ZARLINK SEMICONDUCTOR

ZL63034
4x6.25 Gb/s Multirate VCSEL Driver
Data Sheet

January 2008

Features

- Single +3.3 V supply dissipating 70 mW per channel
- 4-channel VCSEL driver operates from DC to 6.25 Gb/s
- Individual channel control for enable, drive currents, and VCSEL fault control
- Adjustable temperature compensation for threshold and modulation drive currents
- Selectable analog multiplexer provides junction temperature, supply voltage and VCSEL bias current for each channel
- Programmable VCSEL fault detection with autonomous fault handling and interrupt
- Squelch automatically disables channel when input amplitude falls below programmable threshold
- Adjustable VCSEL peaking control
- 2-wire interface provides access to internal registers
- IC dimensions 2245 x 3870 um
- 250-micron channel pitch matches optical ribbon fiber and VCSEL arrays
- Differential CML compatible inputs with on-chip termination

Applications

- Single data rate (SDR) and double data rate (DDR) XAUI
- Single data rate (SDR) and double data rate (DDR) Infiniband®
- 1x, 2x, 4x Fiber Channel
- Gigabit Ethernet
- PCI Express 1.1 and 2.0
- QSFP and POP4 optical modules
- Proprietary and CWDM parallel optical modules

Description

The growing use of the Internet has created increasingly higher demand for multi-Gb/s I/O performance. The demand for 40 Gb/s bandwidth and beyond fuels the growth of short-reach 10 Gb/s infrastructures within high-end telco and datacom routers, switches, servers and other proprietary chassis-to-chassis links.

The Zarlink ZL63034 4x6.25Gb/s VCSEL Driver is a 4-channel VCSEL driver designed for various parallel optics and CWDM PMD applications. It consists of a DC-coupled amplifier with selectable threshold and modulation currents optimized for driving commercially available, common cathode VCSELs from a single +3.3 V supply.

Individual channel settings are used to control the threshold and modulation drive current and their temperature coefficients, allowing the optical output power and extinction ratio to be optimized. A selectable analog multiplexer provides junction temperature, supply voltage, and VCSEL bias current for each channel to enable optical module diagnostic features.

Data controlling the Zarlink ZL63034 VCSEL driver settings is loaded by a simple 2-wire serial serial interface reducing the number of pins required of a microcontroller.

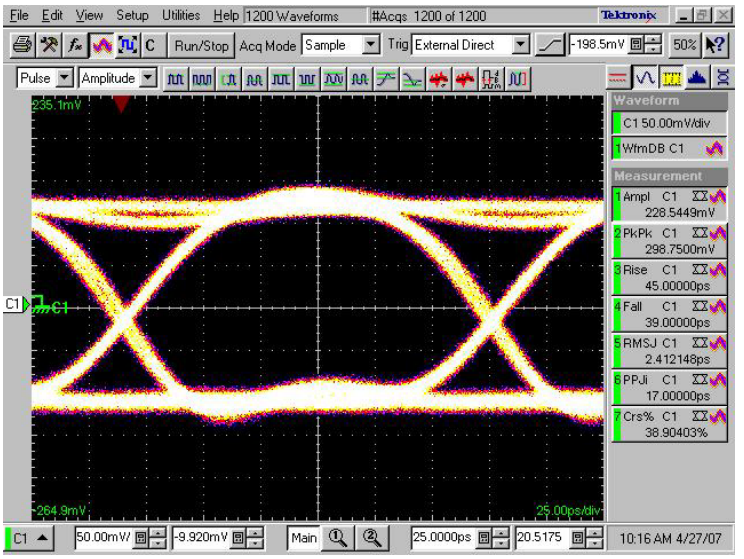

Figure 1: Representative Optical Data Pattern at 6.25 Gb/s with a Bessel-Thomson Filter

