

Desain Pembagi Daya Optik Berbasis Multimode Interference 2x2 pada Semikonduktor GaN/Si = Design of 2x2 Multimode Interference-Based Optical Power Splitter in GaN/Si Semiconductor

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Abstrak

Recently, gallium nitride (GaN) material has attracted the attention of researchers as a candidate for third generation semiconductor material for optical telecommunication applications. In this research, a 2x2 multimode interference optical power splitter (MMI) based on a waveguide and ridge structure is proposed using gallium nitride material on a silicon (GaN/Si) substrate for optical telecommunication applications. The design optimization carried out resulted in two optical power splitter designs based on rib (design A) and ridge (design D) waveguide. Based on the simulation using the eigenmode expansion method (EME) algorithm, design A has an optimal dimension of 15 m 212 m with an insertion loss of 0.085 dB, power balancing of 0.007 dB, C-band (1530 nm – 1565 nm) broadband bandwidth of 0.140 dB, and fabrication tolerances for width and length are ± 0.3 m and ± 0.5 m, respectively. Meanwhile, design D has optimal dimensions of 15 m 214 m with insertion loss of 0.036 dB, power balancing of 0.017 dB, C-band broadband bandwidth of 0.088 dB, and fabrication tolerances for width and length respectively. of ± 0.3 m and ± 0.5 m