

ABSTRACT

A II-VI compound semiconductor laser diode 10 is formed from overlaying layers of material including an n-type single crystal semiconductor substrate 12, 5 adjacent n-type and p-type guiding layers 14 and 16 of II-VI semiconductor forming a pn junction, a quantum well active layer 18 of II-VI semiconductor between the guiding layers 14 and 16, first electrode 32 opposite the substrate 12 from the n-type guiding layer 14, and a 10 second electrode 30 opposite the p-type guiding layer 16 from the quantum well layer 18. Electrode layer 30 is characterized by a Fermi energy. A p-type ohmic contact layer 26 is doped, with shallow acceptors having a shallow acceptor energy, to a net acceptor concentration 15 of at least $1 \times 10^{17} \text{cm}^{-3}$, and includes sufficient deep energy states between the shallow acceptor energy and the electrode layer Fermi energy to enable cascade tunneling by charge carriers.

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