

Performance Comparison of Upgraded Planar Waveguide and Comparative Versions

Article Overview

Upgraded planar waveguides, particularly those with bonded thermal oxide claddings, offer ultra-low propagation loss and high integration potential, outperforming conventional polymer, glass, and grating-based alternatives in spectral control and reliability.

Planar Waveguides Overview

Planar waveguides confine light within a high-index core layer between lower-index claddings, enabling integration of multiple optical functions on a single chip. They are fabricated using semiconductor-inspired lithographic processes, allowing precise control over geometry and refractive index profiles. Upgraded planar waveguides, such as those with wafer-bonded thermal oxide upper claddings, achieve record low propagation losses below 0.1 dB/m, reduced absorption, and low dielectric stress, making them highly suitable for high-speed optical interconnects.

Alternative Waveguide Solutions

- **Waveguide Gratings:** Incorporate periodic structures for wavelength-selective filtering, dispersion compensation, and optical feedback. They provide high spectral selectivity but involve more complex fabrication and higher cost compared to planar waveguides.
- **Polymer and Glass Embedded Waveguides:** Graded-index polymer waveguides off...

Article Content

Jun 16, 2026

(PDF) Progress in Planar Optical Waveguides

A theoretical study that enables us to make a plain quantitative analysis of subwavelength-gap metal-clad planar

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Improved Design Techniques for High Performance Planar Waveguide

In this paper we describe the main limitations and drawbacks of waveguide slot arrays configurations, and the possible

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High-Q Slow-Wave Coplanar Waveguides

Abstract—A comprehensive study of methods of maximizing Q for slow-wave coplanar waveguides is described.

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A Review on Improved Design Techniques for High Performance Planar Waveguide Slot Arrays. Electronics 2021,

Sep 14, 2025

Performance analysis of polarization transformation waveguide ...

Polarization management is an important issue in current planar light circuit as there are many photonic devices that

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Planar Waveguide

Planar waveguide lasers are a special class of laser where light is confined to a waveguide. They have distinctive advantages that

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Optimizing structured surfaces for diffractive waveguides

Fig. 1: Comparison between a traditional dielectric waveguide and a diffractive waveguide. Fig. 2: Comparative analysis

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Development of planar diffractive waveguides in optical see-through ...

The diffractive waveguides can be divided into surface relief grating waveguides and volume hologram grating

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A Review on Improved Design Techniques for High Performance

In this review, our attention has been focused mainly on the improved available design techniques to obtain high

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A miniaturized and low-profile planar antenna is a crucial part of any wireless communication system. To cover

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An Ultra-Broadband Conductor-Backed Coplanar

In this paper, a conductor-backed coplanar waveguide with sine edges (CBCPW-SE),

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A comparison of planar transmission lines, including microstrip, stripline, CPW, slotline, and finline, highlighting differences in

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Competitive Evaluation of Planar Embedded Glass and Polymer

We describe the fabrication of graded index polymer waveguides, using the Mosquito and photo-addressing methods,

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A comparative performance analysis of various shapes and substrate ...

The antenna performance parameters are observed using different materials of different dielectric constants and

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A systematic comparison of optics and optical material design parameters and the merit of the different PLC systems

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Planar Waveguides and other Confined Geometries

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Abstract Integrated planar optical waveguide interferometer biosensors are advantageous combinations of evanescent

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A Review on Improved Design Techniques for High Performance Planar ...

We present in this work a review of the most typical waveguide slot array configurations proposed in the literature, describing their

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Comparative study of asymmetric versus symmetric planar slab

In this paper we have studied the asymmetric versus symmetric planar waveguide in terms of their usefulness in

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Abstract The performance evaluation of coplanar waveguide (CPW)-fed square slot antenna which is loaded on various

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Optical printed circuit board (OPCB) waveguide materials and fabrication methods have advanced considerably over

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In this paper, we aim to demonstrate the superior performance of this novel architecture by utilizing III-V materials

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ANALYSIS AND COMPARISON OF WAVE PROPAGATION IN

The modelling and comparison between the attenuation of waves propagating in a coplanar waveguide (CPW) and microstrip line are

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Planar waveguide slot arrays (WSAs) have been used since 1940 and are currently used as performing antennas for

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In this paper, we provide an overview and comparison of devices used for optical waveguide-to-waveguide coupling

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Progress in Planar Optical Waveguides | Springer Nature Link

This book provides a comprehensive description of various slab waveguide structures ranged from graded-index waveguide to

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Introduction to the Special Issue on Ultralow Loss Planar Waveguides ...

Ultra Low Loss Planar Waveguides and Their Applications. Ultra-low loss optical planar waveguide technology is a critical research

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Planar Waveguides

Planar Waveguides Optical signal transmission via fiberglass waveguides revolutionized telecommunication over long distances. The

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