

# 2 to 4 Digital Optical Line Decoder based on Photonic Micro-Ring Resonators

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**Abstract**—The need for the research breakthrough in terms of the underlying electronic components have been rising due to the limitations of the current technology. Several alternative methods for digital circuits are needed, thus silicon photonics could be the answer. This paper presents the design of a digital 2 to 4 electro-optic line decoder based on the photonic micro-ring resonator as its core component. This work provides the design principle of the proposed digital decoder, together with the demonstration and simulation of the time varying operation with the speed of 5Gbps. The performance of the proposed line decoder is shown by clear output timing diagrams.

**Keyword**—micro-ring resonator, electro-optic devices, combinational logic, circuit



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