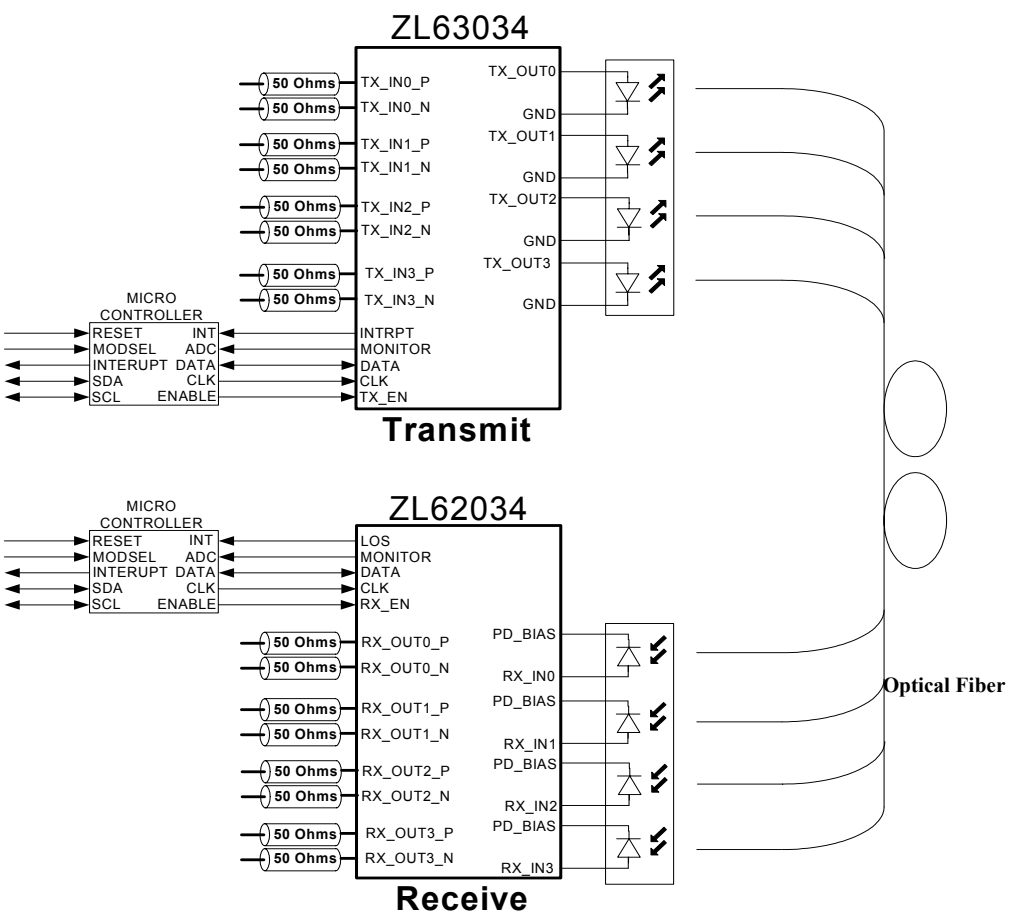

Figure 2: Application Block Diagram Utilizing the ZL63034 VCSEL Driver and the ZL62034 Optical Receiver

Functional Description

The Zarlink ZL63034 VCSEL driver is a 4-channel, monolithic SiGe BiCMOS integrated circuit that provides all the functionally needed to digitally modulate commercially available common cathode VCSEL arrays. Features include buffered, fully differential CML and LVDS compatible inputs that are DC-coupled to VCSEL drivers. Independent control of VCSEL drive currents and temperature coefficients enable the design of cost-effective, 4-channel optical data communication transmitters.

The differential inputs (TX_IN) are internally terminated and drive single-ended, ground-referenced, output current drivers as seen in Figure 3. Loading of on-chip CMOS control registers through a 2-wire interface sets the VCSEL current levels for digital modulation. An internal bandgap voltage reference enables precise, separately adjustable logic-high current (I_{max}) and logic-low current (I_{min}) levels for each channel, allowing each VCSEL output's optical power and extinction ratio to be optimized. Separately adjustable temperature coefficients for I_{max} and I_{min} allow each VCSEL output to be maintained through ambient temperature variations. A multiplexed analog output provides a proportional signal for VCSEL bias, junction temperature, and power supply voltage for analog diagnostics.

