

LOW-POWER FREQUENCY CONTROL

Low-Power Crystal Oscillators

Microamp-class 32.768 kHz oscillators and low-voltage MHz oscillators for always-on timing, duty-cycled processing, and battery-powered electronic systems.

- Always-On μ A Timing · Sleep/Wake Scheduling
- Low-Voltage MHz Clocking · Duty-Cycled Operation



One Portfolio for Always-On and Active Clocks

Combine 32.768 kHz microamp-class timing with low-voltage MHz clocking across 2016, 2520, and 3225 SMD package formats.

Power-Profile Engineering Review

Begin with the clock role. FCom reviews continuous current, active current, start-up behavior, output load, rail voltage, and firmware duty cycle before confirming the configuration.

1.4–1.8 μ A

Listed 32.768 kHz input-current range*

0.9 V

Lowest listed supply option for MHz series*

1–50 MHz

Low-voltage MHz frequency range*

+105°C

Highest listed operating-temperature endpoint*

* Series-level reference values. Confirm the controlled datasheet for nominal frequency, supply, output load, enable state, temperature, and applicable current-test conditions.

32.768 kHz XO

Always-On Timing

For RTC, timekeeping, and sleep/wake functions where continuous current and compact size are primary constraints.

FCO-6K-UC · FCO-2K-UC

Low-Voltage MHz XO

Active System Clock

For MCU, sensor, control, and peripheral clock domains operating from low-voltage rails.

FCO-2K-UP · FCO-3C-UP

Power-Aware Selection

Review the Full Power Profile

Evaluate active current, standby behavior, start-up time, output load, and duty cycle together.

System-level verification required

01

Choose the Right Low-Power Clock

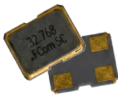
Use the series-level portfolio to develop a shortlist, then confirm the latest controlled datasheet for the exact orderable configuration.

Start with the operating state—not the lowest current value. The 32.768 kHz series supports continuously active timekeeping and wake functions; the MHz series supports low-voltage processing, sensing, and peripheral clock domains.

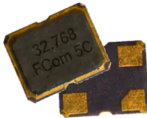
4 SERIES
2 POWER DOMAINS

32.768 kHz Low-Current XO

CMOS · 1.4–1.8 μ A listed input-current range*



FCO-6K-UC
2.0 × 1.6 mm · 4-SMD
32.768 kHz · 1.5 / 1.8 V · CMOS
±20 ppm · –40 to +105°C



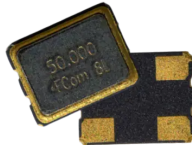
FCO-2K-UC
2.5 × 2.0 mm · 4-SMD
32.768 kHz · 1.5 / 1.8 V · CMOS
±20 ppm · –40 to +105°C

Low-Voltage MHz XO

CMOS · 1–50 MHz frequency coverage



FCO-2K-UP
2.5 × 2.0 mm · 4-SMD
1–50 MHz · 0.9 / 1.2 / 1.5 V · CMOS
±25 ppm · –40 to +85°C



FCO-3C-UP
3.2 × 2.5 mm · 4-SMD
1–50 MHz · 0.9 / 1.2 / 1.5 V · CMOS
±25 ppm · –40 to +85°C

Operating-Profile Selection Matrix					Define the clock role before comparing current values
Clock Role	Power State	Frequency Domain	Primary Review Items	Series Starting Point	
Timekeeping / Wake	Always on	32.768 kHz	Continuous current, temperature, package	FCO-6K-UC / FCO-2K-UC	
MCU / Sensor Clock	Active or cycled	1–50 MHz	Supply, active current, start-up, load	FCO-2K-UP / FCO-3C-UP	
Dual Clock Domain	Mixed	32.768 kHz + MHz	Duty cycle, enable sequence, energy per cycle	Combine the appropriate series	

Compact Always-On Option
FCO-6K-UC provides 32.768 kHz CMOS timing in a 2.0 × 1.6 mm package.

0.9 V MHz Supply
FCO-2K-UP and FCO-3C-UP provide listed supply options down to 0.9 V.

Wide-Temperature 32.768 kHz
FCO-6K-UC and FCO-2K-UC list operation from –40 to +105°C.

Package Choice
Select 2016, 2520, or 3225 formats according to board and assembly constraints.

How to read the current values: Current consumption depends on frequency, supply voltage, output load, operating mode, enable state, and test conditions.

How to use the series values: Use them for shortlisting only; confirm the applicable controlled datasheet and exact orderable configuration before design release.

02

Place Each Clock in the Correct Power Domain

Low-power oscillator selection begins with the operating state and system function—not with the lowest current value alone.

Battery & Power Rails

Energy budget, regulator efficiency, and available voltage

Always-On Timing

RTC, timekeeping, and wake scheduling

Power Management

Enable sequence, sleep interval, and wake event

Active Clock Domain

MCU, sensor, control, or peripheral clock

Battery-Powered IoT & Remote Sensors

Role: Always-on timebase plus an active MCU, sensor, or communications clock.

