

CONTROLLED CLOCK MODULATION

Spread-Spectrum Clock Oscillators

Spread-spectrum CMOS oscillators engineered to redistribute clock energy and reduce peak spectral amplitude in compatible digital systems.

- Center- and Down-Spread Options · CMOS Output
- 3–200 MHz · 2520 to 7050 Packages

Receiver compatibility, project qualification, and completed-system EMC validation must be confirmed.

- Industrial & Embedded
- Automotive Project Review
- Displays & Multimedia
- Processor & FPGA Systems
- Networking Equipment
- Dense Digital Systems

SIX SERIES · PACKAGE PORTFOLIO



FCO-2C-LE



FCO-3C-LE



FCO-5C-LE



FCO-7C-LE



FCO-5P-LE



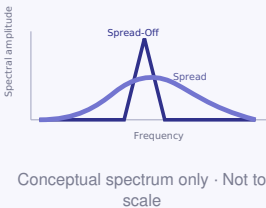
FCO-7P-LE

Six-Series Portfolio

C-LE covers compact 16–40 MHz designs in four package sizes. P-LE extends coverage to 3–200 MHz in 5032 and 7050 packages. All listed series use CMOS output and offer center- or down-spread options by configuration.

How It Works

Controlled modulation redistributes clock energy across a defined frequency band, reducing peak amplitude at individual spectral lines. The result depends on the selected profile and the completed system.



3–200 MHz

Series frequency coverage across the C-LE and P-LE portfolios

Up to ±2.0%

Center-spread deviation around nominal, available on designated configurations

Up to 4.0%

Down-spread depth expressed as a downward frequency excursion

Up to +125°C

Operating-temperature options extending to +125°C

* Series-level capability. Confirm the controlled datasheet for the exact frequency, supply, load, spread profile, stability, temperature range, modulation conditions, and orderable configuration.

Center Spread

Modulation Around Nominal

The instantaneous output frequency moves above and below the nominal frequency. Apply where the receiving clock tree supports excursions in both directions.

Specified as ± deviation · Available by configuration

Down Spread

Modulation Below Upper Limit

The clock is modulated downward from its specified upper frequency. Initial tolerance and temperature stability remain part of the frequency-limit review.

Specified as downward deviation · Available by configuration

Reference Mode

Spread-Off / Unmodulated Reference

A spread-off, unmodulated reference option, where supported, assists functional comparison and system-level emissions evaluation.

Spread-Off availability depends on series and configuration

01

Choose the Right Spread-Spectrum Clock

Select a series by frequency, spread profile, and package. FCom will confirm the exact orderable configuration for the required operating conditions.

Start with the permitted instantaneous frequency window—not the largest spread percentage. Confirm every downstream receiver and PLL before selecting center spread, down spread, depth, and package.

6 SERIES
2 FREQUENCY CLASSES

C-LE Compact & Multi-Package Series					16–40 MHz · CMOS · ±25 ppm frequency stability* · –40 to +125°C*
SERIES	PACKAGE	FREQUENCY & SUPPLY	SPREAD OPTIONS	CURRENT & ENVIRONMENT	
FCO-2C-LE 2520 · 4-SMD	2.5 × 2.0 mm CMOS output	16–40 MHz 1.8 / 2.5 / 3.3 V	Center options: ±0.4% to ±1.0%† Down options: 0.8% to 2.0%†	Series range: 1.5–6 mA* ±25 ppm freq. stability* · –40 to +125°C*	
FCO-3C-LE 3225 · 4-SMD	3.2 × 2.5 mm CMOS output	16–40 MHz 1.8 / 2.5 / 3.3 V	Center options: ±0.4% to ±1.0%† Down options: 0.8% to 2.0%†	Series range: 1.5–6 mA* ±25 ppm freq. stability* · –40 to +125°C*	
FCO-5C-LE 5032 · 4-SMD	5.0 × 3.2 mm CMOS output	16–40 MHz 1.8 / 2.5 / 3.3 V	Center options: ±0.5% to ±1.0%† Down options: 1.0% to 2.0%†	Series range: 1.5–6 mA* ±25 ppm freq. stability* · –40 to +125°C*	
FCO-7C-LE 7050 · 4-SMD	7.0 × 5.0 mm CMOS output	16–40 MHz 1.8 / 2.5 / 3.3 V	Center options: ±0.5% to ±1.0%† Down options: 1.0% to 2.0%†	Series range: 1.5–6 mA* ±25 ppm freq. stability* · –40 to +125°C*	

