

INFLUENCE OF FABRICATION PROCEDURE ON BASIC CHARACTERISTICS OF SEMICONDUCTOR LASERS

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ABSTRACT

Broad-area contact ridge waveguide technology has been used for manufacturing lasers from AlGaAs/InGaAs or AlGaAs/GaAs SCH-SQW or GRIN-SCH-SQW diode structures grown by MBE. The stripe-geometry ohmic contacts were made by sputtering Cr/Pt and defined by photolithography and metal lift-off. The ridge was formed during Ar-ion beam etching by removing the p⁺-GaAs cap and part of the p-AlGaAs confinement layer besides the stripe. The P-I and I-V characteristics and light field intensity distributions were determined, and images from SEM were analysed for evaluation of the manufactured lasers. We report on the anomalies in laser characteristics if a metal layer covered the entire surface as usually in the lasers fabricated by means of this technique. Results presented are discussed in categories of effects influencing the electrical characteristics of the (Cr/Pt) – p-AlGaAs Schottky contact that formed outside the contact stripe. We conclude that defects in the vicinity of the metal – semiconductor interface, introduced during the processing steps, may be responsible for a poor rectifying behaviour of the Schottky contact. Consequently, a lack of the current spreading may be a reason of irregularities in characteristics of the laser studied.