ZL30250, ZL30251
3-Input, 3-Output Any-to-Any Clock
Multiplier and Frequency Synthesizer
Product Brief
August 2014

Features

• 4 Input Clocks
  • One crystal/CMOS input
  • Two differential/CMOS inputs
  • One single-ended/CMOS input
  • Any input frequency from 9.72MHz to 1250MHz
    (9.72MHz to 300MHz for CMOS)
  • Clock selection by pin or register control

• Low-jitter Fractional-N APLL and 3 Outputs
  • Any output frequency from <1Hz to 1035MHz
  • High-resolution fractional frequency conversion
    with 0ppm error
  • Easy-to-configure, encapsulated frequency conversion
    requires no external VCXO or loop filter
  • Each output has independent dividers
  • Output jitter is typically 0.16 to 0.28ps RMS
    (12kHz-20MHz integration band)
  • Outputs are CML or 2xCMOS, can interface to
    LVDS, LVPECL, HSTL, SSTL and HCSL
  • In 2xCMOS mode, the P and N pins can be
    different frequencies (e.g. 125MHz and 25MHz)
  • Per-output supply pin with CMOS output
    voltages from 1.5V to 3.3V

• Precise output alignment circuitry and per-
  output phase adjustment
• Per-output enable/disable and glitchless
  start/stop (stop high or low)
• General Features
  • Automatic self-configuration at power-up from
    external (ZL30250) or internal (ZL30251)
    EEPROM; up to four configs, pin-selectable
  • Numerically controlled oscillator mode
  • Spread-spectrum modulation mode
  • SPI or I2C processor Interface
  • Tiny 5x5mm QFN package
  • Easy-to-use evaluation software

Applications

• Frequency conversion and frequency synthesis in
  a wide variety of equipment types

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
<th>Package Size</th>
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</thead>
<tbody>
<tr>
<td>ZL30250LDG1</td>
<td>32 Pin QFN Trays</td>
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<tr>
<td>ZL30250LDF1</td>
<td>32 Pin QFN Tape and Reel</td>
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Matte Tin

Package size: 5 x 5 mm

-40°C to +85°C

Figure 1 - Functional Block Diagram
1. Application Examples

![Figure 2 – Ethernet Frequency Synthesis Application](image)

ZL3025x

50MHz

2x 156.25MHz differential
125MHz CMOS
25MHz CMOS

Frequency synthesis from crystal resonator

![Figure 3 – PCI Express Frequency Multiplication Application](image)

ZL3025x

25MHz

3x 100MHz differential

Frequency multiplication from input clock signal

2. Detailed Features

2.1 Input Clock Features
- Four input clocks: one crystal/CMOS, two differential/CMOS, one single-ended/CMOS
- Input clocks can be any frequency from 9.72MHz up to 1250MHz (differential) or 300MHz (CMOS)

2.2 APLL Features
- Very high-resolution fractional scaling (i.e. non-integer multiplication)
- Any-to-any frequency conversion with 0ppm error
- Two high-speed dividers (integers 4 to 15, half divides 4.5 to 7.5)
- Easy-to-configure, completely encapsulated design requires no external VCXO or loop filter components
- Bypass mode supports system testing

2.3 Output Clock Features
- Three low-jitter output clocks
- Each output can be one differential output or two CMOS outputs
- Output clocks can be any frequency from 1Hz to 1035MHz (250MHz max for CMOS and HSTL outputs)
- Output jitter is typically 0.16 to 0.28ps RMS (12kHz to 20MHz integration band)
- In CMOS mode, an additional divider allows the OCxN pin to be an integer divisor of the OCxP pin (Example: OC3P 125MHz, OC3N 25MHz)
- Outputs easily interface with CML, LVDS, LVPECL, HSTL, SSTL, HCSL and CMOS components
- Supported telecom frequencies include PDH, SDH, Synchronous Ethernet, OTN
- Can produce clock frequencies for microprocessors, ASICs, FPGAs and other components
- Can produce PCIe clocks (PCIe gen. 1, 2 and 3)
- Sophisticated output-to-output phase alignment
- Per-output phase adjustment with high resolution and unlimited range
- Per-output enable/disable
- Per-output glitchless start/stop (stop high or low)
2.4 General Features

- SPI or I²C serial microprocessor interface
- Automatic self-configuration at power-up from external (ZL30250) or internal (ZL30251) EEPROM memory; pin control to specify one of four stored configurations
- Numerically controlled oscillator (NCO) mode allows system software to steer frequency with resolution better than 0.01ppb
- Spread-spectrum modulation mode (meets PCI Express requirements)
- Four general-purpose I/O pins each with many possible status and control options
- Reference can be fundamental-mode crystal, low-cost XO or clock signal from elsewhere in the system

2.5 Evaluation Software

- Simple, intuitive Windows-based graphical user interface
- Supports all device features and register fields
- Makes lab evaluation of the ZL30250 or ZL30251 quick and easy
- Generates configuration scripts to be stored in external (ZL30250) or internal (ZL30251) EEPROM
- Generates full or partial configuration scripts to be run on a system processor
- Works with or without a ZL30250 or ZL30251 evaluation board
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