Focus: Sleep duration, wake frequency, rail voltage, output load, footprint, and service interval.

FCO-6K-UC / FCO-2K-UC · FCO-2K-UP / FCO-3C-UP as required

Wearables & Health Devices

Role: Timekeeping, sensor scheduling, and low-voltage processing.

Focus: Continuous current, compact package, thermal range, start-up, and duty cycle.

FCO-6K-UC · FCO-2K-UP where a low-voltage MHz clock is required

Smart Home, Security & Portable Electronics

Role: Sleep/wake timing, controller reference, sensing, and peripheral clock generation.

Focus: Standby duration, supply compatibility, board area, start-up behavior, and load.

FCO-2K-UC · FCO-2K-UP / FCO-3C-UP

Tracking, Telematics & Scheduled Wake

Role: Scheduled wake, data logging, reporting, and low-voltage controller timing.

Focus: Reporting interval, temperature exposure, start-up, communications activity, and energy per event.

FCO-2K-UC · FCO-2K-UP / FCO-3C-UP

Choose FCO-6K-UC when...

A 2.0 × 1.6 mm package is preferred for an always-on 32.768 kHz CMOS timing function.

Choose FCO-2K-UC when...

A 2.5 × 2.0 mm package is preferred for an always-on 32.768 kHz CMOS timing function.

Choose FCO-2K-UP / FCO-3C-UP when...

The design requires a 1–50 MHz CMOS clock from a 0.9 V, 1.2 V, or 1.5 V rail.

Evaluate Energy per Operating Cycle

Continuous current, start-up energy, active duration, regulator efficiency, peripheral loads, and firmware duty cycle all contribute to the final battery budget.

System-Level Verification Still Matters

Series recommendations are initial engineering guidance. Final performance depends on the exact oscillator configuration, clock loading, enable behavior, power architecture, and verification plan.

03

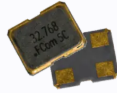
Shortlist by Clock Role and Power Priority

Each featured series addresses a defined clock role and package format. The final orderable part number is determined by the complete electrical, mechanical, and environmental requirements.

32.768 kHz XO

FCO-6K-UC

2.0 × 1.6 mm PACKAGE



Compact CMOS oscillator for always-on timing and wake control.

32.768 kHz

Nominal frequency

1.4–1.8 μ A

Input-current range*

1.5 / 1.8 V

Supply options

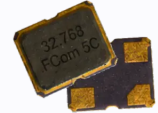
–40 to +105°C

Operating temperature

32.768 kHz XO

FCO-2K-UC

2.5 × 2.0 mm PACKAGE



2520 CMOS option for always-on timing and wake control.

32.768 kHz

Nominal frequency

1.4–1.8 μ A

Input-current range*

1.5 / 1.8 V

Supply options

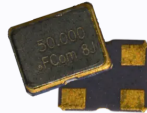
±20 ppm

Frequency stability*

Low-Voltage MHz XO

FCO-2K-UP

2.5 × 2.0 mm PACKAGE



Compact CMOS oscillator for low-voltage active clock domains.

1–50 MHz

Frequency range

0.9–3.0 mA

Input-current range*

0.9 / 1.2 / 1.5 V

Supply options

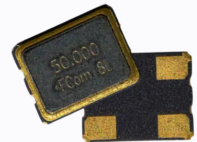
–40 to +85°C

Operating temperature

Low-Voltage MHz XO

FCO-3C-UP

3.2 × 2.5 mm PACKAGE



3225 CMOS option for low-voltage active clock domains.

1–50 MHz

Frequency range

0.9–3.0 mA

Input-current range*

0.9 / 1.2 / 1.5 V

Supply options

±25 ppm

Frequency stability*

Minimum RFQ Information

Clock function

RTC/wake timing, MCU, sensor, or peripheral clock.

Nominal frequency

32.768 kHz or exact MHz frequency.

Electrical requirements

Supply, CMOS load, and enable logic.

Power profile

Active/standby targets, duty cycle, and start-up.

Stability requirement

Stability target and temperature range.

Project requirements

Package, height, annual usage, and schedule.

FCom Engineering Review Can Confirm

Frequency & Configuration

Available frequencies and orderable options.

Start-Up & Enable Behavior

Clock availability, logic, and wake sequence.

Mechanical Fit

Package, height, land pattern, and assembly.

Current-Test Conditions

Frequency, supply, load, enable state, and limits.

Stability Breakdown

Initial tolerance, temperature stability, and error budget.

Verification & Documentation

Electrical checks, datasheet, test data, and screening.

FCOM ENGINEERING SUPPORT

Request a Low-Power Clock Review

Share the clock role, frequency, supply, current budget, load, temperature range, and duty cycle. FCom will help identify suitable series and a practical verification path.

* Series-level reference values. Confirm the controlled datasheet for the exact configuration and current-test conditions. Product information: www.fujicrystal.com

GENERAL INQUIRY

FCom@fujicrystal.com

TECHNICAL SUPPORT

support@fujicrystal.com



Product Information