


Easy to use, Easy to get!

Features

High Performance

- Realizing +/-2ppm Tight Stability by utilizing Custom IC with Temperature Compensation function



- +/- 2ppm (-40 ~ + 85°C)
- +/- 5ppm (-40 ~ +105°C)
- +/- 10ppm (-40 ~ +125°C)

Short LT

- Programming to required Freq. & Stability and realizing shipment within 1week.

Specifications

- **Frequency Range**
0.5MHz ~ 170MHz
- **Operating Temp. Range**
-40 ~ +85°C (+125°C)
- **Freq. Stability**
Listed in feature's section
- **Voltage Range**
1.71 to 3.63V
- **Current Consumption**
Typ 2.85mA
(@25MHz / 3.3V / No Load)
- **Enable/Disable function**
- **Automotive Grade Available**
AEC-Q100/200

Schedule

• Sample, Mass Production(MP) Schedule

E/S(Approval)
MAY/2018

C/S(MP)
JUN/2018

Type 3

Low Jitter/High Performance



Easy to use, Easy to get!

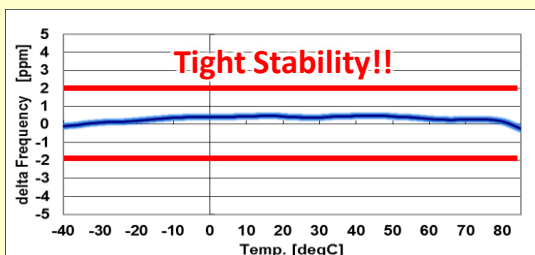
Features

Low Jitter

- Taylor made Crystals for each frequency to bypass PLL for superior jitter performance

High Performance

- Realizing +/-2ppm Tight Stability by utilizing Custom IC with Temperature Compensation function



+/- 2ppm (-40 ~ + 85°C)

+/- 5ppm (-40 ~ +105°C)

+/- 10ppm (-40 ~ +125°C)

Specifications

- **Frequency Range**
24MHz ~ 72MHz
- **Operating Temp. Range**
-40 ~ +85°C (+125°C)
- **Freq. Stability**
Listed in feature's section
- **Voltage Range**
1.71 to 3.63V
- **Current Consumption**
Typ 2.85mA
(@25MHz / 3.3V / No Load)
- **Enable/Disable function**
- **Automotive Grade Available**
AEC-Q100/200

Schedule

• Sample, Mass Production(MP) Schedule

E/S(Approval)
MAY/2018

C/S(MP)
JUN/2018