P-LE Wide-Frequency Series					3–200 MHz · CMOS · ±25 ppm frequency stability* · –40 to +125°C*
SERIES	PACKAGE	FREQUENCY & SUPPLY	SPREAD OPTIONS	CURRENT & ENVIRONMENT	
FCO-5P-LE 5032 · 4-SMD	5.0 × 3.2 mm CMOS output	3–200 MHz 2.5 / 3.3 V	Center options: ±0.125% to ±2.0%† Down options: 0.25% to 4.0%†	Series range: 20–30 mA* ±25 ppm freq. stability* · –40 to +125°C*	
FCO-7P-LE 7050 · 4-SMD	7.0 × 5.0 mm CMOS output	3–200 MHz 2.5 / 3.3 V	Center options: ±0.125% to ±2.0%† Down options: 0.25% to 4.0%†	Series range: 20–30 mA* ±25 ppm freq. stability* · –40 to +125°C*	

Center Spread

Choose when the complete clock tree permits frequency excursion above and below nominal.

Down Spread

Choose when the clock must remain below a specified upper-frequency limit under defined conditions.

Spread-Off / Unmodulated Reference

Use a spread-off, unmodulated reference, where available, for functional and emissions comparison.

Read frequency stability and spread separately

Frequency stability is specified separately from intentional modulation. Combine the applicable initial tolerance, temperature stability, supply/load effects, aging, and spread excursion when calculating the minimum and maximum instantaneous frequency.

Series-level values require configuration review

† Spread depths are discrete, configuration-dependent options and are not continuously programmable. * Current consumption, frequency stability, temperature range, and modulation conditions depend on the selected frequency, supply, load, and orderable configuration.

02

Select by System Node First

For each application, verify that the complete clock tree supports the selected modulation profile and instantaneous frequency range, and confirm any required device qualification.



03

Shortlist by Frequency, Profile and Package

Begin with the required frequency class and package strategy, then confirm the spread profile, receiver limits, and exact orderable configuration.

Selection at a Glance

Six series · 2520 to 7050 packages · 3–200 MHz portfolio · Center- and down-spread options · Compatibility-led engineering review


2520

FCO-2C-LE


3225

FCO-3C-LE


5032

FCO-5C-LE / 5P-LE


7050

FCO-7C-LE / 7P-LE

Smallest Footprint

2520 · FCO-2C-LE · 16–40 MHz

C-LE Multi-Package

3225 / 5032 / 7050 · 16–80 MHz

P-LE Wide-Frequency

5032 / 7050 · 3–200 MHz

Minimum RFQ Information

Clock profile

Nominal frequency, spread type and depth, and any spread-off control requirement.

Modulation details

Required modulation rate, waveform, enable control, and switching behavior.

Frequency limits

Allowed minimum/maximum instantaneous frequency and stability budget.

Electrical conditions

Supply voltage, CMOS load, receiver, PLL, and clock-distribution path.

Environment & mechanics

Temperature, package, height, land pattern, and qualification needs.

Evaluation & project

Target spectral peak, test method, annual usage, schedule, and documentation.

FCom Engineering Review Can Confirm

Spread Profile

Center/down definition, available depth, and spread-off configuration.

Modulation Conditions

Rate, waveform, timing behavior, and applicable tolerances.

Frequency Window

Nominal frequency, modulation excursion, stability, and upper/lower limits.

Receiver Compatibility

PLL tracking, clock tolerance, interface requirements, and timing margin.

Electrical & Mechanical Fit

Supply, load, current, package, height, and land pattern.

Evaluation Documentation

Datasheet, spectral data, verification scope, and project-specific screening.

Share Requirements

1 Frequency window, receiver limits, spread profile, supply, package, and environment.

Engineering Confirmation

2 FCom reviews the suitable series, configuration, compatibility points, and documentation.

Proceed with the Project

3 Request the controlled datasheet, samples, quotation, or additional engineering support.

FCom Engineering Support

Request a Datasheet, Sample or Engineering Review

Share the clock role, frequency window, receiver limits, spread profile, supply, temperature, package, and emissions target. FCom will confirm the suitable series, orderable configuration, and required validation points.

* Series-level capability. Confirm the latest controlled datasheet for the exact orderable configuration and operating conditions. EMC performance must be verified on the completed system.

GENERAL INQUIRY

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TECHNICAL SUPPORT

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PRODUCT INFORMATION

Scan or visit
www.fujicrystal.com