

# Arrayed Fiber Bragg Grating



## Overview

Arrayed waveguide grating (AWG) is the core component of the photonic integrated interrogation system. Its spectral characteristics will affect the wavelength interrogation performance of the photonic integrated fiber grating interrogati. Arrayed waveguide grating (AWG) is the core component of the photonic integrated interrogation system. Its spectral characteristics will affect the wavelength interrogation performance of the photonic integrated fiber grating interrogation system. We designed, simulated and fabricated a 15-channel 400 GHz AWG based on silicon on insulator (SOI) substrate. The test result shows that the AWG the insertion loss is about 2.5-5 dB, the crosstalk is about -20 dB and the 3 dB bandwidth is about 2 nm. A wavelength interrogation system based on this AWG is established. According to the test results, the system has a wavelength resolution of 4 pm and an interrogation accuracy of 31.4 pm in a dynamic range of 0.8 nm. Our test result confirms that the AWG can be used as a spectral device in the fiber Bragg gr. ••Designed and fabricated a 15-channel 400 GHz arrayed waveguide grating based on silicon on insulator substrate. ••Optimized the performance of the arrayed waveguide grating by using double-etched

structure and widened arrayed waveguides. • • Simulated and analyzed the effect of manufacturing errors on the crosstalk of arrayed waveguide grating by transfer function method. • • Arrayed waveguide grating Silicon photonics Silicon on insulator Fiber Bragg grating interrogator Fiber Bragg grating (FBG) sensing technology has developed over the years and is now widely employed in a variety of industries, including aerospace, military, rail transit, structure monitoring, geological exploration, etc.,. In the field of FBG sensor applications, it is essential for interrogating the optical wavelength from FBG. There are many widely used FBG interrogators (FBGIs) based on discrete optical and optoelectronic components such as tunable Fabry-Perot filters,, tunable lasers, charge-coupled devices (CCDs), and FBG filters. However, the above interrogation systems fall short in areas such as aerospace where smaller, faster, and lower power interrogators are required. As a result, a new interrogation system based on photonic integrated circuit (PIC) has been the focus of research. Fiber grating interrogation system based on AWG is shown in Fig. 1. The optical signal from the amplified spontaneous emission (ASE) reaches the FBGs through the circulator. FBGs reflect the narrow-band light meeting the Bragg condition, which enters the AWG through the circulator. The output of AWG is connected to the PD array and data processing circuit. When the FBG reflection spectrum passes through the adjacent channels of the AWG, the FBG reflection spectrum overlaps with the transmission spectrum of the two adjacent channels of the AWG. By monitoring the optical power change of the adjacent channels of the AWG, the change of the FBG center wavelength can be interrogated. Eq. (1) shows the FBG wavelength interr.

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We report a compact high-resolution arrayed waveguide grating (AWG) interrogator system designed to measure the relative wavelength spacing between two individual resonances of a tilted fiber Bragg ...



We specialize in custom fabrication of fiber optical gratings (FBG) across wavelengths from 400 nm to 2000 nm, tailored to precise customer specifications.



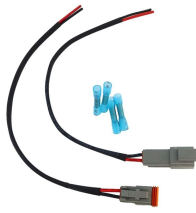
The arrayed waveguide grating (AWG), one of the fundamental parts of the FBG interrogation system, is essential for driving the downsizing of the system and high-speed rate.



Fiber Bragg grating (FBG) sensors are widely used in aerospace monitoring and intelligent manufacturing due to their high sensitivity, yet their deployment relies on manual assembly, limiting ...



A fiber Bragg grating (FBG) interrogator is a scientific instrument that converts the wavelength change of FBG sensors into readable electrical signals. To achieve miniaturization and integration of FBG ...



Multipeak Wavelength Detection of Ultra-Short Fiber Bragg Grating Array Based on Arrayed Waveguide Gratings and Convex Optimization Algorithm Published in: Journal of Lightwave ...



Arrayed waveguide gratings (AWGs) are extensively employed in fiber Bragg grating (FBG) interrogation systems due to their compact size, lightweight nature, and excellent interrogation performance.



To achieve miniaturization and integration of FBG interrogator, we designed and fabricated a 36-channel array waveguide grating (AWG) on silica-based planar lightwave circuits (PLC) as a...



Fiber Bragg Grating Products Using our advanced FBG writing technologies with holographic phase mask and ebeam phase mask, we are able to write many different types of fiber Bragg grating such ...



Designed and fabricated a 15-channel 400 GHz arrayed waveguide grating based on silicon on insulator substrate. Optimized the performance of the arrayed waveguide grating by using ...

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