

Performance Comparison of Arrayed Waveguide Grating Intelligence and Delay



Article Overview

RDL-AVGs offer significantly higher compactness and reduced phase errors compared to traditional AVGs, achieving ultra-high resolving power with lower insertion loss and improved scalability.

Traditional AVGs

Traditional arrayed waveguide gratings (AVGs) operate by introducing a constant path difference between adjacent waveguides, producing wavelength-dependent phase shifts that focus light onto output channels. Key performance characteristics include:

- Resolving Power: Limited by fabrication imperfections; higher resolving power requires longer waveguides, increasing the device footprint and susceptibility to phase errors, which degrade spectral resolution and increase crosstalk and insertion loss .
- Footprint: Increases monotonically with resolving power, leading to larger chips and higher sensitivity to uniformity errors .
- Insertion Loss and Crosstalk: Typically moderate; insertion loss around 1.8 ± 0.4 dB and crosstalk around -32 ± 2 dB in optimized designs .
- Polarization-Dependent Loss (PDL): Can be significant, requiring careful design to minimize effects, especially in high-capacity DWDM systems

Article Content

Nov 30, 2025

Performance Simulation and Optimal Design for Silicon-Nitride

In this work, we simulate/discuss the SiN waveguide dimensional scales for single-mode conditions and then select two

Oct 26, 2025

(PDF) High-resolution arrayed waveguide grating-assisted passive ...

Integrated optical phased arrays (OPAs) based on arrayed waveguide gratings (AWGs) enable two-dimensional (2D)

Apr 01, 2026

Optical performances analysis and structure parameters optimization ...

The optical performances of AWG are mainly affected by the structure parameters such as the waveguide spacing, the

Nov 22, 2025

Design and characterization of arrayed waveguide gratings ...

Abstract Planar waveguides with ultra-low propagation loss are necessary for integrating optoelectronic systems that require long

Feb 09, 2026

Performance Comparison of Grating-Assisted Integrated Photonic Delay ...

Abstract Incorporation of grating waveguides in optical delay lines based on integrated microring resonator structures is

Nov 27, 2025

Effect of mask grid on SOI arrayed waveguide grating performance

I. INTRODUCTION Arrayed waveguide gratings (AWGs) are one of the commonly used devices for wavelength multiplexing .

Jul 06, 2026

Custom Arrayed Waveguide Gratings with Improved Performance

In this review, an overview of the available methods for improving the bandwidth, spectral resolution, and transmission

Jul 07, 2026

Arrayed waveguide grating

Arrayed waveguide gratings (AWG) are commonly used as optical (de)multiplexers in wavelength division multiplexed (WDM)

Jun 27, 2026

High Resolving Power and Highly Compact Arrayed Waveguide

Abstract— Arrayed waveguide grating with reusable delay lines (RDL-AWG) with a resolving power of 28,000 is experimentally

Oct 05, 2025

(PDF) Review Paper of Array Waveguide Grating (AWG)

Array waveguide gratings (AWGs) enhance WDM networks by enabling efficient multiplexing and demultiplexing of optical signals.

Mar 17, 2026

Custom Arrayed Waveguide Gratings with Improved Performance

Arrayed waveguide gratings (AWGs) are key optical components of various new applications in telecommunication, astronomy,

Dec 15, 2025

Arrayed Waveguide Gratings

On average, data traffic in the internet grows by 40% each year. This growth, and, in particular, the rapidly increasing interest in

Apr 16, 2026

Design and fabrication optimization of low-crosstalk silicon arrayed ...

Abstract To satisfy the stringent requirements of large-capacity optical communication systems, the high-performance

May 29, 2026

Paper Title (use style: paper title)

Abstract— Arrayed waveguide gratings with reusable delay lines (RDL-AWG) are demonstrated as high resolving power integrated

Jun 24, 2026

Review paper for developments in Array Waveguide Gratings

The proposed work reviews the evolution of Arrayed Waveguide Gratings (AWG) from concentric phased arrays to present day

Jul 10, 2026

AdvancedPhotonicsResearch_revised_CLEAN

Optical loss, bandwidth, spectral resolution, transmission function shape, crosstalk, and polarization sensitivity are the most

Apr 25, 2026

Arrayed waveguide grating (AWG)

Calculate the response of a 1x8 arrayed waveguide grating (AWG) working as a demultiplexer. An INTERCONNECT compact model

Feb 07, 2026

Wavelength Tunable, Polymer-Based Arrayed Waveguide Gratings

This flat-top performance is achieved by including a MMI (multi-mode interference) section in the input waveguide of

Jan 28, 2026

Silicon-Based Arrayed waveguide gratings for WDM and

We compare the performance of silicon-based arrayed waveguide gratings (AWGs) with star couplers of Rowland and

Aug 29, 2025

Arrayed waveguide gratings in lithium tantalate integrated photonics

Arrayed Waveguide Gratings (AWGs) are widely used photonic components for splitting and combining different

Jul 16, 2026

Performance Analysis and Design Optimization of Array Waveguide Grating ...

Publication Date: 2026/02/19 Abstract: Arrayed Waveguide Gratings (AWGs) are essential components in modern Dense

May 20, 2026

Crosstalk reduction for Arrayed waveguide gratings on Silicon-on ...

Abstract Ultracompact silicon-based arrayed waveguide gratings (AWGs) with low loss and low crosstalk are essential

Aug 10, 2025

Performance Analysis and Design Optimization of Array Waveguide

Performance analysis was conducted using OptiSystem version 17.0, incorporating optical transmitters (1525-1565 nm), Mach

Jun 14, 2026

Performance analysis of PLC-based 32-channel arrayed waveguide grating ...

Highlights • Designed and tested a PLC-based 32-channel array waveguide grating. • Comparison of the edge filtering

Dec 15, 2025

Performance Comparison among Silicon-Based Arrayed Waveguide

Abstract: With comparison, experimental results show that the AWG with Rowland configuration in combination with constant period

Oct 31, 2025

(PDF) Arrayed Waveguide Gratings

Seyringer: Arrayed Waveguide Gratings Figure 7 (a) and (b) Cross-sections of SoS and SOI waveguides with typical dimensions and

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