

# Press Release

## Tuning Fork Quartz Crystals

**High Reliability - Small - Precise @ 32.768 kHz**

Seiko Instruments is manufacturer of watch- and clock-quartz crystals with excellent features, which allow customers to achieve most efficient circuit designs. Of course we already provide our Quartz Crystals as lead-free parts to fulfil market requirements according to RoHS.

### Technology & Features

1. Photo-lithography technology
2. Space saving through small, slim and lightweight design
3. Excellent heat and shock resistance and high reliability
4. Oscillation circuit design support service
- 5.

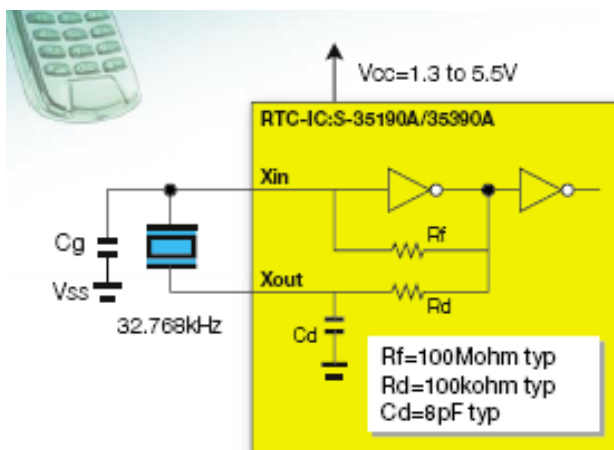
### Application

Various small portable equipment, Cellular phones, Digital still cameras, Notebook PCs, PDAs, Remote controllers, Portable games, Watches, etc, and Applications having their focus on very low power requirements.

### The following has two application examples:

#### 1. Time Tracking Operation

The tuning fork quartz crystal is used to pulse the real-time clock to keep accurate time for quartz watches and various devices.



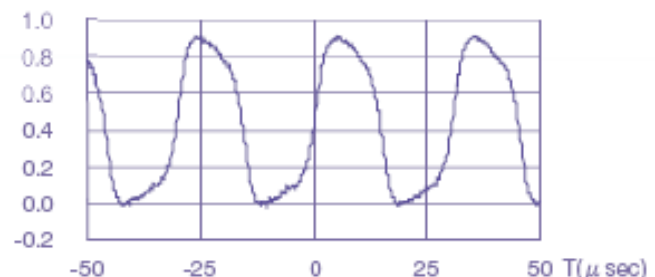
#### Specifications

Voltage Range • 1.3 to 5.5V  
Temperature Range • -40 to 85°C  
Load Capacitance • 6.0pF

#### Circuit Constants (Reference)

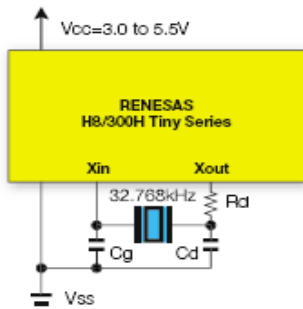
Rf=Built-in Rd=Built-in  
Cd=Built-in Cg=3 to 4pF

#### Oscillation Output Characteristics



#### 2. Subclock Operation for MPU (given example Renesas H8/300H)

In addition to the source of the real-time clock for compact mobile devices such as cellular phones, mobile devices, etc. the tuning fork quartz crystal is used for sub clock operation for MPU to further reduce power consumption.



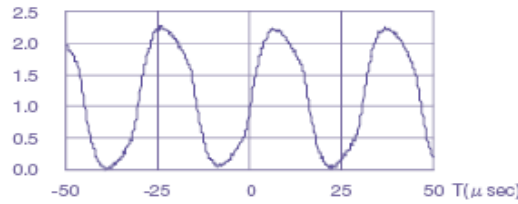
**Specifications**

Voltage Range • 3.0 to 5.5V  
 Temperature Range • -40 to 85°C  
 Load Capacitance • 7.0pF

**Circuit Constants (Reference)**

Rf=open Rd=0Ω  
 Cd=6pF Cg=7pF

**Oscillation Output Characteristics**



**3. Lineup**



SSP-T7-F-T



SP-T2A-F-T



VT-200-F-T

The displayed quartz crystals are available in various accuracy versions (ppm) and load capacitances (pF).

**Circuit-Matching**

Under the topic of a Circuit Matching Programme Seiko Instruments is offering a free of charge service to their Quartz Crystal customers. This service includes the analysis of the schematic, the components and their dimensioning, the PCB layout and where applicable, recommendations for the optimization of the whole setup. This service is willingly accepted because out of energy saving reasons only small power is available for the operation of a quartz oscillator. With the appropriate dimensioning of load capacitance and series resistor for current limiting a fast oscillation start-up and reliable control of oscillation frequency is ensured.

Examples of design optimization regarding several MPU's (e.g. Renesas, NEC, Fujitsu) and further detailed information may be found on our global website:

<http://www.sii-crystal.com>

On the basis of application examples, designs are optimized in a product typical manner, and a link is given to the referring schematic of the MPU maker e.g. Renesas

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