

Energy-Saving Optical Modulator Test Report



Overview

Here, we report double single-layer graphene electro-absorption modulators on Si optimized for energy-efficient and ultra-fast operation, demonstrating 67GHz bandwidth and 80Gbit/s data rate, in both O and C bands, using a fabrication tailored for wafer-scale integration. Abstract— Silicon-organic hybrid integrated devices have emerging applications ranging from high-speed optical interconnects to photonic electromagnetic-field sensors. Silicon slot photonic crystal waveguides (PCWs) filled with electro-optic (EO) polymers combine the slow-light effect in PCWs with. A promising application of cryogenic PICs is to provide optical interconnects by up-converting signals from electrical to optical domain, allowing massive data-transfer from 4 K superconducting (SC) electronics to room temperature environment. We include dynamic dissipation from charging modulator capacitance and net energy consumption from absorption and photocurrent, both in reverse and small forward. Abstract—Parallel optical interconnects at the extreme scale hold the key to resolve the grand challenge of moving enormous amount of data between on-chip cores and within multi-chip modules. We have also achieved 192 Gb/s PAM-4 modulation with TDECQ of 2. Introduction Silicon optical modulators provide.

Article Content

Dec 16, 2025

High-speed electro-optic modulation in topological interface states of ...

In this work, we report high-speed and energy-efficient electro-optic modulation in topological interface states of a 1D microstructure lattice on a silicon-nitride-loaded LNOI platform.

Aug 15, 2025

A comprehensive survey on optical modulation techniques for ...

It provides a detailed assessment of each technique's working principles, advantages and limitations, and potential applications in cutting-edge photonics. Additionally, it covers relevant topics ...

Jan 08, 2026

Ultralow voltage, High-speed, and Energy-efficient Cryogenic ...

Abstract: Photonic integrated circuits (PICs) at cryogenic temperatures enable a wide range of applications in scalable classical and quantum systems for computing and sensing.

Jan 03, 2026

Realization of an ultra-energy-saving electro-optic ...

In this work, we used our nanotechnology to demonstrate E-O/O-E/O-E-O devices with extremely small capacitance and energy consumption that ...

Dec 30, 2025

(PDF) Ultralow voltage, High-speed, and Energy ...

We achieve this record performance by designing and fabricating a compact optical ring resonator modulator in a heterogeneous InP-on-Si platform, ...

Apr 28, 2026

A high-speed micro-ring modulator for next generation energy ...

In this paper, we report a high-speed silicon micro-ring modulator with a record-breaking speed of 128 Gbaud on-off keying (OOK) modulation.

Mar 15, 2026

DABM OIC Abstract as submitted

Here we analyze the dissipation mechanisms for optical modulators operated in depletion, including both the dynamic and photocurrent dissipations.

Dec 22, 2025

Microsoft Word

Considering the system level integration with microelectronics, our investigation of energy-efficient, high-speed E-O modulators will only focus on devices that are compatible with silicon photonics.

Sep 14, 2025

Graphene Electro-Absorption Modulators for Energy-Efficient and High ...

Here, we report double single-layer graphene electro-absorption modulators on Si optimized for energy-efficient and ultra-fast operation, demonstrating 67GHz bandwidth and 80Gbit/s data rate, in both O ...

Dec 04, 2025

Application Note Evaluating Optical Modulators

As a result, evaluation of optical modulators no longer requires an external amplifier and power supply, because direct driving is supported and evaluation can be performed without calibration using an ...

Apr 08, 2026

Realization of an ultra-energy-saving electro-optic modulator and ...

In this work, we used our nanotechnology to demonstrate E-O/O-E/O-E-O devices with extremely small capacitance and energy consumption that cannot be achieved with any other ...

Oct 28, 2025

Energy consumption in optical modulators for interconnects

Abstract: We analyze energy consumption in optical modulators operated in depletion and intended for low-power interconnect applications. We include dynamic dissipation from charging modulator ...

Dec 15, 2025

(PDF) Ultralow voltage, High-speed, and Energy-efficient Cryogenic ...

We achieve this record performance by designing and fabricating a compact optical ring resonator modulator in a heterogeneous InP-on-Si platform, where we optimize a multi-quantum-well ...

Aug 31, 2025

High Performance Optical Modulator Based on Electro-optic ...

In this the following sections, we report the design, fabrication, and characterization results of a high-speed silicon-organic hybrid (SOH) PCW modulator with high modulation efficiency, low power ...

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