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| **Title:** | Characteristics of a Designed 1550 nm AlGaInAs/InP MQW VCSEL | | |
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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). In this work, the  design and characteristics of a 1550 nm Multi Quantum Well  (MQW) VCSEL using AlGaInAs/InP Materials have been  obtained through computation and simulation using MATLAB  simulation Tool. 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 another research works. The  material gain of the 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 0.6075 mA.  A maximum output power of 1.02 mW has been obtained for this  designed VCSEL at 8.5 mA injection current. Corresponding to  this the modulation bandwidth has been obtained as 14.2 GHz  which indicates a high speed performance of the designed  VCSEL for applications in optical fiber communication. Further  by increasing the injection current up to 16.5 mA a maximum  bandwidth is obtained as 19.5 GHz. | |