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Utilizing 1.2 GHz bandwidth reflective semiconductor optical amplifier for 1.25–10 Gbit/s for colourless and cooler-less wavelength conversion

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Abstract In this investigation, we propose and investigate a wavelength converter by using a cost-effective and uncooled TO-can package reflective semiconductor optical amplifier with ~1.2 GHz bandwidth. In this measurement, the converted data rate can support 1.25–10 Gbit/s on-off keying modulation rates by using the cross gain modulation technique.

Keywords Reflective semiconductor optical amplifier (RSOA) · Wavelength converter · Cross gain modulation (XGM)

1 Introduction

Recently, the semiconductor optical amplifier (SOA) and Fabry–Perot laser diode (FP-LD) have been proposed in various all-optical applications, such as wavelength conversion, pulse generation, optical logic gate, and optical switching etc. (Guo and Connelly 2008; Yeh et al. 2009) Based on intensity-modulated gain of SOA, the cross gain modulation (XGM) is a simple and promising method for all-optical wavelength conversion (Manning and Davies 1994; Obermann et al. 2007; Yoo 1996). Here, the attractions of XGM wavelength conversion components lie in their simplicity, high conversion efficiency, polarization independence, and insensitivity to the wavelength of the input data within their effectively gain bandwidth (i.e. colourless operation). In the XGM method, the amplifier gain is saturated by using

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