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| **Title:** | Design and Performance Analysis of a 1550nm Al0.09Ga0.38In0.53As/InP MQW VCSEL by Varying Injection Current. | | |
| **Author(s) Name:** | Tamal Roy, Avijit Das, Sujan Howlader, Md. Ronok Hasan Rubel and Rinku Basak. | | |
| **Contact Email(s):** | sujan@aiub.edu | | |
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| **Abstract:** |  |
| The Vertical-Cavity Surface-Emitting Laser (VCSEL) is becoming a key device in high-speed optical local-area networks (LANs) and even wide-area networks (WANs). This device is also enabling ultra parallel data transfer in equipment and computer systems. In this work, the performance characteristics of a designed AlGaInAs/InP based 1550nm multiple quantum well (MQW) VCSEL have been obtained through computations. The obtained characteristics have been analyzed for obtaining better performance. For achieving a superior performance, the concentrations of AlGaInAs QW material have been chosen using the results of other research works. The material gain of a compressive strained Al0.09Ga0.38In0.53As/InP MQW VCSEL has been theoretically computed. Using the peak material gain obtained from this computation the performance characteristics of the designed VCSEL have been obtained. At 300K, the threshold current of the VCSEL has been obtained as 0.61mA. A maximum output power of 2.24mW has been obtained for this designed VCSEL at 6.1mA injection current. Corresponding to the frequency modulation, the maximum resonance frequency has been obtained as 7.7GHz at 6.1mA injection current which indicates high speed performance of the designed VCSEL. By varying injection current the characteristics of designed VCSEL have also been obtained. | |