ZEUS™ 2 PON Transceiver Chip Family . . . . .

- **Range of innovative bi-directional laser transceiver interface solutions**
- **Supports all PON infrastructures including GPON, EPON, A/BPON, WDMPON**
- **Very high level of feature integration**
- **Product family supports both CO and CPE installations**
- **Broad spectrum of diagnostic, network and safety monitoring and control**
- **Cost savings through reduced BOM, common footprint, test time, and engineering support**

the edge in broadband™

Optical technology allows significantly higher speeds and greater data bandwidth than the conventional copper wire. In order to modulate this data onto a laser and to recover very weak receiving signals, this requires a very accurate driver and a highly sensitive amplifier. The solution is Centillium's Zeus™ 2 PON transceiver, the industry's first fully integrated 2.5 Gbps optical transceiver that targets the A/BPON, GPON, and EPON markets.

The Zeus 2 product line rigidly controls the operation and behavior of laser transmitters and optical receivers. Using CMOS technology, Zeus 2 provides optical module vendors, and service providers, transmission rates of up to 2.5 Gbps with an extremely high level of reliability, increased flexibility, faster time-to-market, and reduced bill of materials (BOM) cost. This newest optical transceiver chip family complements Centillium's existing industry-leading optical access product portfolio, strengthening the company's position as the only provider of end-to-end fiber-to-the-premise (FTTP) solutions. Zeus 2's companion products from the Apollo 2 family, adhering to the same footprint, cover the full range of the Gigabit Ethernet, SONET, and SDH markets up to 2.7 Gbps, offering transceiver module integrators the opportunity to create a broad range of products from a single engineering effort.

Zeus 2 offers a range of integrated capabilities enabling our customers to develop new transceiver designs for emerging standards such as GPON and at the same time allows them to save costs in their current transceiver designs. When supplied with unique performance monitoring capabilities, service providers are then able to remotely monitor the "health" of the network, thus allowing them to achieve significant operational savings.

Zeus 2 integrates Laser Driver (LDD), Limiting Amplifier (LIA), and Digital Diagnostics Monitoring (DDM) functionality plus an EEPROM into a single package resulting in BOM cost reductions and a simplified board design. The DDM functionality, fully compliant with the industry standard SFF8472, reduces the incidence of unexpected laser diode failures and enables remote failure diagnostics. The EEPROM supports the DDM function, while also enabling factory customization and calibration, and providing for customer specific applications. A dual password scheme allows customer and end user data to be separately secured.

Family Features
Overall Specifications

- 155 Mbps to 2.5 Gbps data rates, Transmit and Receive
- Bias current range: 1 mA to 100 mA
- Modulation current range: 1 mA to 80 mA
- Limiting amplifier sensitivity of 5 mVppd at 2.5 Gbps (BER <1E-10)
- 6 mm x 6 mm, 40-pin QFN package
- Versions for both CO and CPE deployments
- Operating ambient temperature: -40 C to +85 C
- Low power consumption with power saving modes
- Single power supply 3.3 V operation, with on chip 1.8 V regulator
- Complies with Telcordia, IEEE 802.3ah, and ITU-T 983/984 specifications

CENTILLIUM COMMUNICATIONS

ZEUS™ 2 PON Transceiver Chip Family

Integration Features

- Fully integrated burst-mode LDD and LIA
- Integrated EEPROM
    - Manufacturer's access to EEPROM
        - L1 and L2 password protection
    - Two-wire serial interface with programmable chip addresses
    - Supports range of Look Up Tables (LUT)
- On-chip transceiver Digital Diagnostics Monitoring per SFF-8472
    - Laser bias and modulation
    - Receive and transmit power
    - On-chip voltages
    - Internal temperature sensor
    - Customer accessible ADC
    - Internal and external calibration supported

Diagnostics and Safety Controls

- Loss of receive signal detect and squelch (programmable)
- SFF and SFP compatible
- User-programmable bias and modulation current through two-wire interface (APC disabled)
- Transmit fault indication (pin and register monitored)
- Loss of receive signal detect (pin and register monitored)
- Laser driver safety shut-off feature
- Programmable threshold and reaction time for the LOS (loss of signal) detect

Laser Control

- Very accurate control and tracking of laser output power and extinction ratio
    - 16 bit closed-loop control
    - LUT for open loop additional tracking accuracy
- Laser eye PWA (pulse width adjustment) of +/-30 ps digitally controlled
- All laser power is saved during disable with response time <5 ns
- Fast laser output enable/disable for both bias and modulation current (pin controlled)
- Fast disable is LVDS/LVPECL/CML and CMOS compatible
- Single ended DC-coupling or differential AC coupling (Continuous mode) to the laser diode
- Laser output disable (pin and register controlled)
- Low laser driver output voltage compliance, 0.9 V when the modulation current is equal to 75 mA
- Built-in PIN-PD bias circuit, plus PD current monitor, for PIN-TIA

Testing and Evaluation

Centillium makes available a customer oriented Zeus 2 evaluation board set and complementary Configurator software to program the on-chip EEPROM. Through a Windows based GUI complete control of a very wide range of on chip parameters is made available for evaluation and production oriented calibration.

Functional Block Diagram
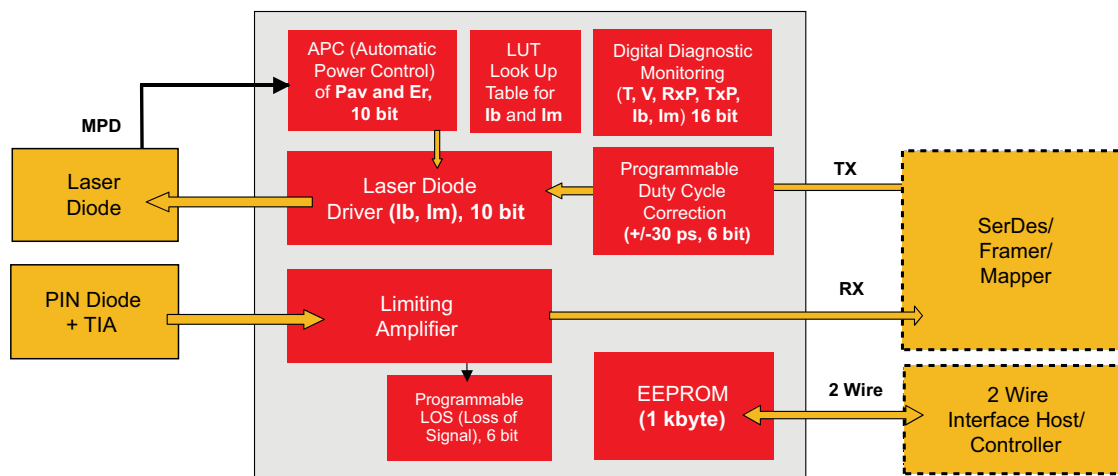
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