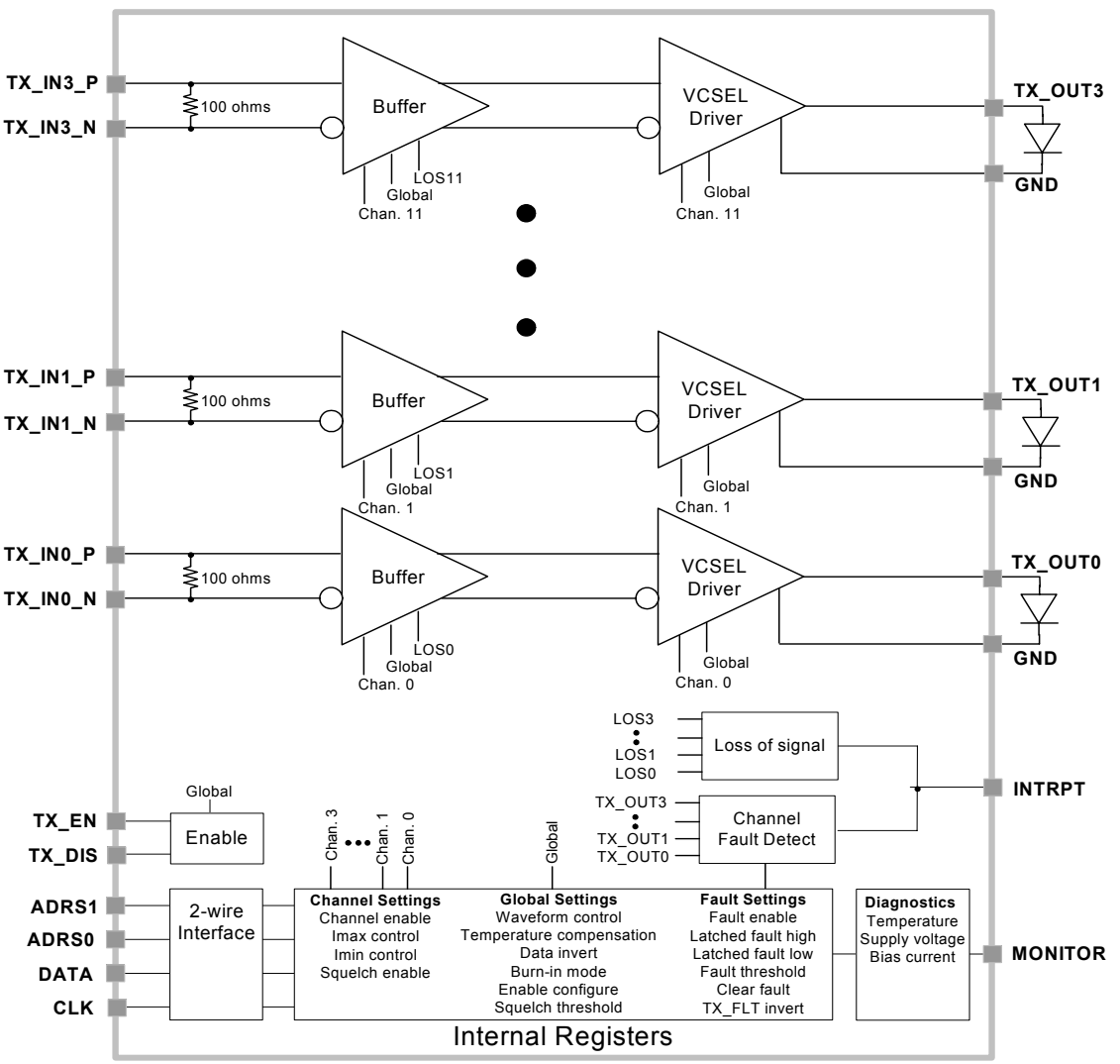

Figure 3: Block Diagram

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