Complete List of Optical Module Chip Models

Overview

Comprehensive Guide to Optical Module Chips | WeylandThe core of an optical module lies in its internal chips, which determine the module's data rate, powe.

Key Takeaways

Optical module chips include VCSELs, DFB lasers, PIN and avalanche photodiodes, driver ICs, and TIAs, forming the core components of high-speed optical transceivers.Transmitter Chips

VCSELs (Vertical-Cavity Surface-Emitting Lasers)

• Core light source for multimode optical modules, converting electrical signals into optical signals.

• Features: low threshold current, high modulation bandwidth, circular beam shape, array capability.

• Typical models: multi-channel VCSEL arrays for 10G, 25G, 50G, and 100G SFP/SFP+ modules . DFB Lasers (Distributed Feedback Lasers)

• Single-mode lasers used in long-distance and WDM systems.

• Features: high spectral purity, wavelength stability.

• Typical models: DFB lasers for 10G, 40G, 100G, and 400G CFP/XFP modules . Laser Diodes (LD)

• Used in TOSA assemblies for converting electrical signals to optical signals.

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• Features: high output power, low power consumption, improved coupling efficiency.

• Typical models: 1310 nm, 1550 nm, and 850 nm LDs for short- and long-reach modules . LEDs (Light-Emitting Diodes)

• Lower-cost option for low-rate, short-distance modules.

• Typical models: 850 nm LEDs for legacy multimode fiber applications .
Receiver Chips

PIN Photodiodes

• Convert optical signals into electrical currents.

• Features: high sensitivity, broad bandwidth, fast response.

• Typical models: PIN photodiodes for multimode SFP/SFP+ modules . Avalanche Photodiodes (APD)

• High-sensitivity detectors for low optical power or long-distance links.

• Features: avalanche multiplication effect, 6–10 dB sensitivity improvement over PINs.

• Typical models: APDs for 10G, 25G, and 100G long-reach modules . Trans-impedance Amplifiers (TIA)

• Amplify weak photocurrent signals from photodiodes into voltage signals.

• Features: low noise, wide bandwidth, essential for receiver performance.

• Typical models: TIAs integrated in ROSA assemblies for SFP, SFP+, XFP, CFP modules . Post Amplifiers

• Convert analog TIA output into digital signals of uniform amplitude.

• Typical models: integrated in ROSA for high-speed optical receivers .
Driver and Control Chips

Driver ICs

• Provide high-speed modulation current to VCSELs or LDs.

• Features: differential input/output, pre-emphasis, equalization for high-frequency compensation.

• Typical models: 10G, 25G, 50G, 100G driver ICs for SFP/SFP+/XFP/CFP modules .
Automatic Power Control (APC) Circuits

• Maintain consistent optical output power in TOSA assemblies.

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• Typical models: integrated APC in TOSA for 10G–400G modules . Oscillators

• Provide precise clocking for PAM4 DSPs in high-speed modules.

• Types: quartz and MEMS oscillators.

• Typical models: sub-60 fs ultra-low jitter oscillators in 5070, 3225, 2520 packages . Summary

Optical module chips can be categorized into transmitters (VCSEL, DFB, LD, LED), receivers (PIN, APD, TIA, post amplifier), and driver/control circuits (driver ICs, APC, oscillators). Each type has multiple models optimized for data rates from 1G to 400G, different form factors (SFP, SFP+, XFP, CFP, X2/XENPAK), and reach requirements (short, medium, long). These chips collectively enable high-speed, low-power, and reliable optical communication systems .

Article Content

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An optical module is a typically hot-pluggable optical transceiver used in high-bandwidth data

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Also known as an optical transceiver, it sits at the physical layer of the OSI model and serves as the core bridge in any fiber optic

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Final Conclusion □□ Optical modules rely on a multi-chip cooperative system, including DSP, Driver IC, TIA, PD/APD,

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Data centers, the beating hearts of this digital revolution, are tasked with processing and

TI DLP® System Design: Optical Module Specifications

The presentation provides a comprehensive overview of the guidelines specific to designing an optical system with DLP Products

Introduction to Optical Chips

Optical chip is a chip in the optical module that completes the conversion of photoelectric signals. It is divided into

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At present, the world''s AI large-scale models have been released one after another and

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On an optical network, a sender needs to convert electrical signals into optical signals before sending them to a receiver, and the

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II-VI offers a complete line of optical modules for the market. These product lines cover the most commonly SFP and

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